"POLYMYALGIA RHEUMATICA"

Presented for the Degree

of

Doctor of Medicine

(1965)

by

M.I. EKUK, M.B., Ch.B., D.Phys.Med.

ACKNOWLEDGEMENTS

I wish to record my grateful thanks to Dr. J. Sharp for all his assistance throughout this study, which was made at his suggestion; also for his reading and constructive criticism of this thesis.

I wish to thank Dr. R. Harris for his constant encouragement, assistance and advice during this study.

I am indebted to Professor J.H. Kellgren for placing at my disposal the facilities of the University of Manchester, Rheumatism Research Centre and for permission to report on his patients.

I am very grateful to Dr. F.E. Aaron for all the assistance and advice with the histological studies.

I also wish to thank Dr. J. Ball for performing the Sheep Cell Agglutination Tests and for his interest in the synovial biopsies;

Dr. E.L. Peel for the biochemical investigations;

Dr. V. Dubowitz for assistance with the muscle enzyme studies;

Mr. E.W. Quince, B.Sc., for the statistical analyses; and

Mr. E.L. Pearson of the Department of Medical Illustration, Wythenshawe Hospital for preparing all the micro-photographs.

Finally, I wish to thank my wife for her constant assistance during the preparation of this thesis.

CONTENTS

INTRODUCTION

In recent years considerable interest has been aroused in the syndrome of polymyalgia rheumatica and it has become apparent that it is a relatively common affliction of the elderly. While there is general agreement regarding the broad outlines of the clinical picture, clear-cut diagnostic criteria are lacking, the diagnosis usually being made by exclusion of other conditions.

One of the main objects of this study was to determine whether polymyalgia rheumatica is a distinct entity and if so, to elaborate satisfactory diagnostic criteria for it, and to observe its natural history and the effects of certain therapeutic measures on the course of the disease.

Several different views are current regarding the nature of polymyalgia rheumatica and the pathogenesis of symptoms in it. It was hoped to throw some light on these aspects also, in particular on its possible relationship to giant-cell arteritis.

"Polymyalgia Rheumatica"

Summary of M.D. Thesis

M.I. Bruk, M.B., Ch.B., D.Phys.Med.

Eighty patients suffering from polymyalgia rheumatica have been studied. The findings suggest that the vast majority of these patients were suffering from the same disease and that this was in fact a disease entity and not a clinical syndrome.

No primary abnormality of muscle was found either clinically, by serum enzymes, electromyography or muscle biopsies. It has been demonstrated that the pains felt by the patient to be in the muscles, are largely referred from central joints, tendons and ligaments.

Two-thirds of the patients had transient synovitis, most often of the sterno-clavicular joints. Histological examination of these joints showed changes of active non-specific synovitis in 3 patients and in 2 of these there were also non-specific inflammatory changes in the capsule. Residual instability of the sterno-clavicular joint resulted in 17 patients in whom there had been tenderness or synovitis of this joint. Seven patients developed radiological changes of joints, which were considered to be manifestations of the disease.

Several patients developed clinical manifestations of giant-cell arteritis some time after the onset of the polymyalgia rheumatica. Cranial artery biopsies were performed in 33 patients and evidence of giant-cell arteritis found in 9 and non-specific arteritis in 6 patients.

Twenty-one patients were considered to have definite arteritis, 17 possible arteritis, and in the remaining 42 no evidence of arteritis was found.

Clinical evidence of large vessel involvement was looked for and found in more than half the patients with definite arteritis. Six patients developed partial or complete occlusion of the sub-clavian arteries. Two of these had histological changes of giant-cell arteritis in temporal artery biopsies.

It has been demonstrated that there were no significant differences in the locomotor findings in patients with and without arteritis. One patient with histological changes of synovitis in a sterno-clavicular joint also had histological changes of temporal giant-cell arteritis on biopsy. It is thus likely that polymyalgia rheumatica and giant-cell arteritis are

manifestations of the same disease.

The differences between patients with and without arteritis were studied and it was found that the patients with arteritis were, as a rule, older, had more severe constitutional illness and had greater abnormalities of the sedimentation rate and serum proteins. A persistently elevated sedimentation rate after the locomotor symptoms had subsided was almost invariably associated with arteritis. A sudden marked rise in the sedimentation rate, often associated with the appearance of abnormalities of the serum proteins and a fall in the haemoglobin value was always followed by manifestations of arteritis.

Polymyalgia rheumatica is probably one of the more common inflammatory rheumatic diseases occurring in the middle aged and elderly. It would also appear from this study that giant-cell arteritis occurs with much greater frequency than is generally recognised.

CHAPTER 1

REVIEW OF POLYMYALGIA RHEUMATICA

Introduction.

(a) Historical.

(b) Aetiology.

(c) Pathogenesis of the symptoms.

(d) Relationship to giant-cell arteritis.

(e) Treatment.

(f) Conclusion.

.....

CHAPTER 1

REVIEW OF POLYMYALGIA RHEUMATICA

The present concept of polymyalgia rheumatica may be summarised as follows:

It is a syndrome occurring in middle-aged and elderly people and affecting women more often than men. The onset may be sudden or gradual over weeks or months. It is characterised by pain and stiffness which are more severe in the morning, felt to be in the shoulder and hip girdle muscles and often in the spine. Fatigue, malaise, anorexia, loss of weight and depression are common.

There is frequent limitation of movement of the shoulders, hips and spine with tenderness of the proximal muscles and peri-articular structures. Occasionally there is synovitis of joints affecting especially the knees and to a lesser extent the wrists and fingers. No diagnostic radiological changes or permanent residua in joints have been reported.

The most constant laboratory finding is an elevated erythrocyte sedimentation rate (E.S.R.). This is often elevated out of proportion to the demonstrable physical signs.

Values of 100 mm. Westergren or more are by no means unusual. Elevation of the plasma fibrinogen, serum globulin and alpha 2 globulin fraction are common. There may be anaemia but the leucocyte count is usually normal. There is no laboratory test which is specific for this syndrome. Tests for the rheumatoid and lupus erythematosis factors in the serum are usually negative.

The prognosis is good, with complete recovery taking place usually in 1 to 3 years.

(a) Historical

The earliest description which resembles our present concept of polymyalgia rheumatica is probably that of Bruce (1888). He drew attention to a group of 5 men aged 60 to 74 who developed severe joint and muscle pain and stiffness associated with marked constitutional disturbance and weight loss. Depression was a prominent feature in two of these patients. The striking feature was the complete recovery within one to 3½ years of all these patients in spite of their advanced age. He believed this to be a disease not previously described and named it "Senile Rheumatic Gout".

Holst & Johannsen (1945) described 5 women aged 48 to 61 with classical features of this syndrome. All had shoulder girdle, and some hip girdle pain, which was presumed to arise from the extra-articular soft tissues as no clinical or radiological changes of joints were found. Low grade persistent pyrexia lasting up to a few months and raised E.S.R's ranging from 68 to 100 mm. in 1 hour were present in all these patients. Considerable improvement was noted in all during the period of observation which lasted up to two years, but none went into complete remission. They believed this disease to be a well defined clinical entity and named it "Peri-Extra-Articular-Rheumatism".

In the same year Moulengracht (1945) of Denmark described 2 patients, a man aged 50 and a woman aged 68, with similar clinical features, but both had limitation of shoulder range. They recovered without treatment in about 12 months.

Moulengracht (1950) described another 17 patients and drew attention to the similarity of the symptoms with those occurring in giant-cell arteritis, in which joint symptoms, especially painful shoulders, had frequently been reported. He suggested that this syndrome might in fact be the same as giant-cell arteritis.

Two years later Moulengracht and Schwartz (1952) reviewed the prognosis of 18 patients with this syndrome. A striking feature of this series was the female preponderance, there being 13 females and 5 males. The duration of the disease was under 1 year in 8 patients and over 1 year in 9; one patient died from unknown causes prior to review.

Peroman (1951) also of Denmark described 29 patients who had a sudden onset of pain and limitation of the proximal joints, especially the shoulders, hips and knees. In a few there was minimal joint swelling. Peripheral joints were seldom found to be affected. Several had impairment of general health with tiredness, malaise and loss of weight.

There were no radiological changes in the joints and the only abnormality on investigation was a raised E.S.R., which was frequently over 100 mm. Westergren. The prognosis was good as the disease usually remitted in 12 to 18 months. He named this syndrome, which appears to be identical with our present concept of polymyalgia rheumatica "A Special Type of Arthritis of Old Age".

Kersley (1951) described 13 patients of average age 71, who had an acute onset of severe and widespread muscular pain and tenderness, especially affecting the scapular and thigh muscles, sufficient to cause crippling, but with no signs of arthritis. In 10 the onset had been preceded by severe stress. During the course of the illness slight joint swelling developed in 3 patients. The hands were affected in two and a knee in the third. The E.S.R. was raised in all and some patients were anaemic. Muscle biopsies were performed in 4 patients, with negative results. Improvement was slow with non specific therapy but 3 patients were given short courses of cortisone and one of corticotrophin with excellent response. Kersley found that this syndrome, which often gave rise to difficulty with diagnosis and treatment, was not uncommon, and considered that it was probably a rheumatoid variant without involvement of the joints.

The first of many contributions from France was by Forestier & Certoncimy (1953), who reported 25 elderly patients with "Pseudo-Polyarthrite Rhizomelique". They did not consider this to be a polyarthritis, as joint effusions were not a feature, but rather a collagen disease of tendons and fascia. In these patients the disease passed into spontaneous remission in 2 to 3 years, but prolonged courses of gold and intravenous copper were thought to have had a beneficial effect.

Bagratuni (1953 and 1956) described a total of 28 patients suffering from what he called "Anarthritic Rheumatoid Disease" - a syndrome which he believed was probably allied to rheumatoid arthritis and consisting of its systemic manifestations without the arthritis.

His first group of 7 patients was aged 57 to 73 and presented with initial malaise, loss of appetite and loss of weight. They complained of vague generalised aches confined most often to the shoulder and cervical region, but sometimes involving the rest of the spine and back, chest, abdomen and limbs. There was no evidence of joint involvement and the prognosis was usually good. In 3 patients in whom the blood fibrinogen was estimated, it was found to be raised.

Four of the 21 patients discussed in his later paper had minimal joint involvement which was not associated with radiological changes of rheumatoid arthritis. These patients

he considered formed "a link between the anarthritic form of the syndrome and true rheumatoid arthritis". Three patients were found to have subcutaneous nodules. Of 14 in whom the sheep cell agglutination test (S.C.A.T.) was performed, it was positive in 3 and doubtfully positive in 4. Thus it is likely that these patients with joint involvement, subcutaneous nodules and a positive S.C.A.T. did in fact have rheumatoid arthritis. He also described the symptoms of vomiting, diarrhoea, conjunctivitis and erythematous rash which had not been reported previously.

Paulley (1956) in a letter to the Lancet mentioned that he had seen several patients with a similar clinical picture. Many of his patients had developed the manifestations of cranial arteritis after weeks or months. Frequently on cessation of cortico-steroid therapy patients with giant-cell arteritis had relapsed into a clinical picture resembling the anarthritic rheumatoid syndrome. He suggested that if Bagratuni's patients were observed some would develop the stigmata of giant-cell arteritis.

Bagratuni (1963), however, presented the findings in 50 patients who had been followed up for several years. None

of these patients had developed the visual disturbances characteristic of giant-cell arteritis and no evidence of arteritis was found in biopsy specimens of the temporal arteries of 2 of his patients.

Barber (1957) presented a classical description of a further 12 patients with this syndrome. Of these 10 were women. The clinical features were largely similar to those previously described. Most patients experienced loss of weight, lassitude, depression and disturbance of sleep by pain. A few patients complained of some degree of morning stiffness. None of these patients had swollen joints and no evidence of muscular weakness or atrophy was present. The laboratory findings were similar to those previously described with a raised E.S.R.(Westergren) and hyperglobulinaemia in all. The differential agglutination test (D.A.T.) was negative in all and lupus erythematosis cells were not found in the blood of the 9 patients examined. Electromyographic (E.M.G.) studies were normal in all 6 patients in which this was performed (Harris 1962).

All patients were treated with prolonged bed rest, daily active non weight-bearing exercises and simple analgesics. The acute phase gradually passed off under this regime, but in

many the E.S.R. remained persistently elevated during the period of observation which ranged from 1 to 9 years. The prognosis, however, was good in all.

Barber emphasised that the diagnosis, based so largely on negative findings could only be made after a lengthy period of observation. As nothing was known about the pathology of this syndrome he coined the descriptive title of "Polymyalgia Rheumatica", by which this syndrome has since generally been known in the English literature.

The best clinical description of this syndrome in the English literature is probably that of Gordon (1960). His findings were essentially similar to those of the previous authors and to those of the series described in this thesis. None of his patients had preceding infection or obvious psychogenic stress as had been described by some authors (Moseley, 1951; Forestier and Certoncimy, 1953; Paulley and Hughes, 1960).

In the fully developed syndrome which persisted for 9 to 30 months, pain and stiffness were widespread and involved muscles, which were often slightly tender on palpation, and to a lesser degree periarticular tissues and tendons. Swellings of the finger and knee joints were observed in 6 cases. The

D.A.T. was performed in all 21 patients, with negative results. There were no radiological changes characteristic of rheumatoid arthritis.

The average duration of the illness was 33 months, with the symptoms usually reaching their phase of greatest severity within a month of the onset although a few months elapsed in some patients. In 3 patients a raised E.S.R. persisted after symptomatic recovery. Thirteen patients were treated with short courses of corticosteroids which resulted in marked symptomatic improvement, although there was no evidence that corticosteroid therapy had any effect on the duration of the disease. When corticosteroids were discontinued a return of symptoms occurred within a few days.

In 9 of the 20 patients with polymyalgia rheumatica described by Todd (1961) widespread non-articular pain was not a prominent feature. The main disturbance was the constitutional illness. Nine of the patients complained of headache and although this was the main complaint in some of the patients, it was not considered to be due to giant-cell arteritis as the headaches varied in character, situation and severity and there was no local evidence of arteritis.

Subsequent publications by Boyle and Beatty (1961) of

Britain, Serre et al. (1961), De Seze et al. (1961), Serre and Simon (1962, 1963) and Forestier and Certoncinv (1963) all of France and Borthne (1962) of Scandinavia have served to confirm the earlier clinical descriptions and the symptomatic relief afforded by corticosteroid therapy. It is of interest that only one publication on this topic, by Levey et al. (1963), has appeared in the American literature.

In 1961 a leading article on polymyalgia rheumatica appeared in the Lancet in which, after an excellent review of the clinical picture and current views of the nature of the condition, it was stated that "Despite several careful studies polymyalgia, if it ranks as a distinct entity, does so only as a clinical symptom complex recognisable by no pathological lesion or specific laboratory test". Reference was made to the paper by Paulley and Hughes (1960), in which they suggested that this syndrome was one manifestation of giant-cell arteritis although there was no histological proof of this. It was considered that this hypothesis was attractive enough to warrant further study and provided one avenue for the experimental approach to the illness.

Several reports have appeared in the last few years of the finding of clinical and histological evidence of giant-cell

arteritis in patients with polymyalgia rheumatica. (Serre and Simon, 1962; De Sese et al., 1961; Auquier and Peltier, 1962; Weissenbach et al., 1963; Olhagen, 1963; Kogstad, 1963; Alestig and Baer, 1963; Hamrin et al., 1964; Cayla et al., 1964).

Gordon, Rennie and Branwood (1964) in a recent report stated, however, that although the symptoms of polymyalgia rheumatica and giant-cell arteritis were frequently similar and affected patients of the same age group, they could be distinguished. In polymyalgia rheumatica the pain in the shoulder and hip girdles was overshadowed by stiffness and limitation of movement of the shoulders, whereas in giant-cell arteritis these features were not prominent. In giant-cell arteritis muscle tenderness was more prominent and in cases of some duration, weakness and wasting of muscle was found.

(b) Aetiology

The aetiology of polymyalgia rheumatica is unknown. Moxley (1951) reported that in 10 of his 13 cases the illness had been preceded by severe mental or physical stress.

Pamilley and Hughes (1960) who thought that giant-cell arteritis and polymyalgia rheumatica were in fact the same disease obtained a history of migraine or vascular headaches in most of their patients. They also considered that stress was an important precipitating factor and that the disease was often preceded by severe psychological stress. No distinction was, however, found in the types of stress and personality make-up between patients with giant-cell arteritis and rheumatoid arthritis.

The suggestion that polymyalgia rheumatica was a form of rheumatoid arthritis without joint involvement (Moxley, 1951; Bagratuni, 1956) has not been supported by subsequent evidence and is not seriously considered today.

(c) Pathogenesis of the Symptoms

Patients with polymyalgia rheumatica complain of severe widespread muscular pain affecting predominantly the shoulder and hip girdle and spinal muscles. The painful muscles are frequently tender to palpation. Until recently this has tended to direct attention to the muscles as the tissue primarily involved. No convincing abnormality of muscle has however been demonstrated either clinically or by muscle biopsy or electromyography.

Muscle biopsies were performed in a total of 56 patients by Kersley (1951), Bagratuni (1957), Gordon (1960), Boyle and Beatty (1961), Todd (1961), Weber (1961), Serre et al. (1962), Lovey (1963), Weissenbach et al. (1963) and Olhagen (1963). No definite histological abnormalities were found in the whole series although Gordon (1960) found small collections of inflammatory cells in two of his six biopsies of the deltoid muscle in which muscular septa were included, and similar changes were found by Weissenbach et al. (1963) in two of nine muscle biopsies.

Electromyographic explorations were carried out in a total of 35 patients by Gordon (1960), Boyle and Beatty (1961), Harris (1962), Serre and Simon (1963), Olhagen (1963) and

Serre and Simon (1962, 1963) of France agreed that polymyalgia rheumatica was in fact a polyarthritis affecting the central and occasionally the peripheral joints in elderly subjects. In their 40 patients with this syndrome they found painful limitation of the shoulder joints, and to a lesser degree of the hips, frequently accompanied by cervical, and less frequently by lumbar pain.

Chalmers, Alexander and Duthie (1964) described the results of investigations in 22 patients who had complained of widespread muscle pains. They illustrated that several diseases of muscle may present with pain in the muscles e.g. polymyositis, dermatomyositis and myositis in association with rheumatoid arthritis and systemic lupus erythematosis, but in these cases there was usually biochemical or electromyographic evidence of muscle disease. Fourteen of their patients were considered to have evidence of muscle disease. The remaining 8 in whom no evidence of muscle disease was found consisted of a mixed group including one with polyarteritis nodosa, 3 with probable rheumatoid arthritis and one with an aortic arch syndrome.

In a recent article Gordon, Rennie and Branwood (1964) reported the histological changes found at biopsy of the shoulder joint in 6 patients with polymyalgia rheumatica. Mild inflammatory

changes were present in all 6. There was minor hyperplasia and oedema of the synovium with slight or moderate, but never massive perivascular infiltration with lymphocytes and macrophages. Similar cellular infiltration was found in the capsule, bursa, deep fascia and tendinous septa. It was suggested that these inflammatory changes were the cause of the pain in polymyalgia rheumatica.

From the published reports it would appear most likely that the pains are referred to the muscles from inflammatory changes in the joints and possibly other related connective tissue structures in the spine and limb girdles.

(d) Relationship to giant-cell arteritis

A number of authors have drawn attention to the similarity between polymyalgia rheumatica and giant-cell arteritis stressing the correspondence in age groups, constitutional symptoms and laboratory findings, a very high E.S.R. often being the only abnormality.

Moulengracht (1950) was the first to draw attention to the similarity between polymyalgia rheumatica and giant-cell arteritis. He referred to the similar constitutional illness and joint symptoms, especially painful shoulders, which had frequently been described in both polymyalgia rheumatica and giant-cell arteritis and suggested that these two syndromes might in fact be the same.

Russel (1959) who reviewed 35 cases of giant-cell arteritis noted the muscular and joint pains occurring in this syndrome. Twenty of his patients had muscular pains which followed the cranial arteritis. The cause of these muscle pains could, however, not be determined. In 3 patients after a characteristic attack of temporal arteritis, severe pain and weakness developed in the muscles of the limb girdles and trunk, accompanied by limitation of movement in the shoulders, hips and spine. These patients were severely incapacitated and had fever, sweating, anaemia and loss of weight. There was patchy muscle wasting

and weakness, and this weakness persisted long after the patient became ambulant. He suggested that the muscle wasting was unlikely to be secondary to joint changes, as it was out of all proportion to the clinical and radiological involvement of the joints. Further, there was no evidence to suggest that this was due to peripheral nerve or anterior horn cell involvement. Although he believed that a myositis was the most likely explanation, none of the cases studied (number not specified) showed evidence of this on electromyography and muscle biopsy; neither was evidence of muscular arteritis found, although this had previously been reported. (Finlayson and Robinson, 1955).

Paulley and Hughes (1960) suggested that polymyalgia rheumatica was none other than giant-cell arteritis in which the classical stigmata had yet to develop or had already occurred. Although they did not present any histological evidence to support this hypothesis they did find clinical evidence of polymyalgia rheumatica in 32 of their 76 patients with giant-cell arteritis. These 32 patients had pain and stiffness in the muscles of the shoulders, arms, back and legs. Polyarthritis of the "rheumatoid" type, with frozen shoulders, was found less frequently but the exact incidence was not stated.

Only 32 of their patients had classical temporal arteritis and a further 31 had head or facial pains. They found that random scalp biopsy and muscle biopsy had proved to be unhelpful

in patients without clinical involvement of the cranial arteries. They drew attention to the limited value of temporal artery biopsy as an absolute criterion for diagnosis, as only a small segment of artery was available to the histologist and the arterial involvement tended to be patchy, with accessable arteries often not being affected at all. This had also been noted by McCormick and Neuhauerger (1958) and Crompton (1959). They were of the opinion that the stiffness frequently occurring in the neck and back was probably due to an arteritis of the meningeal vessels.

MacGregor (1961) published an article entitled "Giant-Cell Arteritis without Headache". He described 12 cases of whom one (Case 12) was a typical case of giant-cell arteritis with headache and inflamed tender nodules on both temporal arteries, and also pains in the neck, hips, thighs and shoulders. The other 11 cases had similar locomotor symptoms without the headache or clinical evidence of temporal artery involvement, this in fact being the clinical picture generally recognised as characteristic of polymyalgia rheumatica. In view of the similarity between the locomotor symptoms of these 11 cases and the case with giant-cell arteritis it was suggested that they were all suffering from the same disease. Six of the 11 cases had pain in the neck and it was postulated that this was due to

arteritis of the occipital arteries. Furthermore it was suggested that involvement of the branches of the subclavian and iliac arteries accounted for the muscular pain in the shoulder and hip girdles. However, no evidence was presented to support the suggestion that these widespread pains were in fact due to an arteritis.

Boyle and Beatty (1961) described 21 patients with typical polymyalgia rheumatica. However, one of these (Case 3) developed systemic manifestations which were considered to be due to polyarteritis nodosa. Unfortunately no details of the clinical picture or evidence for this diagnosis are presented.

Of the 20 patients with typical polymyalgia rheumatica described by Todd (1961), 9 complained of headache, which varied in character, situation and severity. In some it was widespread and continuous. In one patient (Case 3), there was initial head tenderness, but the site of tenderness varied from day to day and no local evidence of cranial arteritis was found. In this series only 2 patients subsequently developed manifestations of arterial disease. Case 1, a man aged 71, died of a stroke two years after the disease had gone into remission, and a man aged 61 (Case 6) had cardiac infarcts 18 and 24 months after the onset of his illness. This incidence of vascular disease in people of this age followed up over a period of nearly 10 years

was not considered to be higher than average.

In 1963 Bagratuni presented the results of 50 patients with this syndrome who had been followed between 1945 and 1961. None of these patients had developed the visual disturbances characteristic of giant-cell arteritis but 16 had complained of headache during the course of their illness. Eleven patients had died from causes unconnected with the polymyalgia rheumatica, from which most had by that time recovered. Autopsies were performed in 6 of these but no evidence of arteritis found. Furthermore there was no evidence of arteritis in temporal artery biopsies of 2 patients with this syndrome.

In spite of the suggestion of Russel (1959), Paulley and Hughes (1960) and MacGregor (1961) who found a close resemblance between the clinical picture of giant-cell arteritis and polymyalgia rheumatica, none of the authors in the English literature have found evidence of giant-cell arteritis in any of their patients with polymyalgia rheumatica. The incidence of visual impairment in cases of giant-cell arteritis was generally considered to be in the region of 40% (Hollenhorst et al., 1960). It is thus surprising that none of the patients with polymyalgia rheumatica had developed visual impairment or other evidence of giant-cell arteritis.

A total of 151 cases of polymyalgia rheumatica have been

described in Britain up to 1964 (Bruce, 1888; Kersley, 1951; Bagratuni, 1953, 1956 and 1963; Bevan, 1955; Barber, 1957; Gordon, 1960; Boyle and Beatty, 1961; Todd, 1961; and Gordon et al., 1964).

Thus if it be true that giant-cell arteritis may present as a generalised vascular disease which may spare the cranial vessels, it is surprising that in this number of patients the vascular involvement did not spread to the cranial vessels to produce the typical clinical picture of giant-cell arteritis.

At the present time the majority of English studies of polymyalgia rheumatica agree that this syndrome is in fact a clinical entity which is unrelated to giant-cell arteritis in spite of the close resemblance of the constitutional symptoms in the two conditions. However, some authors on giant-cell arteritis (Russel, 1959; Paulley and Hughes, 1960; McGregor, 1961) have included typical cases of polymyalgia rheumatica in their series in spite of the absence of vascular changes compatible with arteritis.

Between 1961 and 1964 several clinical studies of polymyalgia rheumatica appeared in the French literature (Serre et al., 1961; Desprages-Cotteron, 1962; Serre and Simon, 1962, 1963; De Sese et al., 1961; Auquier and Peltier, 1962; Weissenbach et al., 1963; Forestier and Certoneimy, 1963; Coste et al., 1964; Cayla et al., 1964). Of the total of 198 patients with typical

clinical polymyalgia rheumatica, 9 had developed clinical evidence of temporal arteritis, 6 being proved histologically. These authors stressed that the clinical pictures in polymyalgia rheumatica and those that developed evidence of giant-cell arteritis were identical initially. The only difference which has been described was by Costa et al., (1964), who did very careful serum protein studies in 23 patients with polymyalgia rheumatica including one patient who developed giant-cell arteritis. They found an elevated alpha 2 globulin in 17 of these patients and a normal gamma globulin in all the patients with polymyalgia rheumatica, but in the patient with giant-cell arteritis both the alpha 2 and gamma globulin were raised.

In contrast to the findings of English and French authors there have recently been several contributions from the Scandinavian countries, where a very high incidence of giant-cell arteritis has been found in patients with polymyalgia rheumatica.

From Sweden, Olhagen (1963) reported that 7 of 15 patients with typical manifestations of polymyalgia rheumatica developed clinical evidence of arteritis within 3 to 27 months of the onset of the polymyalgia rheumatica. Three of these patients developed bilateral visual loss due to central retinal artery involvement. In 2 of these there was no clinical evidence of temporal arteritis. Four other patients developed arteritis of the temporal arteries.

In these this was a brief episode in the illness and except for the headache was not of great clinical significance. It is unfortunate that there was no histological confirmation of the diagnosis.

Kogstad (1963) of Norway also found an association between polymyalgia rheumatica and giant-cell arteritis. Half of his 20 patients with polymyalgia rheumatica complained of headache which was diffuse in character and varying in intensity in 6 subjects. The 4 in whom the pain was localised to the temporal regions had positive biopsies of the temporal artery although only 3 had clinical involvement of this artery. In 2 the onset had been with manifestations of giant-cell arteritis and symptoms of polymyalgia rheumatica had developed subsequently.

Alestig and Barr (1963) of Sweden performed temporal artery biopsies in 9 of 10 patients with clinical polymyalgia rheumatica including one patient with "Takayasu's syndrome". None of them had headache or tenderness of the temporal arteries. The patients who were all elderly had been admitted to hospital for investigation of prolonged pyrexia of obscure aetiology and had presented with muscular pain without joint involvement, and a high erythrocyte sedimentation rate. In 7 cases biopsies of the temporal arteries were stated to be diagnostic of giant-cell arteritis, but no histological criteria for this diagnosis are presented.

They raised the question whether polymyalgia rheumatica was

to be regarded as an early stage of a generalised arteritis, with some patients developing a localised form such as temporal arteritis or aortic arch syndrome. Although no muscular biopsies were performed they suggested that the muscular symptoms arose from a diffuse arteritis.

Hamrin, Jonsson and Lundberg (1964) also of Sweden described 23 cases with polymyalgia rheumatica. Nine had tenderness of temporal arteries. A 2 to 14 cm. segment of the temporal artery was resected in 21 cases and in 2 of these bilateral temporal artery biopsies were performed. In addition in one case a biopsy of the occipital artery, in 6 of the circumflex scapular artery, in 5 of the perforating branch of the femoral artery and in one of the superior gluteal artery was performed.

Histological changes of arteritis were found in the temporal arteries of 16 cases. One of these cases also had histological evidence of arteritis of the superior gluteal and the perforating branch of the femoral arteries.

Comment

The recent reports from Scandinavia raise the question of the identity of giant-cell arteritis and polymyalgia rheumatica. Their finding of a high incidence of clinical and histological evidence of giant-cell arteritis in patients with polymyalgia rheumatica contradicts the results obtained in British studies. This difference may be due to the different criteria adopted for the diagnosis of the syndrome.

The Scandinavian authors stress the principal diagnostic criteria of mild pyrexia, high E.S.R. and muscular pain in elderly patients (Olhagen, 1963; Alestig and Barr, 1963; Hamrin et al., 1964) although Olhagen does mention that transient swelling and pain of joints have been reported. No indication is given, however, as to whether this was present in his series. On the other hand joint involvement has frequently been present in the cases reported by British and French authors.

Clinical evidence of temporal arteritis was present in a high percentage of the patients described by the Scandinavian authors. In Olhagen's series, 7 of 15 cases had clinical evidence of arteritis, with visual loss in 3, while 9 of the 23 patients of Hamrin et al. had symptoms of temporal arteritis. It is likely that these authors are describing the samedisease which British authors (Russel, 1959; Pumley and Hughes, 1960)

are naming giant-cell arteritis, as patients presenting with clinical giant-cell arteritis have been excluded from British series of polymyalgia rheumatica.

It would thus appear from the review of the literature that Gordon et al. (1964) may in fact be correct when they state that the difference between the two is that in polymyalgia rheumatica the characteristic feature is stiffness with limitation of movement of the shoulders, whereas in giant-cell arteritis tenderness, weakness and wasting of muscles is out of proportion to the joint changes. This view is strengthened by their finding of inflammatory histological changes in the shoulder joint at biopsy in cases with polymyalgia rheumatica.

(e) Treatment

Ideally the treatment of any disease should eradicate the cause. When the cause is unknown, treatment must be empirical and is largely dependent on experience and the results of controlled clinical trials. No such trials in the treatment of polymyalgia rheumatica have been reported. Kersley (1951) treated his patients with rest, physiotherapy and gold therapy. No dramatic results were obtained but this programme appeared to have a beneficial effect. Four patients who had short courses of corticosteroids responded very well and when this was discontinued the improvement was partly maintained.

Forestier and Certonciny (1953) stressed the good prognosis of this disease. They considered that intravenous copper and intramuscular gold had had beneficial effects, but felt that corticosteroids were likely to be the most effective therapy.

Gordon (1960) treated the majority of his patients with corticosteroids. The earlier patients were, however, treated with bed rest, heat, exercises and salicylates with only slight symptomatic relief. Two patients had phenylbutazone with poor response and one received a course of gold salts without benefit. Thirteen patients were treated with corticosteroids which resulted in rapid symptomatic improvement. Prednisolone,

Serre and Simon (1962) found intra-articular injections of corticosteroids into affected joints together with physiotherapy in 19 patients to be beneficial. Another 12 patients received small doses of systemic corticosteroids with benefit. The course of the disease and the prognosis were not, however, altered.

(f) Conclusion

Review of the literature on polymyalgia rheumatica indicates that while there is a broad measure of agreement regarding the clinical picture there exist no generally agreed diagnostic criteria for the syndrome. The only consistent laboratory finding described is an elevation of the E.S.R. This is frequently very high and often out of keeping with the patient's clinical state. Some authors are only prepared to make this diagnosis when the E.S.R. is markedly raised, although cases of all grades of severity must obviously occur.

There is no question that other diseases such as rheumatoid arthritis, ankylosing spondylitis, psoriatic arthropathy, polymyositis, systemic lupus erythematosis, polyarteritis nodosa and myelomatosis may occasionally produce a picture clinically indistinguishable from polymyalgia rheumatica, the correct diagnosis only becoming apparent with the further evolution of the disease. Several of the reported cases, who were initially considered to be suffering from polymyalgia rheumatica have in fact developed rheumatoid arthritis and one polyarteritis nodosa.

The absence of any diagnostic laboratory test or specific radiological abnormalities in polymyalgia rheumatica enhances the diagnostic difficulty. Thus, some authors, such as Mason (1963) are not prepared to accept polymyalgia rheumatica as a clinical entity, with a specific aetiology, but only as a

clinical syndrome occurring in the course of other diseases.

Until the last 2 years, however, the majority have favoured the view that polymyalgia rheumatica is a disease sui generis but there has been much disagreement as to its basic nature. The prominence of morning stiffness in the symptomatology both of polymyalgia rheumatica and other rheumatic diseases such as rheumatoid arthritis in which inflammation is known to be a feature, and the consistent presence in polymyalgia rheumatica of abnormalities of the serum proteins of the type found in diseases known to be inflammatory in nature had suggested that in polymyalgia rheumatica also, an inflammatory process is present. However, which tissues are primarily involved has not been established. The pains are felt to be in the muscles but the failure to demonstrate any consistent abnormalities in muscle, suggest that the pains are referred from other deep structures in the limb girdles and spine.

Some authors have postulated that the primary lesions are periarticular. Synovial thickening in the sternoclavicular and occasionally in the limb joints has also been reported in some patients. Also the presence of histological changes of synovitis in the shoulder joint has suggested that there may be similar changes in the deeper joints of the spine less accessible to clinical examination.

The recent reports from Scandinavia of the demonstration of giant-cell arteritis in a high proportion of patients with this syndrome raise two further possibilities. First, they indicate that giant-cell arteritis must be added to the list of diseases which may simulate polymyalgia rheumatica. Second, that giant-cell arteritis and polymyalgia rheumatica are manifestations of a single disease which includes synovitis among its manifestations. However, in several of these reports from Scandinavia the absence of synovitis is considered to be one of the criteria for the diagnosis of polymyalgia rheumatica. Nevertheless, if giant-cell arteritis and polymyalgia rheumatica are manifestations of the same disease, it follows that since in the great majority, polymyalgia rheumatica is a benign and self-limiting condition, not associated with the complications commonly associated with giant-cell arteritis, such as blindness, the concept of giant-cell arteritis must be broadened to include the polymyalgia rheumatica syndrome. Giant-cell arteritis must also be much more common than is at present generally believed.

CHAPTER 2

REVIEW OF GIANT-CELL ARTERITIS

Introduction.

(a) Historical.

(b) Large-vessel arteritis.

(c) Joint and muscle symptoms.

(d) Pathological studies:

(i) Age changes in temporal arteries.

(ii) Pathology of giant-cell arteritis.

(e) Conclusion.

.....

CHAPTER 2

REVIEW OF GIANT-CELL ARTERITIS

Introduction.

It is now generally recognised that temporal, or better giant-cell arteritis, is a widespread arteritis affecting medium sized and large vessels especially those arising from the aortic arch, with frequent involvement of the cranial arteries (Gilmour, 1941; Cooke et al., 1946; Palm, 1958).

The onset may be sudden with severe headache, but in the majority the onset is insidious with fatigue, anorexia, loss of weight, night sweats, pyrexia, depression and diffuse aching and pain in the muscles of the neck, back, shoulder and hip girdles with occasional pain in the joints (Palm,1958; Russel, 1959; Paulley and Hughes, 1960).

During the prodromal period, which may last from several weeks to several months, many patients are considered to have "influenza".

The headache which is almost invariably present is usually severe and associated with superficial tenderness of the scalp, so that combing the hair or the pressure of the pillow may be unbearable. It is situated in the temporal or occipital regions, but occasionally there may be pain over the lower jaw. It may be throbbing in character or there may be a generalised

dull ache. There is often an afternoon or evening exacerbation. The patient may notice tender areas or nodules of the scalp.

Visual loss is the most common and best known severe complication of the disease and has been recorded in over 40% of the patients described (Roux, 1954; Palm, 1958; Hollenhorst et al., 1960). In view of the gravity of this manifestation and in view of the fact that the diagnosis is often made only after visual loss has occurred, the major interest has been directed to the visual changes.

Cerebral artery (McCormick and Neuburger, 1958; Crompton, 1959) and coronary artery (Cardell and Hanley, 1951; Meadows, 1954; Spencer and Hoyt, 1960) changes are well known. The mortality from the disease is generally believed to be between 10 and 15% (Roux, 1954), but Meadows (1954) reported a mortality of 5 out of 12 cases (42%).

The most common abnormal laboratory findings are abnormalities of the serum proteins, there being a considerable increase in the alpha 2 globulin fraction and a slight increase of other globulins (Small and Gourilesco, 1963). The E.S.R. is usually elevated, often to high levels.

Several authors (Meulengracht, 1950; Russel, 1959; Pamilay and Hughes, 1960) have drawn attention to the similarity between symptoms in the locomotor system of giant-cell arteritis and

those of polymyalgia rheumatica. The cause of these symptoms is still unexplained (Russel, 1959). It has been suggested that they are due to an arteritis of intramuscular arteries, but muscle biopsies have been negative apart from the positive biopsies obtained by Finlayson and Robinson (1955) and Russel (1962). Pamlley and Hughes (1960) have suggested that the pain and limitation of movement of the spine may be due to an arteritis of the meningeal arteries.

(a) Historical

The first reference to giant-cell arteritis in the literature is probably that in the Tadhkirat of Ali ibn Isa of Baghdad, who lived from about 940 to 1010. The twenty-fifth chapter concerns excision of arteries and their cauterisation and it appears very likely that he was referring to giant-cell arteritis when he stated: "By these means one treats not only migraine and headache in those patients that are subject to chronic eye disease, but also acute, sharp catarrhal affections, including those showing heat in and inflammation of the temporal muscles. These diseased conditions may terminate in loss of eyesight; frequently they are attended by a considerable degree of chemosis."

The first clinical description was by Hutchinson (1890), who described an 80 year old bald man, who developed bilateral red streaks extending from the temporal region to the middle of the scalp, overlying the temporal arteries which were inflamed and swollen. At first the pulsation was weak and then ceased. Subsequently the redness subsided and the vessels were left impervious cords. This man also suffered from "gout".

Schmidt (1931) described a typical case of giant-cell arteritis, although he made the mistaken diagnosis of aneurysm of the right internal carotid artery. This was a man aged 69

who had a long history of "rheumatic myalgia". Following an attack of "influenza" he developed severe bilateral pain and tenderness extending from the ears up into the scalp. The temporal arteries were firm, thickened and pulseless. This was followed by impaired vision of the right eye. He had severe malaise, weakness and sweating and lost 15 lbs. in weight. He was found to be anaemic and had a raised temperature for 2 to 3 months. Complete recovery occurred in 6 months.

Temporal arteritis was not defined as a disease entity until Horton et al. (1932 and 1937) reported 7 patients suffering from arteritis of the temporal vessels and described the characteristic histological changes of the disease. These patients aged 55 to 75 all had severe headache which was more or less constant and frequently worse at night. There was associated malaise, lassitude, weakness, fever and night sweats. All found difficulty in chewing food. Two to 6 weeks after the onset the temporal arteries became tortuous, enlarged and prominent and very tender with raised reddish nodules which were visible and palpable. In the early stages the vessels pulsated but later became pulseless. In one case the left radial artery was affected. One patient had diplopia and in two there was evidence of phlebitis of retinal veins with haemorrhages and exudates. All of them recovered completely in 4 to 6 months.

A man aged 61 with bilateral tender temporal arteries associated with acute rheumatism was reported by Paviat et al. (1934).

Jennings (1938) reviewed the first two British cases of giant-cell arteritis and was the first to recognise blindness as a complication of this disease.

Hoyt et al. (1941) stressed that the constitutional illness and joint symptoms were an integral part of the disease and that the constitutional illness was often out of proportion to the local disease. They described 3 typical patients with histologically proven giant-cell arteritis, each of whom had joint symptoms including tenderness and limitation of the tempero-mandibular joints. All had headaches and tender inflamed temporal arteries.

Gilmour (1941) described the pathological findings in 3 cases in whom he found histological evidence of arteritis of the larger arteries. Because of the presence of multi-nuclear giant-cells in most of the affected vessels he suggested that the disease be called "Giant-Cell Chronic Arteritis".

Cooke et al. (1946) confirmed that giant-cell arteritis was a generalised vascular disease.

Several case reports of giant-cell arteritis stressed the association of joint and locomotor symptoms with this disease (Brown and Hampson, 1944; Chasnoff and Vorzimer, 1944; Gordon

and Thurber, 1946; Cooke et al., 1946; Anderson, 1947; Dupont and Meerup, 1948; Schrader, 1949).

Harrison (1948) from a review of the literature found a total of 75 published cases of giant-cell arteritis. Roux (1954) collected a total of 248 cases of this disease described prior to 1954. Eight of these patients were probably not genuine giant-cell arteritis as several of the younger cases described were probably cases of young female arteritis, and of the rest 127 were women and 113 men. The majority (93%) were over the age of 60, the average being 68 years; 50% of these patients had visual disturbances and 10% died from causes directly related to the disease. He concluded that a prodromal stage consisting of constitutional illness and widespread pains was almost always present before manifest evidence of temporal artery involvement appeared. Headache was invariably present and was nearly always associated with signs of inflammation of the temporal arteries. The disease pursued a relapsing and remitting course usually lasting from one to two years.

In the succeeding years an ever increasing number of articles, case reports and reviews of giant-cell arteritis appeared which were largely concerned with the visual manifestations of the disease.

Palm (1958) paid attention to the systemic manifestations of the disease when he reviewed 31 cases all with ocular symptoms.

diagnostic feature of the disease. Six were presumed by Palm to have a polyarthritis of the rheumatoid type; 12 had diffuse muscle and joint pains, and 5 had muscle stiffness.

Thirty-five cases of giant-cell arteritis were reviewed by Russel (1959). All had headache, which was severe in 33. Scalp tenderness was present in 34 and tenderness of the temporal arteries was found in 32. Twenty patients complained of muscular pain. Visual failure occurred in 16 patients, in 7 of whom both eyes were affected. Of the 23 eyes affected 13 were completely blind.

Visceral arteritis is generally considered to be an uncommon manifestation of giant-cell arteritis but one of Russel's patients developed a mesenteric thrombosis. He stressed that while chronic myalgia and arthritis are well recognised to be part of the prodromal stage of giant-cell arteritis, these symptoms may follow the typical attack of arteritis. He agreed with Palm (1958) that both the skeletal lesions and the arterial lesions had to be considered as manifestations of the same disease process.

Pamley and Hughes (1960) who studied 76 patients with giant-cell arteritis drew attention to the diverse presentations of this disease and pointed out that involvement of the temporal arteries was only one manifestation of a widespread disorder. They confirmed that a negative temporal artery biopsy did not exclude the disease, as the vascular changes were patchy and subject to phases of activity. They also found temporal

and have included older patients under the diagnosis of Takayasu's arteritis (Ask-Upmark, 1954; Barker and Edwards, 1955; Ask-Upmark and Fajers, 1956; Judge et al., 1962). Although the histological descriptions of the affected arteries appear to be similar it seems likely for the reasons already mentioned that the aetiology may be different in the 3 groups.

i. Aortitis of Childhood

This has frequently been reported, in children up to the middle teens, from Africa (Golfand, 1955; Penn, 1963; Schrire and Asherson, 1964). Both sexes are affected with a slight female preponderance in the cases described. The most common clinical presentation is with hypertension, or its effects, resulting from narrowing of the renal arteries. A past history of ill-health with joint symptoms is frequently obtained. The disease appears to be largely confined to the aorta resulting in areas of narrowing and aneurysmal dilatation with frequent involvement of the vessels arising from the aorta.

ii. Young Female Arteritis (Takayasu's arteritis)

This appears to be largely confined to females. Nasu (1963) in his review of 21 autopsy cases reported in Japan, described only 3 males and of these, one was aged 5, while Schrire and Asherson (1964) in their report of arteritis of the aorta and branches reported 3 males out of a total of 19 cases and in all of them the disease had commenced before the age of 14. Thus

these males may be classified with the previous group. Wagener (1958) found that 90% of the 81 cases reported in the literature, aged under 40 years, were women.

The syndrome is most common in Japan, whence most of the reports have come. Several case reports which seem to be similar, have appeared from other countries (Ask-Upmark, 1954; Ask-Upmark and Fajers, 1956; Pahwa et al., 1959; Judge et al., 1962; Strachan, 1964; Schrire and Asherson, 1964).

The age of onset is usually in the late teens or third decade, although the date of onset is frequently difficult to determine. The recognised symptoms are mainly due to impairment of the carotid artery blood flow resulting in cerebral, eye, ear and face changes. Reduction of the retinal artery pressure is one of the earliest objective findings and narrowing of the subclavian arteries, resulting in reduced or absent pulses and blood pressure in the arms is a frequent finding. The blood pressure in the legs may be elevated due to renal ischaemia from renal artery stenosis.

Gilmour (1941) reported the clinical details and autopsy findings of a woman who had died at the age of 23 from large vessel arteritis. At the age of 17 she had had "acute articular rheumatism" (about which no further details are given). Six months before death she developed attacks of giddiness and hot sweats. Eight weeks before death a lump, which increased in

size, was noticed in the neck. This was followed by pain, weakness and numbness of the right arm. On examination a loud systolic murmur was heard in the region of the supraclavicular swelling. The right radial artery was tortuous with a pulse of small volume, while the left radial pulse was almost imperceptible. At autopsy the findings were those of a chronic arteritis of the aorta and the branches arising from its arch. Death had been due to rupture of an aneurysm of the right subclavian artery into the pleural cavity and lung. The histological changes of the arteries were those of a giant-cell arteritis and were indistinguishable from the histological changes found in his other 3 cases, who were much older.

The early manifestations of Takayasu's arteritis were stressed by Strachan (1964) who reported 3 patients with this syndrome, and reviewed the literature. Recognition of the early manifestations was considered to be particularly important in view of the possible response to corticosteroid therapy. In the early stages a variety of symptoms may be present, such as fatigue, fever, night sweats, cough, pleurisy, pericarditis, polyarthralgia and cutaneous lesions. Persistent neck and abdominal murmurs were present in all 3 patients, with tenderness over some arteries. Persistent elevation of the E.S.R. and abnormalities of the plasma proteins were almost invariable. Arthralgia and polyarthritis have been reported in a high percentage of these patients. Two

of Strachan's 3 patients had a history of arthritis and several other authors have also recorded joint symptoms in patients with this syndrome (Gilmour, 1941; Ask-Upmark, 1954; Ask-Upmark and Fajers, 1956; Schrire and Asherson, 1964).

The prognosis is usually poor with death occurring in 1½ to 14 years, most frequently from cerebral ischaemia (Hodges, 1963).

A review of the pathological changes of 21 autopsy cases reported in Japan was presented by Nasu (1963). The characteristic features described were thickening and fibrosis of the arterial wall with narrowing of the lumen, affecting mainly the aortic arch, the descending aorta and the arteries arising from the arch. Strachan (1964) demonstrated aneurysmal dilatations and narrowing of large vessels in these patients by aortography. Similar changes were found by arteriography and at autopsy by Schrire and Asherson (1964), who also reported irregularity of the thoracic and abdominal aorta and frequent stenosis of the arteries arising from the aorta. They also reported histological changes of non-specific arteritis, affecting mainly the aorta, but one patient (Case 19) also had arteritis with giant-cells of the coronary artery. Although the clinical findings and pathological changes reported in cases of young female arteritis from Japan and elsewhere are very similar, one is impressed with the significant absence of reports of the finding of aneurysmal dilatations of the aorta at autopsy in case reports from Japan.

iii. Large-vessel arteritis of middle and old age

Gilmour (1941) drew attention to the presence of arteritis of the aorta and its branches, including the common, internal and external carotid, subclavian and iliac arteries in 3 patients with giant-cell arteritis. The histological changes in these vessels were similar to those described in the temporal arteries by previous authors. One of these patients who was found to have arteritis of the internal carotid arteries had complained of noises like an engine in the left ear and of left temporal headaches.

Cooke et al. (1946) also found, at autopsy, widespread giant-cell arteritis of the large vessels of two patients who had died from cerebral causes. In addition to the aorta, the superior mesenteric, femoral and radial arteries also showed histological changes of giant-cell arteritis.

Robertson (1947) recorded a thrombosed subclavian artery, found at autopsy, in a patient with giant-cell arteritis.

Histological changes of giant-cell arteritis in large arteries, at autopsy, have also been recorded by Dupont and Meerup (1948), Moptinstall et al., (1954), Morrison and Abitbol (1955), Lander and Bonnin (1956), McCormick and Neuburger (1958), Crompton (1959) and Spencer and Hoyt (1960). Involvement of the larger arteries appears to be an almost invariable finding in patients who have died from giant-cell arteritis and it is

clear that any artery may be affected. From these autopsy reports it would appear that histological lesions are most frequently found and are most diffuse in the aorta and become less widespread and are found with decreasing frequency the more distant the arteries are from the aorta.

Clinical evidence of large-vessel involvement in patients with giant-cell arteritis has also been recorded by a few authors. Palm (1958) recorded intracranial bruits in 3 patients with giant-cell arteritis. One was found to have bilateral stenosis of the internal carotid arteries, another diffuse narrowing of the upper part of the internal carotid and a third complete occlusion of the internal carotid artery on angiography.

Spencer and Hoyt (1960) reported a 77 year old man with giant-cell arteritis who had a murmur over the right carotid artery and at autopsy widespread arteritis was found, including involvement of the carotid arteries.

Hollenhorst et al. (1960) found 6 patients with clinical evidence of large-vessel arteritis in their series of 175 patients with giant-cell arteritis. One had occlusive arterial disease of the left arm and both legs, another had an occluded left radial artery and in a third the radial pulses were absent in both arms. Two patients had tender common carotid arteries and occluded facial arteries; one of these died 10 years later of a dissecting aortic aneurysm.

Pumley and Hughes (1960) also recorded a patient with giant-cell arteritis and a dissecting aneurysm of the aorta. Another of their patients had dilatation of the bifurcation of the left common carotid artery and aneurysmal dilatation of the aortic arch with aortic incompetence.

Hamrin et al. (1964) recorded one patient in their series of 23 with giant-cell arteritis who had developed progressive occlusion of a brachial artery.

Gilroy and Meyer (1962) found good correlation between the clinical detection of murmurs over large arteries in the neck and the changes of occlusive vascular disease on angiography.

Brice, Dowsett and Lowe (1964) who studied the haemodynamic effects of common carotid artery stenosis in 8 subjects, by progressively constricting the carotid artery at open operation, found that there was no change of pulse pressure, of mean pressure, or of flow until the carotid artery lumen had been constricted to a cross sectional area of 4.5 sq. mm. A significant reduction of blood flow only resulted when the cross-sectional area was less than 2 sq. mm. It was also found that this constriction was unrelated to the calibre of the normal lumen. As the mean cross-sectional area of the common carotid artery was found to be 30 sq. mm., a significant reduction of blood flow and pressure would only be produced when the calibre of the lumen had been reduced to almost an eighth of normal.

It is likely that these results would also apply to other large vessels. Furthermore the adequacy or otherwise of the collateral circulation will greatly influence both the effects and the physical signs of arteritis of large vessels as in the "subclavian-steal syndrome" in which the blood pressure and pulse in the arm may be virtually normal in spite of almost complete occlusion of the subclavian artery, provided the stenosis is situated proximally to the origin of the vertebral artery. In this syndrome the blood supply to the distal part of the subclavian artery arises from the base of the brain via the vertebral artery. The difference in blood pressure in the two arms may be as little as 20 mm. Hg. systolic and 10 mm. diastolic (Toole, 1964).

In this syndrome neurological symptoms and signs may be produced by ischaemia of any structure supplied by the vertebral-basilar system in patients whose brainstem supply is precarious. Thus subclavian artery occlusion may mimic impairment of the cerebral blood flow due to carotico-vertebral artery stenosis. Neurological symptoms may be precipitated or aggravated during exercises of the arm supplied by the affected subclavian artery, due to the increased shunt of blood from the brainstem to the arm. The diagnosis of the subclavian-steal syndrome can only be confirmed by arteriography.

Cases with large-vessel arteritis have been reported

under many descriptive titles, the most common being the "Aortic Arch Syndrome" which is characterised by absent or reduced pulses in the neck and upper extremities. However, the aortic arch syndrome may also be caused by several other diseases including severe atherosclerosis, dissecting aneurysm of the arch of the aorta, syphilitic aortitis and thrombo-angiitis obliterans.

Comment

From the autopsy reports it is clear that giant-cell arteritis very frequently affects the large vessels, particularly the aorta and the large arteries arising from it and also the cranial arteries with less frequent involvement of other peripheral arteries. However, the number of clinical reports of arteritis of the large vessels is surprisingly few. This may be due to the difficulty of making this diagnosis during life.

Clinical evidence of partial or complete large vessel occlusion may be obtained by the detection of:

1. murmurs over large vessels;
2. reduced blood pressure in 1 to 4 limbs;
3. reduced oscillometric deflections in 1 to 4 limbs, and
4. by arteriography.

It is clear that in many cases of arteritis of large vessels the only clinical evidence of this will be the presence of murmurs over them. Reduction of blood pressure and oscillometric deflections are only likely to be found where there has been very marked narrowing of the arterial lumen (Brice et al., 1964).

Atherosclerosis is common in elderly people and as giant-cell arteritis occurs in people of the same age group, clinical abnormalities of large vessels, even in a proven case of giant-cell arteritis, may be related either to the arteritis or

to atherosclerosis, provided of course, that other causes such as syphilis have been excluded.

A systematic clinical investigation of the large vessels, by auscultation over these arteries, routine blood pressure estimations and measurement of the oscillometric deflections in both arms and legs in patients with giant-cell arteritis and a control group of middle aged and elderly people, without symptoms of arterial disease, may provide further information concerning this question.

(e) Joint and muscle symptoms of giant-cell arteritis

Widespread joint and muscle pains are well-recognised features of giant-cell arteritis and have been described by several authors. As in polymyalgia rheumatica, the pain is usually situated in the shoulder and hip girdles and spinal muscles and there is occasional pain around peripheral joints.

Although joint and muscle pains had been recorded in patients with giant-cell arteritis by Hutchinson (1890), Schmidt (1930) and Paviot et al. (1934), Hoyt et al. (1941) were the first to appreciate that the joint and muscle pains were an integral part of the disease. They described 3 patients with giant-cell arteritis who had joint and muscle pains. All had tenderness of the temporomandibular joints; one had pain in the shoulders, hips, back and knees while another had diffuse muscle pain and tenderness and pain in the neck.

There followed several case reports describing the association of locomotor symptoms with this disease.

Chasnoff and Vorzimer (1944) reported a woman aged 60 with giant-cell arteritis who developed lumbar backache followed a few months later by dorsal and cervical pain, shoulder girdle pain and pain in the groins which resulted in difficulty in walking. No evidence of joint involvement was found.

Gordon and Thurber (1946) described a 65 year old man with

giant-cell arteritis whose headache had been preceded by 2 months of pain in both thighs and the left shoulder. They suggested that these pains were due to involvement of arteries around the shoulders and hips and that the succession of symptoms was due to progressive involvement of different arteries.

Cooke et al. (1946) reported 7 patients with giant-cell arteritis of whom 6 had started with "myalgia and arthralgia". This was followed some months later by temporal headaches and visual changes. The main complaints were again of generalised muscle aches and soreness, painful shoulders, hips and knees. Joint swellings were reported in 3 patients; in one the wrists were affected. The interval between the onset of these symptoms and overt manifestations of arteritis varied up to 9 months.

Roux (1954) in his review of 240 patients described prior to 1954 found that 67 had had joint pains and 22 muscle pains. In addition several were recorded as having an "influenza-like illness" - presumably constitutional illness with pyrexia, malaise and muscle pains.

Seven of the 14 cases reported by Koptinstall, Porter and Barkley (1954) with histologically proven giant-cell arteritis had complained of muscle and joint pains. Case 12, a 65 year old woman had been diagnosed as having rheumatoid arthritis with involvement of several joints, 18 months prior to the onset of visual impairment of the left eye. On examination the temporal

arteries could not be felt. There was no clinical evidence of rheumatoid arthritis and the radiological changes also cast doubt on the original diagnosis of rheumatoid arthritis. Some joints had changes suggestive of osteo-arthrosis but in others they were those of "polyarthritis, not degenerative in type, but far removed from the typical appearance of rheumatoid arthritis". The E.S.R. was 130 mm. Westergren and a muscle biopsy from the leg was negative. The patient died and at autopsy the walls of the larger arteries appeared abnormal and considerable reduction of the lumen of the right axillary artery was found. There was flattening of the head and also the lower end of the femur with erosion of the articular cartilage. Details of other joints were not included. The cause of death was presumed to be due to renal amyloidosis and bronchopneumonia. On histological examination widespread changes of giant-cell arteritis were found in the arteries. The head of the femur was eroded by very vascular granulation tissue containing numerous histiocytes and plasma cells. Since this patient had died from bronchopneumonia and amyloidosis, the pathological joint changes may not have been related to the giant-cell arteritis.

Kvalvik (1957) gave a detailed description of 7 patients with giant-cell arteritis in whom the muscle and joint symptoms appeared to be identical with those found in polymyalgia rheumatica. Case 5 was typical of this group. This was a

64 year old man who presented with pain in the thighs, shoulders, back, neck and knees. There was morning exacerbation of the pains resulting in difficulty with dressing. Two months after the onset he developed bilateral temporal artery changes. Case 1 was unusual in that he presented with pains in the large joints and fingers. After 31 months he still had pain in the knees and limitation of the fingers with mild flexion contractures. The joint changes were then indistinguishable from those of a chronic polyarthritis.

Palm (1958) made a detailed study of the constitutional as well as the vascular manifestations of giant-cell arteritis. Of his 31 patients he considered 6 to have rheumatoid arthritis although no criteria for the diagnosis were given, but it would appear that "rheumatoid arthritis" was used synonymously with polyarthritis. Twelve patients had widespread muscle and joint pains, and 5 had "hypertonia" which probably denotes stiffness. Thus a total of 23 patients had symptoms from the locomotor system.

Russel (1959) in his study of 35 patients with giant-cell arteritis found that 20 complained of muscular pains which were very similar in character to those of polymyalgia rheumatica. Of the 7 case reports included 5 had locomotor symptoms and 4 of these patients were also found to have objective weakness and wasting of proximal muscle groups. This muscular weakness cleared completely within 24 hours of starting corticosteroid therapy so it was unlikely to have been due to a myositis. Furthermore, a

muscle biopsy in one and electromyography in two were normal.

Russel was clearly puzzled by these muscular manifestations. It is well known, however, that tender focal areas at the bony attachments of muscles or tendons may result in apparent muscle weakness due to inhibition of muscle activity by pain, and that disuse atrophy may ensue.

Russel (1962) described an 80 year old man with histologically proven giant-cell arteritis of the temporal artery who, a year later developed widespread pains with marked wasting and weakness of the shoulder and hip girdle muscles. The urinary creatine was raised and on electromyographic examination changes characteristic of myositis were present. This was confirmed by biopsy of the deltoid and quadriceps muscles which showed degeneration of muscle fibres with interstitial cellular infiltration. One muscular artery showed histological evidence of a very active arteritis with marked infiltration of lymphocytes and to a lesser extent of plasma cells and polymorphs. The histological picture of such an acute arteritis is unusual in giant-cell arteritis particularly in a patient on corticosteroid therapy. It seems reasonable to suppose that the myositis was at least contributing to the pains in this particular patient but this is the only definitely proven instance of myositis associated with giant-cell arteritis.

Pamley and Hughes (1960) also found that almost half of

their 76 patients with giant-cell arteritis had symptoms indistinguishable from those of polymyalgia rheumatica.

MacGregor (1961) described 11 typical cases of polymyalgia rheumatica in whom no clinical evidence of arteritis was found. He suggested that they were suffering from "Giant-cell Arteritis without Headache" as the symptoms in these patients were indistinguishable from those in one case of giant-cell arteritis (Case 12) who had tender, thickened temporal arteries. He also stated that the presumptive diagnosis of giant-cell arteritis in these patients was confirmed by their good response to corticosteroid therapy. This assumption is obviously invalid as response to corticosteroid therapy is not specific for giant-cell arteritis; all inflammatory polyarthritides will respond to high doses of corticosteroids with rapid symptomatic improvement of joint symptoms. He suggested that the pain and stiffness of the neck muscles was due to occipital arteritis and the muscular pain and stiffness of the shoulder and hip girdle muscles to involvement of the branches of the subclavian and iliac arteries but advanced no histological evidence to support this hypothesis. No biopsies of arteries or muscles were in fact performed.

Comment

From the descriptions of those authors who have paid particular attention to the signs and symptoms in the locomotor system in patients with giant-cell arteritis, it is clear that the most common presentation of giant-cell arteritis is with painful limitation of movement of the shoulder and hip girdles and of the spine. Less frequently there may be painful limitation of movement of the knees and wrists and, very occasionally, of the fingers. This clinical picture may be indistinguishable from that of polymyalgia rheumatica, and indeed on biopsy of the temporal arteries giant-cell arteritis has been found by several authors in patients who were previously considered to be suffering from polymyalgia rheumatica. However, from the review of the literature it is clear that in spite of the similarity of the clinical pictures in those with and without arteritis, it has still not been proved conclusively that polymyalgia rheumatica and giant-cell arteritis are the same disease.

Apart from Russel's one case with myositis no evidence of muscle involvement in giant-cell arteritis has been found. Neither is there conclusive evidence to confirm the view generally held that the muscle pain is due only to arteritis of the vessels in the affected areas in spite of the finding of giant-cell

arteritis of the intramuscular arteries in 2 cases with giant-cell arteritis. The nature of the joint involvement described in some patients is also obscure. The only patient in whom histological changes in joints were described also had amyloidosis and bronchopneumonia, thus the pathological joint changes may not have been related to the giant-cell arteritis.

(d) Pathological studies of giant-cell arteritis

The temporal arteries are medium sized muscular arteries and are thus prone to the degenerative changes occurring in such vessels with advancing age i.e. atherosclerosis and medial sclerosis. Since giant-cell arteritis affects patients over the age of 50 and usually over the age of 60 years, the variations from normality resulting from these degenerative changes must be recognised before a definite diagnosis of an inflammatory arteritis such as giant-cell arteritis can be made. The changes of well-established giant-cell arteritis are easy to recognise but difficulty may arise in distinguishing the early changes from those of atheroma. This applies particularly in patients who have been treated with corticosteroids and in whom the inflammatory changes in the vessel wall have been suppressed. Difficulty may also arise in the later stages of the disease in the case of vessels which have been the site of an inflammatory arteritis which has subsided, leaving an altered artery without inflammatory cells.

(i) Age changes in temporal arteries

Kimmelstiel et al. (1952) examined the temporal arteries of 30 elderly patients who had died from causes other than giant-cell arteritis. They confirmed that the abnormalities were those of atherosclerosis or medial sclerosis. They found no giant-cells in relation to the degenerating elastica.

Ainsworth et al. (1961) examined the temporal arteries removed at post mortem from 14 subjects aged from 40 to 60 years and from 39 over the age of 60 to determine the changes occurring in these arteries due to age. Thirteen of the latter were aged 80 or more. In those aged 40 to 60 they found diffuse intimal thickening with small atherosclerotic plaques in a few arteries. Beneath these plaques the internal elastic lamina was often stretched and fragmented. The media was usually well preserved. In those over the age of 60 the intimal thickening was frequently found to be more marked and usually consisted of concentric thin elastic layers often fragmented, together with collagen and smooth muscle. The internal elastic lamina was usually fragmented with partial loss and alteration in staining properties. In two there was calcification of the degenerating membrane. The media in a few showed generalised loss of muscle with replacement fibrosis. Lymphocytic infiltration of the adventitia and vascularisation of the wall

only occurred in one patient in relation to large atherosclerotic plaques.

In two cases aged 85 and 86 years the histological appearances differed from those in the arteries of the other patients of that age. There was considerable intimal thickening by concentric collagen fibres, granular elastic fibres and smooth muscle cells. A new elastic lamina had developed just beneath the endothelium. Capillaries and arterioles were present in the outer intima and inner media. There was extensive loss of the internal elastic lamina. The media was replaced by fibrous tissue, mainly in relation to the damaged internal elastic lamina. In the adventitia there was increased vascularity with fibrous thickening. These changes in the temporal arteries were considered to be those of a healed arteritis. The one case had died of myocardial infarction and histological examination had shown active giant-cell aortitis and healing arteritis in the small branches of the coronary arteries. The other case had died of a ruptured fusiform aneurysm of the descending thoracic aorta and in sections of the aorta there was evidence of the late stage of giant-cell aortitis, while the anterior descending branch of the left coronary artery showed healing giant-cell arteritis. No evidence of giant-cell aortitis was present in 29 other cases in their series in whom the aorta was examined histologically.

These observations that giant-cell arteritis was present in 5% of cases, over the age of 60 years, where this had not been suspected during life, may indicate that giant-cell arteritis is more common in elderly people than is generally recognised.

Wright (1963) in routine post mortem studies of 39 cases of all ages examined 12 peripheral arteries in each subject. The vertebral, radial and digital arteries were included in this routine, but the temporal arteries were not examined. In the arteries studied he found age changes similar to those described by Ainsworth et al. In the same subject these changes did not affect all the vessels examined to the same degree. Intimal thickening, atheroma and calcification of the internal elastic lamina were seen with increasing frequency from the 5th decade onwards, with medial calcification usually appearing in older subjects.

(ii) Pathology of giant-cell arteritis

Horton, Magath and Brown (1932 and 1937) were the first to describe the histology of giant-cell arteritis of the temporal arteries. In their first publication they described the histology of the temporal arteries of two patients which showed identical lesions and had the changes of an "extremely chronic peri-arteritis and arteritis". The intima was markedly thickened and the lumen partly or completely occluded by cellular or acellular thrombi. The media had slight round cell infiltration and in the adventitia there was round cell infiltration around the vasa vasorum. In 1937 they described another 5 patients and added that in those arteries where the media had been completely destroyed it was replaced by a granulomatous type of lesion in which numerous giant-cells were present.

Numerous reports have since appeared confirming the histological changes in the temporal arteries of patients with giant-cell arteritis (Brown and Hampson, 1944; Chamoff and Versimer, 1944; Gordon and Thurber, 1946).

Gilmour (1941) described the post mortem changes in 4 cases with generalised arteritis involving large vessels. The clinical features of 3 of these patients were similar to those described in giant-cell arteritis. The histological changes in the larger arteries were similar to those described in the temporal arteries with intimal thickening, inflammatory changes of the media, disappearance of muscle and destruction of the elastica.

Giant-cells containing minute fragments of elastic fibres or in contact with elastic fibres were found in the media in the most actively inflamed arteries. Because of the presence of these multi-nuclear giant-cells in most of the affected arteries he suggested that the disease be called "Giant-cell Chronic Arteritis". In the aorta the histological changes were usually widespread but in the other arteries the lesions were usually focal. He suggested that giant-cell arteritis was in fact a widespread arteritis of large vessels affecting mainly the aorta and the vessels arising from the arch of the aorta.

Similar widespread arterial changes have also been found at autopsy by several authors (Chasnoff and Vorzimer, 1944; Dupont and Heerup, 1948; Heptinstall et al., 1954; Morrison and Abitbol, 1955; Lander and Bonnin, 1956; McCormick and Neuburger, 1958; Crompton, 1959; Spencer and Hoyt, 1960).

Cooke et al. (1946) recorded the histopathological findings in the temporal arteries of 6 patients with giant-cell arteritis and attempted to construct the sequence of changes occurring in the vessels during the course of the disease. They suggested that a subacute inflammatory reaction began in the adventitia. At the same time there was a focal necrosis of the media and internal elastica without inflammatory reaction. In some cases the process halted at this stage of periarteritis and medial necrosis, and healing occurred. Usually the inflammatory

reaction spread to the media which was converted to granulation tissue, infiltrated by lymphocytes, plasma cells and large mononuclear cells. The necrotic media and elastica stimulated a giant-cell reaction. With healing a new internal elastic lamina arose from the fragments of remaining elastica. The arrangement of this elastica was irregular forming loops extending from the original site of the elastica into the deeper layers of the intima, closer to the lumen. The intima was markedly thickened, containing loose cellular tissue, but no evidence of inflammation, and this resulted in narrowing of the lumen.

Several authors (Cooke et al., 1946; Gordon and Thurber, 1946) have had difficulty in distinguishing the histological changes of giant-cell arteritis from those of periarteritis nodosa and thromboangiitis obliterans. Kimmelstiel et al. (1952) however, found by appropriate elastic tissue staining, that the giant-cells present in giant-cell arteritis were related to the elastic lamina or to degenerate elastic fragments which were phagocytosed by the giant cells, and they suggested that this process was specific for giant-cell arteritis.

Heptinstall et al. (1954) also found that the giant-cells were related to the internal elastic lamina and were present in large numbers where the lamina was deficient. As the lesions aged, giant cells decreased in number. Large mononuclear cells were present in large numbers at the same sites and were considered by them to be the precursors of giant-cells. The intensity of

the inflammatory reaction was found to vary in different segments of the same vessel. Intimal proliferation was found to be the main cause of the reduced arterial lumen and actual thrombosis was infrequently found.

McCormick and Neuburger (1958) reported that histological changes of giant-cell arteritis were present in the smaller vessels at the base of the brain and in the meningeal and cortical arteries in two patients who had died from cerebral vascular disease. In neither case had the diagnosis been suspected during life.

A very detailed post mortem examination of the cerebral vascular changes in a patient with bilateral blindness due to giant-cell arteritis was carried out by Crompton (1959). He found involvement of the ophthalmic, retinal, posterior ciliary, vertebral and chiasmic arteries as well as of the arteries of the occipital cortex and suggested that visual impairment may be due to occlusion of the central artery of the retina or posterior ciliary arteries or of the arteries supplying the visual pathways. He also drew attention to the fact that vision may be impaired through involvement of extracranial arteries if the collateral circulation is impaired. Thus occlusion of the internal carotid or vertebral arteries might produce symptoms and signs similar to those described in carotid artery stenosis due to atherosclerosis.

Spencer and Hoyt (1960) also found histological changes of

giant-cell arteritis in the ophthalmic and posterior ciliary arteries of a patient who had become completely blind.

(e) Conclusion

Review of the literature on giant-cell arteritis indicates that this is a disease occurring in elderly people. Headache, which is almost invariably present, is followed in about 50% of cases by blindness. There is usually associated constitutional illness with fatigue, anorexia, loss of weight, pyrexia and depression.

From the autopsy reports it is clear that giant-cell arteritis frequently affects the larger arteries, but diagnosis of involvement of large vessels during life is usually difficult. The arteritis may produce murmurs over the arteries, reduced blood pressure or oscillometric deflections in the limbs or arteriographic abnormalities, but atherosclerosis is very common in this age group and it may produce the same clinical signs and similar arteriographic abnormalities.

Diffuse aching and widespread pains in the muscles frequently occur and these symptoms would appear to be indistinguishable from the symptoms described in polymyalgia rheumatica. The most commonly held view is that these pains are due to an arteritis of the muscular arteries or other vessels in the appropriate areas, but in spite of numerous muscle biopsies in patients with giant-cell arteritis, arteritis of muscular arteries has only been reported in 2 cases and in only one has histological evidence of myositis been found. This is not considered by the author to be convincing evidence that in all cases of giant-cell arteritis the

widespread muscular pains are due only to an arteritis. No systematic study of the cause of these symptoms has in fact been made.

Joint changes have been reported in patients with giant-cell arteritis, but at present the nature of these changes is completely unknown. Several authors have called these joint changes "Rheumatoid Arthritis" without producing any specific laboratory findings or radiological evidence to support this diagnosis, and it is clear from the descriptions of the cases that the term rheumatoid arthritis was being used in a broad sense to describe an inflammatory polyarthritis.

The similarity of the locomotor symptoms in giant-cell arteritis and polymyalgia rheumatica, is not proof that their aetiology and underlying pathology are identical. It is well recognised that the application of a variety of noxious stimuli to a tissue may result in lesions in it, which appear identical. From the evidence available in the literature it appears likely that the two conditions are of different aetiologies in view of the good prognosis of polymyalgia rheumatica with complete absence of residua and the frequent serious complications of giant-cell arteritis. The demonstration of histological changes of giant-cell arteritis in patients with polymyalgia rheumatica and of the characteristic joint changes of polymyalgia rheumatica

in patients with giant-cell arteritis would favour their being variants of the same disease, but a definite answer to this question must await the discovery of their cause or causes. If giant-cell arteritis and polymyalgia rheumatica are manifestations of the same disease, it follows that giant-cell arteritis must be much more common than is at present generally believed.

CHAPTER 3

MATERIAL

(a) Selection of patients

Eighty patients seen personally at the University of Manchester Rheumatism Research Centre under Professor J.H. Kellgren, the Withington Hospital, Manchester, under Dr. J. Sharp and the Devonshire Royal Hospital, Buxton, under Dr. J. Sharp and Dr. R. Harris, have been studied.

Eleven patients in whom the diagnosis of polymyalgia rheumatica had previously been made were recalled but the rest attended from 1962 onwards.

(b) Duration of Study

This study was undertaken from June 1962 to December 1964.

(c) Criteria for inclusion in series

Four criteria were obligatory:

1. A history of pain and stiffness affecting predominantly the shoulder and hip girdles and spine, in middle aged and elderly patients.
2. A history of morning stiffness lasting for at least 30 minutes.
3. The finding, on examination, of tenderness of central joints, tendons or ligaments.

4. No clinical, radiological or pathological evidence that the symptoms were due to any other defined inflammatory rheumatic syndrome.

It will be noted that an elevated E.S.R. is not necessary. Prolonged morning stiffness is generally recognised to be an important feature distinguishing inflammatory from non-inflammatory diseases of the locomotor system, and has been adopted as a major diagnostic criterion for rheumatoid arthritis by the Committee of the American Rheumatism Association (Ropes et al., 1958). The validity of this as an index of inflammatory activity has been confirmed by several workers (Cobb, 1955 and 1956; Lawrence, 1964).

Lansbury (1956) found that most patients with rheumatoid arthritis could accurately observe the duration of their morning stiffness and this correlated roughly with the E.S.R. but was unrelated to the age, sex, duration of disease and the haemoglobin level. He concluded that the duration of morning stiffness was a valid index of inflammatory activity.

Prolonged morning stiffness is also a well known feature of other inflammatory polyarthritides such as ankylosing spondylitis, psoriatic arthropathy and systemic lupus erythematosus.

(d) <u>Numbering of Cases</u>

Cases were numbered according to the date when first seen personally.

Case 32 was excluded from the series as she only attended the out-patient clinic on one occasion and failed to attend subsequently. Thus the available information was inadequate.

CHAPTER 4

METHOD

A detailed history was taken and physical examination carried out personally in all patients. The 11 patients who had been recalled were seen on one occasion only, when a detailed history was obtained and physical examination carried out, paying particular attention to a past history of symptoms of diseases of the vascular and locomotor systems and to residual changes in these systems. Results of earlier physical examinations and investigations during the course of the illness were obtained from the hospital records of these patients. Of the other patients 53 were seen as in-patients for varying periods and all were followed up repeatedly as out-patients. As in-patients they were cared for personally under the supervision of Professor J.H. Kellgren, Dr. J. Sharp or Dr. R. Harris.

A. History

In the history, particular attention was paid to the locomotor symptoms including joint and muscle pain, muscle weakness, limitation of joint movement and duration of morning stiffness. Special enquiry was also made for symptoms suggestive of arterial involvement including headache, scalp tenderness, visual disturbance, angina pectoris and intermittent claudication.

B. Physical Examination

i) A general physical examination was carried out in all patients with special attention to the locomotor system and the large vessels including the cranial arteries.

ii) In the locomotor system:

a. Joints were examined for

1. bony enlargement
2. synovial thickening
3. effusion
4. range of movement; active and passive
5. abnormal mobility (or instability)
6. tenderness of the capsule and surrounding ligaments
7. warmth
8. wasting of surrounding muscles.

b. Tendons and ligaments were palpated for tenderness especially at the bony attachments, and resisted movements around the shoulders were performed to find evidence of tendon involvement.

c. The spine was examined for range of movement and tender focal points were sought.

d. The chest expansion was measured.

iii) Muscles were examined for:

a. tenderness

b. weakness

c. wasting

d. evidence of muscle shortening.

iv) The cranial arteries including the superficial temporal and branches, occipital and facial arteries were palpated for tenderness, thickening and reduced or absent pulsation. The carotid, subclavian, axillary, brachial, radial, femoral, dorsalis pedis and posterior tibial arteries and the abdominal aorta were palpated for tenderness and degree of pulsation.

Auscultation was performed over the carotid, subclavian, axillary and femoral arteries and the abdominal aorta. The criteria for murmurs arising from the aortic arch or large vessels are adapted from the findings of Gilroy and Mayer (1962). In the absence of other causes of vascular murmurs e.g. compression of the artery by a cervical rib, or high cardiac output states such as thyrotoxicosis, anaemia, extensive Paget's disease, etc., the presence of a murmur, loudest above the clavicle, and not associated with a cardiac murmur, but decreasing in intensity on sitting up and not obliterated by head turning

was considered to arise from the large vessels. The obliteration or reduction in intensity of the murmur on distal compression of the artery and the presence of a thrill over the artery was regarded as additional evidence that the murmur originated in the vessel.

The blood pressure was recorded in both arms and when indicated in the legs. The blood pressure was considered to be reduced in an arm if the difference between the two arms was consistently at least 20 mm. mercury (Hg.). The amplitude of oscillometric pulsation was considered to be reduced when the maximal deflection was at least one third less in one arm or leg than the other, and/or the difference of pressure at which this occurred was at least 20 mm. Hg. The pulsation in the legs was further considered to be reduced when the total deflection was less than 3 divisions. It was assumed that the blood pressure in the legs was reduced when this was at least 20 mm. Hg. lower than in the arms. When the blood pressure in the arms was unequal the higher was taken to be the normal value. These criteria were adopted arbitrarily.

The amplitude of arterial pulsation was determined with a Pachon oscillometer in both arms, thighs and calves in all patients with murmurs over large vessels or where there was other evidence of vascular involvement.

v) A control group of subjects aged over 50 years was investigated for a history of temporal headaches in the preceding 3 years and examined for arterial changes as above. These subjects were patients who had attended the Physical Medicine out-patient departments or were in-patients with diagnoses not related to the vascular system.

C. Laboratory Investigations

i) Erythrocyte Sedimentation Rate (E.S.R.)

The E.S.R. was estimated routinely in all patients whenever they were seen as out-patients and in in-patients at one or two-weekly intervals by the method of Westergren, and expressed as the rate of sedimentation in millimetres during the first hour. In all cases where E.S.R. values are quoted, these are the results obtained by the Westergren method unless otherwise specified.

ii) Haemoglobin Concentration

Haemoglobin estimations were performed in all cases at all out-patient attendances and in in-patients at two-weekly intervals or more frequently if indicated. The results of the estimations are expressed as gm. of haemoglobin per 100 ml. of blood, and as a percentage of 14.8 gm. per 100 ml.

iii) Leucocyte Count

Leucocyte counts were done whenever patients were seen in the out-patient department, and on admission in all and when clinically indicated in in-patients.

iv) Serum Protein Concentration

Serum protein estimations were performed by Dr. Peel in the Group Laboratory by the Biuret method on at least one occasion in most patients and repeated when indicated. The results were expressed as serum albumin and serum globulin in gm. per 100 ml. Results of electrophoresis of serum protein fractions were recorded in relative terms as normal or raised and the degree of increase indicated. Electrophoresis was onto cellulose acetate strips, eluted and read colorimetrically.

v) Sensitised Sheep-cell Agglutination Test (S.C.A.T.)

The S.C.A.T. was performed repeatedly in all patients, by Ball's modification of the original Rose-Waaler test (Ball, 1950) by Dr. J. Ball in the laboratories of the University of Manchester Rheumatism Research Centre. The results are expressed as the reciprocal of the highest titre at which agglutination occurred (Joint Committee of the Medical Research Council and Nuffield Foundation, 1959).

vi) The Lupus Erythematosis Cell test was carried out in 17 patients by the method of Hargraves, by the technical staff of the Devonshire Royal Hospital laboratory.

vii) Antinuclear Factor (A.N.F.)

The A.N.F. was sought in the serum of 16 patients by the technical staff of the Manchester Royal Infirmary laboratory.

viii) Antistreptolysin O Titre (A.S.O.)

The A.S.O. test was performed in 15 patients.

ix) Serum Transaminases

Serum transaminases were determined by the Spectrophotometric method in 11 patients in the Group laboratory, Stepping Hill Hospital.

x) Serum Aldolase

The serum aldolase estimation was performed in 10 patients by the Boehringer method in the Group laboratory, Stepping Hill Hospital.

xi) Serum Creatine Phospho-kinase

This estimation was performed in 12 patients by the Boehringer method at the Sheffield Children's Hospital by courtesy of Dr. V. Dubowitz.

xii) Serum Uric Acid

The serum uric acid was determined by the method of Folin (1934) in the laboratory of the Devonshire Royal Hospital.

xiii Blood Urea

Blood urea estimations were performed in the majority of patients by the Urease Nesslerization Method in the laboratory of the Devonshire Royal Hospital.

D. Radiological Examinations

In all patients radiographs of the chest, hands, feet, anterior-posterior view of the pelvis, lateral view of the lumbar spine and lateral view of the cervical spine in flexion and extension were obtained initially and repeated 12 months later or when indicated. In addition other radiological investigations were carried out when indicated.

E. Special investigations of Muscle

i. Electromyographic exploration of muscle was carried out in 18 patients. In 12 cases this was performed personally. During this investigation evidence of neuropathy and myopathy were sought. The deltoid and rectus femoris muscles were usually examined. Criteria for neuropathic lesions were the presence of fibrillation and positive potentials on volition and a reduced interference pattern of motor unit potentials; for myopathic lesions a full interference pattern of motor unit potentials on volition, the majority of which were of short duration and polyphasic (Richardson and Wynn Parry, 1957). The normal motor unit potential duration in limb muscles is in the range of 5 to 10 msec., with an amplitude of 1 to 2 m V. (Peterson and Engelberg, 1949).

ii. Muscle biopsies from the deltoid muscle were performed personally in 11 cases under local anaesthesia with a Desoutter pneumatic drill and using a 3 mm. core biopsy needle. The specimens were fixed with formal saline and stained with haematoxylin and

eosin. The histological specimens were examined by Dr. E.F. Aaron, the pathologist to the Stockport Group of Hospitals.

F. Sterno-clavicular Joint Biopsies

Under local anaesthesia in one patient and general anaesthesia in 3, biopsies of the sterno-clavicular joint synovium and capsule were performed personally. The specimens were fixed in formal saline. Sections were stained with haematoxylin and eosin. These sections were examined personally, under the supervision of Dr. E.F. Aaron and Dr. J. Ball.

G. Investigation of Site of Origin of the Muscle Pain

In order to determine the site of origin of pain felt in the muscles, points of maximum tenderness in central joints, tendons and ligaments were infiltrated with 1% lignocaine. The distribution of the pain arising from affected sterno-clavicular joints was investigated by a modification of the technique described by Kellgren (1938) and used by Coomes and Sharp (1961) in which the distribution of the pain produced by infiltration of 5% saline into the chosen site was charted. In those patients who also had tenderness of the acromio-clavicular joint on the same side, this was first infiltrated with local anaesthetic to abolish the pain arising from this joint. Pain from the sterno-clavicular joint was induced by shrugging the shoulders and forced terminal elevation of the arm in flexion. The sterno-clavicular joint and

capsule were then infiltrated with Lignocaine 1% and the effect on the pain previously present on these movements and on the range of movement was noted. In the earlier part of the study only Lignocaine 1% was injected but subsequently hydrocortisone was added as this was found to prolong the relief of symptoms and in some cases abolished them permanently.

In a similar manner painful lesions in other joints including the acromio-clavicular and scapulo-humeral joints and in tendons and ligaments around the shoulders, wrists, knees and hips and tender interspinous ligaments were infiltrated and the distribution of pain relief was noted.

H. Cranial artery biopsies

In 30 patients a biopsy specimen comprising approximately 1 cm. of one of the branches of the temporal artery was obtained under local anaesthesia. Two patients also had biopsies of the facial artery and 2 had biopsies of the occipital artery only. The specimen was fixed in formal-saline. Transverse sections were prepared and stained with haematoxylin and eosin and also with Verhoeff's elastic Van Gieson stain.

All the biopsies were performed personally. A few sections were cut and about a third also stained personally. All the sections were examined personally under the supervision of

Dr. E.F. Aaron.

Histological sections of temporal arteries which had been removed at autopsy from 10 cases aged over 60 years and who were not considered to have arteritis, were obtained from Dr. Aaron and examined personally to become acquainted with the changes occurring in temporal arteries of elderly subjects.

Throughout this thesis, where the age of patients is indicated, this refers to the age at the onset of their polymyalgia rheumatica.

Abbreviations used in tables in this thesis

G.C.A.	-	Giant-cell arteritis
? G.C.A.	-	Possible arteritis
P.R.	-	Polymyalgia rheumatica
R.A.	-	Rheumatoid arthritis
A.C.J.	-	Acromio-clavicular joint
C.C.J.	-	Costo-chondral junction
M.S.J.	-	Manubrio-sternal joint
M.C.P.	-	Metacarpo phalangeal joint
P.I.P.	-	Proximal interphalangeal joint
S.C.J.	-	Sterno-clavicular joint
S.D.B.S.	-	Sub-deltoid bursa
S.H.J.	-	Scapulo-humeral joint
S.I.J.	-	Sacro-iliac joint
T.M.J.	-	Tempero-mandibular joint
C.S.	-	Cervical spine
D.S.	-	Dorsal spine
L.S.	-	Lumbar spine
I.S. Lig.	-	Interspinous ligament
Th.	-	Synovial thickening
T.	-	Tenderness
Ef.	-	Synovial effusion
M.	-	Murmur

B.P. - Blood pressure

A.N.F. - Antinuclear factor

A.S.O. - Antistreptolysin O Titre

E.M.G. - Electromyography

E.S.R. - Erythrocyte sedimentation rate

L.E. - Lupus erythematosis

S.C.A.T. - Sheep cell agglutination test

N.S. - Not stated

Where possible all abnormalities e.g. synovial thickening, thickening of cranial arteries, intensity of murmurs etc., have been graded quantitatively. Unless specified otherwise the following grading has been followed:

0 - Normal

1 - Doubtful

2 - Minimal

3 - Moderate

4 - Marked

The degree of constitutional illness was graded from 1 to 4 as follows:

1 - Perfectly fit

2 - Not well, but able to continue working

3 - Too ill to work

4 - Virtually bedridden

CHAPTER 5

RESULTS

A. Clinical features.

B. Joints and ligaments.

(a) Clinical.

(b) Biopsies of the sterno-clavicular joints.

(c) Radiological changes in joints.

C. Muscles.

(a) Clinical.

(b) Investigation of the sites of origin of the pain.

(c) Special investigations of muscle

(i) Electromyography.

(ii) Muscle biopsies.

D. Investigation of arteries in control subjects.

symptoms due to degenerative joint or disc disease the symptoms due to the polymyalgia rheumatica were different in character from those to which the patient was accustomed. The main distinction was that in polymyalgia rheumatica the symptoms were worse in the morning and associated with prolonged morning stiffness, whereas in degenerative joint disease morning stiffness or stiffness after resting only persisted for a few minutes, and the joint pains were aggravated by use of the affected joint. Thus in cases with a long history of degenerative joint or disc disease the onset of any inflammatory polyarthritis can be recognised by the change in the nature of the pains and by the onset of prolonged morning stiffness.

Family History of Polyarthritis

Ten patients had a family history of polyarthritis. The mothers of five (Cases 8, 27, 43, 53 and 67) had an inflammatory polyarthritis of rheumatoid type. The mother of Case 14 had a transient acute polyarthritis while in her 4th decade. The sister of Case 11 had a chronic inflammatory polyarthritis of unknown type, but which was apparently not rheumatoid arthritis. The brother of Case 54 had an acute polyarthritis at the age of 17 and Case 58 had 2 sons who had had rheumatic fever in childhood. The wife of Case 72 gave a strong family history of rheumatoid arthritis. Their son developed classical rheumatoid arthritis at the age of 33.

Thus although several patients had a family history of

inflammatory polyarthritis the incidence was no higher than would be expected from chance (Lawrence, 1964). Very little information was available in most patients about the type of polyarthritis from which their relatives suffered, but there did not appear to be any who had had an illness which could have been interpreted as polymyalgia rheumatica. Neither was there a family history of ankylosing spondylitis in any of these cases.

No evidence of familial tendency was disclosed but this is not significant as polymyalgia rheumatica is a recently recognised, ill-defined, non-lethal condition of the elderly.

Previous Diagnoses

The diagnoses with which these patients were referred to hospital or for which investigations had previously been carried out are indicated in Table 3:

Initial Diagnosis	Number of Cases
Osteoarthrosis	18
Polyarthritis	9
Rheumatoid Arthritis	8
Cervical or lumbar degenerative disc disease	4
Frozen shoulder	4
Polymyositis	2
Myelomatosis	2
Osteoporosis	2
Neurosis	2
Polyarteritis Nodosa	1
Cerebral Tumour	1
Intracranial Aneurysm	1
Thyrotoxicosis	1
Temporal Arteritis	1
Polymyalgia Rheumatica	1
Undiagnosed	23

It will be seen that the majority of these patients were referred to departments of rheumatology or physical medicine with a diagnosis of some other disease of the locomotor system, but that in many of the others, various diseases of other systems had been suspected.

History of Psoriasis

One patient (Case 26) had psoriasis, another (Case 37) had pitting of the nails characteristic of psoriasis and three others (Cases 50, 64 and 74) had a history of psoriasis but had not had psoriatic lesions for some years.

Four other patients (Cases 9, 56, 59 and 71) had a family history of psoriasis but did not suffer from it themselves.

Age of Onset

This varied from 42 to 83 years. The mean age of onset was 61 for the total series.

The number of cases in each decade are shown in Table 4:

Age (years)	No. Men	No. Women	Total
under 50	2	3	5
50 - 59	3	29	32
60 - 69	9	21	30
70 and over	5	8	13
Total	19	61	80

It will be seen from table 4 that in 62 (78%) the first symptoms occurred between 50 and 70 years.

Locomotor Symptoms

In 35 patients the onset was so sudden that they were able to give the exact date and time of onset of symptoms. These rapidly became severe, usually within a period of one month. In the other 45 the onset was more gradual and in some was

preceded by a period of vague ill health.

In 5 patients the symptoms began following attacks of influenza or bronchitis, in one patient following cholecystectomy and in another while she was confined to bed with varicose ulcers.

At the onset of the disease pain and stiffness were usually felt around the shoulder girdle, hip girdle or spine. The initial pain occurred slightly more often in the shoulder girdle than at the other sites. In 33 patients pain and stiffness were first experienced in the shoulder girdles and in 25 in the buttocks, groins and upper thighs. Twenty-six first complained of painful stiffness of the spine. In a number of patients the symptoms began at several sites simultaneously. The patients usually stated that the pain and stiffness were felt in the muscles and that the affected muscles were tender to palpation.

In the fully developed syndrome pain and stiffness were more widespread and were felt in the shoulder girdles, pelvic girdles, spine, knees and occasionally in the elbows, wrists, fingers and ankles. There was usually limitation of movement of the shoulders and spine.

Morning stiffness lasting at least half an hour was invariably present during the active phase of the illness and in 56 patients persisted for more than 2 hours.

Symptoms compatible with giant-cell arteritis

Table 5 indicates the symptoms which may have been due to giant-cell arteritis:

Symptom		No. of patients
Headache	(total)	36
	generalised	11
	local and possibly due to arteritis	29
Visual symptoms		16
	transient unilateral blindness	3
	visual field defect	3
	transient blurring of vision	10
	visual hallucinations	1
	diplopia	6
	ptosis	1
	photophobia	6
Intellectual impairment		3
Vertigo		2
Impairment of hearing		1
Loss of smell and taste		2
Angina pectoris		5
Intermittent claudication		5

Headache

Thirty-six patients complained of headache. Of these, 11 patients complained of diffuse headache which was non-specific

in character and not associated with scalp tenderness. Five patients complained of occipital or suboccipital headache associated with upper cervical pain and limitation of neck movement. This headache and neck pain was worse in the morning and associated with neck stiffness. It was, therefore, presumed to be due to pain referred from the upper cervical spine. Of the 16 patients with diffuse headache or headache referred from the spine, 9 subsequently developed local headache.

Local headache

Local headache was present in a total of 29 patients. In 14 of these it was severe and in some so severe that it was not controlled by analgesics. In the other 15 the headache was not severe and was only disclosed on specific inquiry; these patients were more concerned about their skeletal pains. The headache was most frequently felt in one or both temporal regions, less often in the occipital region and in a few patients over the lower jaw. In those patients who had pain over the lower jaw or the occipital region, there was, as a rule, also pain in the temporal region. The headache was often felt to be superficial and in the scalp, the patients often complaining of pain in the head of a throbbing nature rather than of headache. Twenty-one of these 29 patients were aware of scalp tenderness on palpation or combing the hair. In some this was so severe that they were unable to tolerate the pressure of the pillow when lying down. The headache was

frequently intermittent in character. A feature of this local headache was that it was usually least severe in the morning and increased in intensity during the afternoon. It was aggravated by exertion, straining and coughing. In patients who had not had corticosteroids the headache most frequently persisted for 3 to 6 months. In 3 patients there was excessive loss of hair from the area of the scalp affected by the local headache.

Visual symptoms

Visual symptoms occurred in 16 patients (20%). This varied from transient blurring of vision or spots in front of the eyes to transient complete loss of vision.

Transient unilateral blindness

Transient complete loss of vision of one eye occurred in three patients.

Case 15, a man aged 73 years, had episodes of complete loss of vision lasting a few minutes starting 2 months after the onset of his temporal headaches. He also had hallucinations, which occurred intermittently for some weeks, of a woman's hand in the right temporal field. No abnormality of the fundi was found by an ophthalmologist.

Case 78, a woman aged 69, developed sudden blindness of the left eye 6 months after the onset of temporal headaches. Vision returned in a few hours. She was seen by an ophthalmologist within a few hours, who found an occlusion of the temporal branch of the central retinal artery and the visual acuity was then 1/64.

A few weeks later vision was completely normal. Two months later she developed ptosis of the left eyelid with diplopia, which cleared in a month.

Case 79, a woman aged 66, developed transient episodes of blurring of vision of the right eye three months after the onset of temporal headaches. One month later, while doing exercises in a warm pool, she completely lost the vision of the right eye. She recovered after one hour, and her vision remained normal thereafter.

Visual field defects occurred in 3 patients.

In Case 67, a woman aged 70, double vision and occasional flashes of light occurred in front of the eyes soon after the onset of temporal headaches. These visual symptoms cleared in about 1 month. Twenty months later she developed episodes of left homonomous hemianopia lasting about 15 minutes and occurring at approximately weekly intervals. They only came on when she was erect and were rapidly relieved by lying down. These symptoms cleared completely within 6 weeks of her starting corticosteroid therapy.

Case 76, a woman aged 68, noticed impairment of vision of the left eye two months before being seen. She had had headaches, and for three months had had a throbbing sensation of the left side of the head and in the left ear synchronous with the pulse. She was seen by an ophthalmologist who found an occlusion of a superior branch of the retinal artery. Within a few weeks of

starting corticosteroid therapy vision returned almost to normal.

Case 80, a man aged 68, noted a rapid onset of a field defect of the right eye four weeks after the onset of temporal and occipital headaches. When seen two weeks later he was found to have a defect in the inferior field of the right eye due to occlusion of the superior temporal branch of the retinal artery. Vision below the horizontal was absent. He was started on prednisolone, 50 mg. daily. Three days later the visual field of the right eye was almost full on waking in the morning but the visual field defect returned when he sat up. This phenomenon recurred each morning for two weeks, after which he was left with a persistent visual field defect of the right eye occupying approximately the lower quarter of the field of the right eye.

Blurring of vision

Ten patients complained of transient blurring of vision (Cases 1, 3, 5, 9, 15, 27, 33, 77, 78 and 79). Several of these also complained of spots or flashes of light in front of the eyes.

Photophobia

Six patients (Cases 3, 4, 17, 45, 50 and 68) had transient photophobia during the period when they were suffering from temporal headaches.

Diplopia

Six patients (Cases 3, 5, 33, 67, 71 and 78) developed diplopia. In five patients it cleared within a few weeks, but

in Case 33 diplopia was still present after twelve months of corticosteroid therapy. Case 78 had ptosis of the left eyelid at the same time. This cleared in four weeks.

Intellectual impairment

Three patients (Cases 69, 77 and 81) had deterioration of memory and intellect during the course of their illness.

Case 69, a man aged 76, who had worked as an accountant and had played chess for his county until just before the onset of his illness, developed severe intellectual deterioration and impairment of memory such that he was unable to play chess soon after the onset of his headaches.

Vertigo

Two patients (Cases 23 and 58) had continuous vertigo which cleared in a few weeks.

Impairment of hearing

Case 27 developed impaired hearing in the left ear eight weeks after she developed left temporal headaches but recovered normal hearing in four months.

Loss of smell and taste

Two patients (Cases 15 and 80) lost their sense of smell and taste. In Case 15 this occurred within three months of the onset of his temporal headaches. In Case 80 this occurred one month after the onset of his temporal headaches, and had not recovered six months later. This occurred at the same time

that he developed a defect in the field of vision of his right eye.

Angina pectoris

Angina pectoris developed in five patients (Cases 3, 33, 45, 68 and 80) during the acute phase of the illness. This has persisted in all of them, although in four (Cases 3, 33, 45 and 68) there appeared to be some improvement in their exercise tolerance following corticosteroid therapy.

Intermittent claudication

Intermittent claudication began in five patients (Cases 15, 33, 51, 58 and 72) during the illness. Improvement occurred over several months in two (Cases 51 and 72) and over three years in Case 58. The other two showed no improvement.

Interval between onset of locomotor symptoms and local headache

The exact time of appearance of local headache was often difficult to determine. The interval between the onset of locomotor symptoms and local headache is indicated in Table 6:

Interval (months)	No. of patients with local headache
• - 1	1
0 - 3	9
4 - 6	2
7 - 9	1
10 -12	2
13 -24	7
25 -36	2
over 36	1
unknown	4

• The local headache appeared one month before the onset of locomotor symptoms.

It will be seen that in almost one half of the patients local headache developed within six months of the onset of the locomotor symptoms, and in only three did it appear more than two years later; the longest interval was 49 months.

Constitutional symptoms were present in all. In the majority of patients this started at the onset of pains or within a few weeks. In some there was a slow deterioration of general health

over several months, which either preceded the locomotor symptoms or occurred at the same time.

Fatigue and malaise were present in 75 patients (94%).

Depression was very common, 56 patients admitting to being unduly depressed. Some stated that this was due to the severe pains, whereas others did not know why they were depressed.

Anorexia and dyspepsia were present in 42 and 29 cases respectively. It was often difficult, particularly in those who were depressed, to assess whether the dyspepsia was directly associated with the underlying disease or was attributable to the analgesics that they were usually taking. Seven of these patients had a previous history of a peptic ulcer and a hiatus hernia was found in three.

Loss of weight is indicated in Table 7:

Weight loss (lbs.)	No. of patients
0 - 7	29
8 - 14	15
over 14	36

The mean weight loss of the group as a whole was 11 lbs., but 45% of the patients lost over 14 lbs. in weight. The greatest weight loss observed was 42 lbs. When the onset of the illness was acute, the maximum weight loss usually occurred within the first few months. Where the onset was gradual it occurred during the height of the illness.

The patients' subjective assessment of the degree of constitutional illness was graded as follows and the number of patients in each grade is indicated in Table 8:

grade 1. Perfectly fit.

" 2. Not well but able to continue working.

" 3. Too ill to work.

" 4. Virtually bedridden.

Grade	No. of Patients	Percentage
1	3	4
2	29	36
3	27	34
4	21	26
Total:	80	100

It will be seen that 60% of the patients felt too ill to work.

General examination

Apart from the abnormalities in the locomotor system and in some cases in the arteries, the findings on general examination were as might be expected in a population of this age.

B. Joints and Ligaments

(a) Clinical

In the locomotor system many had, as has been previously mentioned, evidence of osteoarthrosis and disc degeneration.

A characteristic feature of this syndrome was the painful limitation of movement of the shoulder girdles with less frequent pain on hip motion. There was also frequent painful limitation of movement of the spine, the cervical and lumbar spine being most frequently affected. Painful limitation of movement of other joints was found less frequently. The range of joint movement was often greater after the patient had been active for some hours, than on awakening.

Tenderness, often with synovial thickening of joints, especially the sterno-clavicular and acromio-clavicular joints was very common. Multiple focal tender areas at sites of attachment of tendons and ligaments were present in all patients usually around the shoulder girdle, pelvis, knees, wrists, manubro-sternal and costo-chondral joints and occasionally the fingers. In those patients with limitation of the spine, focal tender areas were often present over the interspinous ligaments.

Tender focal points and synovitis

The frequency of occurrence of synovitis, and effusion of, and focal tender areas around joints, is shown in Table 9:

Joint	Tenderness of or around joints		Synovial thickening or effusion	
	No.	%	No.	%
Sterno-clavicular	55	69	34	43
Acromio-clavicular	59	72	15	19
Shoulder	56	70	6	8
Wrist	28	35	10	12
Pelvis or hip	55	69	0	0
Knee	57	71	40	50
Finger	7	9	5	6
Tempero-mandibular	4	5	0	0

Tenderness of the interspinous ligaments was present in:

the cervical region in 51 patients (64%)

" dorsal " " 26 " (32%)

" lumbar " " 44 " (55%)

In 61 cases (76%) there was limitation of shoulder girdle range of movement. In 53 of these it was bilateral and unilateral in the other 8. In 4 other cases no information was available about the range of movement.

Synovial thickening or effusion was present at some time during the course of the illness in 55 (69%) of these 80 patients. As a rule the synovitis lasted only a few weeks in any one joint. The synovitis was frequently symmetrical, but was occasionally asymmetrical, and then weeks or months after the changes in a joint had subsided an episode of synovitis in the same joint in the opposite limb might occur.

In a few cases, especially where the patient continued at work, the synovitis persisted in a joint for several months, but in the majority the transitory nature of the synovitis was often striking, particularly when patients were brought into hospital and their activities were curtailed. Objective evidence of synovitis often cleared within a few days or weeks. A characteristic example was Case 81 who was admitted to hospital with fluctuant swellings of the sterno-clavicular joints the size of ping-pong balls and a moderate effusion in the left knee. Within a week the effusion in the knee had cleared and the synovitis of the sterno-clavicular joints was barely detectable, but at biopsy the synovium of the right sterno-clavicular joint was found to be thickened and inflamed. One week later there was no clinical evidence of synovial thickening of the left sterno-clavicular joint.

The focal tender areas of tendons, ligaments and capsules were more persistent, and usually lasted for several months and often for the entire duration of the illness.

Residual changes in the sterno-clavicular joints

No residual joint changes have been reported in patients with polymyalgia rheumatica. However, in seventeen of the patients in this series residual instability of the sterno-clavicular joints has been found, which has persisted for as long as they have been followed. The relationship between the detection of synovial thickening in these joints and the subsequent recognition of instability in them is shown in Table 10:

Case No.	Instability (Graded 0-4) Rt.	L.	Synovial Thickening (Graded 0-4) Rt.	L.	Duration of follow-up Months	Final Diagnosis
1	0	2	0	0	39	? G.C.A.
5	2	0	2	0	38	G.C.A.
9	3	3	3	3	29	? G.C.A.
13	2	0	3	0	19	P.R.
18	3	3	2	2	22	P.R.
23	3	2	N.S.	N.S.	85	? G.C.A.
24	2	3	3	3	29	P.R.
28	4	3	2	2	15	G.C.A.
37	3	4	3	3	35	P.R.
44	3	2	2	2	35	P.R.
45	3	2	2	2	18	G.C.A.
56	2	3	2	2	49	P.R.
58	3	2	N.S.	N.S.	72	G.C.A.
66	2	2	2	0	22	P.R.
76	2	3	N.S.	N.S.	10	G.C.A.
77	2	0	0	0	38	? G.C.A.
81	4	4	4	4	26	G.C.A.

The incidence of instability of the sterno-clavicular joints is almost certainly higher than is recorded here, as we were not aware of this feature early in the study.

From Table 10 it will be seen that in most patients there was some correlation between the degree of joint instability and the preceding synovial thickening. In a few the instability of the joint was greater than would have been expected to follow the previous degree of synovial thickening, but the difficulty of assessing the degree of synovial thickening particularly in obese subjects must be stressed. It is also likely that in some cases with joint instability where no synovial thickening was recorded, this had resolved by the time the patient was seen. As stability of the sterno-clavicular joints depends mainly on the integrity of the supporting ligaments it is likely that in some patients the inflammatory process was more active in the ligaments and peri-articular structures than in the synovium. This would correspond with the clinical impression gained and would explain this discrepancy.

It is not known whether these sterno-clavicular joints eventually became stable again as these patients have not been followed for a sufficiently long period of time. However, during the period of observation no definite decrease in the degree of instability has been observed.

(b) Biopsies of the sterno-clavicular joints

Biopsies of the sterno-clavicular joints were obtained from four patients (Cases 24, 33, 34 and 51). When the sterno-clavicular joint biopsies were performed there was clinical evidence of very

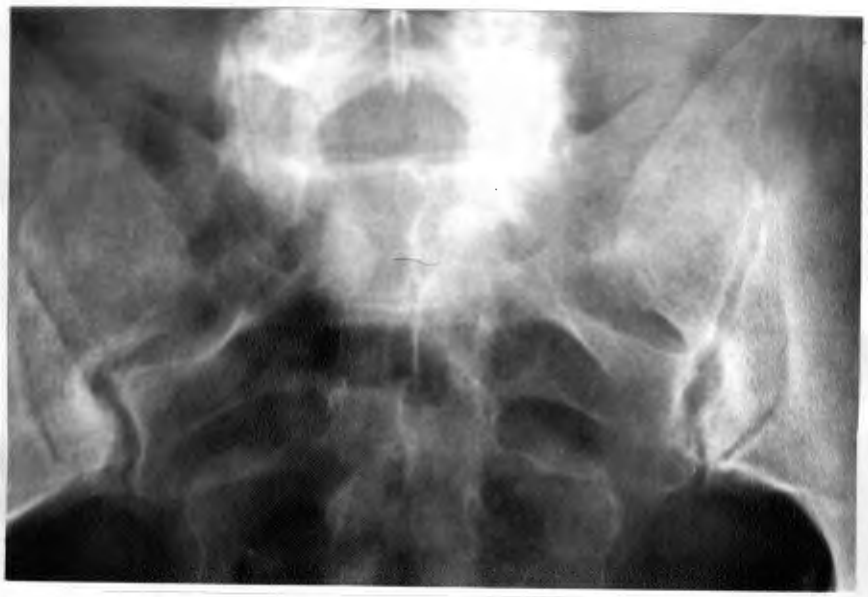
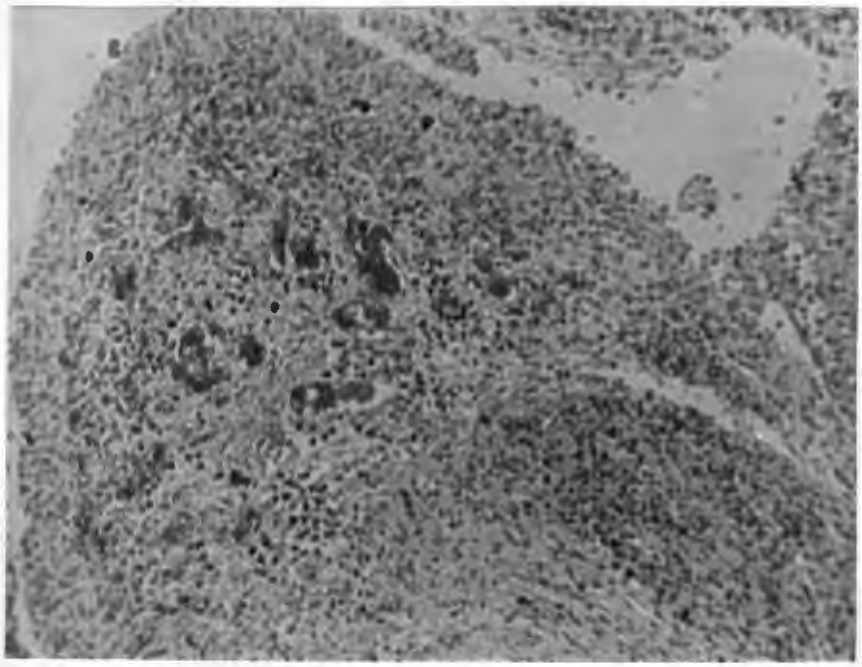
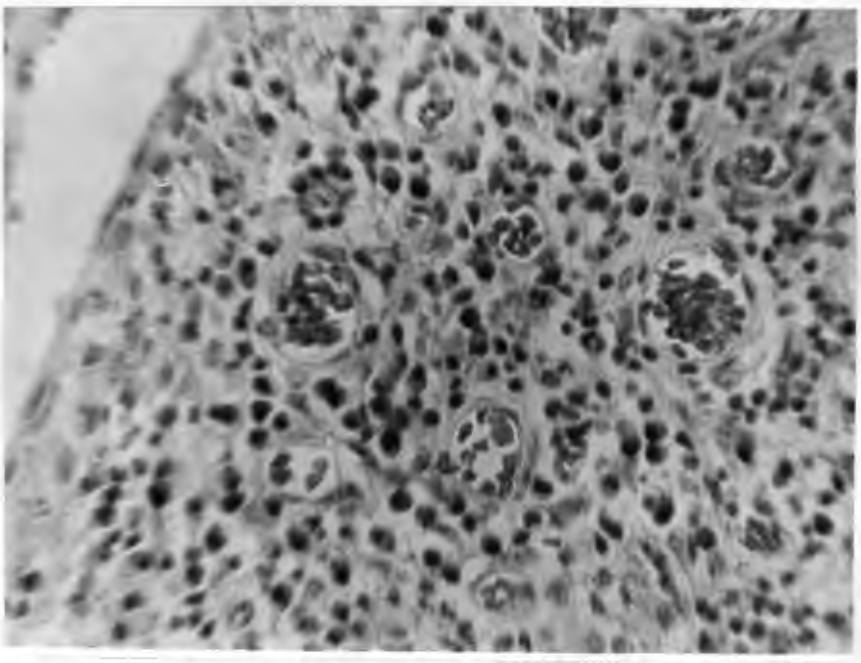
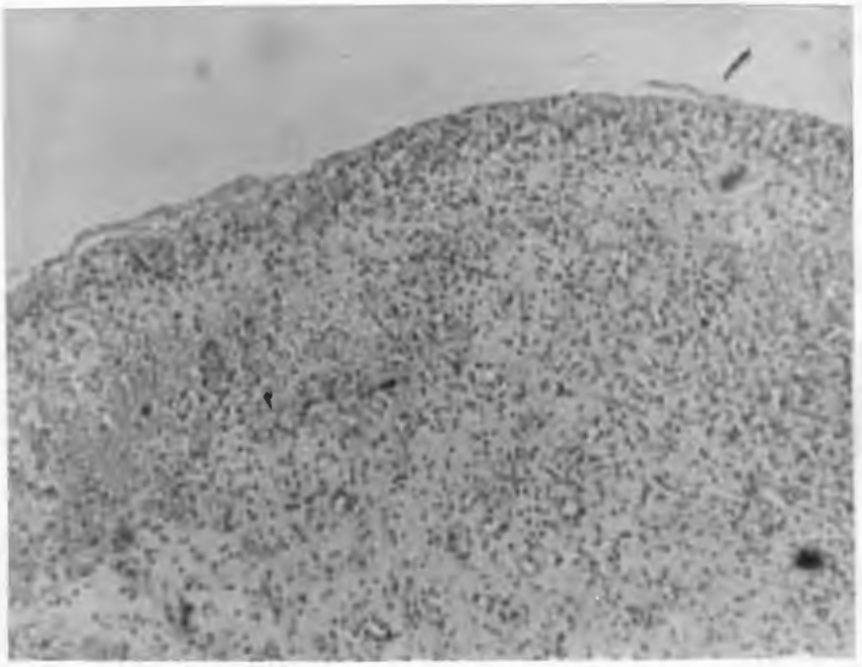


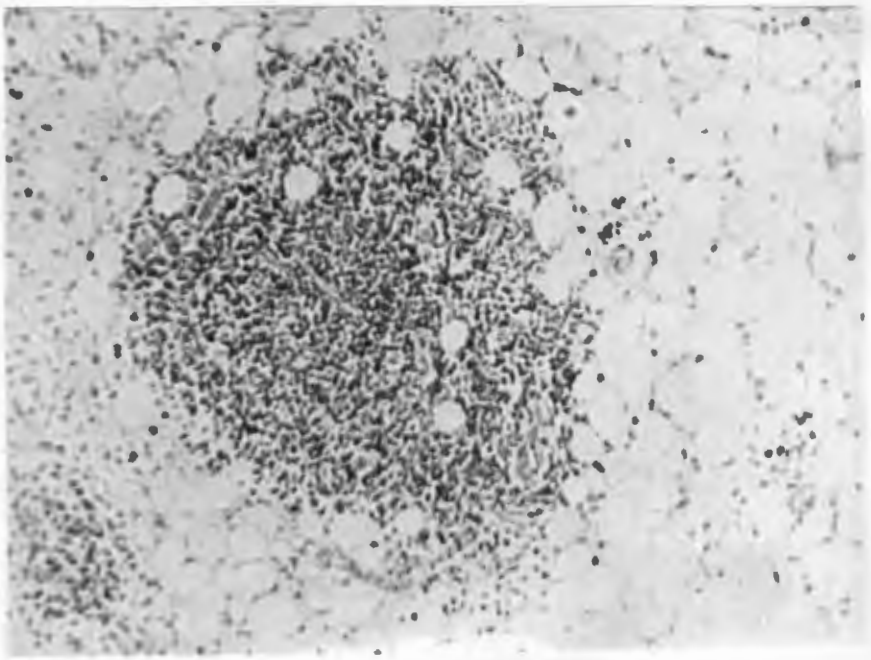
Fig. 7 Case 23
Radiograph (February 1960) showing minimal erosion and sclerosis of the left sacro-iliac joint, 2 years after the onset of polymyalgia rheumatica (Page 123).



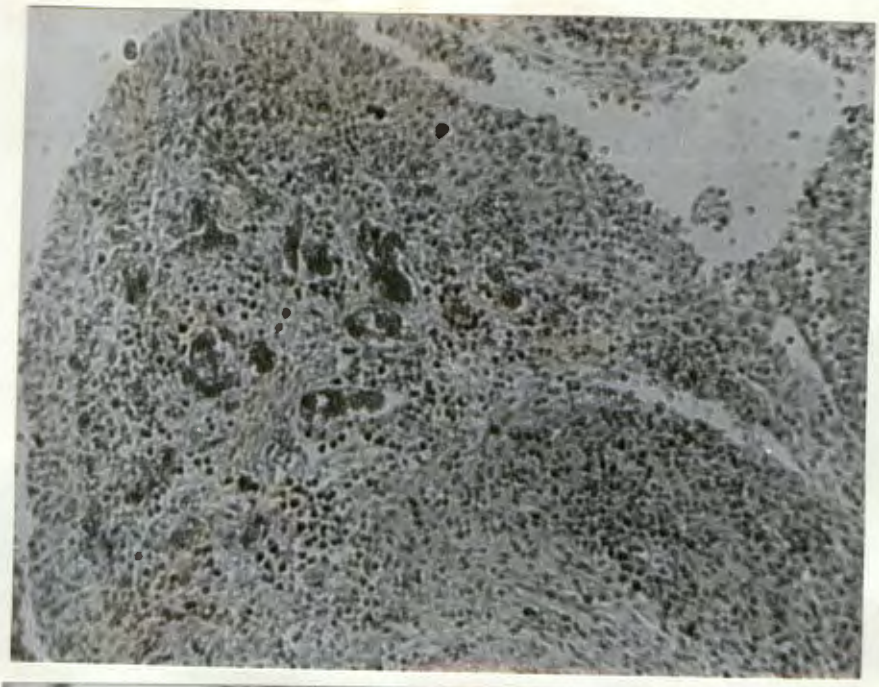


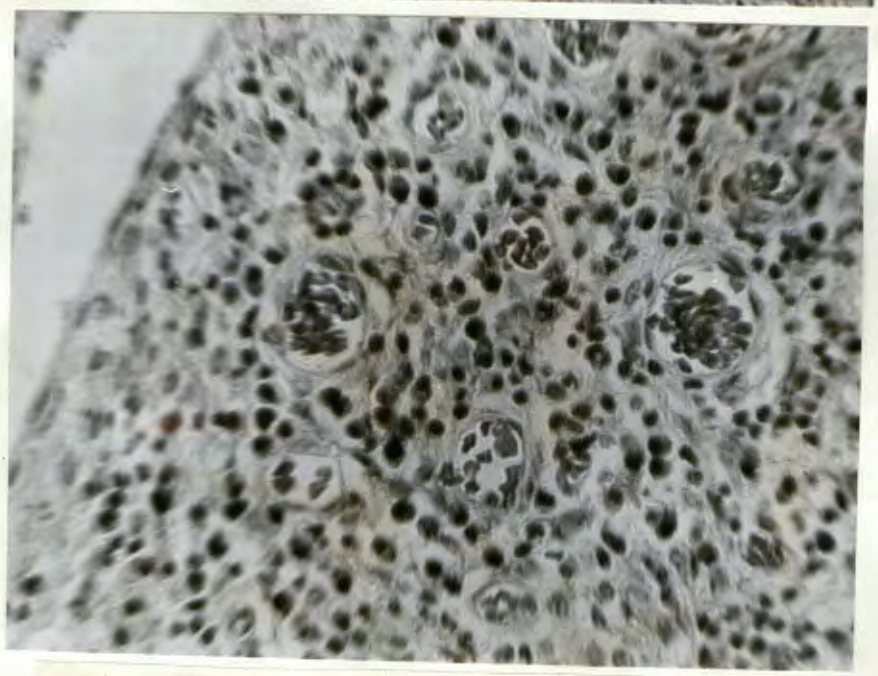
Figs. 3 and 4 Case 33
Photomicrographs showing synovial hypertrophy, increased vascularity and infiltration with lymphocytes, plasma cells and occasional polymorphs, (H. and E. x 160 and x 900).



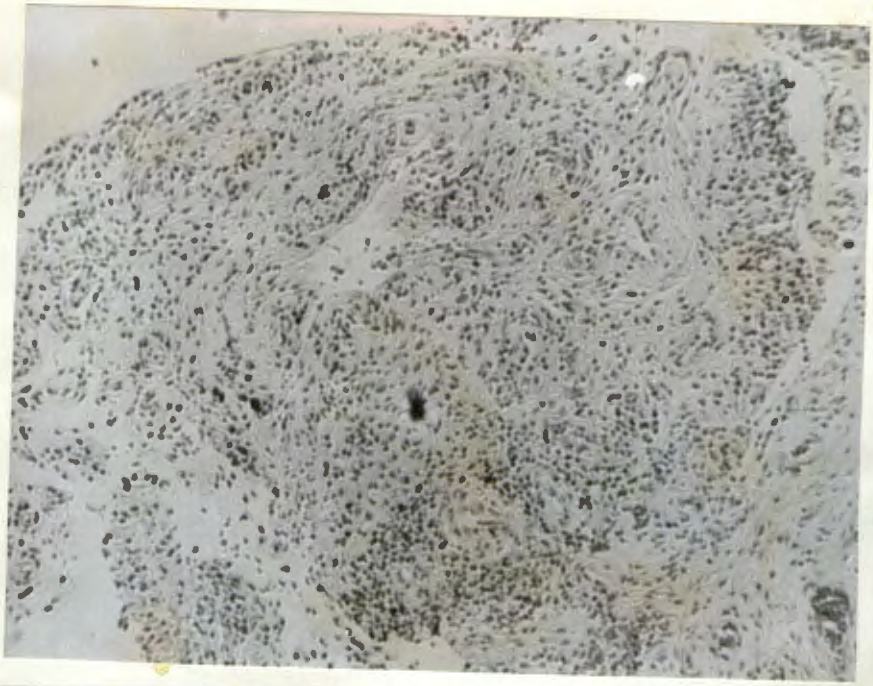


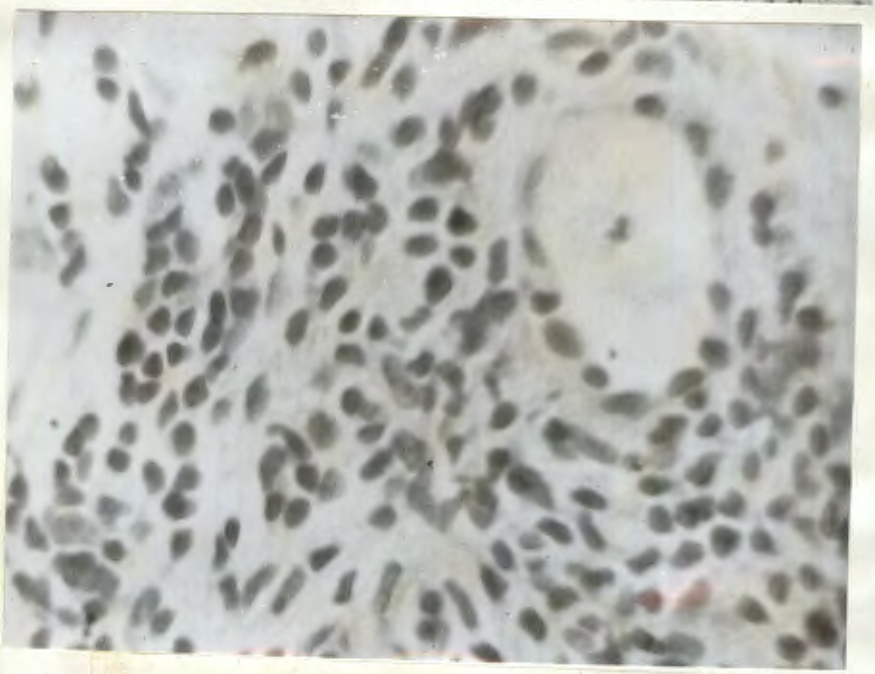
Figs. 1 and 2 Case 24
Photomicrographs of synovium of sterno-clavicular joint showing synovial hypertrophy, cellular infiltration and lymphoid follicle in subsynovial tissue, (H. and E. x 160 and x 300).





Figs. 3 and 4 Case 33
Photomicrographs showing synovial hypertrophy, increased vascularity and infiltration with lymphocytes, plasma cells and occasional polymorphs, (H. and E. x 160 and x 900).





Figs. 5 and 6 Case 81
Photomicrographs showing synovial hypertrophy and cellular infiltration (H. and E. x 160 and x 900).

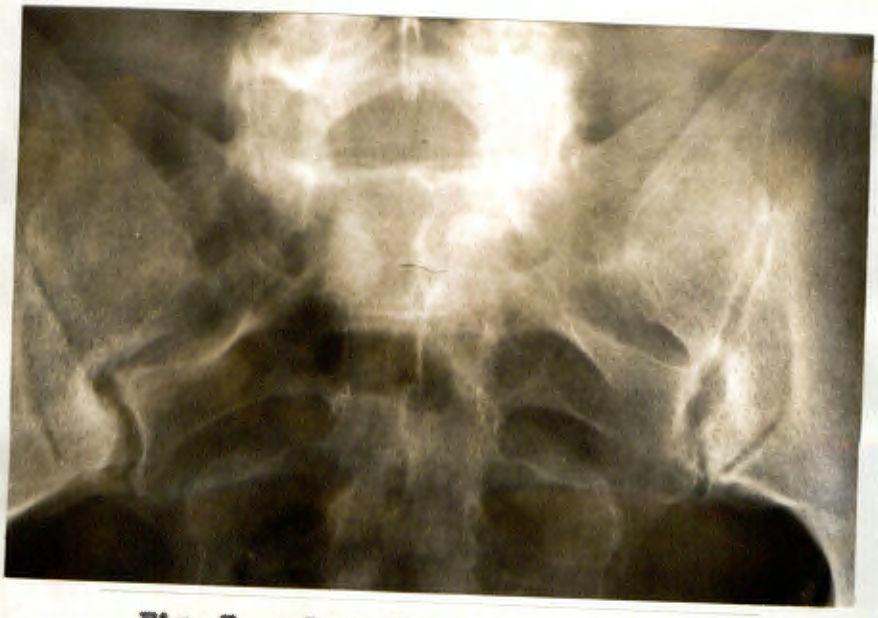
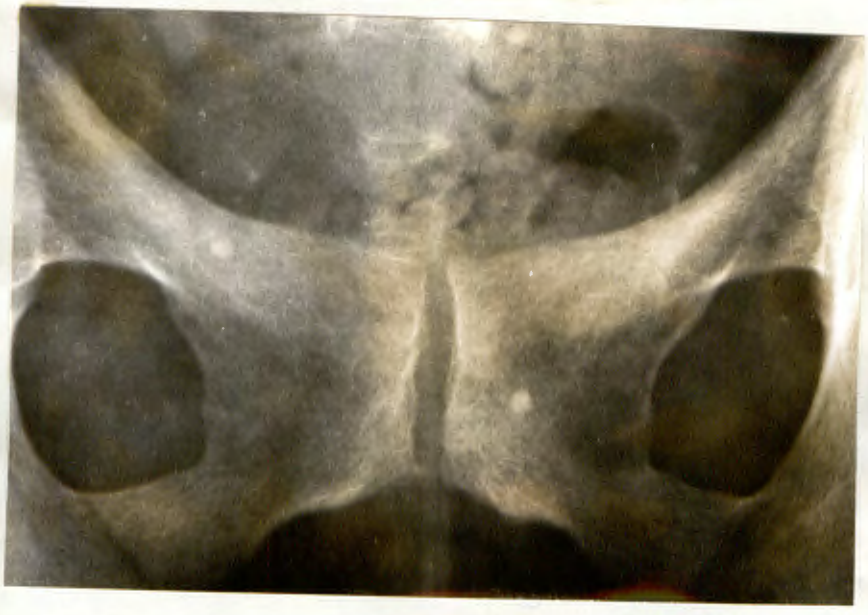


Fig. 7 Case 23
Radiograph (February 1960) showing minimal erosion and sclerosis of the left sacro-iliac joint, 2 years after the onset of polymyalgia rheumatica (Page 123).

Fig. 8 Case 23
Radiograph showing normal pubic symphysis (February 1960).



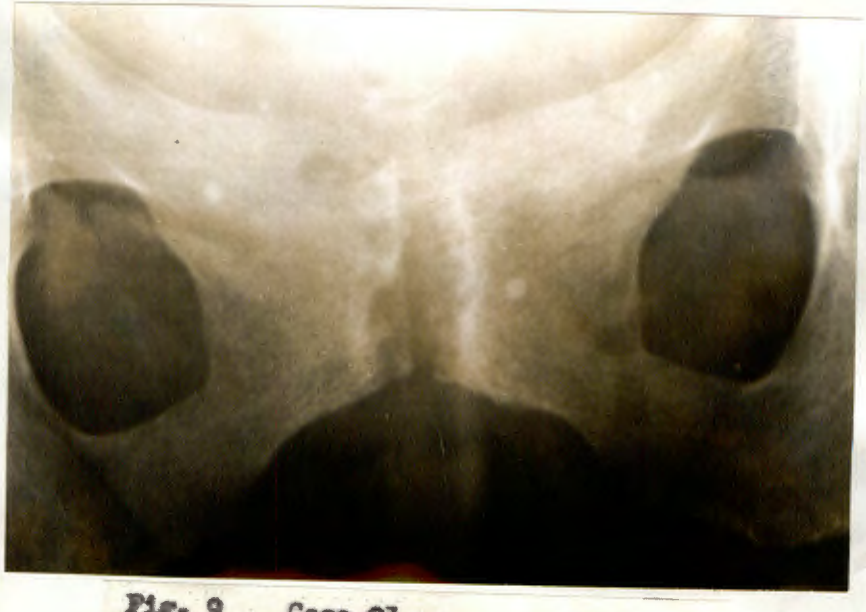


Fig. 9 Case 23
Radiograph showing marked erosion of the pubic symphysis, (August 1963).

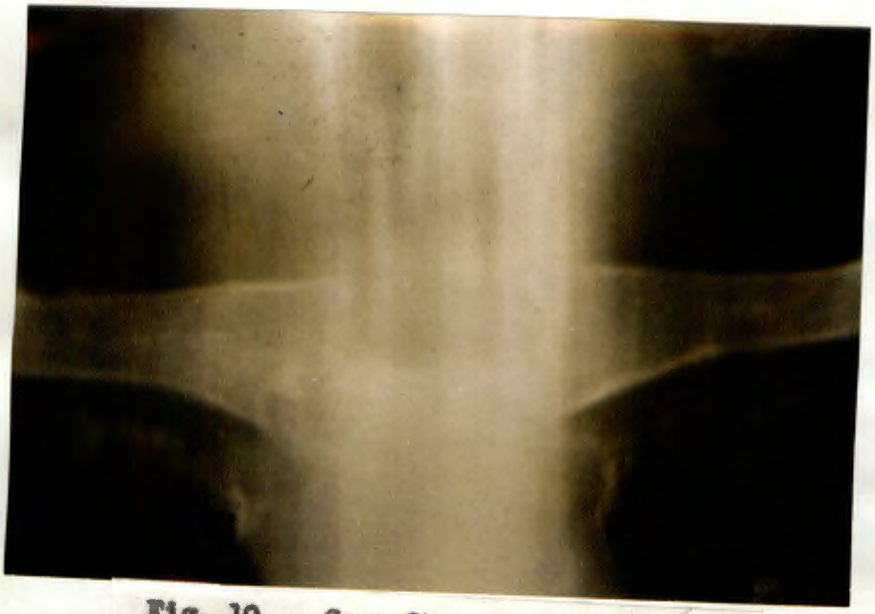


Fig. 10 Case 24
Tomogram showing erosion of the right sterno-clavicular joint.

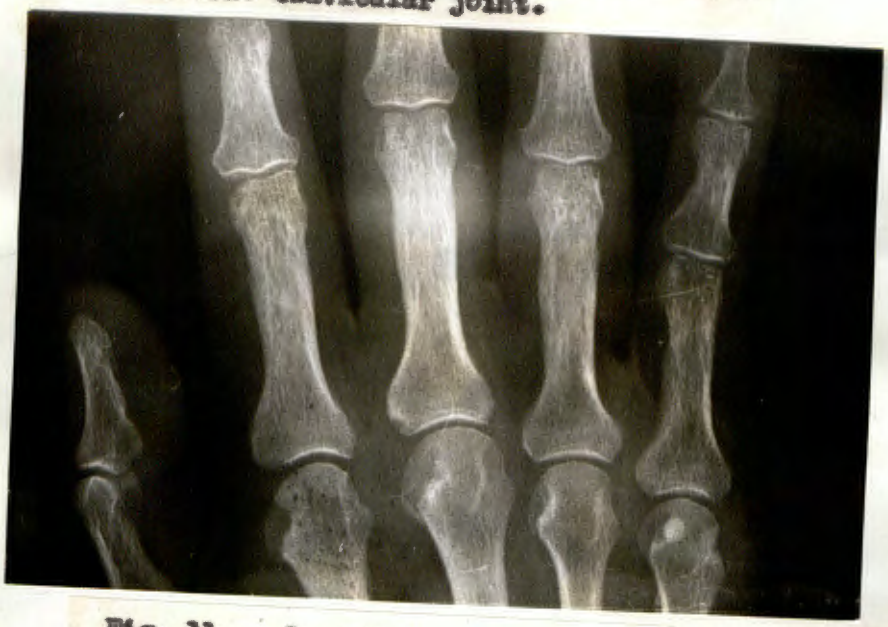


Fig. 11 Case 24
Radiograph showing erosion of the metacarpo-phalangeal joint of the left middle finger.

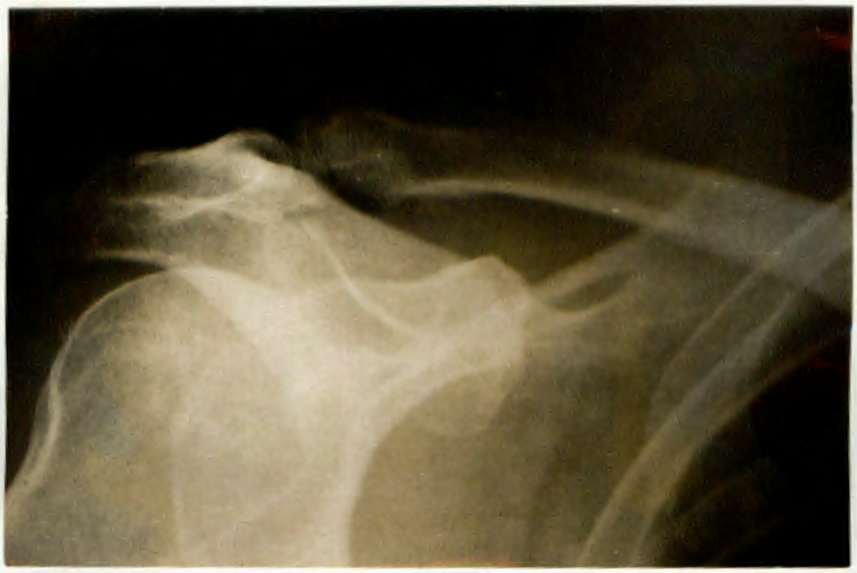


Fig. 12 Case 26
Radiograph showing erosion of the right acromio-clavicular joint.

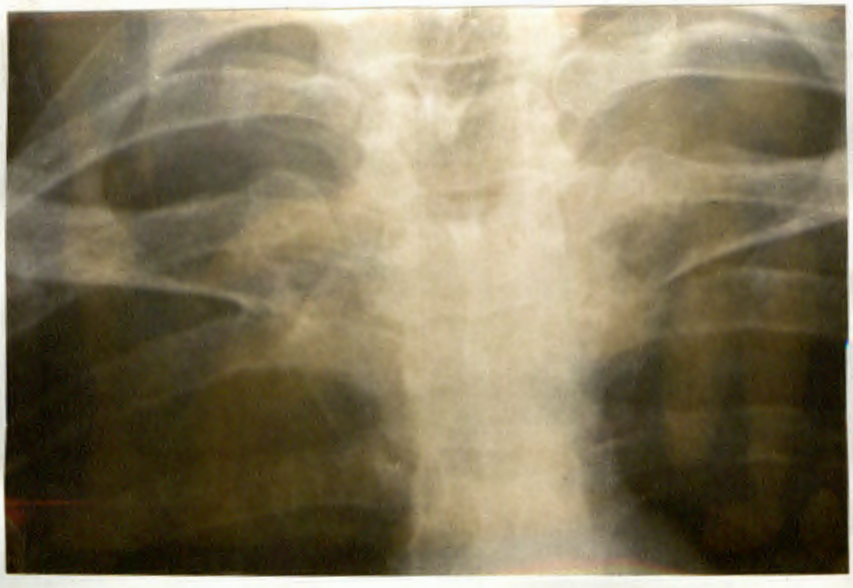
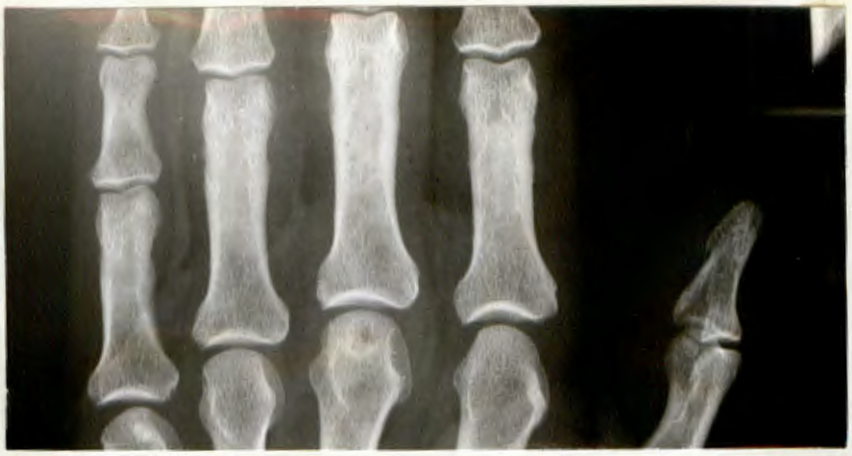
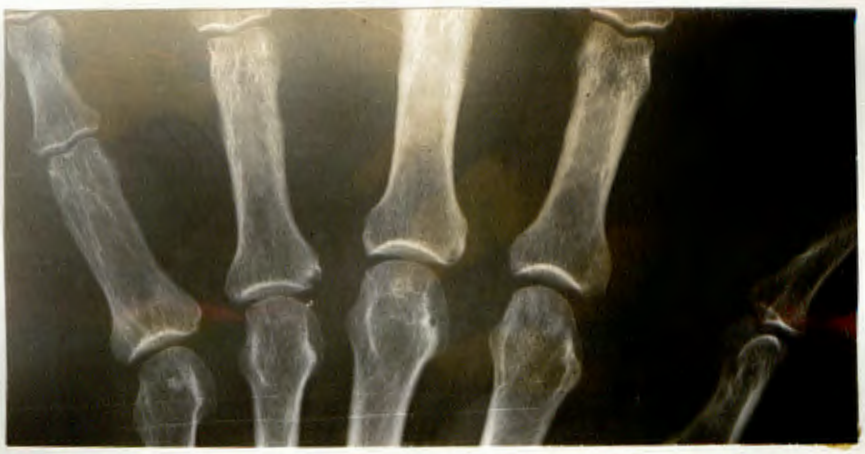
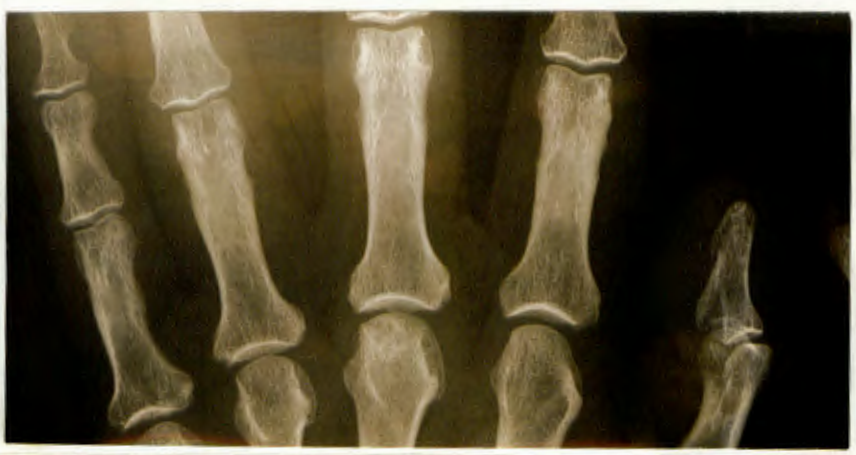


Fig. 13 Case 28
Radiograph showing erosion of the right sterno-clavicular joint.

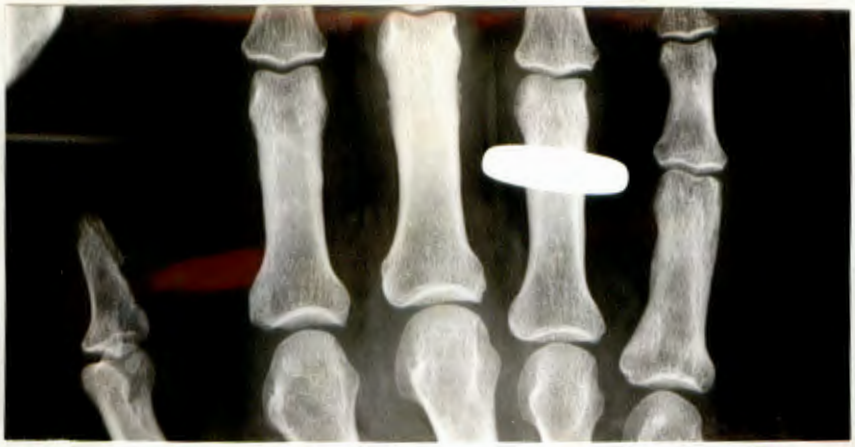


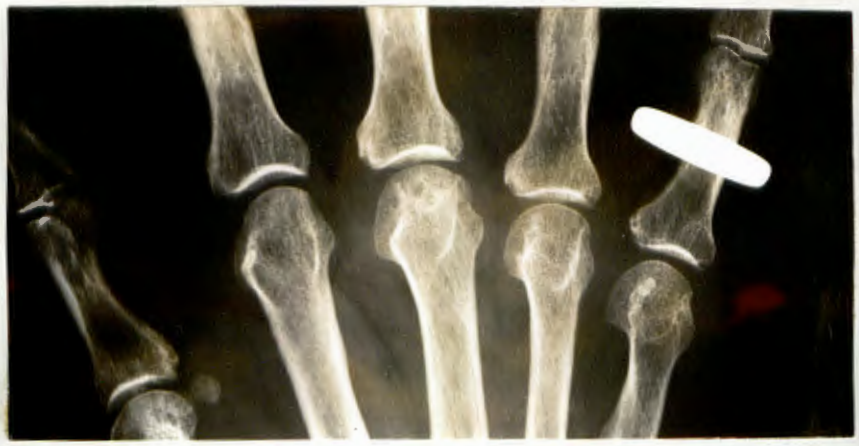


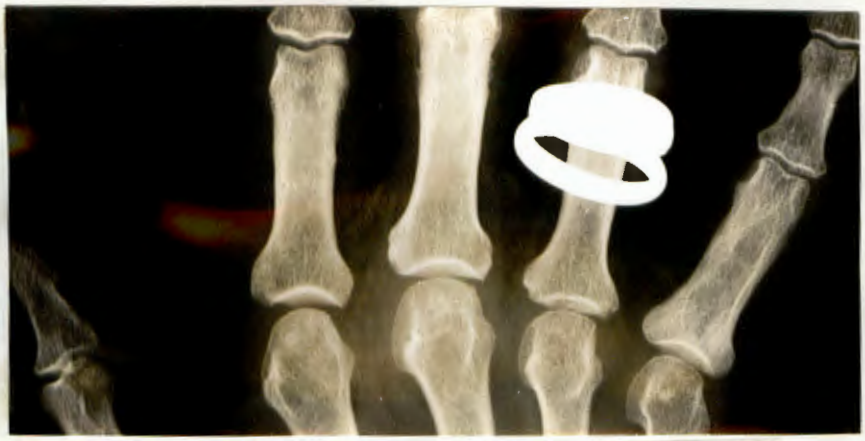


Figs. 14, 15 and 16 Case 29

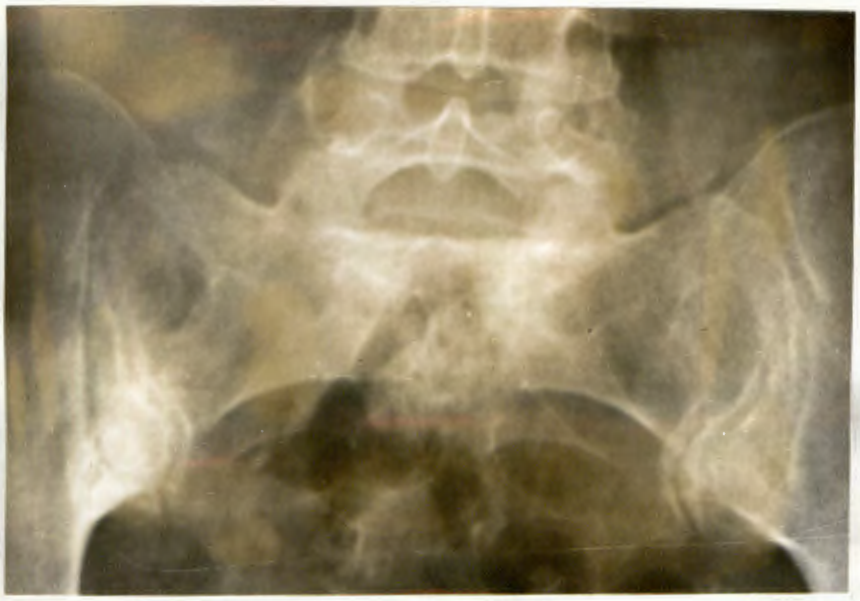
Radiographs of the right hand showing cyst in middle metacarpal bone (December, 1961), erosions of metacarpo-phalangeal joints (January, 1963) and healing of the erosions (January, 1965).

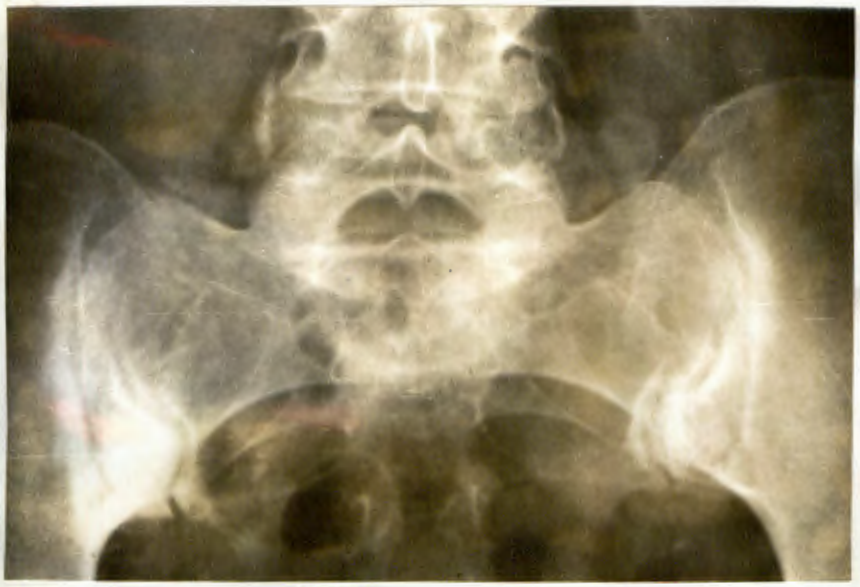






Figs. 17, 18 and 19 Case 29
Radiographs of left hand showing early erosions of metacarpo-phalangeal joints (December 1961), increased erosions of metacarpo-phalangeal joints (January 1963) and healing of erosions (January 1965).





Figs. 20 and 21 Case 29
Radiographs showing minimal erosion and sclerosis of the right sacro-iliac joint (December 1961) and increased sclerosis of both sacro-iliac joints (January 1965).

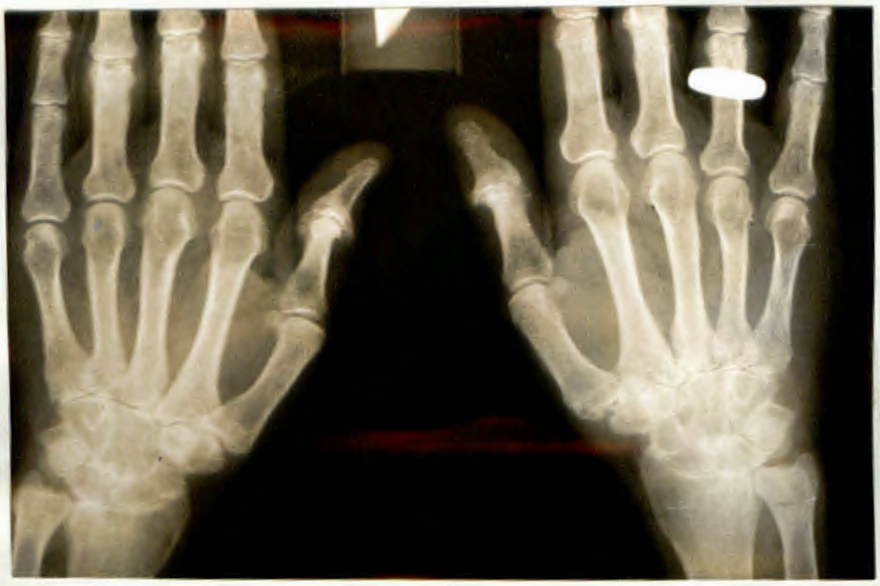


Fig. 22 Case 50
Radiographs of hands showing loss of cartilage and erosions of the wrist and proximal interphalangeal joints (November 1964).

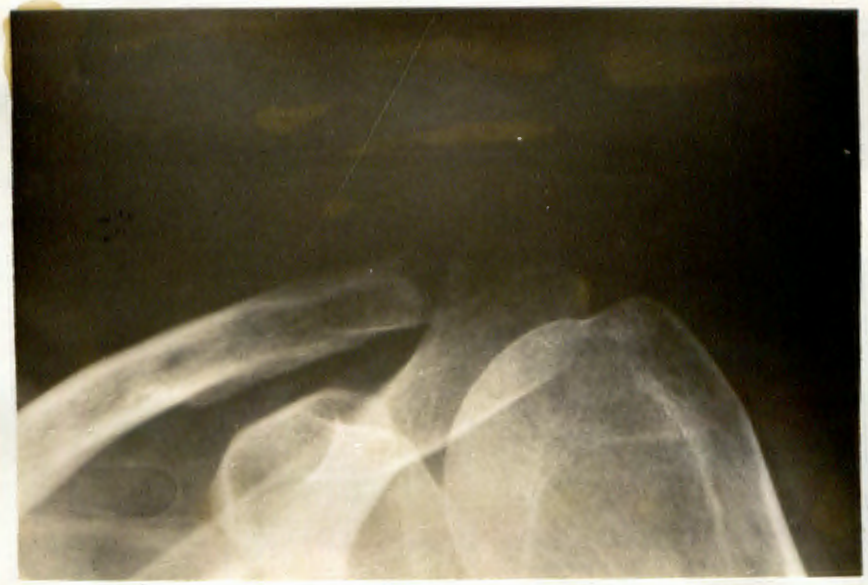


Fig. 23 **Case 66**
Radiograph showing marked erosion of the right acromio-clavicular joint.

inflammatory changes. In the other two (Cases 24 and 81) there were perivascular foci of lymphocytes and plasma cells. The changes were those of a non-specific inflammation of the capsule.

C. Radiological changes in joints

As has previously been mentioned all the patients in this series had changes of degenerative disc disease and many also had evidence of degenerative joint disease on radiological examination. Erosive changes of joints and/or sclerosis of the sacro-iliac joints on radiological examination appeared in 8 cases during the illness (Figs. 7-23). The joints affected were the sterno-clavicular, acromio-clavicular, wrist, proximal interphalangeal and sacro-iliac joints and the symphysis pubis.

The sites and severity of joint erosion, the final diagnosis and the presence of psoriasis are indicated in Table 11:

Case No.	Diag.	S.C.J.		A.C.J.		Wrist		M.C.P. and P.I.P.		S.I.J.		Pubis	Psoriasis
		R.	L.	R.	L.	R.	L.	R.	L.	R.	L.		
23	?G.C.A.									2		4	
24	P.R.	3x						2	2				
26	?G.C.A.			2									+
28	G.C.A.	4											
29	?G.C.A.							2	2	3	2		
37	P.R.	2		3	4	2	2			2		2	+
50	?G.C.A.					3	3	3	2				+
66	P.R.			4	2					•			

x Case 24 developed erosions of the right sterno-clavicular joint after a biopsy had been performed.

• Case 66 had partial fusion of the right sacro-iliac joint, which was presumed to be related to an old healed tuberculous lesion of this joint.

In five of these patients (Cases 23, 26, 28, 29 and 66) the clinical picture and course of the illness were indistinguishable from the other patients but they developed erosions. The distribution of the erosions in the joints was not characteristic of any recognised inflammatory polyarthritis. Three patients (Cases 24, 27 and 50) developed unusual features. One (Case 24) presented with a clinical picture not unlike the other patients in the series, but after 2 years developed erosions of the proximal interphalangeal joints, which were compatible with the changes of

rheumatoid arthritis, but the S.C.A.T. has remained negative and she has not developed subcutaneous nodules. Case 37 developed erosions of the acromio-clavicular joints 2 years after the onset of her polyarthritis which, at the onset, was indistinguishable from that of the other patients. At the same time she developed pitting of the nails characteristic of psoriatic nail changes. Radiological examination 3 years after the onset of her illness revealed erosions of both acromio-clavicular joints, the right sterno-clavicular joint, both wrists, the right sacro-iliac joint and the pubis. On clinical examination at this time, she still had limitation of shoulder girdle range, and synovial effusions of both knees. She had, however, developed moderate limitation of wrist movement and instability of the terminal interphalangeal joints. Her clinical picture was then indistinguishable from that of psoriatic arthropathy. Another patient (Case 50) who also had psoriasis developed radiological changes and clinical features which were not unlike those of psoriatic arthropathy, but had a sedimentation rate persistently above 100 mm. for over 3 years and had a history suggestive of arteritis of the temporal arteries. It is of interest that three-eighths of the patients with erosive changes of joints had psoriasis. Five patients (6%) in the whole series had a history of psoriasis. The other two patients in the series with psoriasis did not have erosions but as the duration of their

polymyalgia symptoms was less than one year, the possibility that these two may yet develop erosions cannot be ruled out.

Excluding the one patient who was considered to have psoriatic arthropathy, the presence or a history of psoriasis in 5% of the patients in this series is not significantly higher than would have been expected, as Lomholt (1963) found the incidence in the general population to be almost 3% and it is likely that the incidence rises with increasing age.

There are, therefore, two possibilities in patients with polymyalgia rheumatica who have joint erosions and psoriasis. Firstly that those patients with apparent polymyalgia rheumatica and erosive joint changes are in fact cases of atypical psoriatic arthropathy, or secondly as erosions may occur in patients with polymyalgia rheumatica psoriasis in some way enhances the chances of erosions occurring in patients with polymyalgia rheumatica. As erosive changes of joints were also present in other cases without psoriasis both possibilities may in fact be correct.

As none of these patients have been followed for a sufficiently long time and the aetiology of polymyalgia rheumatica is unknown, the possibility that the radiological changes in all these patients are related to the same disease cannot be ruled out, unless some of these patients develop typical features of one of the defined rheumatic diseases.

Summary

Focal tender areas were present in all these patients and in the majority these were widespread. Transient synovial thickening or synovial effusions were present in 69% of the patients, most often in the sterno-clavicular joints and also frequently in the knees.

Biopsy of the sterno-clavicular joints in 3 patients revealed thickening of the synovium with villous hypertrophy. The histological changes in these 3 sterno-clavicular joints were those of an active non-specific synovitis. In two patients there were also non-specific inflammatory changes in the capsule. Residual instability of the sterno-clavicular joints resulted in several patients in whom there had been tenderness or synovitis in these joints.

Erosive changes in joints on radiological examination appeared during the course of the illness in 8 patients. The relationship of these patients to the other patients with polymyalgia rheumatica is at present not definitely known, but it is possible that in several of these patients the erosive changes are manifestations of the same disease. However, in one patient (Case 37) it was considered that she was not suffering from the same disease but was probably suffering from psoriatic arthropathy.

Comment

In spite of the fact that the criteria for inclusion of patients in this series were not strict it is indeed surprising that in almost all the patients the locomotor manifestations appeared to follow a similar pattern. Whether those with erosive joint changes have a different disease awaits long-term observation of the disease. At the time of writing, only one patient (Case 37) was considered not to be suffering from polymyalgia rheumatica but to have psoriatic arthropathy.

C. Muscles

(a) Clinical

Tenderness

This was usually widespread. Painful muscles were frequently tender to palpation, the muscle groups usually affected being the shoulder and hip girdle and paravertebral muscles.

Weakness and Wasting

Muscle weakness was not usually found. Apparent subjective or objective muscle weakness was common, but normal power was restored following local injection of 1% Lignocaine into the tender focal area, usually at the origin or insertion of the affected muscle. Only one patient (Case 15) had objective evidence of weakness and wasting which affected mainly the quadriceps and hip girdle muscles. This occurred after he had been treated with 30 to 60 mg. prednisolone daily for three months. No other patients had muscle wasting which was incompatible with the local joint changes and the general loss of weight.

Muscle shortening

No evidence of muscle shortening was found in any of these patients. In two (Cases 33 and 34) there was apparent shortening of the quadriceps muscles on flexing the knee with the patient lying prone. This apparent muscle shortening was abolished by local infiltration of Lignocaine 1% into the tender focal areas; these were principally in the origins of the rectus femoris and sartorius muscles.

Figs. 24 to 30

Illustrations showing distribution of the pain referred from the sterno-clavicular joints, which was felt to be in the muscles.

Fig. 24 Case 2

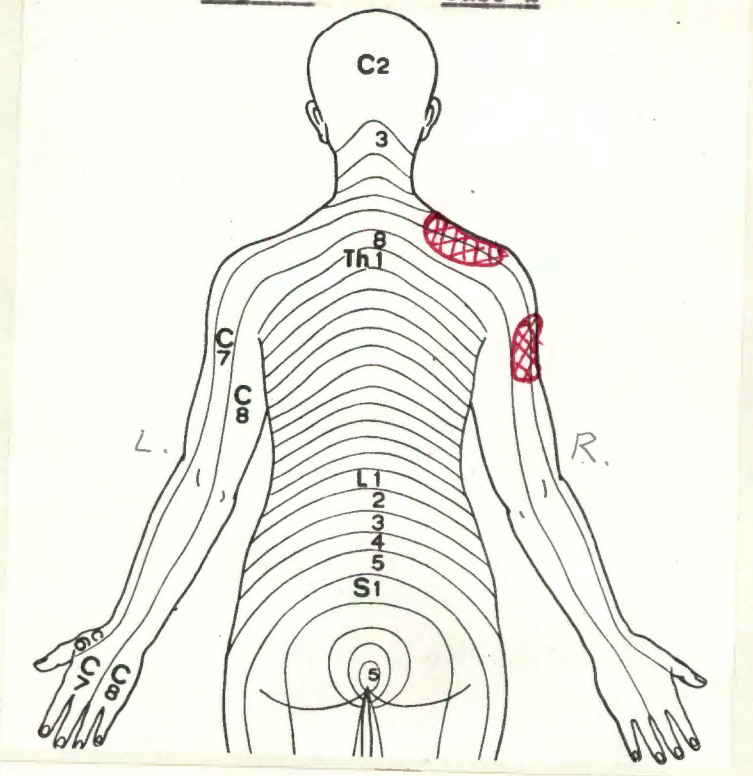


Fig. 25 Case 5

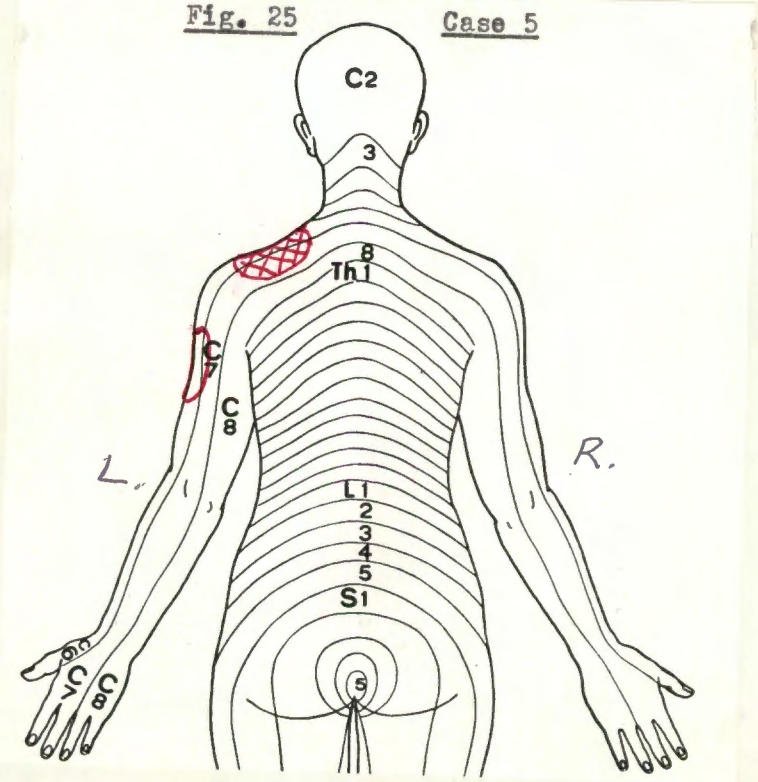


Fig. 26 Case 7

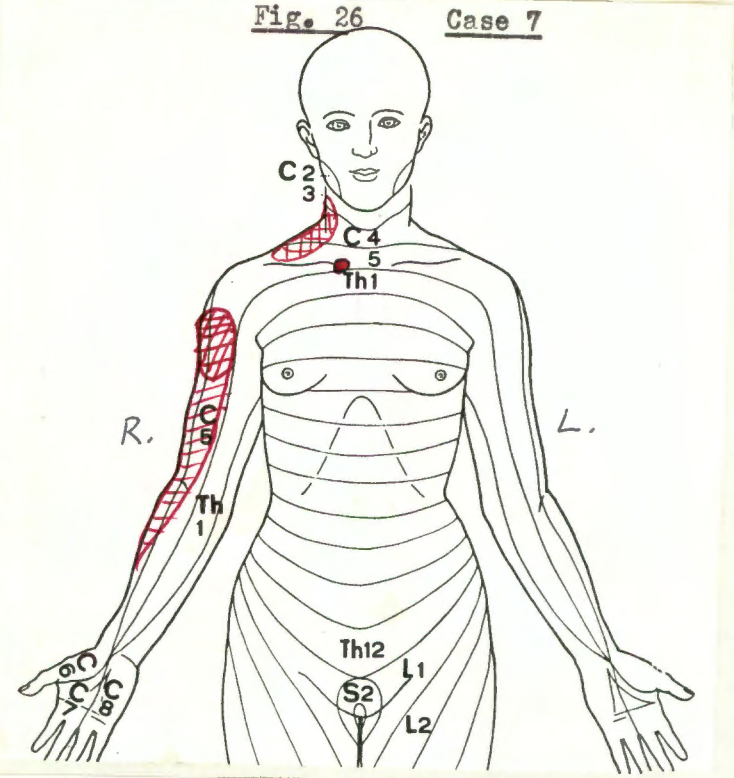


Fig. 27 Case 8

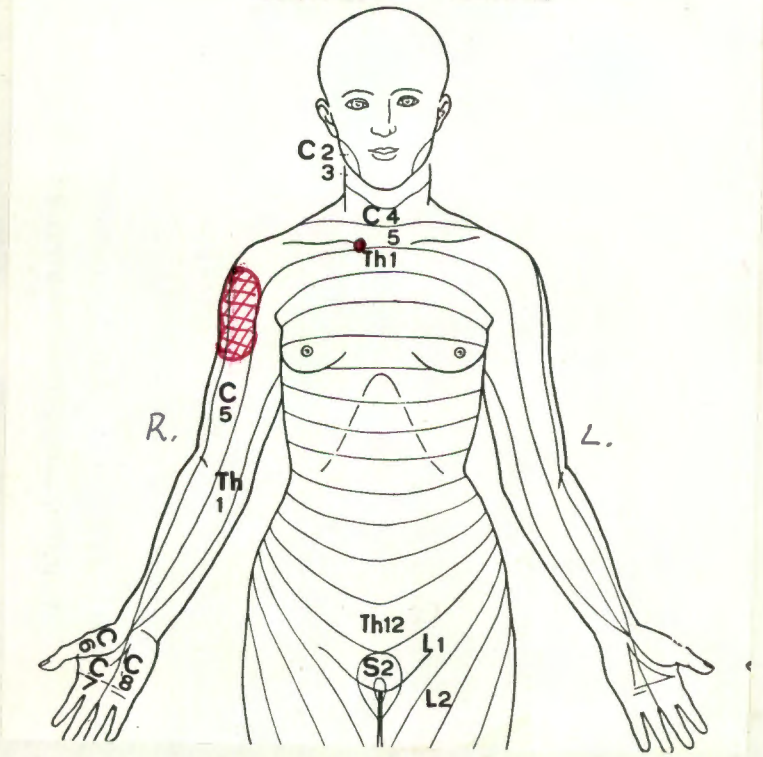


Fig. 28 Case 13

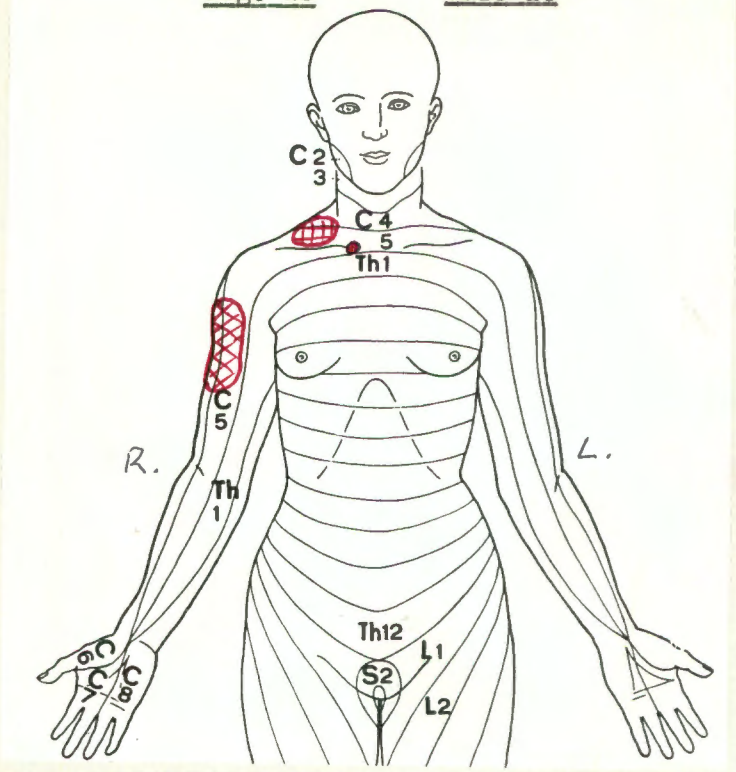


Fig. 29 Case 24

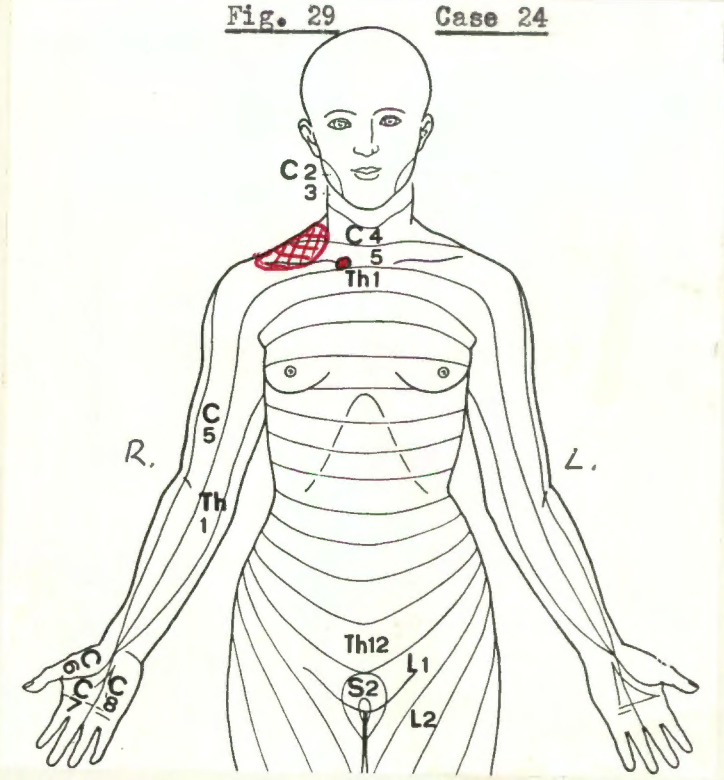
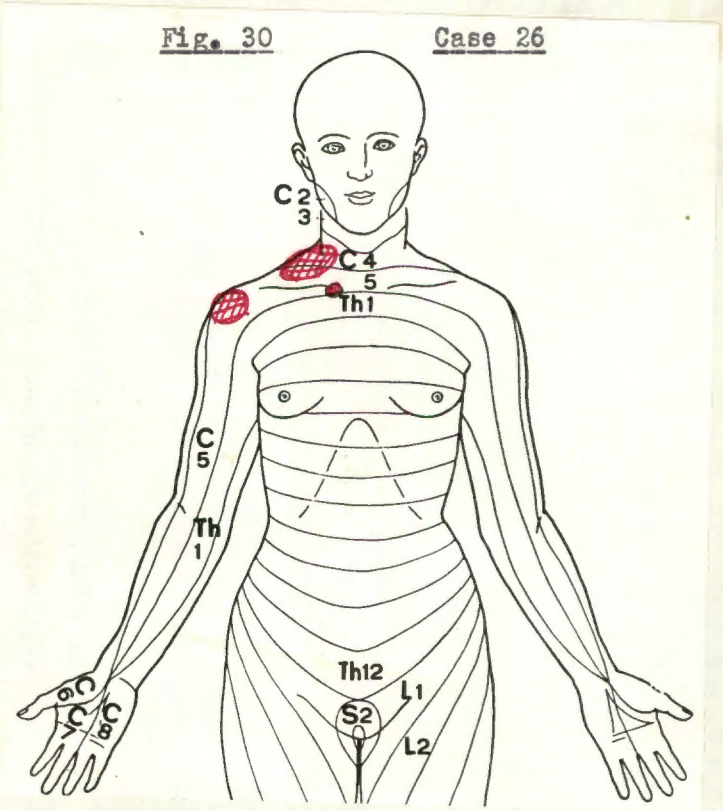


Fig. 30 Case 26



(b) Investigation of the sites of origin of the pain

(i) Pain arising from the sterno-clavicular joints

The distribution of pain arising from the sterno-clavicular joints was investigated in seven patients (Cases 2, 5, 7, 8, 13, 24 and 26), as described in Chapter 4. The sterno-clavicular joint and capsule were then infiltrated with Lignocaine 1% and it was noted whether the distribution of pain previously recorded on forced motion of the joint was completely relieved.

It was found that the pain was felt by the patient to be in the muscles of the shoulder girdle, most frequently in the trapezius muscle, at the base of the neck and/or over the deltoid muscle and lateral aspect of the arm. Occasionally there was also pain near the medial aspect of the clavicle and, when the pain was very severe, at the side of the neck and in the muscles on the radial aspect of the forearm. Only 2 of these patients were aware that the sterno-clavicular joints were tender before their attention had been drawn to this. The extent of pain distribution was related to the severity of the pain, being greater in those cases where the sterno-clavicular joint was more tender. The distribution of pain from the sterno-clavicular joints in these 7 patients is shown in Figs. 24-30. Following infiltration in these patients, the range of movement of the shoulder girdle was improved in all and the pain on motion previously experienced in the muscles was relieved. The

tenderness which had previously been felt in the muscles was also relieved, indicating that this was hyperalgesia of the muscle within the area of deep pain reference from the joint (Kellgren, 1964).

One of these patients (Case 5) later developed giant-cell arteritis which was proved histologically and another (Case 26) had clinical evidence of occlusion of the subclavian artery and was considered to have large vessel arteritis. In each case the distribution of pain from the sterno-clavicular joint was identical with that found in the other patients.

A control experiment was performed in 6 other cases who had arthritis of the sterno-clavicular joint and were suffering from an inflammatory polyarthritis other than polymyalgia rheumatica. The distribution of pain from the sterno-clavicular joint was also recorded and the areas of relief of pain noted following infiltration of this joint with Lignocaine. In all cases the pain which had previously been felt in the shoulder girdle muscles was relieved. The distribution of the pain was similar to that found in the patients with polymyalgia rheumatica.

The sterno-clavicular joints of another 8 cases in this series (6 bilaterally) were also infiltrated with Lignocaine and hydrocortisone for therapeutic reasons, with beneficial results.

The degree of tenderness of the sterno-clavicular joint was not related to the degree of synovial thickening. It was

often found that the most tender areas were at the attachments of the capsule to the bones. The degree of limitation of movement of the shoulder girdle was more related to the capsular tenderness than to the degree of synovial thickening of the sterno-clavicular joint. The distribution of pain from the sterno-clavicular joint corresponds to the 3rd, 4th, 5th and 6th cervical scleratomes, as might be anticipated from the fact that its nerve supply arises from the 3rd, 4th, 5th and 6th cervical roots (Johnston, 1938).

Pain from the acromio-clavicular joints was also aggravated by shoulder girdle movements and involvement of these joints resulted in restriction of motion, but the pain was usually felt maximally in the region of the joint itself and did not radiate widely. Patients were usually aware of the tenderness of these joints. Twenty-three of 59 patients with tenderness of the acromio-clavicular joints had injections of hydrocortisone and Lignocaine into these joints for therapeutic purposes, resulting in improvement of local pain and range of shoulder girdle movement.

In the patients with polymyalgia rheumatica the greatest limitation of movement of the shoulder girdle was observed in patients in whom the sterno-clavicular joints were the most tender, particularly at their capsular attachments. From observation of the increased range of movement resulting from

injection of local anaesthetic into the sterno-clavicular joints it was apparent that involvement of these joints was mainly responsible for the limitation of movement of the shoulder girdles which is a characteristic feature of polymyalgia rheumatica, more so than tenderness of the acromio-clavicular and scapulo-humeral joints and the multiple tender focal areas around the shoulder joints at the insertions of tendons, which were also present in most cases.

(ii) Hip girdle pain

Tender focal areas round the pelvis of 4 patients were injected with Lignocaine 1% and hydrocortisone. The tender areas injected were on the anterior superior iliac spines, anterior inferior iliac spines, adductor tubercles and trochanters. In all cases pain which was felt by the patient in the thigh muscles was relieved or improved. It was also found that limitation of movement of the hip joints, especially of adduction and abduction was abolished when the focal tender areas on the trochanters and adductor tubercles respectively were infiltrated, showing that the limitation of movement of the hip joints was mainly due to painful lesions of periarticular structures. In hip joint disease of any cause all movements, and especially rotation, are limited whereas in those patients with limitation of movement due to pain of the periarticular structures, rotation was usually full, while adduction, abduction and flexion were limited depending on

the periarticular structure involved.

In two patients (Cases 33 and 34) flexion of the knee with the patient lying prone was limited and painful. The pain was felt to be in the quadriceps muscles. In both, this pain and limitation was abolished by infiltration of the tender focal areas at the origin of the rectus femoris muscle on the anterior inferior iliac spines.

Comment

Limited prone lying knee flexion is usually regarded as being indicative of muscle shortening which occurs in myositis, or involvement of the upper lumbar roots, but in these two cases it was due to pain arising from the origin of the rectus femoris muscle.

(iii) Injection of spinal ligaments

Injections of the tender interspinous ligaments were performed in the cervical region in five patients (Cases 4, 5, 23, 42 and 80), in the dorsal region in seven (Cases 3, 18, 21, 28, 33, 35 and 57) and in the lumbar region in four patients (Cases 3, 4, 5 and 33).

Case 80 was a typical example. The onset of his illness was with pain, limitation of movement and stiffness of the cervical spine. Subsequently he developed evidence of temporal arteritis with tenderness and thickening of the temporal arteries and tenderness of the occipital arteries. He was found to have very marked tenderness over the C.4-C.5 interspinous ligament.

Following infiltration of this with Lignocaine and hydrocortisone his cervical pain and limitation of movement were almost completely relieved.

In many cases the pain and limitation of spinal movement were improved following anaesthesia of the spinal ligaments. It would appear that the spinal pain and limitation of movement of these patients was partly due to involvement of spinal ligaments.

(iv) Tempero-mandibular pain

In one patient (Case 57) who had pain and tenderness over both tempero-mandibular joints with pain on chewing and limitation of opening of the mouth, this was completely relieved by infiltrating both joints with Lignocaine and hydrocortisone. This indicates that pain in this region may be caused by involvement of this joint and is not invariably due to temporal arteritis.

(c) Special investigations of muscle

i. Electromyography

This was performed in 18 patients, in 17 of whom no evidence of neuropathy or myopathy was found. In one patient (Case 31) it was reported that there was a slight reduction of the amplitude and duration of the motor unit potentials in the deltoid muscle, considered to be suspicious of a myopathy. Biopsy of the deltoid muscle revealed no abnormalities and the subsequent course of the patient was not consistent with this diagnosis.

ii. Muscle biopsies

Biopsies of the deltoid muscle using a Desoutter pneumatic drill were performed personally in 11 patients under local anaesthesia. In addition 6 other patients had had muscle biopsies at other hospitals before they were seen personally. No evidence of muscle pathology or of vascular changes was found in any of these patients.

Histological specimens of the left vastus and psoas muscles from Case 15 were obtained at autopsy. The histological sections were examined by Dr. V. Dubowitz. The section of the left vastus muscle showed extensive pathological change, which was uniform throughout. The fibres varied in size but the majority were atrophic and the largest 40 μ in diameter. There was marked cellularity with proliferation of the sarcolemmal nuclei as well as extensive phagocytosis. There were similar changes in the psoas muscle, but the fibres were more atrophic than in the vastus muscle; the majority were 10 to 20 μ in diameter. Acute inflammatory cells were not seen in either specimen.

It is considered that these changes were probably due to a steroid myopathy as this patient had received high doses of corticosteroids for nine months and had become clinically very hypercorticoid. The muscle weakness and wasting was predominantly in the proximal muscles of the limb girdle, as occurs characteristically in steroid myopathies. It has been shown by electromyographic studies (Coomes, 1964) that patients

with rheumatoid arthritis who are hypercorticoid almost invariably have electromyographic evidence of proximal myopathic changes, the severity of these changes being related to the degree of hypercorticism.

Summary

With the exception of one patient who was considered to have developed a steroid myopathy, no primary abnormality of muscle has been demonstrated in any of these patients either clinically or by electromyography, muscle biopsies or serum enzyme studies (Results of enzyme studies are included in laboratory results).

It has been demonstrated that the pains, felt by the patients to be in the muscles are largely referred from central joints, tendons and ligaments.

D. Investigation of arteries in control subjects

In view of the highly selective nature of the patients attending the units in which this study was carried out, it was clear that no adequate series of control patients could be assembled from them. Over a period of 6 months the author routinely examined the cranial, carotid and subclavian arteries of all out-patients and in-patients over the age of 50 years, seen personally.

In 40 of these the findings were recorded, to provide some kind of background against which to compare the findings in the patients with polymyalgia rheumatica. These 40 patients were questioned regarding the occurrence of headache of the type encountered in patients with giant-cell arteritis within the previous 3 years and were examined for signs of arterial involvement. They were attending the out-patient department or had been admitted to hospital with diseases other than polymyalgia rheumatica. They included 4 cases who had been referred to hospital with local headache. There were 24 men and 16 women.

The age distribution of these patients is indicated in Table 12:

Age (years)	No. of Men (24)	No. of Women (16)
50 - 59	5	3
60 - 69	13	8
70 and over	6	5

The vascular abnormalities found in these 40 subjects are recorded in Table 13:

Abnormality	No. of Subjects	
History of local headache	4	
Temporal artery		
Tenderness	3	
Minimal thickening with increased pulsation	3	
Increased pulsation	6	
Facial artery		
Vessel wall palpable	40	
Large vessel murmurs	5	
Moderate intensity		1
Minimal intensity		4
Unequal B.P. in arms (20 subjects)	0	
Unequal oscillometry in arms (11 subjects)	0	

As will be seen a history of local headache was present in four subjects whose histories were as follows:

(a) A man aged 59 had had a head and neck injury 4 years previously, followed by severe and persistent right temporal pain. Both temporal arteries were prominent with strong pulsation and there was diffuse tenderness in the right temporal region most marked over the anterior branch of the temporal artery. There were no other clinical abnormalities apart from moderate restriction of movement of the cervical spine. The laboratory

investigations were normal. A biopsy of the right temporal artery was performed and there was no histological evidence of arteritis in the section.

(b) A man aged 53 had had intermittent bitemporal headaches for 6 months. On examination, both temporal arteries were very prominent with strong pulsation and tender. The cervical spine was moderately limited in range and radiologically severe degenerative changes were present. There were no other abnormal physical signs and the laboratory investigations were normal. A biopsy of the left temporal artery relieved his left-sided headache, but on histological examination there was no evidence of arteritis.

(c) A man aged 77 had had intermittent bitemporal headache for 3 years, which was worse on the right side. Both temporal arteries were prominent and pulsating strongly with tenderness over the right temporal artery and possible thickening of the vessel wall. He had clinical and radiological evidence of marked degenerative changes in the cervical spine, but no other clinical or laboratory abnormalities. A biopsy of the right temporal artery relieved his right temporal headache. The histological changes in the artery were those associated with ageing.

As the great auricular nerve which arises from the 2nd and 3rd cervical roots supplies the temporal regions, pain in these regions may be referred from the upper cervical spine. The arteries are almost certainly the most sensitive structures in this area and the tenderness felt over them may be due to their being in the area

of reference of deep hyperalgesia from the upper cervical spine.

(d) A woman aged 77 complained of pain and tenderness of the head which had been present for 9 years. On examination she had very advanced changes of Paget's disease of the skull with very enlarged cranial arteries. There were also loud murmurs (grade 3) over both carotid arteries. In this case the murmurs were undoubtedly due to the increased blood flow in these vessels.

Minimal or doubtful thickening of the temporal arteries was present in 3 subjects. In (c) above and the other 2 subjects this was associated with easily palpable pulsation and in all was associated with tortuous, thickened radial arteries. In no case were reduced pulsation and thickening of the temporal arteries found together.

Large-vessel murmurs were audible over the subclavian arteries in 4 subjects. In 1 it was bilateral and in 3 unilateral. In all, the murmurs were of minimal intensity. In the 20 cases where the blood pressure and the 11 cases where oscillometry were determined in the arms, the values were equal on the two sides. The vessel wall of the temporal artery could not normally be felt or rolled under the palpating finger, but the pulsation could usually be quite readily felt. In those cases with tortuous, thickened radial arteries the temporal arteries were also tortuous and sometimes considered to be thickened but the thickening was never more than of minimal degree. A feature of these tortuous

temporal arteries was the strong pulsation which was felt. Three other cases with hemiplegia due to carotid artery occlusion did not have palpable pulsation in the temporal artery on the same side. It would thus appear that palpable thickening of the wall and reduced pulsation in a temporal artery is highly likely to be due to an arteritis. This corresponds with the findings of Fisher (1961).

The wall of the facial artery in middle aged and elderly subjects was invariably found to be palpable and the pulsation was often less easily felt than in the temporal arteries. The normal thickness of the facial artery wall corresponded with grade 3 thickening of the temporal artery. Thus it would be expected that abnormalities of the cranial arteries would be recognised with the greatest ease in the temporal arteries.

Murmurs arising from the subclavian arteries were not uncommon. These murmurs were not loud and were usually not graded more than 2 according to our criteria.

E. Cranial Arteries of patients with polymyalgia rheumatica

(a) Clinical

In Table 14 the abnormalities found in the cranial arteries are compared with the histological diagnosis. Where definite thickening of the artery was found, tenderness was not recorded as this was invariably present.

Table 14

Artery	Thickening		Pulsation		Only Tenderness
	Doubtful or minimal	Present	Reduced	Absent	Present
Temporal					
No. of Cases	5	10	7	6	7
No. of biopsies	4	9	6	5	5
Histological arteritis	3	9	3	5	0
Occipital					
No. of Cases	-	4	1	2	9
No. of biopsies[x]	-	3	1	2	7
Histological arteritis	-	3	1	2	5
Facial					
No. of Cases	-	3	-	3	2
No. of biopsies[+]	-	3	-	3	2
Histological arteritis	-	3	-	3	1

x The occipital artery was biopsied in only one patient and

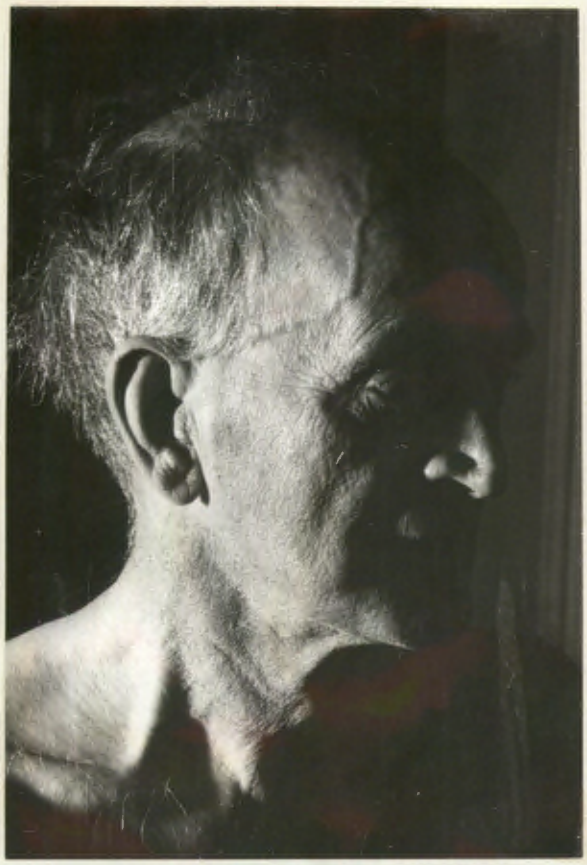


Fig. 31 Case 69
Photograph showing thickened superficial temporal artery.

arteritis was found; the other biopsies were of the temporal artery.

+ The facial artery was only biopsied in two patients (Cases 5 and 27) and arteritis found in one.

In only 6 of the 9 patients with definite thickening of the temporal arteries who had had cranial artery biopsies was the vessel definitely thickened at the time of biopsy.

In six patients (Cases 20, 41, 51, 67, 78 and 81) no thickening, or only doubtful thickening of the cranial arteries had been detected, but histological changes of arteritis were found on biopsy. Two of these patients (Cases 41 and 51) had been treated with corticosteroids for their arthritic symptoms, and this may have masked the clinical signs of arteritis. Two others (Cases 67 and 78) had given a history of temporal headaches in the past, but these manifestations had subsided by the time they came under observation. No definite thickening of the temporal arteries had ever been recorded in Cases 20 and 81 although both had slight tenderness in the region of the temporal arteries and their disease was still in the active phase at the time of the biopsies.

In some patients with definite clinical thickening of the temporal arteries it was found that the artery was not uniformly thickened but usually had localised areas of thickening while the rest of the vessel appeared to be virtually normal. In those arteries which were diffusely thickened the degree of thickening

varied over the length of the artery. This accounts for the frequent description by patients of feeling a string of tender bead-like structures under the skin.

The objective changes in the temporal arteries are further compared in Table 15:

	Thickening only	Reduced pulsation only	Thickening + reduced pulsation
No. of Cases	6	9	4
No. of biopsies	5	8	4
Histological arteritis	5	4	4

Comment

It will be seen from these results that thickening of the temporal arteries together with absent or reduced pulsation is highly likely to be significant in patients with suspected giant-cell arteritis. Absent or reduced temporal pulsation alone is found in patients with thrombotic occlusion of the carotid arteries (personal observation) and is therefore of lesser significance in the diagnosis of arteritis. In several cases where the pulsation in the temporal artery was considered to be reduced on clinical examination, it was found at biopsy that the vessel was small or was replaced by several small arteries. Thickening and reduced pulsation of the facial and occipital arteries are more difficult to assess and where significant abnormalities of these vessels have

been found in this series, they have been accompanied by temporal artery changes.

It is thus apparent that whereas definite thickening of the temporal arteries is likely to be associated with positive histological evidence of arteritis, histological changes of arteritis are often found in vessels which are clinically normal.

(b) Results of cranial artery biopsies

Cranial artery biopsies were performed in 32 patients. Sections of the anterior or posterior branches of the temporal arteries were removed in 30 patients. In two of these, biopsies of the facial arteries were also performed and in another two patients biopsies were obtained from the occipital arteries only. In one patient (Case 15) sections of the temporal artery were removed at autopsy. In Case 76 no artery was found in the tissue removed.

i. Macroscopic appearances of cranial arteries at biopsy

The macroscopic appearances of the cranial arteries at biopsy are compared with the histological diagnosis, in Table 16:

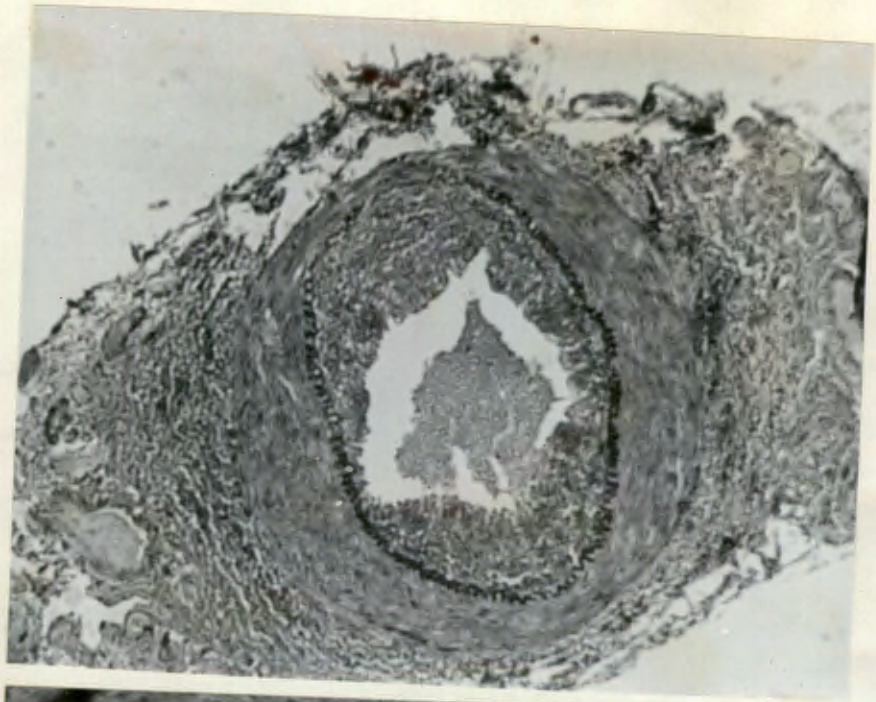
Macroscopic abnormalities	No. of patients	Histological changes of giant-cell arteritis
Perivascular scarring	8	7
Artery thickened	7	7
Vessel wall inflamed	8	6
Artery not pulsating	6	6
Artery reduced pulsation	6	5
Lumen occluded	6	6
Artery appeared abnormal	9	9
Artery possibly abnormal	5	2
Artery normal	19	4

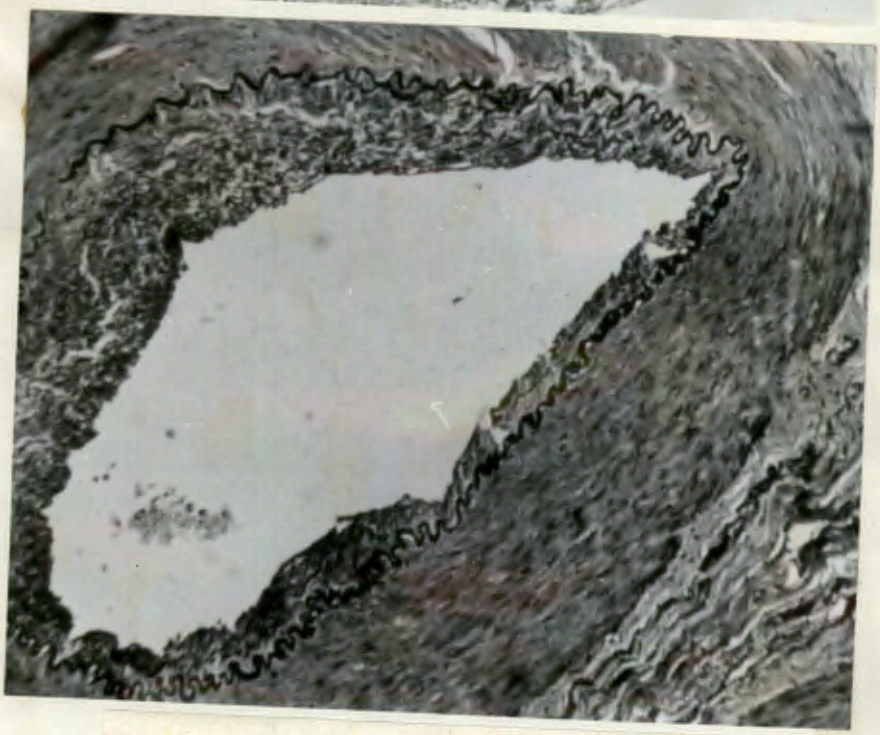
It will be seen that abnormal arteries can frequently be recognised at biopsy. All nine of the arteries which were definitely considered to be abnormal had histological changes of giant-cell arteritis. Two of the 5 arteries which appeared slightly abnormal also had histological changes of giant-cell arteritis. Both these patients had had their disease for a prolonged time and the inflammatory changes had subsided. Four of the 19 arteries which appeared to be normal macroscopically had histological changes of arteritis. However, 3 of the 4 patients had had corticosteroid therapy. The most reliable and easily recognisable macroscopic features of arteritis are probably thickening and non-pulsation of the artery at biopsy.

Comment

The presence of arteritis in a cranial artery can frequently be recognised from the macroscopic appearance of the vessel. Specific therapy can thus be started before the histological report is available.

In those cases with histological changes of arteritis, but where the vessel appeared normal, this was presumably due to the fact that the arteritis of the temporal artery was not very acute in some cases and did not result in symptoms or marked thickening of the artery, or was subsiding or the inflammatory manifestations had been suppressed by corticosteroid therapy.





Figs. 32 and 33
Sections of control arteries. (x 160)
(and x 280)

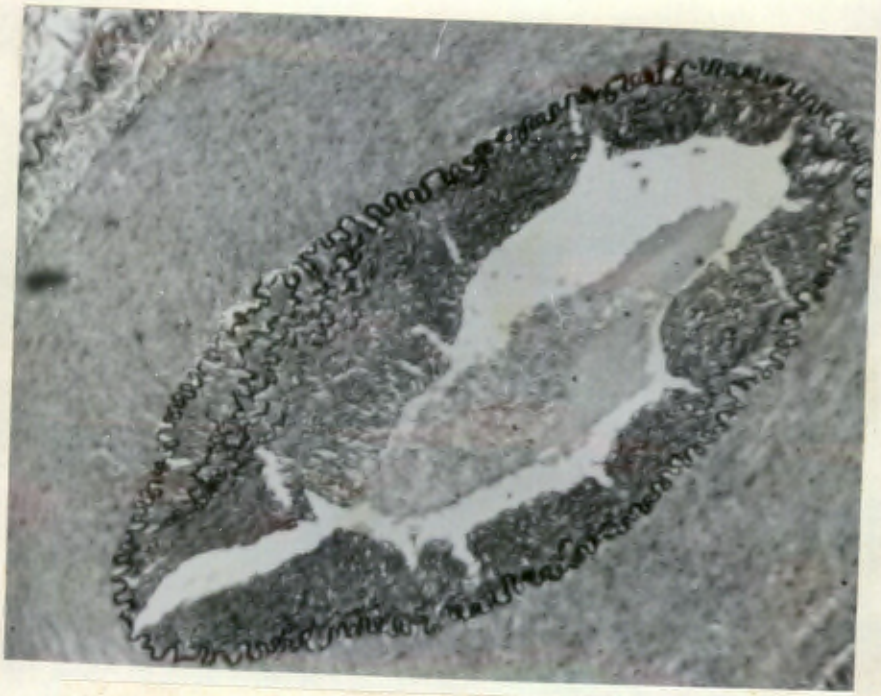


Fig. 34
Section of control artery showing intimal thickening and duplication of the elastic lamina. (x 160)

ii. Histology of the cranial arteries

Control arteries

The temporal arteries of ten patients, aged from 61 to 84 years, in whom there was no clinical or post mortem evidence of arteritis, were examined to obtain an impression of the histological appearance of these vessels in patients of this age. Two to six sections of each vessel were examined.

In all, there was intimal thickening graded either 1 or 2. In two vessels, areas of the intima were thickened at the sites of atheromatous plaques. The internal elastic lamina was frequently fragmented to a varying degree, and in some the layer was duplicated (Figs. 32-34). Overlying the atheromatous plaques the elastic lamina was stretched and partly destroyed. There was thinning of the media overlying the plaque, but there were no other apparent abnormalities either in the media or in the adventitia, and no infiltration with inflammatory cells was present in any of these sections.

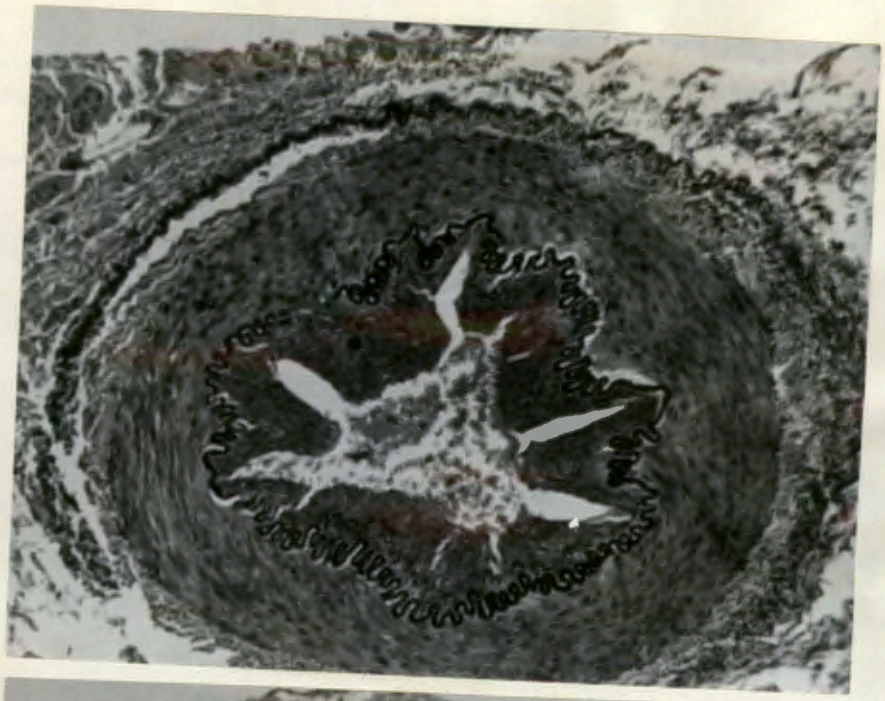
Histology of the cranial arteries of these patients

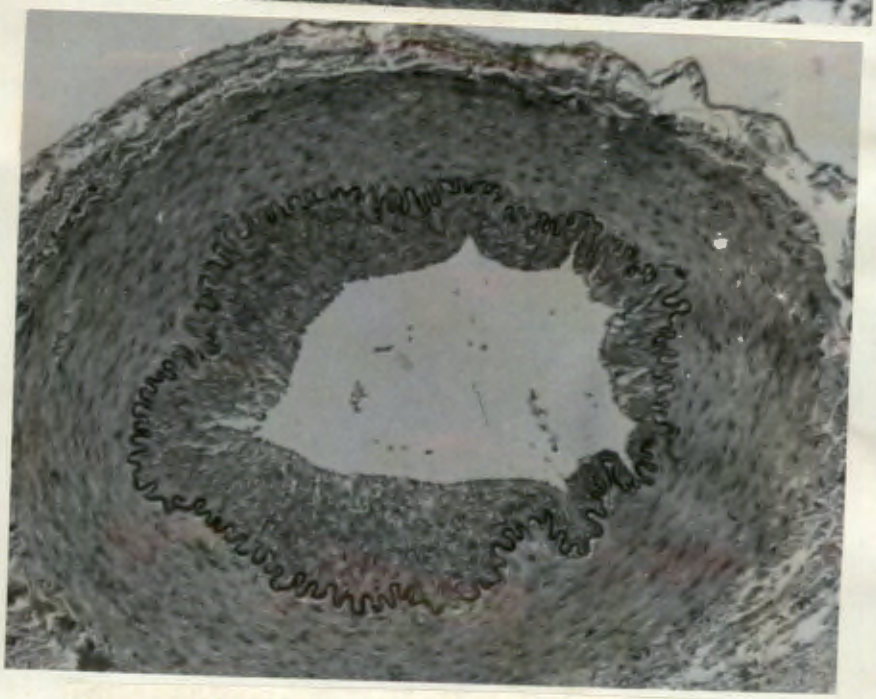
Sections of 36 cranial arteries from 33 patients were examined. In 30 patients one temporal, in another both temporals, in 2 the facial and in 2 the occipital artery were examined. In describing the histology of the cranial arteries an attempt has been made to grade the degree of abnormality of all the factors studied quantitatively.

The degree of intimal thickening in 36 cranial arteries obtained from 33 patients and the histological diagnosis are indicated in Table 17:

Grade of intimal thickening	No. of arteries	Histological diagnosis	
		Arteritis (total)	G.C.A.
0 or 1	6	0	0
2	16	3	0
3	8	8	5
4	6	6	4
Total	36	17	9

It will be seen that all 14 arteries with intimal thickening graded 3 or 4 had other histological evidence of arteritis. Nine of these 14 arteries showed histological changes of giant-cell arteritis, and 5 other arteries evidence of arteritis without giant-cells. In two of these (Cases 67 and 78) the clinical episode of temporal arteritis had subsided 2 and 6 years previously and there was disorganisation of the architecture with fibrosis of





Figs. 35 and 36 Cases 24 and 19
Sections of temporal arteries showing intimal thickening associated with ageing.
(x 160 and x 280)

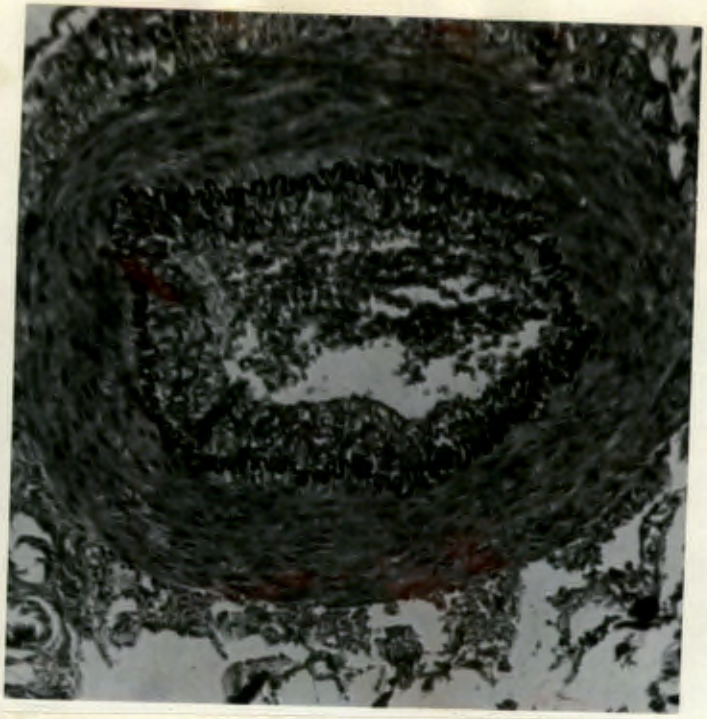


Fig. 37 Case 29
Section of temporal artery showing duplication of elastic lamina associated with ageing. (x 160)

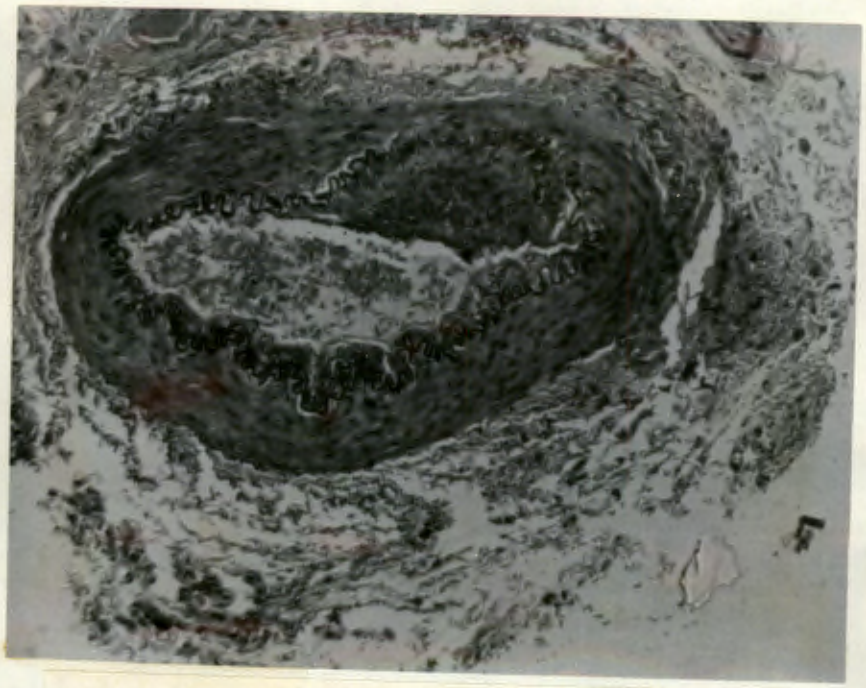


Fig. 38 Case 23
Section of temporal artery showing destruction of the elastica and thinning of the media overlying an atheromatous plaque. (x 160)

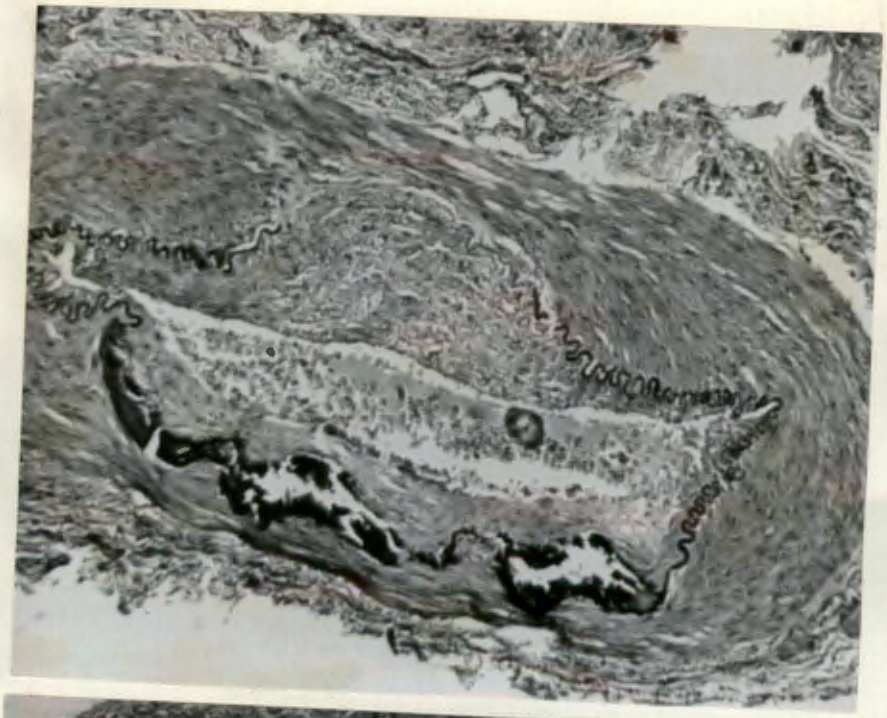
the vessel wall. The three other arteries with grade 3 intimal thickening were obtained from two patients (Cases 15 and 51), who had been on prolonged corticosteroid therapy and did not contain inflammatory cells.

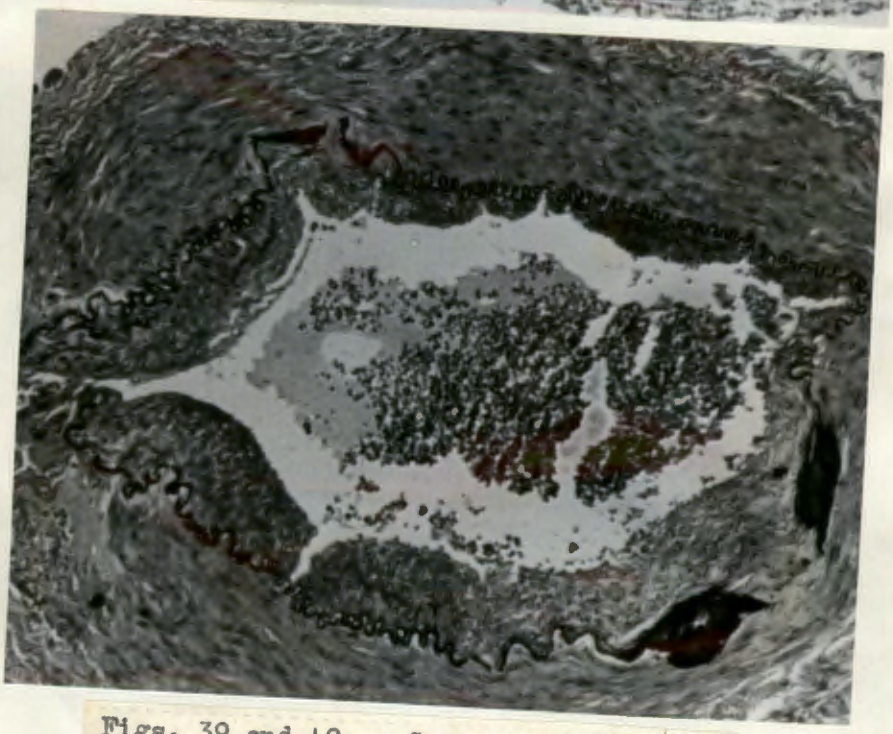
Only 3 of the 16 arteries with grade 2 intimal thickening had other evidence of arteritis. In one (Case 5) the changes were considered to be those of an early arteritis, and the other two had been on corticosteroid therapy almost from the onset.

The lumen of the temporal artery was occluded by intimal thickening and/or fibrosis in six patients (Cases 5, 15, 67, 69, 72 and 80); in these cases the intimal thickening was graded 4.

Thrombosis of the temporal artery was only found in two vessels. In one patient (Case 15) the right temporal artery was occluded by an organising thrombus while the left temporal artery was completely occluded by intimal proliferation. In Case 20 a biopsy of the anterior branch of the temporal artery contained organising thrombus in the lumen. A further section from the same vessel more proximally showed the lumen to be almost completely occluded by intimal thickening of active giant-cell arteritis.

Fragmentation and duplication of the internal elastic lamina occurred very frequently in these arteries, these changes being particularly prominent overlying atheromatous plaques. In two patients (Cases 11 and 57) there was much destruction and





Figs. 39 and 40 Cases 57 and 11
Sections of temporal arteries showing atheromatous plaques and calcification of the internal elastic lamina. (x 160) (and x 280)

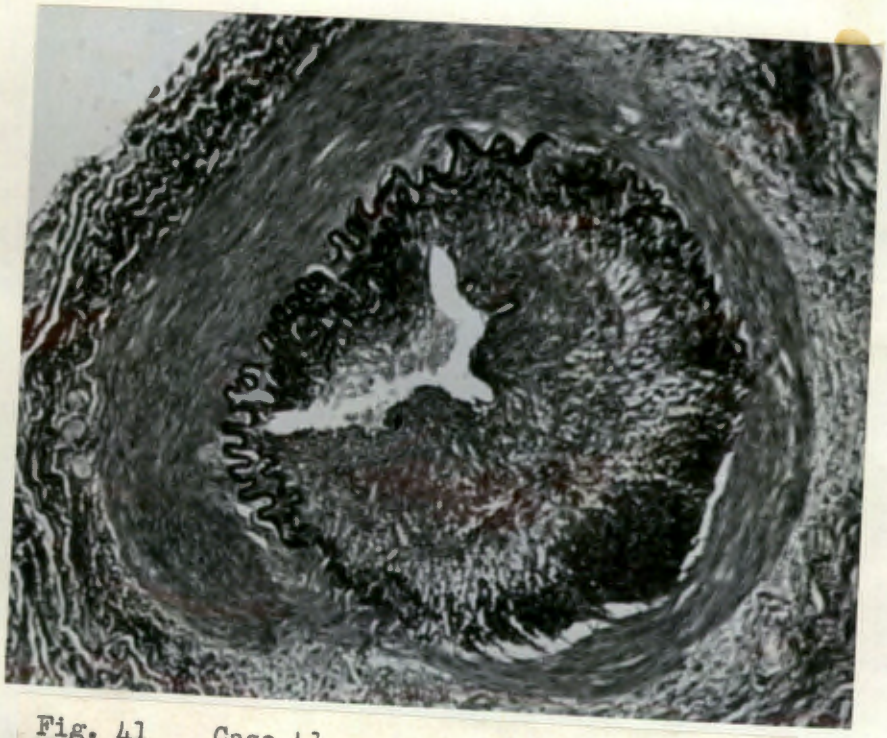
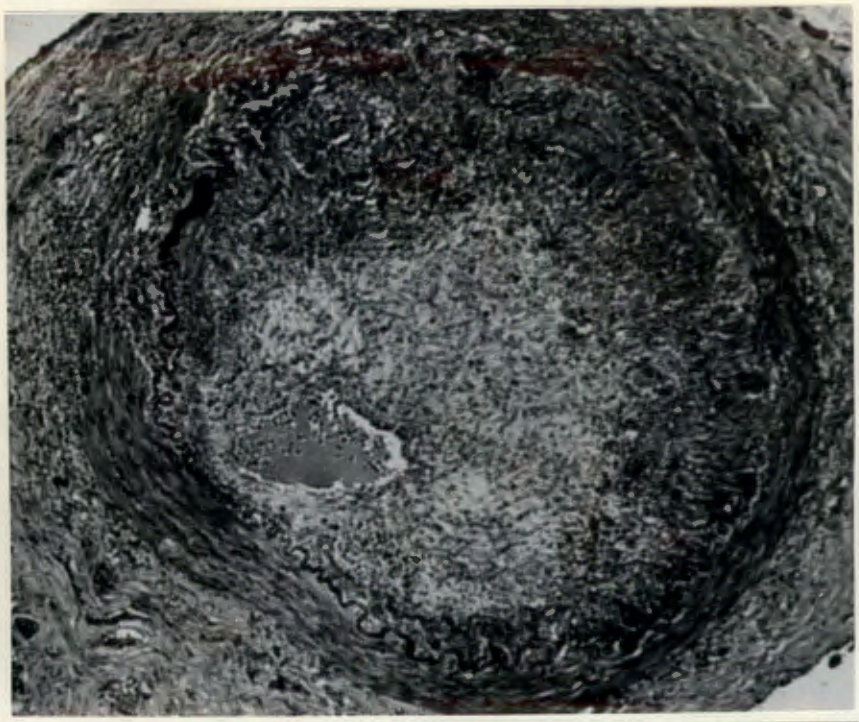
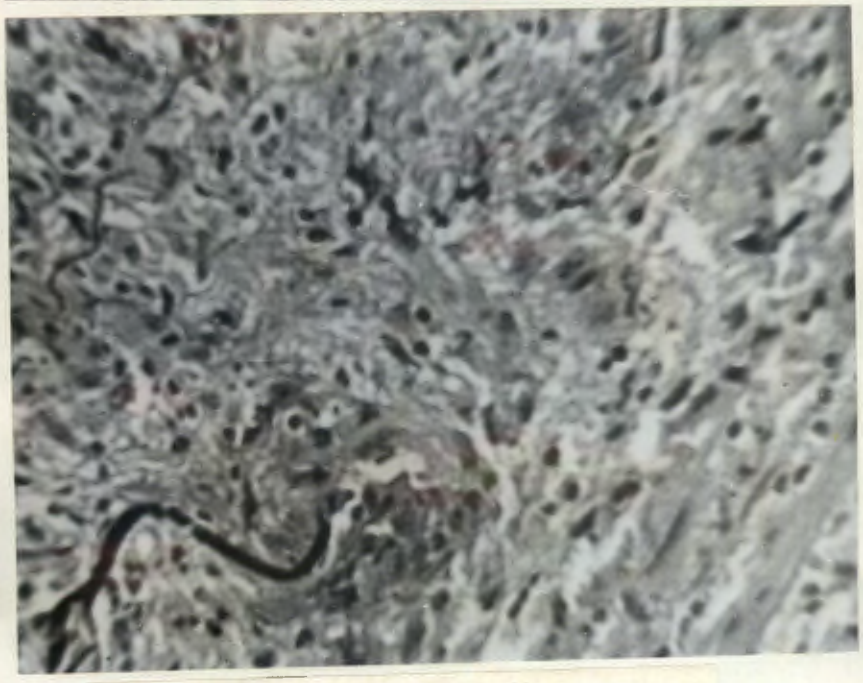
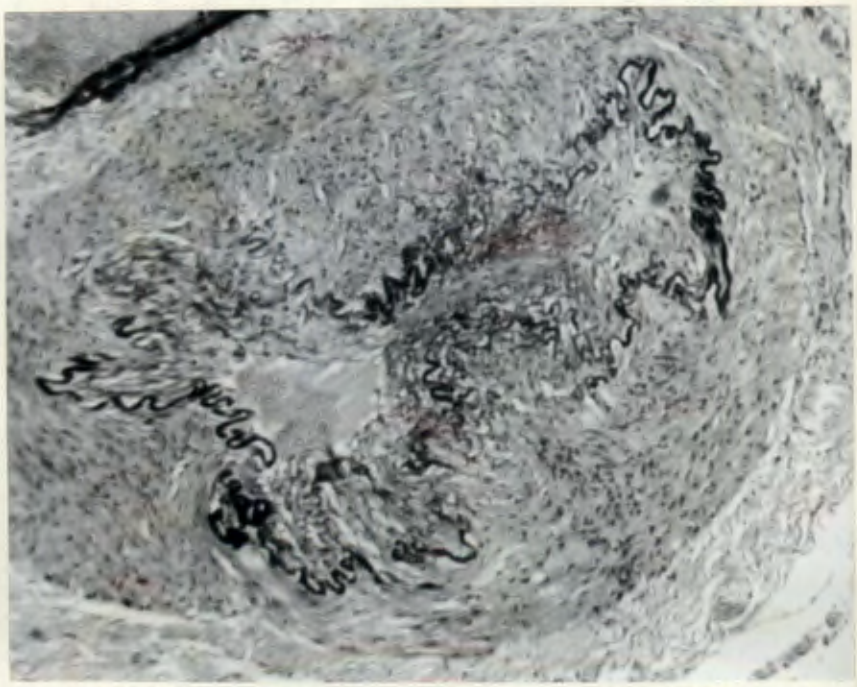


Fig. 41 Case 41
Section of temporal artery showing intimal thickening, fragmentation and duplication of the elastic lamina due to giant-cell arteritis. (x 160)





Figs. 42 and 43 Case 68
Section of temporal artery showing fragmentation and duplication of the elastic lamina. (x 160 and ×900)



Figs. 44 and 45 Cases 51 and 78
Sections of temporal arteries showing healed arteritis with disorganisation of the elastic lamina. (x 160)

Fig. 46 Case 69
Section of temporal artery showing changes of active giant-cell arteritis, with cellular infiltration and several giant cells. (x 160).

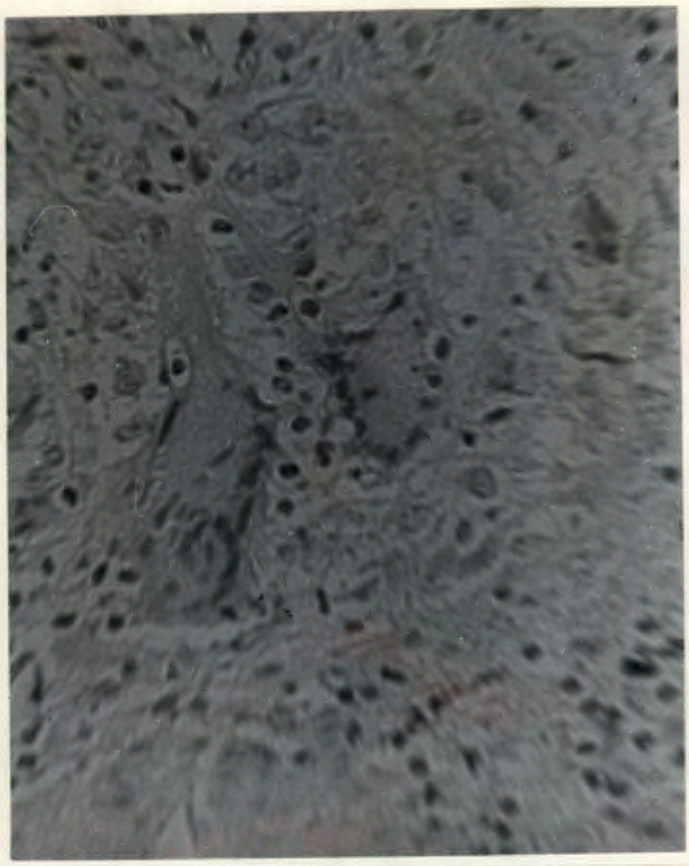


Fig. 47 Case 5
Section of temporal artery showing typical giant cells. (x 900)

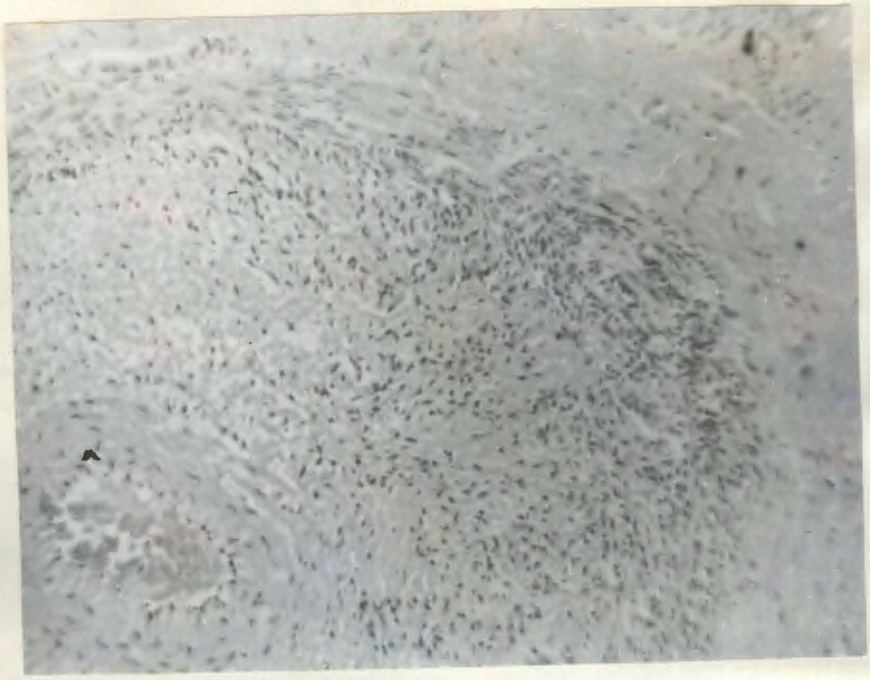
calcification of the elastic lamina, but no evidence of arteritis. In 10 cases there was extensive destruction of the elastic lamina due to active arteritis and in the two arteries which were presumed to be examples of healed arteritis there was marked disorganisation of the elastica (Fig. 44).

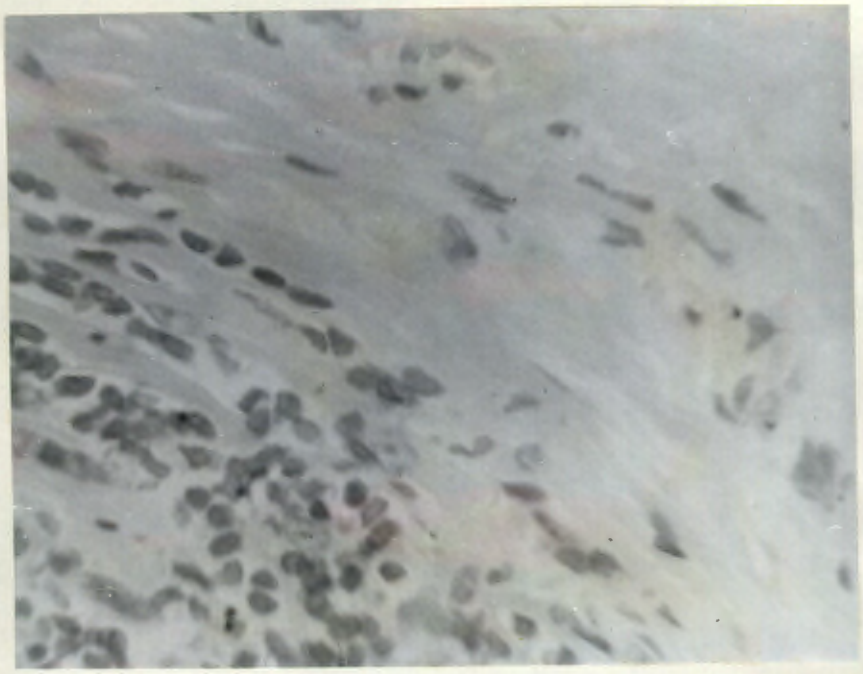
Giant-cells situated close to the degenerating elastic lamina or in relation to fragments of elastic tissue were present in the arteries of nine patients (Cases 3, 5, 20, 41, 68, 69, 72, 80 and 81) (Fig. 46). All but one (Case 41) who had had corticosteroid therapy were considered to be in the active phase of the disease and had not had suppressive corticosteroid therapy.

The degree of inflammatory cell infiltration of the media and adventitia, destruction of the muscle fibres of the media, fibrosis of the vessel wall and degree of inflammatory activity in the 17 arteries obtained from the 15 patients with a histological diagnosis of arteritis were assessed. The number of arteries in each grade are indicated in Table 18:

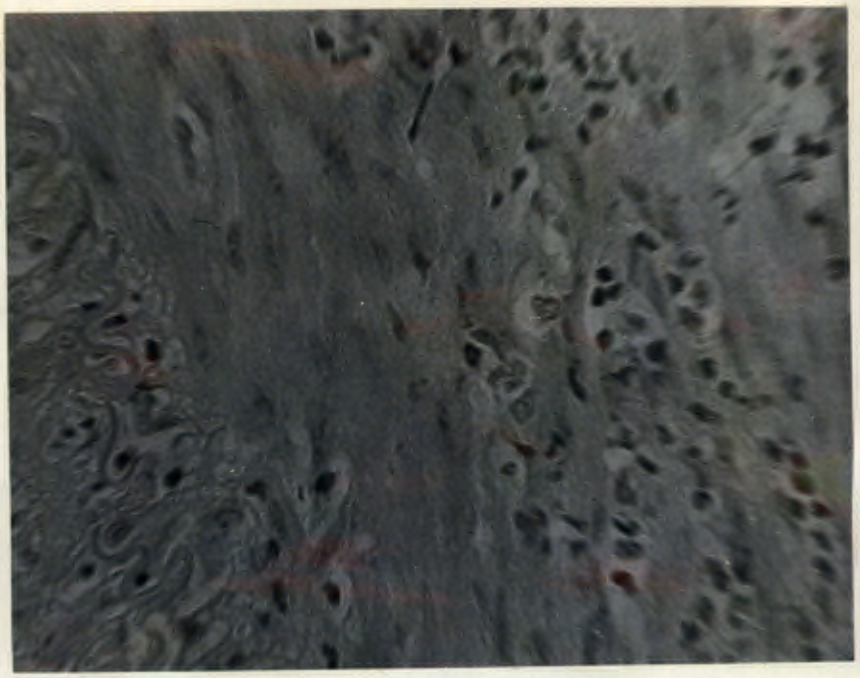
Grade	Media destroyed	Inflammatory cell infiltration		Fibrosis of wall	Degree of activity
		of Media	of Adventitia		
0	1	5	4	8	4
1	0	1	1	2	2
2	3	4	6	3	3
3	9	4	3	3	4
4	4	3	3	1	4

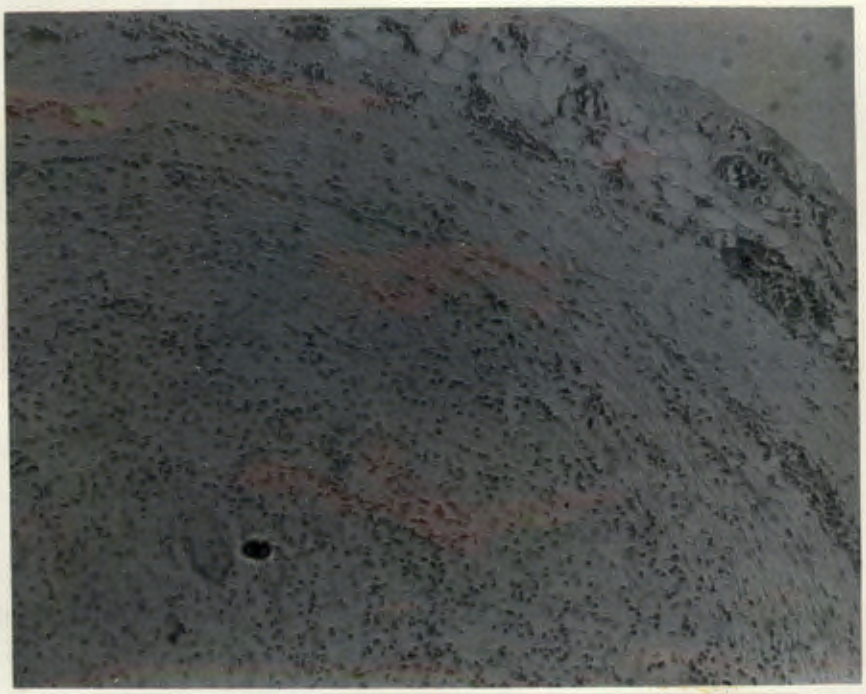
Fig. 48 Case 80
Section of temporal artery showing typical appearance of active giant-cell arteritis with occlusion of the lumen by intimal thickening. (x 40)





Figs. 49 and 49(a) Case 81
Section of temporal artery showing marked cellular infiltration and destruction of the media. (x 280 and x900).





Figs. 50 and 51 Case 5
Section of temporal artery showing marked cellular infiltration of the media and adventitia and also occasional giant cells.
(x900 and x940)

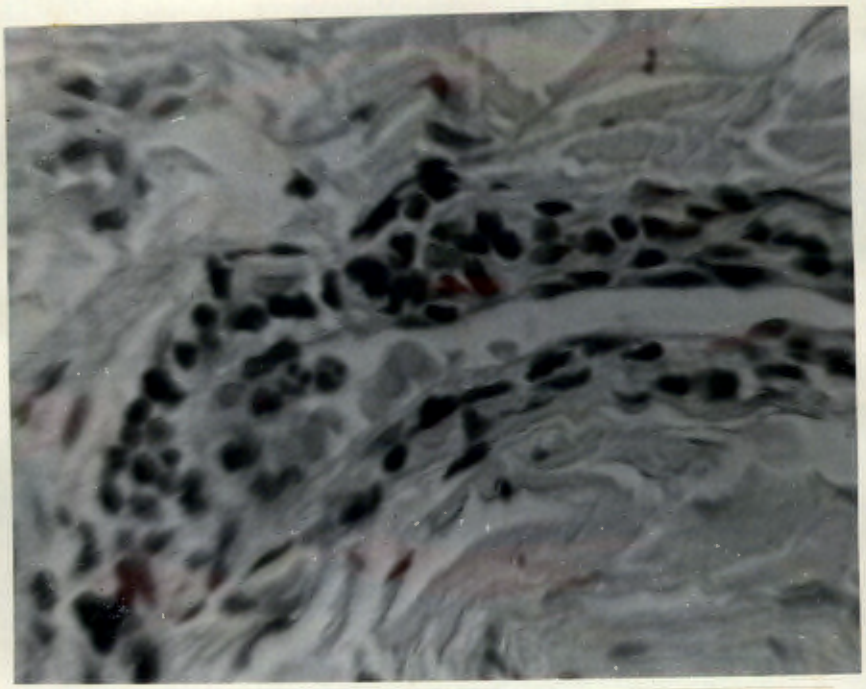


Fig. 52 Case 45
Section of temporal artery showing perivascular infiltration of the adventitia, with lymphocytes and plasma cells. (x 900)

It will be seen that in 8 arteries there was a moderate or marked degree of inflammatory activity in the vessel wall, with moderate or marked infiltration of the media with lymphocytes, plasma cells, mononuclear cells and giant cells. The media was destroyed to a variable degree, and the muscle fibres were separated by inflammatory cells. In the adventitia there was infiltration with lymphocytes and plasma cells situated mainly around vessels.

In the sections of 3 patients there was minimal inflammatory activity but one of these sections (Case 41) contained a few giant cells in relation to the elastic lamina. This patient had had corticosteroid therapy for 12 months until 3 months prior to biopsy. In another (Case 5) the adventitia and outer part of the media was infiltrated with lymphocytes and plasma cells in a very small section of the vessel wall. These were considered to be the earliest changes of giant-cell arteritis as a subsequent section of the temporal artery from the same patient showed changes of very active giant-cell arteritis. The third (Case 45) had had suppressive corticosteroid therapy from the onset of her temporal arteritis and the only changes on histological examination were the presence of lymphocytic and plasma cell infiltration around 2 small vessels in the adventitia (Fig. 52).

The temporal artery of one patient (Case 73) contained a few lymphocytes and plasma cells in one small area of the adventitia but there were no other abnormalities. This may represent an

Fig. 54 Case 67
Section of temporal artery showing complete replacement of the vessel by fibrous tissue, due to healed arteritis. (x 160)
(The dark lines are artefacts.)

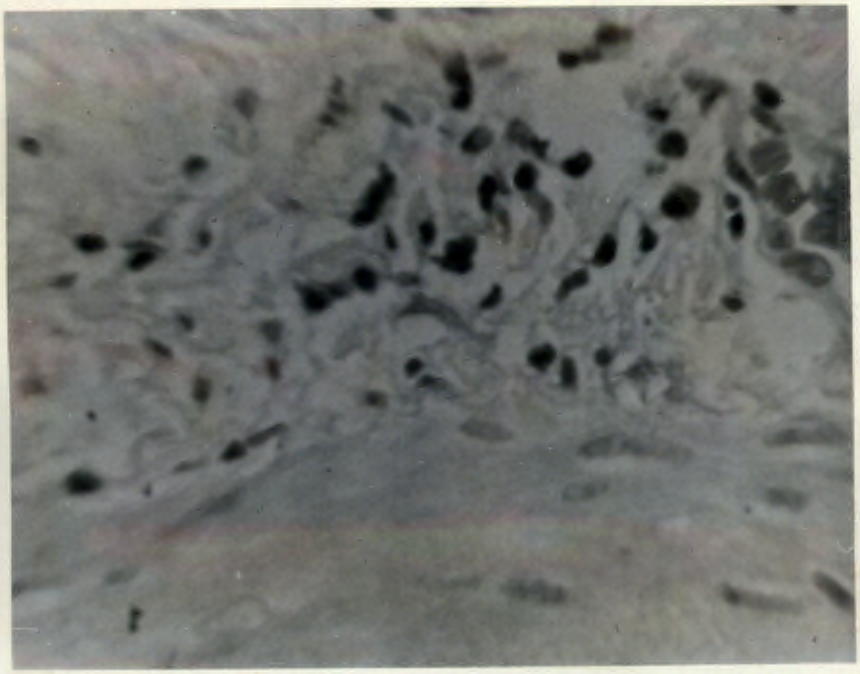


Fig. 53 Case 73
Section of temporal artery showing minimal cellular infiltration of the adventitia, possibly due to arteritis. (x 900)

early lesion of arteritis, although the exact significance is difficult to assess. (Fig. 53).

Fibrosis of the vessel of grade 3 or 4 was present in four arteries. None of these vessels contained inflammatory cells. In one patient (Case 67) who had had temporal headaches 2½ years previously, the whole vessel was replaced by a fibrous cord (Fig. 54). Case 78, who had had symptoms of temporal arteritis seven years previously had a moderate degree of fibrosis of the vessel wall with marked distortion of the elastic lamina (Fig. 45). Two other patients (Cases 15 and 51), who had had suppressive corticosteroid therapy for several months, also had a moderate degree of fibrosis of the vessel wall. Minimal fibrosis of the vessel wall was present in three arteries (Cases 3, 15 and 79).

In several of the arteries in which the arteritis was apparently of prolonged duration there was vascularisation of the intima and media by multiple small vessels.

Summary

Biopsies of 36 cranial arteries from 33 patients with polymyalgia rheumatica were examined. Seventeen arteries from 15 patients showed evidence of arteritis. In 9 of these patients the changes in the arteries were those of giant-cell arteritis, while in 6 other patients there were no giant-cells in the vessel wall. Four of these 6 patients had had corticosteroid therapy; the biopsy of one of these showed inflammatory changes of early arteritis, but in the other 3 all manifestations of inflammation had been suppressed, leaving an altered artery. In the remaining 2 patients the inflammatory manifestations had subsided, and the changes were presumed to represent a healed arteritis.

F. Clinical abnormalities of the larger arteries

The difficulty of diagnosing arteritis of large vessels has been discussed previously. Tenderness of large vessels was difficult to assess as these patients frequently had soft tissue lesions or referred tenderness from central joints and ligaments in the region of the large vessels. In view of this, tenderness of large vessels was only recorded when there were no tender soft tissue lesions in the region, apart from the arteries. Thus, in the tables, tenderness of arteries was probably underestimated. In the case of the abdominal aorta it was also difficult to be sure that this was the seat of the tenderness, in spite of the fact that the tenderness was in the vicinity of the artery.

The total number of patients in whom abnormalities of individual large vessels were found are indicated in Table 19:

Table 19

Artery	Number of Patients			
	Right	Left	Bilateral	Total No.
Carotid				
Murmurs	5	2	1	6
Tenderness	4	0	0	4
Reduced pulsation	1	1	0	2
Dilated and tortuous	2	0	0	2
Tortuous	0	1	0	1
Subclavian				
Murmurs	12	13	7	18
Tenderness	3	3	2	4
Reduced pulsation	0	4	0	4
Absent pulse	1	0	0	1
Thrill	2	3	1	4
Axillary				
Murmurs	6	10	6	10
Reduced pulsation	0	2	0	2
Absent pulse	1	2	1	2
Thrill	0	1	0	1
Brachial				
Reduced blood pressure	1	6	1	6
Reduced oscillometry	1	6	1	6
Abdominal aorta				
Murmurs				7
Tenderness				6
Femoral				
Murmurs	6	8	3	11
Tenderness	1	1	1	1
Reduced pulsation	3	3	3	3
Dorsalis pedis				
Absent pulse	6	9	5	10
Posterior tibial				
Absent pulse	8	7	6	9

Thus of the 80 patients with polymyalgia rheumatica 25 had clinically detectable abnormalities of the larger arteries. Five of these twenty-five (20%) were men. The most frequent abnormality was the presence of murmurs heard over the larger arteries. Murmurs were present in twenty-three of the twenty-five patients. Two patients (Cases 58 and 67) in whom murmurs were not recorded were only seen personally several years after their clinical episode of arteritis. It would appear that murmurs over large vessels are almost invariably found when other clinical evidence of large vessel abnormality is present. In four cases, only an isolated murmur was heard over one of the large vessels. Twenty cases had more widespread murmurs and some of these also had reduced pulsation and some tenderness over large vessels. One (Case 20) developed bilateral occlusion of the subclavian arteries three months after loud murmurs had first been detected over these vessels.

It was noted that a palpable thrill could frequently be felt over the artery when the murmur was loud. When there was a reduced blood pressure or oscillometric deflection in an arm the murmur over the subclavian artery was higher in pitch. The pitch of the murmur appeared to be related to the degree of arterial obstruction.

Murmurs were most frequently audible over the subclavian arteries, being present in eighteen patients; in seven of these the murmur was bilateral. In four patients the murmur was accompanied by a palpable thrill. Of these eighteen patients

with murmurs over the subclavian arteries, 9 had a history of temporal headaches. Of all 25 patients with large vessel abnormalities, 14 gave a history of temporal headaches.

The cases in whom reduced blood pressure and oscillometric readings in the arms were noted are recorded in Table 20:

Case No.	Reduced Blood Pressure		Reduced Oscillometry	
	Right	Left	Right	Left
20	Not obtainable		3/140	2/90
26	105/80	0/0	10/120	4/80
28	150/80	120/80	8/80	5/70
58	180/80	160/90	11/130	9/110
76	140/80	120/80	15/110	10/90
78	150/90	110/60	12/160	10/140

Note:

1. In Cases 20 and 26 these oscillometric readings were taken after pulsation had returned in the arms.

2. In Cases 58 and 78 these readings were taken several years after the presumed arteritis had subsided.

Of the eighteen cases with murmurs over the subclavian arteries one (Case 20) developed occlusion of both subclavian arteries and another (Case 26) occlusion of the distal part of the left subclavian artery. Another four cases had evidence of partial occlusion of the left subclavian artery. Thus in all six cases there was evidence of partial or complete occlusion of the left subclavian artery and in only one case of the right subclavian artery.

Cases with absent or reduced pulsation in the arteries of the lower limbs and reduced oscillometric deflections over the calves are recorded in Table 21:

Case No.	Femoral Artery		Dorsalis Pedis Artery		Posterior Tibial Artery		Oscillometric Deflection	
	Rt.	L.	Rt.	L.	Rt.	L.	Rt.	L.
1				-	-			
5			-	-				
15			-	-	-	-		
28	±	±		-		-	3/110	2/80
33	±	±	-	-	-	-	1.5/?	2.5/?
58	±	±	-	-	-	-	1.5/?	1.5/?
74			-	-	-	-	3/80	1.5/70
76			-	-	-	-	6/90	3/80
78				-	-	-		
79					-	-		
80			-					

Note:.

1. - Absent arterial pulsation.
2. ± Clinically reduced pulsation.
3. In Cases 33 and 58 the blood pressures at which maximum oscillometric deflections occurred were not recorded.

Cases 15, 33 and 58 developed intermittent claudication in the calves during the illness. In all three the pulsation in the dorsalis pedis and posterior tibial arteries was not palpable and in Cases 33 and 58 oscillometric pulsation in the calves was reduced. Two patients (Cases 74 and 76) with reduced oscillometric pulsation in the calves and absent peripheral pulses and six other cases with absent peripheral pulses did not complain of intermittent claudication of the calves whereas two patients (Cases 51 and 72) developed intermittent claudication of the calves during the illness in spite of palpable peripheral pulses and normal oscillometry of the calves.

These contradictory results are probably related to the physical activity of the patients. Another operative factor may be that in cases with intermittent claudication a partial occlusion of the intra-muscular arteries may have occurred.

Eight of the 11 cases with absent dorsalis pedis or posterior tibial pulses also had murmurs over the arteries arising from the aortic arch and included in these eight are four of the five cases who, in addition, had reduced oscillometric pulsation of the calves. Eight of these eleven cases also had a history of temporal headaches or were found to have clinically abnormal temporal arteries.

Brief details of the vascular manifestations of some of these patients follow, to illustrate the various ways in which abnormalities of the large vessels may present.

Case 20, a woman aged 67, was the first case in whom large vessel abnormalities were recognised. She was admitted to hospital with typical polymyalgia rheumatica and on routine examination was found to have loud murmurs above both clavicles. Her joint symptoms cleared and she felt well but her erythrocyte sedimentation rate remained persistently elevated at a 100 mm. Three days after discharge from hospital she became ill with vomiting, drowsiness, vertigo, pain in the neck and supraclavicular regions and an erythemato papular rash of the neck, chest and arms. On examination her temperature was 103°F. The left subclavian pulse was just palpable but the right subclavian, both brachial and radial pulses were not palpable. The blood pressure could not be obtained in either arm. There was no history of headaches or scalp tenderness but a biopsy of the left temporal artery showed histological changes of giant-cell arteritis. She was considered to have giant-cell arteritis with involvement of large vessels. Treatment with prednisolone resulted in a rapid improvement of general health and a slow return of pulses in the arms.

Case 5, a woman aged 66, had typical polymyalgia rheumatica which went into remission almost completely with the return of the sedimentation rate to normal after 26 months. Six months later she started feeling ill again and developed generalised headaches. When seen in June 1964 the right facial artery was slightly tender, but no other vascular abnormalities were detected. The sedimentation rate had risen to 59 mm. A biopsy of the facial

artery was performed but was recorded as normal. Two weeks later she developed very severe bitemporal headache and her general health deteriorated further. On examination both temporal arteries were now thickened and tender with reduced pulsation. She had murmurs over both subclavian and axillary arteries and tenderness of the right carotid artery. The sedimentation rate was 110 mm. Biopsy of a temporal artery confirmed the diagnosis of giant-cell arteritis. Treatment with corticotrophin gel., 60 units daily, resulted in gradual symptomatic improvement. Two months later the thickening and tenderness of the temporal arteries had cleared but the pulsation of these vessels was still reduced.

When further sections of the facial artery were later examined, one small section of the vessel wall was found to be infiltrated with large numbers of lymphocytes situated around a small vessel in the adventitia and in the outer third of the media. This was considered to be the earliest recognisable lesion of giant-cell arteritis.

Case 78, a woman aged 76, attended the Devonshire Royal Hospital out-patient clinic in August 1964 complaining of generalised pains of 7 years' duration. The earlier history and findings were obtained from various hospital records. Some months after the onset of widespread pains, when she was found to have a raised sedimentation rate, she developed severe bitemporal headaches followed by impaired vision of the left eye due to occlusion of

the central retinal artery. She also complained of a loud noise in the head synchronous with the pulse. Her vision slowly improved over 2 months. She then developed ptosis of the left eyelid and diplopia. Murmurs were heard over both eyeballs. She was admitted to the Manchester Royal Infirmary department of Neurosurgery for investigation for a suspected intracranial aneurysm. A carotid angiogram was performed and the left internal carotid artery was noted to be very tortuous in its upper part and slightly irregular in calibre. The noises in the head, headache and diplopia cleared in 12 months but she continued to have widespread skeletal pains with prolonged morning stiffness and an E.S.R. varying between 40 and 50 mm. during the 7 years. When seen personally in August 1964 she was found to have reduced blood pressure and oscillometry in the left arm. The left carotid artery pulse was weak and both posterior tibial and left dorsalis pedis arteries were not palpable. There was a murmur accompanied by a thrill over the left axillary artery and murmurs were audible over both femoral arteries. The E.S.R. was 50 mm. On biopsy the lumen of the right temporal artery was small and the vessel wall was disorganised and largely replaced by fibrous tissue. This was considered to be due to a healed arteritis.

Comment

This patient developed clinical evidence of giant-cell arteritis during the course of polymyalgia rheumatica, the

diagnosis of arteritis being confirmed 7 years later. A feature was the development of signs suggestive of an intracranial aneurysm presumably attributable to narrowing of the left internal carotid artery. Seven years after the onset of the polymyalgia rheumatica she still had a raised E.S.R. and abnormal signs arising from the large vessels.

Case 45, a 59 year old woman, developed polymyalgia rheumatica in July, 1963 with widespread pains, limited shoulder girdles and synovial thickening of the sterno-clavicular joints. In January,1964 she began to suffer from severe bitemporal headaches. When seen 2 days later, both temporal arteries were very tender and thickened with redness of the overlying skin. A soft murmur was also heard over the abdominal aorta. She was immediately treated with prednisolone, 80 mg. daily, which suppressed all the inflammatory manifestations in joints and cranial arteries within a few days. The abdominal murmur persisted unchanged. A temporal artery biopsy was performed after she had had prednisolone for 8 days, by which time the temporal arteries were clinically normal. Foci of lymphocytic infiltration were present around two small vessels in the adventitia of the artery wall.

Two months later when the dose of prednisolone had been reduced to 15 mg. daily, temporal headaches recurred and she developed angina pectoris and intermittent claudication of the calves. The temporal arteries were again tender and there was also tenderness over the right carotid and right subclavian arteries.

Murmurs of moderate intensity were now also audible over the latter vessels and there was a soft murmur over the left femoral artery. The tenderness over the arteries subsided after the dose of prednisolone was increased to 20 mg. per day. The vascular murmurs persisted unchanged for several months. Attempts to reduce the dose of prednisolone resulted in a recurrence of the temporal headaches and tenderness of the large vessels. By September 1964 the murmurs over the carotid and subclavian arteries had disappeared. The dose of prednisolone was reduced to 10 mg. daily without recurrence of symptoms or signs of arteritis. By December 1964 her angina pectoris and intermittent claudication had improved somewhat and her exercise tolerance had increased. The arteritis appeared to be in remission since further reduction of the prednisolone was achieved without recurrence of vascular manifestations, but thickening of the sterno-clavicular joints reappeared.

Comment

This patient developed widespread vascular abnormalities including angina pectoris, intermittent claudication of the calves and tenderness, with murmurs, over large vessels following typical temporal arteritis. The disappearance of the murmurs over the large vessels, a most unusual event in our experience, may have been due to the fact that corticosteroid therapy had been instituted before gross permanent abnormalities of the vessel wall had occurred.

Case 28, a woman aged 54, was admitted to hospital within 6 weeks of the onset of polymyalgia rheumatica. She had painful limitation of the shoulder and hip girdles with tenderness and minimal thickening of the sterno-clavicular joints. There was no history of headache or scalp tenderness. No murmurs were detected, other than a soft murmur over the abdominal aorta. A right temporal artery biopsy was performed but there were no histological abnormalities. On discharge 3 months later her joint symptoms were much improved and her E.S.R. had fallen from 85 to 25 mm. without the use of corticosteroid therapy. Two months later her joint symptoms had subsided and she felt very well. No vascular abnormalities were detected. Her E.S.R., however, was 100 mm.

When seen again 3 months later she still felt well but tired rapidly and had lost 9 lbs. in weight. It was noted that she had developed a loud murmur over the right subclavian artery. There was an even louder murmur accompanied by a palpable thrill over the left subclavian artery, which was tortuous with reduced pulsation. The blood pressure and oscillometric readings in the left arm were reduced compared with the right, the blood pressure being 150/80 on the right and 120/80 on the left. The E.S.R. was 85 mm. and the serum gamma globulin fraction was increased on electrophoresis. Following treatment with prednisolone her general health improved and the E.S.R. rapidly returned to normal, but the murmurs over the arteries have persisted.

Comment: This patient was presumed to have developed an arteritis of the large vessels during the course of her polymyalgia rheumatica.

Case 48, a woman aged 48, first attended as an out-patient, with polymyalgia rheumatica, twelve months after the onset of her symptoms. Both shoulder girdles were moderately limited in range and there was tenderness with minimal synovial thickening of both sterno-clavicular joints on examination. She had a soft systolic murmur over the right subclavian artery, which at that time was not considered to be significant. Her E.S.R. was 65 mm. Her symptoms remained unchanged for six months. During the next three months her joint symptoms improved but she lost 5 lbs. in weight. The right carotid artery was now dilated and tender. The right subclavian artery was unfolded and there was a very loud murmur and palpable thrill over it. Loud murmurs were also heard over the left subclavian, both axillary and right femoral arteries and over the abdominal aorta. Her E.S.R. had risen to 115 mm. There was also a slight increase of the alpha 2 and gamma globulin fractions, which had previously been reported to be normal. There was no history of headache and the cranial arteries were clinically normal. At biopsy the right occipital artery showed no histological abnormalities.

Comment: This patient was considered to have developed large vessel arteritis several months after the onset of polymyalgia rheumatica. This was accompanied by loss of weight, a rise in

the E.S.R. and the appearance of increased alpha 2 and gamma globulin fractions.

Case 33, a man aged 61, was admitted to hospital in October 1963 with polymyalgia rheumatica which had commenced in December 1962. He had also developed mild intermittent claudication of the calves a few months prior to these symptoms.

On examination there was a moderate degree of synovial thickening of both sterno-clavicular joints. There was a loud systolic murmur heard over the whole praecordium, loudest at the apex. There were also loud murmurs synchronous with the pulse audible over the abdominal aorta, the right subclavian, right carotid, both axillary, both femoral arteries and on both sides of the vertebral column in the dorsal and lumbar regions. The amplitude of oscillometric deflections was reduced in both calves. A biopsy of the left temporal artery was normal.

He began to have attacks of angina pectoris on exertion 5 weeks after admission. In January 1964 he developed constitutional illness with acute epigastric pain and tenderness. Compression of the femoral arteries aggravated this epigastric pain. The sedimentation rate was 10 mm., white cell count 8,100, serum glutamic-oxalacetic and serum glutamic-pyruvic transaminases both 18 units per ml. Three days later the sedimentation rate had risen to 36 mm., the white cell count to 13,200/cmm., the serum alkaline phosphatase to 41 K.A. units, the serum glutamic-oxalacetic transaminase to 115 units/ml. and the serum glutamic-

pyruvic transaminase to 186 units/ml. It was considered that this episode was probably due to a vascular lesion, with infarction of the liver. Treatment with prednisolone resulted in improvement of these symptoms. When he became mobile again his angina pectoris and intermittent claudication occurred with much less exertion than previously. He also noted blurring of vision and diplopia when sitting up from a lying position and on walking, which subsided on lying down. When examined by Mr. O.M. Duthie he was found to have paresis of multiple extra-ocular muscles and absent convergence.

He remained unchanged until September 1963 when he developed intermittent claudication on use of his arms and on use of the arms even when sitting or standing still he became "lightheaded" and unsteady on his feet. These symptoms cleared within a few minutes on resting.

Comment: This patient with polymyalgia rheumatica had clinical evidence of widespread vascular abnormalities. He also developed intermittent claudication of the arms together with ischaemic cerebral symptoms when using his arms, suggestive of the "subclavian-steal syndrome" (Toole, 1964).

The possibility that the vascular abnormalities in this patient were due to atheroma could not be excluded, but it was felt that the clinical picture was more suggestive of an inflammatory process in the aorta and large vessels.

This patient was considered to have polymyalgia rheumatica with possible arteritis.

Case 74, a woman aged 54, was admitted to hospital in July, 1964 with polymyalgia rheumatica of 7 months' duration. There was no history suggestive of arterial involvement. On examination, the blood pressure was 150/80 and the oscillometric deflections 8/140 in each arm. Soft murmurs were audible over the right carotid, subclavian, axillary and left femoral arteries.

The dorsalis pedis and posterior tibial arteries were not palpable on either side and the amplitude of oscillometric pulsation was reduced to 3/80 in the right calf and to 1.5/70 in the left.

The E.S.R. was 99 mm., serum globulin 3.9 gms.% with a slight increase of alpha 2 globulin on electrophoresis.

Comment: This patient was found to have evidence of vascular involvement. As there was no history suggestive of arteritis and no change in the signs during three months' observation, in the subsequent analysis she has been included in the group without arteritis since the vascular changes may be due to atherosclerosis. She is, however, being observed for the possible development of symptoms or signs of arteritis.

Comment

Twenty-five patients had clinical abnormalities of the larger arteries. As all these patients were middle aged or elderly, clinical abnormalities of these arteries may have been related to atherosclerosis. Even in those patients with histologically proven giant-cell arteritis this may still be the case. Thus in this study evidence of large-vessel abnormalities have been reported without attaching diagnostic significance to them unless other evidence suggestive of arteritis was present. However, the incidence of widespread and loud murmurs and especially evidence of occlusion of the large vessels arising from the aortic arch was much higher than the incidence found in the control group of patients.

In several cases clinical evidence of abnormalities of large vessels arose while the patient was under observation and these frequently followed an exacerbation of the constitutional illness, a marked rise in the sedimentation rate, the development of anaemia and the appearance of increased alpha 2 or gamma globulin fractions on electrophoresis. In these cases the abnormalities of the arteries were presumed to be due to an arteritis of the large vessels.

G. Laboratory Results

1. Erythrocyte Sedimentation Rate (E.S.R.)

The results of the sedimentation rate estimations are expressed in Table 22. These values are the highest recorded during the course of the illness.

E.S.R.	No. of Patients	Percentage of Patients
under 20	4	5
20 - 39	17	21
40 - 59	17	21
60 - 79	16	20
80 - 99	11	14
100 and over	15	19

The mean E.S.R. was 64 mm. Westergren.

Note: One patient with an E.S.R. below 20 mm. (Case 51) and another with an E.S.R. of 32 mm. (Case 21) were on suppressive corticosteroid therapy when these results were obtained.

The E.S.R. was usually highest at the onset of the illness but in six patients (Cases 3, 5, 28, 34, 48 and 68) the E.S.R. was either not very high initially or had fallen from a high initial value, and a sudden marked rise of the E.S.R. heralded the appearance of symptoms or signs of arteritis.

2. Haemoglobin Concentration

Twenty-one patients had haemoglobin concentrations below 75% at some time during the course of their illness. The number of patients in each of three groups is indicated in Table 23:

Percentage haemoglobin	Number of Patients
50 - 59	3
60 - 69	14
70 - 75	4

As a rule the patients with the lowest haemoglobin concentrations tended to have the highest sedimentation rates. The mean E.S.R. in the twenty-five patients with a haemoglobin concentration below 75% was 85 mm. Westergren as compared with 64 mm. Westergren for the whole series.

3. Leucocyte Count

A leucocyte count of over 10,000 per cu. mm. was only present in four patients (Cases 15, 54, 55 and 72), the values being 14,100, 12,100, 10,400, 12,500 per cu. mm. respectively. The leucocyte count in all the other 76 patients was between 4,000 and 10,000 per cu. mm.

4. Serum Protein Concentration

Serum protein estimations were performed in 72 patients.

A frequent abnormality of the serum proteins was a raised total globulin.

Twenty-one patients had a total globulin of over 3.4 gms. per 100 ml., the highest value being 5.4 gms. per 100 ml.

Twelve patients had an inversion of the albumen globulin ratio, but the albumen fraction was normal in all.

The alpha 2 globulin fraction was raised in 21 of the 64 patients in whom serum protein electrophoresis was performed.

The gamma globulin fraction was raised in 9 of the 64 patients in whom it was estimated and in 7 of these was associated with a raised alpha 2 globulin fraction.

No other abnormalities were found on serum protein electrophoresis.

5. Sensitised sheep-cell agglutination test (S.C.A.T.)

The S.C.A.T. was done repeatedly in all the patients. It was found to be positive in two patients (Cases 65 and 70) to titres of 1/64 and 1/32 respectively. The clinical picture in these two patients was indistinguishable from the rest of the patients in the series, apart from the fact that both developed slight transient synovial thickening of the wrists and of a few of the proximal interphalangeal joints. These cleared completely within a few weeks in both and did not recur.

This incidence of positive tests was no higher than would have been expected in a random population sample. Ball and

Lawrence (1961) found an incidence of 1.6 to 5.4% positive tests in seven population samples aged 55 to 64. They also found that the incidence of positive tests increased with age. Only 20% of sero-positive individuals had clinical or radiological evidence of rheumatoid arthritis.

6. Lupus Erythematosis Cell Test (L.E. cell test)

The L.E. cell test was performed in 17 patients and was negative in all.

7. Anti-nuclear Factor Test (A.N.F. test)

The A.N.F. test was performed in 16 patients with negative results in all.

The L.E. cell test or A.N.F. test was performed in 29 patients and in 4 patients both tests were performed.

8. Antistreptolysin O Titre (A.S.O. Titre)

The A.S.O. test was performed in 15 patients and found to be normal in all but one (Case 57), who had the slightly elevated value of 300 units/ml.

9. The serum enzymes including the serum transaminases (serum glutamic-oxalacetic and serum glutamic-pyruvic), aldolase and creatine phospho-kinase were estimated in 21 patients.

a) The values of the serum transaminases were normal in the 11 patients tested except Case 33, who during an acute upper abdominal episode which was presumed to be due to a liver infarct, had raised values for both the serum glutamic-oxalacetic transaminase and serum glutamic-pyruvic transaminase; before and after this episode both were normal.

b) The serum aldolase was normal in all 10 cases in which this test was carried out.

c) The serum creatine phospho-kinase estimation was also normal in the 12 patients in which it was performed.

Thus in these 21 patients there was no evidence by enzyme studies of muscle pathology.

10. Proteinuria

In no patient was there more than a trace of albumin in the urine.

11. Blood urea

Four patients had slightly raised blood urea values. Cases 7, 15, 16 and 81 had values of 53, 52, 46 and 52 mg.% respectively. All had a raised blood pressure.

12. Wasserman reaction (W.R.)

The W.R. was performed in 35 patients and was negative in all.

13. Serum uric acid

The serum uric acid value was normal in all 46 cases in which it had been estimated. A raised serum uric acid had been present previously in Case 15. He had had gout for several years and had attended the hospital for this complaint. At the time of his present illness he was receiving Benemid. His serum uric acid was normal and his gout was under control.

14. Serum Calcium, Phosphorus and Alkaline Phosphatase

The serum calcium, phosphorus and alkaline phosphatase values were normal in all 45 patients in whom it was estimated, apart from Case 36, who had Paget's disease and had a raised serum alkaline phosphatase value.

H. Clinical course of polymyalgia rheumatica

Duration of observation

In this series the period of observation recorded was from the onset of the illness to the most recent review.

The duration of observation in these patients is indicated in Table 24:

Duration (Months)	Number of Patients
0 - 12	14
13 - 24	27
25 - 36	18
37 - 48	10
48 - 60	4
over 60	7
Total	80

The intervals between the onset of symptoms of polymyalgia rheumatica and the patients' first attendance at the out-patient department are denoted in Table 25:

Table 25

Interval (Months)	Number of Patients
0 - 3	13
4 - 6	19
7 - 12	25
13 - 24	17
25 - 36	3
over 36	3
Total	80

The majority of patients were seen personally at their first attendance or shortly thereafter.

Duration of Locomotor Symptoms

Unlike the onset, which was frequently acute, remission of symptoms in polymyalgia rheumatica usually occurred very gradually over a period of months; therefore, dates of remission and duration of locomotor symptoms could as a rule only be given approximately. In those cases where corticosteroid therapy was given because of arteritis, the dose required to suppress the vascular manifestations resulted in an abrupt suppression of the locomotor symptoms and signs, and in these patients the duration of locomotor symptoms was shorter than would otherwise have been the case.

The duration of the locomotor symptoms in those patients in whom these symptoms had remitted, and also the duration of the locomotor symptoms from the onset until the date of the most recent review, in those patients whose locomotor symptoms were not yet in remission are indicated in Table 26:

Duration of locomotor symptoms (months)	Number of Patients	
	In remission	Not in remission
6 - 12	17 (3)	9
13 - 24	24 (3)	5
25 - 36	9 (1)	5
37 - 48	5 (2)	1
over 48	3	2
Total	58 (9)	22

Note: The figures in brackets indicate the number of patients whose locomotor symptoms were in remission and who had received corticosteroid therapy.

The duration of locomotor symptoms varied from 6 months to over 7 years, but it will be seen that the locomotor symptoms subsided spontaneously within 2 years in 44% and within 3 years in 54% of the patients. In three patients (Cases 10, 16 and 78) the symptoms persisted for 6, 6 and 7 years respectively and in Cases 23 and 50 the locomotor symptoms are still present after 7 and 4 years respectively. On radiological examination both these patients (Cases 23 and 50) were found to have joint

erosions and are, therefore, not typical of the series as a whole. Case 23, however, did have an asymptomatic period lasting 18 months during the course of the illness.

Thirteen other patients (Cases 5, 8, 10, 12, 17, 20, 29, 40, 41, 43, 45, 50 and 68) had a recrudescence of locomotor symptoms after the initial symptoms had improved. In these patients the symptoms commenced in one region e.g. the shoulder or hip girdle, and as these symptoms were improving or had almost subsided, new symptoms arose at another site.

The number of patients who had a persistent elevation of the E.S.R. for at least 1 month, and the duration of the elevated E.S.R. after the locomotor symptoms had subsided and which had not been suppressed by corticosteroid therapy, are indicated in Table 27:

Duration (months)	Number of Patients
1 - 6	9
7 - 12	5
13 - 24	4
over 24 (53+)	1
Total	19

It will be seen that a persistent elevation of the E.S.R. after the locomotor symptoms had subsided was recorded in 19

patients. This was most frequently present in those patients who subsequently developed evidence of arteritis. One patient (Case 58), who was considered to have arteritis and had not had corticosteroid therapy, still had an elevated E.S.R. 53 months after her locomotor symptoms had gone into remission and her general health had returned to normal. Another two patients (Cases 11 and 46) were found to have an elevated E.S.R. 18 months after their locomotor symptoms had subsided, but no evidence of vascular involvement was found.

Total duration of the illness

Patients were considered to be in remission when their locomotor symptoms had cleared, their general health had returned to normal and the E.S.R. was below 20 mm. in one hour.

The duration of the disease varied from 8 to over 94 months. One patient (Case 78) still had an elevated E.S.R. 94 months after the onset of symptoms.

The duration of the illness in those who have gone into remission, and the duration of the illness to the date of the most recent review in those patients who had not yet gone into remission, is indicated in Table 28:

Table 28

Duration (months)	Number of Patients In remission	Not in remission
0 - 12	11	10
13 - 24	13	13
25 - 36	4	11
37 - 48	4	6
49 - 60	0	3
over 60	2	3
Total	34	46

These patients have not yet been observed long enough to obtain an accurate indication of the total duration of the illness since at the time of writing less than half of them had recovered. Of the 34 patients in remission 24 (71%) remitted within 2 years, and the mean duration in these 34 patients was 24 months. Of the 46 patients not yet in clinical remission the illness had already persisted for over 2 years in 23 (50%) and the mean duration in these 46 patients was 27 months.

Of the eighteen patients in whom the duration of the disease was more than three years, eight patients (Cases 17, 21, 23, 41, 58, 67, 77 and 78) had definite or possible evidence of arteritis and four (Cases 23, 29, 37 and 50) had radiological evidence of erosion of joints.

Comment

The symptoms of polymyalgia rheumatica subsided spontaneously within 2 years in 44% and within 3 years in 54% of the patients. A recrudescence of locomotor symptoms after these had subsided for some months, occurs not infrequently.

In many patients the E.S.R. remained elevated for several months and occasionally years after the locomotor symptoms had cleared. A persistently elevated E.S.R. after the locomotor symptoms had cleared or a persistence of the illness for more than 3 years was often associated with the presence of arteritis and, less frequently, with radiological evidence of joint erosion.

It would thus appear that the duration of the illness is dependent on the presence or absence of complicating factors. In those patients without complicating factors the duration is likely to be under 3 years, whereas in those patients with arteritis or erosion of joints it is likely to persist for over 3 years. This raises the question whether the patients without complications and those with vascular or joint complications are suffering from the same disease or from different diseases, which at the onset appear to be similar.

CHAPTER 6

COMPARISON OF FEATURES IN PATIENTS WITH AND WITHOUT ARTERITIS

Introduction.

A. Comparison of locomotor signs.

B. Comparison of other features.

.....

CHAPTER 6

COMPARISON OF FEATURES IN PATIENTS WITH AND WITHOUT ARTERITIS

Twenty-one patients were considered to have definite arteritis, 17 possible arteritis and in the rest no evidence of arteritis was found.

Of the twenty-one patients with definite arteritis, fourteen had positive biopsies of the temporal artery and one of the occipital artery. In the other six patients (Cases 21, 28, 34, 48, 58 and 76) a diagnosis of definite arteritis was made in spite of the absence of confirmatory histological evidence. Three of the six had negative biopsies (Cases 28, 34, and 48), but in two of these (Cases 28 and 34) the biopsies were performed several months prior to the appearance of clinical manifestations of arteritis. These three patients all developed clinical evidence of large-vessel abnormalities while under personal observation. In each this was preceded by a marked rise in the sedimentation rate and the re-appearance of constitutional disturbances. These abnormalities were presumed to be due to arteritis of the large vessels. Another patient (Case 76) had tender temporal arteries with reduced pulsation, visual impairment due to occlusion of a branch of the central retinal artery and clinical evidence of widespread vascular abnormalities, as detailed in Appendix III, but no artery was present in the tissue removed at

temporal artery biopsy. In the other two patients no biopsy of the temporal artery was performed. In each of these six patients it was considered that there was sufficient clinical evidence, detailed in Appendix III, to include them in the group with arteritis.

Seventeen patients were considered to be suffering from possible arteritis, and it was felt that, while they were suffering from arteritis, there was insufficient evidence to justify their inclusion in the group with definite arteritis. Details of these patients (Cases 1, 4, 9, 17, 19, 23, 26, 27, 29, 33, 39, 42, 50, 62, 71, 73 and 77) are given in Appendix III.

Forty-two patients were classified in the group without arteritis. Patients who had evidence of abnormalities of large vessels when first seen and who did not have other evidence suggestive of arteritis throughout their illness, were classified in this group.

Evidence of arteritis has been found with greater frequency in the patients reviewed more recently. This may be due to the fact that we have learnt to recognise more readily the diverse clinical manifestations occurring in patients with arteritis.

The duration from the onset of the illness, in the three groups, to the most recent review is indicated in Table 29:

Table 29

Duration (months)	Number of patients G.C.A.	?G.C.A.	P.R.
0-12	4	1	9
13-24	7	5	15
25-36	4	4	9
37-48	4	3	4
49-60	0	3	1
Over 60	2	1	4
Total	21	17	42

Clinical abnormalities of the larger arteries

The number of patients in whom vascular abnormalities were noted in each of the three groups is indicated in Table 30:

Artery	G.C.A.(21)	?G.C.A.(17)	P.R.(42)
Carotid			
Murmurs	3	2	1
Tenderness	4	0	0
Reduced pulse	2	0	0
Dilated and tortuous	2	0	0
Tortuous	1	0	0
Subclavian			
Murmurs	10	5	3
Tenderness	3	1	0
Reduced pulse	2	1	1
Absent pulse	1	0	0
Thrill	3	0	1
Axillary			
Murmurs	7	2	1
Reduced pulse	1	0	1
Absent pulse	1	1	0
Thrill	1	0	0
Brachial			
Reduced B.P.	5	1	0
Reduced oscillometry	5	1	0
Abdominal Aorta			
Murmurs	6	1	0
Tenderness	5	1	0

Artery	G.C.A.(21)	?G.C.A.(17)	P.R.(42)
Femoral			
Murmurs	6	4	1
Tenderness	1	0	0
Reduced pulse	1	1	1
Dorsalis Pedis			
Absent pulse	6	3	1
Posterior Tibial			
Absent pulse	6	2	1
Reduced oscillometry of the calf	3	1	1

In this series of 80 patients with polymyalgia rheumatica, 14 (66%) of the patients with definite arteritis, 8 (47%) of those with possible arteritis and 3 (7%) of the patients without arteritis had clinical abnormalities of the larger arteries. Thus the incidence of abnormalities in the larger arteries was significantly higher in the patients with definite arteritis than in the patients without arteritis ($P < .001$).

A. Comparison of locomotor signs

The findings in the locomotor system of patients with definite arteritis, possible arteritis and those without arteritis were compared to determine whether there were similarities or distinguishing features between the three groups. The patients with atypical features such as joint erosions and those who developed features compatible with other inflammatory polyarthritides have also been included in these comparisons. These atypical patients had a higher incidence of peripheral joint involvement than the series as a whole, and thus a higher incidence of peripheral joint involvement would be expected in the groups in which these patients are mainly included i.e. the group without arteritis and the group with possible arteritis. As objective evidence of joint involvement appeared at any time during the course of the illness and patients with definite arteritis were treated with suppressive corticosteroid therapy as soon as the arteritis was diagnosed, these patients would be expected to have a lower incidence of joint involvement than the other patients.

Sites of tenderness of joints and ligaments

The number of patients with tenderness around the various joints and of the interspinous ligaments are compared in Table 31:

Joint	Patients							
	G.C.A.(21)		?G.C.A.(17)		P.R.(42)		Total(80)	
	No.	%	No.	%	No.	%	No.	%
S.C.J.	13	62	14	82	28	67	55	69
A.C.J.	15	71	14	82	30	71	59	74
S.H.J.	14	67	13	76	29	69	56	70
S.D.B.S.	6	29	8	47	14	33	28	35
Wrists	3	13	8	47	17	40	28	35
Knees	15	71	13	76	29	69	57	71
Hips	13	62	11	65	31	74	55	69
M.C.P. & P.I.P.	1	5	3	18	3	7	7	9
T.M.J.	1	5	1	6	2	5	4	5
C.S.	11	52	12	71	28	67	51	64
D.S.	10	48	7	41	9	21	26	33
L.S.	7	33	10	59	27	64	44	55

It will be seen that the sites of joint and ligamentous tenderness were very similar in the three groups. There was a lower incidence of tenderness around the wrist joints in the group with definite arteritis than in the other two groups ($P < .05$). This can partly be explained by the absence in this group, of

patients with atypical features, who had a higher incidence of peripheral joint involvement, and by the fact that peripheral joint involvement frequently occurred some months after the onset of the illness, and in the patients treated with corticosteroids this may have been prevented.

Sites of synovial thickening or effusion

The number and percentage of patients in each group with objective evidence of synovial thickening and/or effusion of individual joints and the total number of patients with these features are compared in Table 32:

Joint	Patients							
	G.C.A.(21)		?G.C.A.(17)		P.R.(42)		Total(80)	
	No.	%	No.	%	No.	%	No.	%
S.C.J.	7	33	7	41	20	48	34	43
A.C.J.	2	9	6	35	7	17	15	19
Knees	12	57	8	47	21	50	41	51
Wrists	0	0	3	18	7	17	10	13
M.C.P. & P.I.P.	1	5	1	6	3	7	5	6
Total	14	66	13	76	29	69	56	70

It will be seen that there is no significant difference between the 3 groups as regards the incidence of synovitis; this occurs in about 2/3 of the patients in each group. Synovitis of the sterno-clavicular joints was present in a slightly larger percentage of patients without than with arteritis. It is also possible that the patients with definite arteritis would have developed a higher

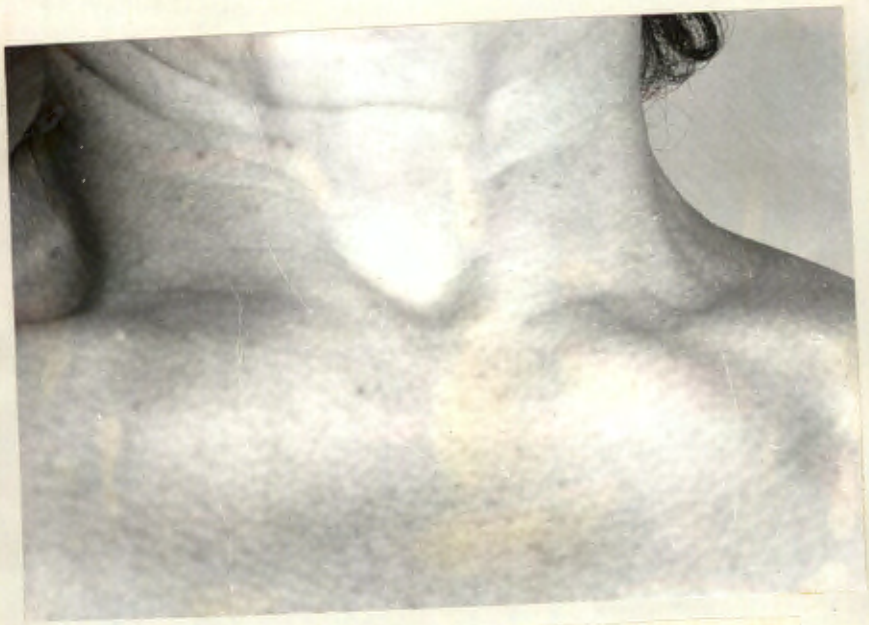


Fig. 55 Case 45
Photograph showing synovial thickening
of the sterno-clavicular joints.
(Case 45 had typical giant-cell arteritis.)

incidence of synovitis if they had not been treated with suppressive corticosteroid therapy as soon as the diagnosis of arteritis was made.

Degree of synovial thickening of the sterno-clavicular joints

The degree of synovial thickening of the sterno-clavicular joints was compared in the 3 groups, and the results are indicated in Table 33:

Degree of Synovial Thickening	Patients							
	G.C.A.(21)		?G.C.A.(17)		P.R.(42)		Total(80)	
	No.	%	No.	%	No.	%	No.	%
2	4	57	2	29	13	65	19	56
3	2	29	5	71	6	30	13	38
4	1	14	0	0	1	5	2	6
Total	7	100	7	100	20	100	34	100

It will be seen that the same grades of synovial thickening were present in the sterno-clavicular joints in patients with and without arteritis, and again there was no significant difference between the groups.

Residual instability of the sterno-clavicular joint

It was only during the course of this investigation that we became aware that in some patients, previously involved sterno-clavicular joints were left unstable. It is probable that this feature may have been missed in some of the patients seen earlier

in the study and it was not possible to recall all of them for re-examination. Insofar as the duration of the disease in the patients with arteritis was on the whole longer and they have been reviewed more recently than those without arteritis, the apparent prevalence of instability of the sterno-clavicular joints among those with arteritis might, therefore, be expected to be higher.

The incidence and degree of instability of the sterno-clavicular joints in the three groups are presented in Table 34:

Degree of Instability	Patients							
	G.C.A.(21)		?G.C.A.(17)		P.R.(42)		Total(80)	
	No.	%	No.	%	No.	%	No.	%
2	3	50	2	40	3	50	8	47
3	2	33	3	60	2	33	7	41
4	1	17	0	0	1	17	2	12
Total	6	100	5	100	6	100	17	100
Percentage of Total Group		29		28		14		21

It will be seen that instability of the sterno-clavicular joints occurred in patients with and without arteritis, thus 29% of the patients with definite arteritis, 28% of those with possible arteritis and 14% of the patients without arteritis had clinical evidence of instability of the sterno-clavicular joints. For the reasons stated above the significance of the apparently increased prevalence of residual instability of the sterno-clavicular joints in patients with arteritis is in doubt. The

Fig. 56 Case 39

Photograph showing limited shoulder girdle range of movement. (Case 39 was considered to have possible arteritis.)

Figs. 57 and 58 Cases 28 and 34
Photographs showing limitation of shoulder girdle range.
(Both had clinical large vessel arteritis.)

Figs. 59 and 60 Cases 76 and 45
Photographs showing limited shoulder girdle range.
(Both had giant-cell arteritis.)

severity of the instability was of the same order in each group.

Limitation of range of shoulder movement

The range of movement of the shoulder and shoulder girdle was compared in the three groups of patients. The range of passive abduction was estimated in degrees, no abduction being recorded as 0 and full abduction 180 degrees. In three patients (Cases 21, 41 and 78) with definite arteritis and one (Case 10) in the group without arteritis, the range of shoulder movement was not recorded and for purposes of this comparison have been excluded.

The mean angle of abduction in the cases with definite arteritis, possible arteritis and those without arteritis was 122, 124 and 128 degrees respectively. It is thus apparent that there was no significant difference in the degree of limitation of shoulder movement in patients with and without arteritis.

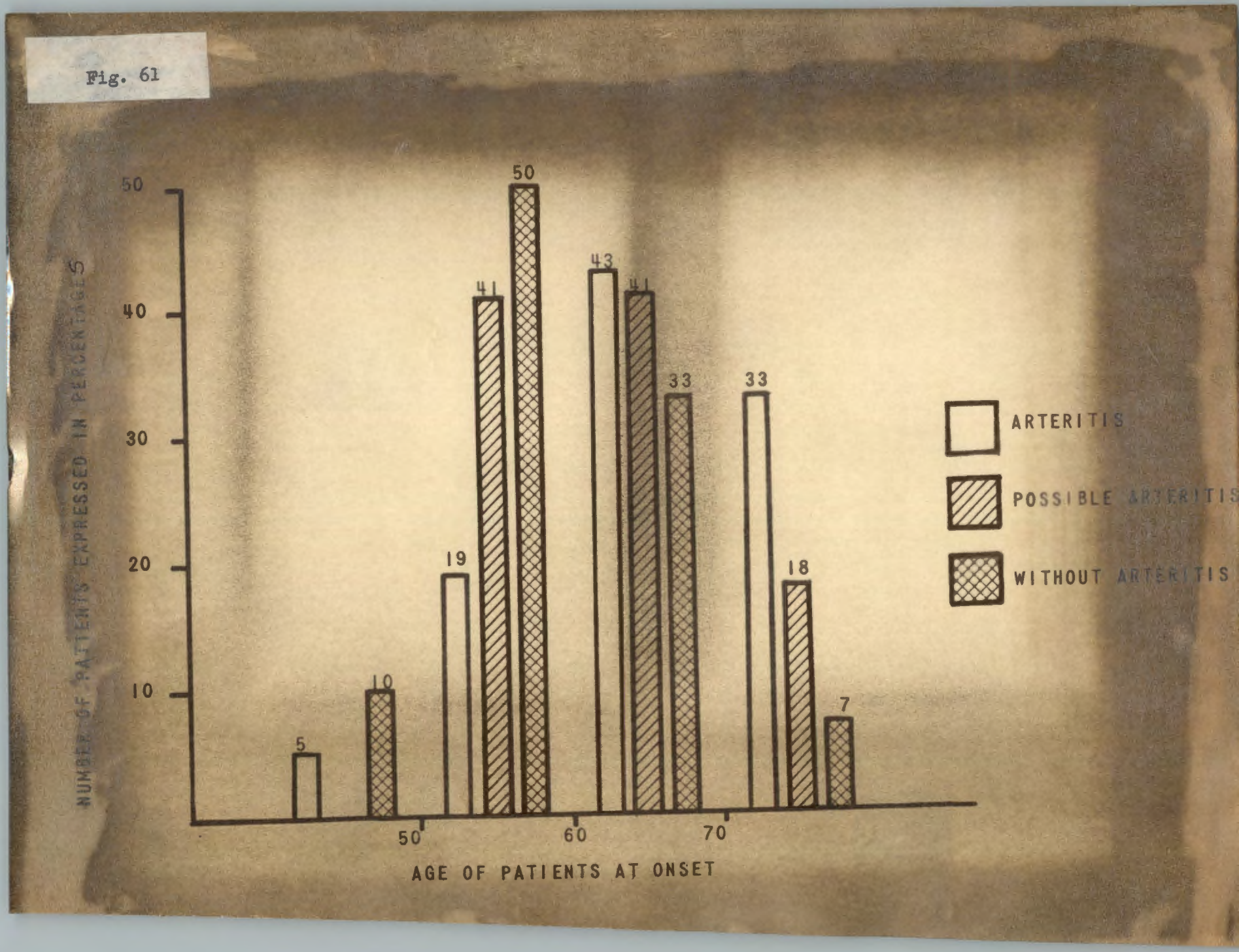
Comment

The locomotor manifestations in the three groups with definite, possible and without arteritis were compared. In the following respects there were no significant differences:

1. Incidence and sites of tenderness of joints, ligaments and tendons.
2. Incidence and sites of synovitis of joints.
3. The degree of synovial thickening of the sterno-clavicular joints, and possibly of the incidence and degree of residual instability of these joints.
4. The limitation of range of movement of the shoulder and shoulder girdle.

Synovitis of non-specific character was present in 3 of 4 sterno-clavicular joint biopsies. One of these patients (Case 81) also had temporal giant-cell arteritis on biopsy, but the synovial histology was indistinguishable from that of the others (Page 122).

Fig. 61


NUMBER OF PATIENTS EXPRESSED IN PERCENTAGES
50
40
30
20
10
5
10
19
41
50
43
41
33
33
18
7
50
60
70
AGE OF PATIENTS AT ONSET
ARTERITIS
POSSIBLE ARTERITIS
WITHOUT ARTERITIS

B. Comparison of other features

In many instances polymyalgia rheumatica clears in one to two years without demonstrable residua and corticosteroid therapy may not be indicated. What features enable us to recognise those patients who are likely to develop manifestations of arteritis with its serious and possibly lethal consequences and in whom corticosteroid therapy may be lifesaving? We shall now compare various features in the 3 groups: those considered to have definite arteritis, possible arteritis and the third group in whom no clinical evidence of arteritis was found.

Age of onset

The age of onset in the 3 groups is indicated in Table 35:

Age	Patients							
	G.C.A.		?G.C.A.		P.R.		Total	
	No.	%	No.	%	No.	%	No.	%
under 50	1	5	0	0	4	10	5	6
50 - 59	4	19	7	41	21	50	32	40
60 - 69	9	43	7	41	14	33	30	38
70 and over	7	33	3	18	3	7	13	16
Total	21	100	17	100	42	100	80	100
Mean age	67		63		58		61	

The ages are illustrated diagrammatically in Fig. 61

As will be seen those with arteritis tend to be older, the mean age for those with arteritis being 67 years as compared with 58 years

for the group without arteritis and 61 years for the whole series. In the group with definite arteritis 76% were over the age of 60 years as compared with only 40% of those without arteritis. Furthermore in the whole series of 80 patients 60% of all the patients over the age of 60 and 77% of all the patients over 70 years had definite or possible arteritis.

It would thus appear that the frequency with which patients with polymyalgia rheumatica develop manifestations of arteritis rises with increasing age.

Positive cranial artery biopsies also occurred with greater frequency in the older patients. Thirteen of the fifteen patients (87%) with positive cranial artery biopsies were over the age of 60 as compared with eight of the eighteen (43%) with negative cranial artery biopsies. The mean age for all the patients who had cranial artery biopsies was 63 but the mean age of those patients with positive biopsies was 68 as compared with 60 years for those patients with negative biopsies.

Clinical evidence of large-vessel arteritis, however, occurred with greater frequency in the younger patients with definite arteritis. The mean age of the eleven patients (Cases 5, 20, 28, 34, 45, 48, 58, 68, 76, 78 and 79) with clinical evidence of abnormalities of large vessels was 62 years. Eight of these also had evidence of arteritis of cranial vessels. The average age of the three patients (Cases 28, 34 and 48) in whom the arteritis appeared to be confined to the large vessels was 55 years.

Summary

Patients with arteritis tend to be older than those without arteritis. In patients with arteritis, involvement of the cranial arteries occurs with greater frequency in the older patients whereas arteritis of the larger vessels occurs with greater frequency in the younger patients.

Sex

In this series 61(76%) of the patients were women, and the number of patients of each sex, in the 3 groups, is compared in Table 36:

Sex	Patients							
	G.C.A.		?G.C.A.		P.R.		Total	
	No.	%	No.	%	No.	%	No.	%
Male	6	29	2	12	11	26	19	24
Female	15	71	15	88	31	74	61	76
Total	21	100	17	100	42	100	80	100

It will be seen that the sex ratio in the patients with and without arteritis was similar.

Constitutional symptoms

The number of patients in each group with constitutional symptoms is compared in Table 37:

Table 37

Constitutional symptoms	Number of Patients			
	G.C.A.(21)	?G.C.A.(17)	P.R.(42)	Total(80)
Malaise	20	17	38	75
Anorexia	15	12	15	42
Dyspepsia	11	9	9	29
Depression	16	13	27	56
Excessive sweating	3	4	5	12

As will be seen from the above table the constitutional symptoms were very similar in character in those with and without arteritis, but were, in general, present with greater frequency in the patients with arteritis.

The patients' subjective assessment of the degree of constitutional illness is compared in the three groups in Table 38:

Constitutional illness (grade)	Patients							
	G.C.A.(21)		?G.C.A.(17)		P.R.(42)		Total(80)	
	No.	%	No.	%	No.	%	No.	%
1	0	0	0	0	3	7	3	4
2	6	29	1	6	21	50	28	35
3	7	33	9	53	12	29	28	35
4	8	38	7	41	6	14	21	26

Thus the patients with arteritis tended to feel more ill. 71% of the patients with arteritis and 94% of those with possible arteritis were too ill to work as compared with 43%

of the patients without arteritis. The lower incidence of severely ill patients in the definite arteritis group as compared with the possible arteritis group is probably due to the fact that several patients with definite arteritis commenced corticosteroid therapy soon after the onset of the illness, and possibly before severe deterioration in their general health had occurred.

Weight loss

The weight loss in the 3 groups is set out in Table 39:

Weight loss (lbs.)	Number of Patients			
	G.C.A.(21)	?G.C.A.(17)	P.R.(42)	Total(80)
0 - 7	8	4	17	29
8 - 14	4	3	8	15
over 14	9	10	17	36
Mean(lbs.)	12	16	9	11

The mean weight loss was greater in those with arteritis than those without, but greatest in the possible arteritis group.

Erythrocyte sedimentation rate

The highest recorded values of the sedimentation rate are set out in Table 40:

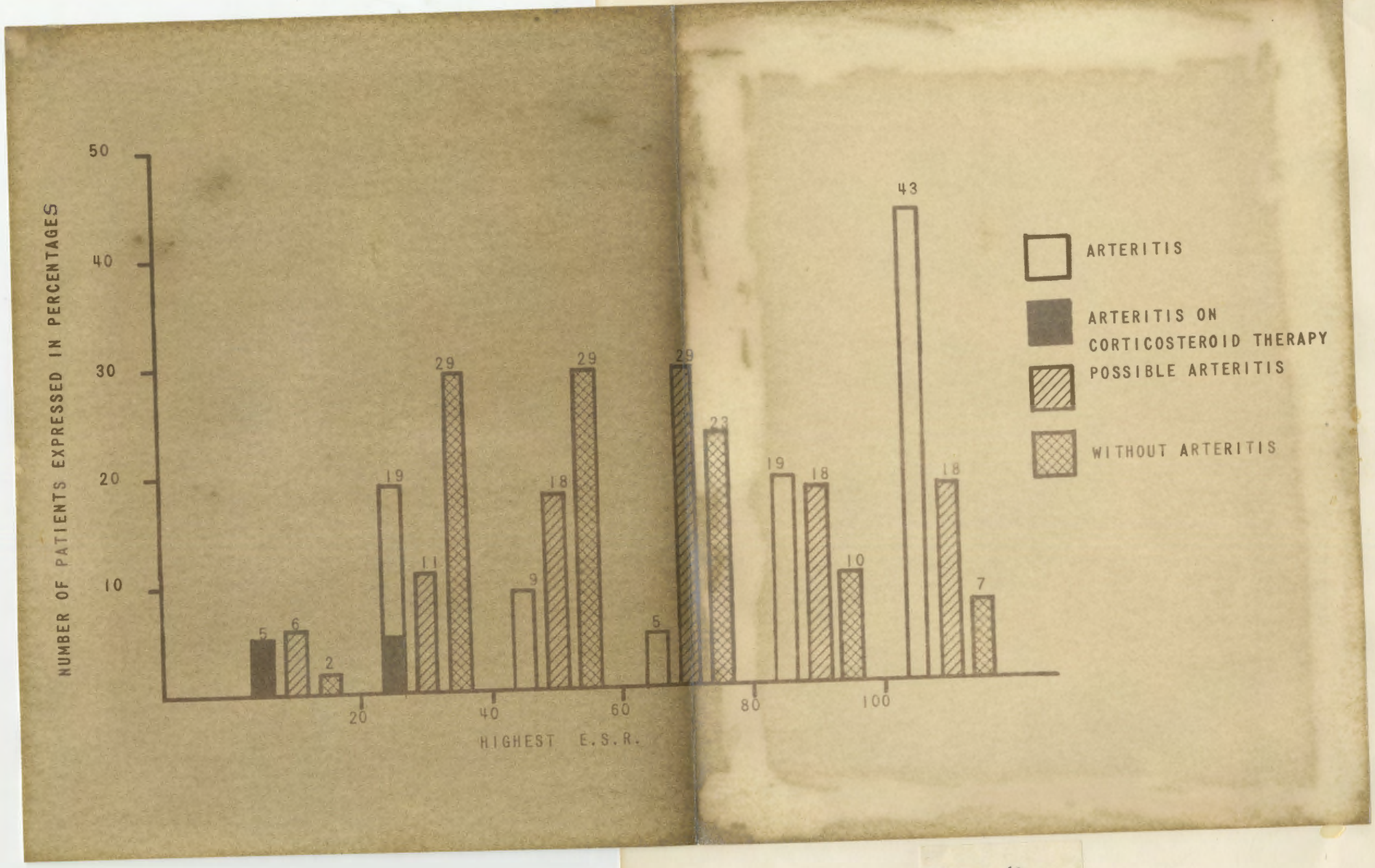

NUMBER OF PATIENTS EXPRESSED IN PERCENTAGES
50
40
30
20
10
5
6
2
19
11
29
9
18
29
5
29
43
23
19
18
10
18
7
20
40
60
80
100
HIGHEST E.S.R.
ARTERITIS
ARTERITIS ON CORTICOSTEROID THERAPY
POSSIBLE ARTERITIS
WITHOUT ARTERITIS

Fig. 62

Table 40

E.S.R. (mm.)	Patients							
	G.C.A.(21)		?G.C.A.(17)		P.R.(42)		Total (80)	
	No.	%	No.	%	No.	%	No.	%
0 - 20	1	5	1	6	1	2	3	4
20 - 39	4	19	2	11	12	29	18	23
40 - 59	2	9	3	18	12	29	17	21
60 - 79	1	5	5	29	10	23	16	20
80 - 99	4	19	3	18	4	10	11	14
100 and over	9	43	3	18	3	7	15	18
Mean E.S.R.	79		70		53		64	

Note: Two patients in the group with arteritis were on suppressive corticosteroid therapy when first seen. One had a sedimentation rate of 17 (Case 51) and in the other (Case 21) the sedimentation rate was 32. The mean sedimentation rate in the definite arteritis group excluding these two patients was 85 mm. These results are expressed graphically in Fig. 62. There was a significant difference in the sedimentation rate between patients with and without arteritis ($P < .01$).

In the group with definite arteritis 62% had a sedimentation rate of over 80 mm. as compared with 17% in the group without arteritis and of the patients with a sedimentation rate of over 80 mm., 73% had definite or possible arteritis.

In five patients (Cases 5, 28, 34, 48 and 68) a sudden marked rise in the sedimentation rate heralded the onset of manifestations

of arteritis.

It has been mentioned previously (Page 182) that a persistently elevated sedimentation rate, after the locomotor symptoms had subsided, was present in 19 patients.

The number of patients who had a persistently elevated sedimentation rate, and the duration of the elevated sedimentation rate, after the locomotor symptoms had subsided in patients with and without arteritis are compared in Table 41:

Duration (months)	Number of Patients			
	G.C.A.(21)	?G.C.A.(17)	P.R.(42)	Total(80)
0 - 6	5	4	0	9
7 - 12	1	4	0	5
13 - 24	2	0	2	4
over 24	1	0	0	1
Total	9	8	2	19

It will be seen that nine patients (Cases 5, 20, 21, 28, 34, 41, 58, 67 and 78) in the group with definite arteritis had a persistently elevated sedimentation rate after the locomotor symptoms had subsided. With the exception of two patients (Cases 58 and 78) the duration of the persistently elevated sedimentation rate in all was cut short by the institution of corticosteroid therapy, which was prescribed for the arteritis. In 11 of the other 12 patients with definite arteritis, corticosteroid therapy was commenced while locomotor symptoms were

still present.

It is apparent that the sedimentation rate frequently remains elevated after the locomotor symptoms have subsided in patients with polymyalgia rheumatica who develop manifestations of arteritis and who have not had suppressive corticosteroid therapy.

Only two (Cases 4 and 33) of the eight patients (Cases 1, 4, 9, 17, 27, 29, 33 and 71) in the group with possible arteritis who had a persistently elevated sedimentation rate received corticosteroid therapy.

In the group without arteritis a persistently elevated sedimentation rate was only found in two patients (Cases 11 and 46). In these two patients the sedimentation rate was still elevated 17 and 18 months respectively after the locomotor symptoms had subsided and their general health had returned to normal. In spite of the fact that no clinical evidence of arteritis was found in these two patients it does raise the suspicion that they may in fact also have had arteritis.

Case 11, a woman aged 61, was first seen 16 months after the onset of her polymyalgia rheumatica. She had attended another hospital at the onset of her illness where her sedimentation rate was found to be 80 mm. She was treated with corticosteroid therapy for fourteen months and when first seen personally was virtually in clinical remission, but her sedimentation rate was still 75 mm. No clinical evidence of vascular involvement was present.

The other patient (Case 46) was only reviewed on one occasion,

18 months after she had recovered clinically, and no objective evidence of vascular involvement was found. Thus in both these patients the possibility of vascular involvement cannot be excluded with certainty.

It would, therefore, be safer to assume, in the absence of any other cause, in all patients with polymyalgia rheumatica who had a persistently elevated sedimentation rate or where the sedimentation rate had risen again, after the locomotor symptoms had subsided, that this was due to an arteritis.

Anaemia

The number of patients in whom the lowest haemoglobin value recorded was below 75% of 14.8 gms. per 100 ml. is compared in the three groups in Table 42:

Diagnosis	Patients	
	Number	Percentage
G.C.A.(21)	7	33
?G.C.A.(17)	5	29
P.R.(42)	9	22
Total(80)	21	26

It will be seen that 33% of the patients in the group with definite arteritis, as compared with 22% of the patients in the group without arteritis had haemoglobin values below 75%.

In three patients (Cases 5, 34 and 68) the onset of vascular manifestations was preceded by a rapid fall in the haemoglobin

value and a marked rise in the sedimentation rate.

Abnormalities of the serum proteins

The proportions of the patients investigated in each of the groups who had abnormalities of the serum proteins are compared in Table 43:

Globulin fractions	G.C.A.	?G.C.A.	P.R.	Total
Increased alpha 2	14/20	4/15	3/32	21/67
Increased gamma	5/20	2/15	3/32	10/67
Total globulin over 3.4G/100 ml.	8/21	7/16	6/37	21/74
Inverted A/G ratio	5/21	5/16	2/37	12/74

The number of patients who had raised values and the number in whom these tests were performed are indicated above.

An increase in the alpha 2 globulin fraction was the most frequent abnormality. It was raised in 70% of the patients with definite arteritis but only in 9% of the patients in the group without arteritis ($P < .001$).

A raised gamma globulin fraction was present less frequently, being present in 25% of those with definite arteritis as compared with 9% of those without arteritis.

An increase in the total globulin and an inversion of the albumin-globulin ratio also occurred with slightly greater frequency in the patients with definite arteritis than in those without arteritis.

The total duration of the illness

The total duration of the illness in patients with definite and possible arteritis and those without arteritis is compared in Table 44:

Duration (months)	Number of Patients		
	G.C.A.(21)	?G.C.A.(17)	P.R.(42)
0 - 12	4 (4)	2 (0)	15 (6)
13 - 24	7 (7)	3 (0)	16 (6)
25 - 36	4 (4)	6 (5)	5 (2)
37 - 48	4 (3)	2 (1)	4 (2)
49 - 60	0 (0)	3 (3)	0 (0)
Over 60	2 (2)	1 (1)	2 (0)
Total	21 (20)	17 (10)	42 (16)

Note: The figures in brackets denote the number of patients not yet in remission.

These patients have not been followed for a sufficiently long period to obtain more than an impression of the total duration of the illness. It will be seen that in the group with definite arteritis, only one patient (Case 41) was in clinical remission, the total duration of her illness being 40 months. In 5 other patients who were not yet in remission the duration of the illness was already more than 3 years. In the group without arteritis 22 of the 42 patients were in remission within 3 years.

It will therefore not be surprising if, at a future review of

these patients, it is found that in those patients with definite arteritis the total duration of the illness was, as a rule, more than 3 years, whereas in the patients without arteritis the duration was less than 3 years.

Comment

The findings in this study suggest that in the syndrome of polymyalgia rheumatica the patients with arteritis are, as a rule, older than those without arteritis and are usually over the age of 60 years. Of all the patients with polymyalgia rheumatica over the age of 70 years more than three-quarters developed evidence of arteritis. Positive temporal artery biopsies have been found almost exclusively in the patients over the age of 60 years. In those patients considered to have arteritis, abnormalities of the larger arteries occurred with greater frequency in the younger patients.

The constitutional symptoms were similar in patients with and without arteritis, but were usually more severe in the patients with arteritis.

Abnormalities of the sedimentation rate and serum proteins tended to be greater in those with arteritis. A sedimentation rate of over 80 mm. was more than three times as common in those with arteritis as in those without, and of all the patients with a sedimentation rate of over 80 mm., three-quarters had definite or possible arteritis. A persistently elevated sedimentation rate after the locomotor symptoms had subsided was present most frequently in those with arteritis. A sudden rise in the sedimentation rate, often associated with the appearance of abnormalities of the serum proteins and a fall in the haemoglobin value, was almost invariably followed by manifestations of arteritis.

CHAPTER 7

MANAGEMENT OF PATIENTS WITH POLYMYALGIA RHEUMATICA

In this series of 80 patients with polymyalgia rheumatica 21 had arteritis and in another 17 this diagnosis was considered to be possible but could not be proved.

In patients with definite giant-cell arteritis the management presents no problem as corticosteroid therapy is generally considered to be definitely indicated. Also in cases where giant-cell arteritis is suspected but cannot be proved, the dangers of corticosteroid therapy may be considered to be out-weighed by the possible complications of giant-cell arteritis and the risks of corticosteroid therapy to be justifiable.

The decision is less easy in patients with polymyalgia rheumatica who have no evidence of arteritis. It has been demonstrated that in the majority of patients polymyalgia rheumatica is a self-limiting condition without sequelae, provided that arteritis does not supervene. In the opinion of the author the risks of corticosteroid therapy are not justified in patients without arteritis, especially in those who are unlikely to develop arteritis, provided that the symptoms can be controlled, during the active phase of the illness, by simpler and safer measures.

The management of patients without arteritis in this series

was not based on the results of controlled trials, but on the experience gained over the years in the units in which this study was carried out.

Fifty-three patients were admitted to hospital and cared for personally under the supervision of Dr. J. Sharp or Dr. R. Harris. Six of the eleven patients who were reviewed later had also been treated in hospital during the active phase of their illness. The period of admission varied from 1 to 4 months; usually from 6 to 8 weeks. The usual treatment regime comprised limited bed rest, with exercises to maintain muscle tone and maintain or promote joint mobility together with analgesics for relief of pain and sedation for the anxiety state which was frequently present. The period of bed rest was governed by the degree of constitutional illness and the parameters of inflammation e.g. the sedimentation rate and serum protein changes. Bed rest was followed by gradual mobilisation, the period out of bed and the physical activity being progressively increased. The patients obtained great symptomatic relief from mobilising exercises in a warmed pool.

Soluble or enteric coated aspirin, 3 to 4 gms. per day, were the analgesics routinely used. This afforded a fair degree of pain relief. In those patients who were intolerant of aspirin, paracetemol, 8 to 12 tablets per day, was prescribed with results

largely similar to those obtained with aspirin. Phenylbutazone, 300 mg. daily, was prescribed for 10 patients in this series who had obtained very little benefit from aspirin. The symptomatic relief obtained with this appeared to be greater than that obtained with aspirin, but in no case was the relief of pain dramatic or followed by an immediate increase of joint range where this had been limited. The symptomatic relief obtained with phenylbutazone in cases with polymyalgia rheumatica would not appear to be, in our experience, as great as that obtained in patients with ankylosing spondylitis.

Sedation was almost invariably indicated since the patients were usually agitated or depressed. Treatment with phenobarbitone, 100 mg. daily, or meprobamate, 600 mg. daily, in divided doses, usually relieved these features satisfactorily.

A controlled trial is at present being conducted at the Devonshire Royal Hospital and the University of Manchester, Rheumatism Research Centre, to determine whether the addition of chloroquin to the normal therapeutic regime influences the course of polymyalgia rheumatica. Individual containers labelled Chloroquin X or Y, each containing 180 tablets of either 2.5 or 250 mg. of chloroquin phosphate were prepared and each patient was given either Chloroquin X or Y at random. This trial has not yet been completed, but of the eighteen patients who have participated, seven have developed clinical evidence of arteritis during or following completion of the six months' trial.

Four of these (Cases 3, 20, 34 and 48) were in the X group and three (Cases 5, 28 and 33) in the Y group. It would thus appear that chloroquin phosphate, 250 mg. daily, for a period of up to six months has no influence on the development of vascular manifestations in patients with polymyalgia rheumatica.

Local Injections

Local infiltration of hydrocortisone and local anaesthetic into the tender joints, tendons and ligaments almost invariably resulted in marked relief of the pain arising from the site injected. The number of patients who had injections at various sites are indicated in Table 45:

Site	Patients	
	No.	No. bilateral
Sterno-clavicular joint	15	6
Acromio-clavicular joint	23	3
Scapulo-humeral joint	11	4
Tendons around shoulder and sub-deltoid bursa	21	8
Hip girdle tendons	4	1
Wrist tendons	3	1
Knee ligaments	4	1
Cervical I.S. ligaments	5	
Dorsal I.S. ligaments	7	
Lumbar I.S. ligaments	6	
Costo chondral junction	2	2
Tempero-mandibular joint	1	1

In all thirty-one patients received injections into joints with good relief in twenty-nine and fair results in two.

Tender focal areas of tendons and ligaments were injected in twenty-eight patients with good results in all but three, in whom injections into the tender tendons around the shoulder joint resulted in no improvement. This is probably due to the fact that in cases where there are multiple focal lesions of the rotator cuff it is often difficult to locate those mainly responsible for the symptoms and to infiltrate them effectively.

In all cases with spinal pain and limitation of spinal movement where the interspinous ligaments were effectively anaesthetised, the pain in the neck or back was diminished and the range of spinal movement improved. It would thus appear that the spinal pain and limitation occurring in these patients was at least partly due to involvement of the spinal ligaments.

In one patient (Case 57) who had pain and tenderness over both tempero-mandibular joints with pain on chewing and a limited bite, this was completely relieved by infiltration of these joints with Lignocaine and hydrocortisone.

Systemic Corticosteroid Therapy

Twelve patients, of whom four were considered to have definite arteritis, three possible arteritis and five had no evidence of arteritis, commenced systemic corticosteroid therapy before attending one of the departments at which this study was undertaken. Of the remaining patients without arteritis three

(Cases 24, 37 and 66) required systemic corticosteroid therapy to control their locomotor symptoms. Case 66 also had Addison's disease and was on a maintenance dose of 50 mg. Cortisone daily for the control of this, but satisfactory control of her locomotor symptoms could not be achieved without the addition of 8 to 10 mg. prednisolone daily. In the other thirty-four cases of polymyalgia rheumatica without arteritis, systemic corticosteroids were not considered to be indicated.

Management of patients with arteritis

The aim of treatment in patients with giant-cell arteritis must be to prevent narrowing or occlusion of affected arteries and the development of permanent changes in these vessels. Where the blood supply to organs such as the eye, brain or heart is threatened, this is obviously a matter of great importance, particularly since by the time that clinical evidence of involvement of these organs is detectable, in most cases irreparable damage has occurred. Changes in the superficial temporal arteries can, however, be observed without difficulty, and it is not unlikely that the pathological changes occurring in other arteries are not unlike those occurring in the temporal arteries.

In patients who were found to have evidence of arteritis it was considered essential to suppress the inflammatory changes in the arteries as completely and as rapidly as possible. In those without clinical signs of arteritis in the temporal arteries the return of the sedimentation rate and serum protein changes to normal was used as the index of the dosage of corticosteroid required. Two patients (Cases 45 and 80), however, had clinical and histological evidence of arteritis of the temporal arteries with a normal sedimentation rate, and where the superficial temporal arteries were thickened and tender the resolution of the signs of inflammation in these arteries was considered to be a more reliable index of the suppression of inflammation present in other vessels. The dose of corticosteroid

required to suppress the arteritis was found to be much higher than the dose sufficient to control the locomotor symptoms. The importance of instituting corticosteroid therapy in dosage sufficient to suppress the inflammatory changes in the arteries as early as possible after the arteritis had been diagnosed is illustrated by the following examples:

Case 3 had histological changes of giant-cell arteritis in an occipital artery biopsy in spite of the absence of tenderness or thickening of any of the cranial arteries. Treatment with prednisolone, 8 mg. daily, resulted in the immediate suppression of all the locomotor symptoms. After she had been taking this dose continuously for 9 months she developed tenderness and thickening of the right superficial temporal artery, which persisted until the dose of prednisolone had been increased to 20 mg. daily.

Case 80, who presented with tender thickened temporal arteries and an inferior field defect of the right eye, responded to 50 mg. prednisolone daily. On gradually reducing the dose to 30 mg. daily he had a recurrence of his temporal headaches and the temporal arteries became tender again. These symptoms again responded to the increase of the dose of prednisolone to 50 mg. daily. Throughout this period his sedimentation rate had been normal.

The following case histories illustrate the relationships between the time of institution of corticosteroid therapy and the dosage employed and the effect on the arteries:

Case 45, a woman aged 59, was seen within 2 days of the onset of her temporal headaches. Both superficial temporal arteries were very tender, thickened and tortuous with redness of the overlying skin. She was treated with prednisolone, 80 mg. daily, and by the eighth day when a temporal artery biopsy was performed, these arteries were clinically normal and the only abnormality found on histological examination was the presence of lymphocytic infiltration around two arterioles in the adventitia. In this case the inflammatory changes in the temporal artery had thus been suppressed before permanent changes had occurred in it.

Case 79, a woman aged 66, started prednisolone, 20 mg. daily, two months after the onset of temporal headaches. This was reduced to 12 mg. daily two months later and when seen four months later both temporal arteries were still slightly thickened and tender with reduced pulsation and her sedimentation rate was still elevated. A biopsy of the temporal artery showed histological changes of moderately severe arteritis with narrowing of the lumen by intimal thickening and incomplete suppression of the inflammatory changes in the vessel wall. Treatment in this case had been commenced too late to prevent permanent vascular changes and the dose of corticosteroid had not been sufficient to suppress the inflammatory changes completely.

Case 5, a woman aged 66, was diagnosed as having giant-cell arteritis two months after the onset of severe bitemporal headaches.

On clinical examination the temporal arteries were very thickened and tender with reduced pulsation. A biopsy of the anterior branch of the right temporal artery was performed and on histological examination the lumen of the vessel was almost completely occluded by the intimal thickening. There was extensive destruction of the internal elastic lamina and of the media, which was infiltrated by inflammatory cells. Treatment with corticotrophin gel, 60 units daily, resulted in suppression of the inflammatory manifestations but three months later there was still reduced pulsation in both temporal arteries. Suppressive corticosteroid therapy had, in this case, been instituted too late to prevent permanent vascular changes.

Case 69, a man aged 76, was seen thirteen months after the onset of his temporal arteritis during which time marked mental deterioration had occurred. On examination, both temporal and facial arteries were tender, tortuous, thickened and pulseless. A biopsy of the anterior branch of the left temporal artery was performed and the histological changes were those of a very advanced giant-cell arteritis with complete occlusion of the lumen and almost complete replacement of the media by granulation tissue. He was treated with prednisolone, 20 mg. daily, for several weeks, before the dose was gradually decreased. Nine months later the temporal and facial arteries, which had been replaced by thin fibrous cords, were still pulseless. There had been no improvement in his mental state. In this patient suppressive

corticosteroid therapy was started too late to prevent permanent vascular occlusion and mental changes.

Case 15, a man aged 73, was seen within two months of the onset of temporal headaches. On examination both temporal arteries were tortuous, thickened, tender and pulseless with redness of the overlying skin. Corticosteroid therapy was begun at once, with prednisolone 20 mg. daily, but this did not suppress the changes in the temporal arteries. A week later the dose of prednisolone was increased to 60 mg. daily and he was also given anticoagulents. The manifestations of inflammation in the temporal arteries were suppressed but the pulses did not return. Two months later he lost his sense of smell and taste and developed progressive intermittent claudication in the thighs. He died nine months after the onset of his illness. Post mortem histological examination showed complete occlusion of the right temporal artery by intimal proliferation with occlusion of the left temporal artery by intimal thickening and organising thrombus.

Case 20, a woman aged 67, with clinical polymyalgia rheumatica developed bilateral occlusion of the subclavian arteries. There was no thickening or tenderness of the temporal arteries, but a biopsy of the anterior branch of the left temporal artery showed histological changes of organising thrombus, without evidence of arteritis. At a second biopsy a section of the same artery was removed more proximally and this section had the typical changes of giant-cell arteritis with almost complete occlusion

of the lumen by intimal thickening. It would thus appear that the thrombosis in the temporal artery in this case occurred secondarily to the occlusion of the vessel by the arteritis situated more proximally in the artery.

In this series of eighty cases with polymyalgia rheumatica seven developed vascular abnormalities while under personal observation. One woman, aged 70 years (Case 3) developed clinical thickening and tenderness of the right temporal artery while being treated with an inadequate dose of prednisolone. The other six (Cases 5, 20, 28, 33, 34 and 48) were not being treated with corticosteroid at the time. In one patient, a woman aged 67, (Case 20) clinical evidence of bilateral occlusion of the subclavian arteries arose after her locomotor symptoms had remitted, but her sedimentation rate had remained elevated at 100 mm. in an hour. In the other five patients (Cases 5, 28, 33, 34 and 48) whose locomotor symptoms were either in remission or much improved, clinical evidence of arteritis became apparent several weeks after the return of constitutional symptoms with malaise, loss of weight and associated with the finding of a marked rise in the sedimentation rate, a fall in the haemoglobin level and an increase in the serum globulin and alpha 2 globulin fraction and occasionally of the gamma globulin fraction. Case 5, a woman aged 66, developed bilateral tender, thickened temporal arteries and loud murmurs over both subclavian arteries. Three patients (Cases 28, 34 and 48) aged 54,

49 and 61 years respectively developed loud murmurs over the subclavian arteries with clinical evidence of vascular obstruction in two (Cases 28 and 48). Case 33, a man aged 61 years, who had had widespread vascular murmurs when first seen, developed an increase of vascular symptoms and signs with evidence of cerebral ischaemia, severe angina pectoris and intermittent claudication of the calves and a possible infarct of the liver.

It is likely, that in several of these patients, the vascular abnormalities may have been prevented had we been aware of these complications and their mode of presentation at an earlier date.

Comment

From the review of the clinical and histological changes found in the temporal arteries of these patients and their response to corticosteroid therapy, it would appear that the results obtained with suppressive corticosteroid therapy depended on the amount of damage which had already resulted in the vessel from the arteritis when the treatment was begun.

It would appear that in the early case where the only changes in the artery are those of inflammatory cell infiltration and oedema, these changes may be completely reversed by corticosteroid therapy. In the moderately advanced case where the vessel wall is partly destroyed but the lumen not completely occluded by intimal thickening, suppressive corticosteroid therapy is likely to result in a fibrosed vessel wall with a lumen of reduced calibre.

In those cases where the arteritis has been very acute or has been present for several months resulting in complete destruction of the vessel wall and complete occlusion of the lumen of the artery by intimal proliferation, the artery is likely to remain a fibrous cord.

On histological examination, thrombosis was infrequently present in the sections of the temporal artery, even in cases where there had been marked reduction of the calibre of the lumen by the arteritis. Where it did occur it may have

resulted from the more proximal occlusion of the same artery by arteritis.

In one patient (Case 15) who had anticoagulents in addition to suppressive corticosteroid therapy, this did not prevent the subsequent occlusion of other arteries and his residual vascular changes were no different from those which would have been expected had he had corticosteroid therapy only. It is, therefore, doubtful whether the additional risks of anticoagulent therapy are justified in patients with giant-cell arteritis, but this question could only be resolved by a controlled trial.

Vasodilators were not prescribed in these cases as it was considered unlikely that they could influence arteries partly or completely occluded by intimal thickening and where the muscular fibres of the media had been destroyed, and that they might be positively harmful through causing a shunt of blood from the affected arteries or a lowering of the blood pressure with a resultant reduction of the blood supply to the structures supplied by the arteritic vessels. In four patients (Cases 33, 67, 79 and 80) their visual symptoms were aggravated by standing and improved by lying down, probably as a result of the increase of the intracranial blood flow with recumbency.

It is concluded that corticosteroid therapy in a dose sufficiently high to suppress all manifestations of inflammation

is indicated in all patients with polymyalgia rheumatica who develop or are likely to develop arteritis. The ones most likely to develop arteritis are those aged 70 years or more with sedimentation rates above 80 mm. in one hour. An exacerbation of constitutional symptoms particularly if associated with a marked rise in the sedimentation rate, a fall in the haemoglobin level and the development of serum protein abnormalities is likely to be followed by clinical evidence of arteritis.

CHAPTER 8

DISCUSSION

In this study of 80 patients with polymyalgia rheumatica it was found that they presented a fairly consistent clinical picture and the majority appeared to be suffering from the same disease. The main diagnostic features were the presence of pain and tenderness of central joints, tendons and ligaments with prolonged morning stiffness in middle aged and elderly people. Clinical evidence of synovial thickening of the sterno-clavicular joints was the most helpful physical sign, as this was present in 40% of these patients and was often the only objective physical sign to indicate that an inflammatory process was present.

The presence of prolonged morning stiffness is the most reliable criterion for distinguishing inflammatory from non-inflammatory symptoms arising from the locomotor system (Ropes et al., 1958), with laboratory investigations such as the sedimentation rate and abnormalities of serum proteins providing valuable confirmatory evidence. Two patients, however (Cases 45 and 81) had normal sedimentation rates in spite of the presence of clinical temporal arteritis which was confirmed histologically.

Patients in this age group almost invariably have evidence of degenerative joint or disc disease on radiological examination, and many have a long history of symptoms resulting from these degenerative changes. Only by recognising the alteration in character of the symptoms, with the onset of prolonged morning stiffness, can the onset of an inflammatory polyarthritis be suspected and the constitutional symptoms and abnormal laboratory findings be ascribed to the correct diagnosis. Many of the patients in this series had been referred to hospital with the diagnosis of osteoarthrosis or degenerative disc disease, as these were the changes found on radiological examination. Others with severe constitutional illness had been investigated for other diseases such as myelomatosis, carcinomatosis, polyarteritis and polymyositis. In one patient (Case 76) with severe constitutional illness, a small adenoma of the thyroid was found, but there was no improvement in her general health following partial thyroidectomy. Treatment with systemic corticosteroids resulted in dramatic symptomatic relief and improvement in her general health. In view of the associated depression several patients were considered to be suffering from neuroses and one patient (Case 57) had been admitted to a psychiatric hospital and had electro-convulsive therapy without benefit.

Patients presenting with pyrexia of undetermined origin

or with an unexplained elevated sedimentation rate have always presented problems in diagnosis. Böttiger (1953) investigated 158 patients presenting with pyrexia of undetermined origin; among these, there were 36 elderly patients with prolonged fever and a raised sedimentation rate. The cause of these abnormalities was not determined and all regained normal health, but at review some still had raised sedimentation rates and "minor circulatory and other symptoms" which were not detailed.

Ansell and Bywaters (1958) reviewed all the new patients attending the Rheumatism clinic of the Post-graduate Medical School, London, with unexplained elevated sedimentation rates, over a period of 3½ years. In their series there were 11 patients (8 women and 3 men) in whom the cause of the elevated sedimentation rate could not be determined. Eight of these patients were over the age of 50. In all, the prognosis was good although in 6 patients the sedimentation rate was still elevated after one year.

Two of the 100 patients with pyrexia of undetermined origin reported by Peterdorf and Beeson (1961) were found to have giant-cell arteritis. Norris (1962) also reported a woman aged 56 who presented with pyrexia of undetermined origin. Biopsy of a lymph gland showed histological changes of giant-cell arteritis in an artery, which was confirmed by

temporal artery biopsy.

Gower (1963) investigated 67 patients with pyrexia of undetermined origin. Ten of these presented with a very similar clinical picture and the results of investigations conformed to a common pattern. They were aged from 52 to 67 years and seven were women. The main complaint was malaise, though 3 complained of headache, 3 of sweating excessively and 2 of muscular aching. One had had "rheumatoid arthritis"in the past and another had bilateral "frozen shoulders". Despite fever and weight loss these patients seldom gave the impression of being seriously ill. The sedimentation rate was raised in all to from 40 to 155 mm., the elevations being out of proportion to the clinical severity of the illness. Nine had an increase in the alpha 2 globulin fraction on plasma protein electrophoresis. Response to corticosteroid therapy in 3 patients was dramatic. Eight patients recovered over weeks or months with or without the use of corticosteroids, although the sedimentation rate often remained elevated after clinical recovery. Two patients died and at autopsy no cause for the symptoms was found. The causes of death were not stated and no information regarding the state of the arteries was given.

The clinical features of some of the patients with pyrexia of undetermined origin and unexplained elevated sedimentation

rates reported by Ansell and Bywaters (1958), and Gower (1963) were very similar to those of the patients with polymyalgia rheumatica in the present study and it is the author's opinion that some of these reported cases were probably examples of this condition. It is possible that some of Gower's patients with severe constitutional illness, markedly raised sedimentation rates, increased alpha 2 globulin fractions and headache may have been suffering from giant-cell arteritis.

Palpation of the cranial arteries should be part of the routine examination of all middle aged and elderly people with undiagnosed illnesses or who begin to fail mentally or physically. Since clinically normal cranial arteries may show histological changes of giant-cell arteritis, a biopsy of the temporal artery should be considered in any patient presenting with symptoms possibly attributable to giant-cell arteritis, particularly in view of the fact that giant-cell arteritis is an illness amenable to treatment, neglect of which may have serious consequences. Unfortunately a negative temporal artery biopsy does not exclude the diagnosis, as it has been demonstrated personally and by Cooke et al. (1946), McCormick and Neubuerger (1958), Crompton (1959) and Paulley and Hughes (1960) that giant-cell arteritis is a patchy lesion. Therefore multiple sections should be examined and if necessary a repeat biopsy should be performed.

Radiological abnormalities in joints

Only one patient (Case 37) who was originally considered to be suffering from polymyalgia rheumatica and developed psoriatic nail changes and multiple erosions of the joints during the course of the illness was, at the time of writing, considered to be suffering, not from polymyalgia rheumatica, but possibly from psoriatic arthropathy. However, her illness at the onset appeared typical of polymyalgia rheumatica.

Seven other patients had erosive changes in joints on radiological examination. The distribution of these erosive changes was not typical of that found in any of the defined rheumatic diseases. Absence of erosive changes in joints has been considered to be a diagnostic feature of polymyalgia rheumatica, but in the patients in this series the clinical features of the patients with erosions were indistinguishable from those found in the other patients. Four patients (Cases 23, 26, 29 and 50) with joint erosions had features of arteritis and were classified in the group with possible arteritis, but as yet, histological changes of giant-cell arteritis have not been demonstrated in patients with erosive changes. Heptinstall et al. (1954) reported the autopsy findings of a patient who had died from giant-cell arteritis, and also had erosion of the head of the femur by vascular granulation tissue containing numerous histiocytes

and plasma cells.

In the author's opinion erosive changes of joints on radiological examination must be considered to be compatible with the diagnosis of polymyalgia rheumatica unless there is a clear alternative diagnosis. Three of the eight patients with joint erosions had psoriasis. This is a higher incidence of patients with psoriasis than would have been expected and it is possible that psoriasis in some way enhances the chances of erosions occurring in patients with polymyalgia rheumatica. Even if the three patients with psoriasis are excluded this still leaves five patients with a clinical picture of polymyalgia rheumatica who had joint erosions.

Changes in the joints

No primary abnormality of muscle has been demonstrated either clinically or by serum enzyme estimations, electromyography or muscle biopsies, and evidence has been presented that the pains, felt by the patients to be in the muscles, are largely referred from inflamed central joints, tendons and ligaments.

It has been suggested by Gordon et al. (1964) that the difference in degree of stiffness and limitation of joint

movement, especially of the shoulder joints, was the distinguishing feature between patients with polymyalgia rheumatica and giant-cell arteritis; joint stiffness and limitation being prominent in patients with polymyalgia rheumatica, but not in patients with giant-cell arteritis. The findings in this study do not support this suggestion, as no significant difference in the degree of shoulder limitation was found in patients with and without arteritis. The mean range of shoulder abduction was 122° in the patients with definite arteritis and 128° in the patients without arteritis.

Furthermore, it has been found in this study that there was no difference between patients with and without arteritis in (1) the incidence and sites of tenderness of joints, ligaments and tendons, (2) the incidence and sites of synovitis of joints and (3) the degree of synovial thickening of the sterno-clavicular joints and of the incidence and degree of residual instability of these joints.

Histological changes of very active non-specific synovitis have been demonstrated in the sterno-clavicular joints of three patients (Cases 24, 33 and 81) in this series, thus confirming that some of these patients do in fact suffer from an arthritis of central joints, and lending support to the suggestion that "Central polyarthritis" is a better designation for the condition than polymyalgia rheumatica (Kellgren, 1962).

One of the three patients (Case 24) with histological changes of synovitis in the sterno-clavicular joint showed no changes of arteritis, another (Case 33) was regarded as suffering from possible arteritis, and a third (Case 81) had histological changes of giant-cell arteritis in a temporal artery biopsy, and histological appearances of the synovium indistinguishable from those of the other two patients.

In view of the histological demonstration of the co-existence of arthritis of central joints and giant-cell arteritis and also the fact that the locomotor manifestations in the patients with and without arteritis were indistinguishable, it is possible that polymyalgia rheumatica and giant-cell arteritis are manifestations of the same disease.

It appears likely from this study, however, that arteritis arises in less than half the patients who suffer from polymyalgia rheumatica, the remainder presenting only the articular, ligamentous and tendinous features of the condition.

Gordon et al. (1964) also found histological changes of synovitis in the shoulder joint of six patients with polymyalgia rheumatica, but there was much less inflammatory cell infiltration in the synovium in this joint than was found in the present study. A further patient who had the typical clinical picture of polymyalgia rheumatica, was found to have

more acute inflammatory changes in the synovium of the knee, with marked infiltration of the synovium and sub-synovium with lymphocytes, plasma cells and macrophages. These changes were similar to those found in the present study, but were considered by Gordon et al. (1964) to be due to rheumatoid arthritis. It is well recognised that the histological appearances of the synovium in the various inflammatory polyarthritides are non-specific and the degree of inflammatory cell infiltration is an indication of the degree of disease activity in the joint (Ball, 1964).

The demonstration in this study of inflammatory changes in the capsules of the sterno-clavicular joints and the report of Gordon et al. (1964) of the finding of chronic inflammatory cell infiltration of the deep fascia and tendinous septa of the deltoid muscle, at biopsy, of patients suffering from polymyalgia rheumatica, raises the possibility that, at the sites of tenderness in the tendons and ligaments there may also be inflammatory changes, but no histological studies of such lesions have as yet been made.

Residual instability of the sterno-clavicular joint has not previously been reported in patients with polymyalgia rheumatica, but in this study was found in 17 patients. This has persisted for as long as the patients have been observed, but has not caused any symptoms.

Bonnin (1960) reported six elderly women who had subluxation of the sterno-clavicular joint, considered to be due to ligamentous relaxation occurring with age. Polymyalgia rheumatica must be recognised to be a further cause of this condition.

Pain arising from the arteries

The view generally held that the pains, felt by patients with giant-cell arteritis to be in the muscles, arise from inflamed arteries within the muscles appears to be only partly correct.

In some patients in this series who were considered to have arteritis, there was tenderness over the large vessels, especially the subclavian and carotid arteries and the abdominal aorta. One patient (Case 20) who developed bilateral occlusion of the subclavian arteries also developed pain and tenderness over these vessels. In all, however, the pain arising from the larger arteries was less severe than

the pain arising from the locomotor system and in some patients there was very little tenderness over the affected vessels.

In the case of the temporal arteries it was found that these arteries were only very painful and tender when there were histological changes of very active inflammation and oedema virtually occluding the lumen. In such vessels the intima bulged at the cut ends when the artery was sectioned at biopsy. In cases where there had not been severe pain or marked tenderness over the temporal arteries, it was found that the histological changes were less acute and there was not the same bulging of the intima on sectioning the artery. It is thus likely that the severe pain, so characteristic of temporal arteritis, is due to the congestive changes resulting in increased pressure within the vessel wall.

Clinical features of arteritis

In this series of 80 patients with polymyalgia rheumatica, clinical features compatible with the diagnosis of arteritis were found in 38 patients. Of these, 21 patients were considered to have definite arteritis. Twenty-nine patients had local headache, but this was often only disclosed on specific enquiry, as patients attending a rheumatology clinic

often do not spontaneously disclose symptoms referable to other systems.

Visual symptoms occurred in 20% of the patients in this series. The more serious symptoms such as blindness, visual field defects and extraocular muscle palsies are well recognised features of giant-cell arteritis. The significance of transient minor visual symptoms such as transient blurring of vision, spots or flashes of light in front of the eyes or photophobia, occurring especially when the patient was erect, must be recognised to be, in some patients, evidence of vascular insufficiency of the retina or visual pathways (Cameron, 1959). In the majority of patients in this series with such symptoms, corticosteroid therapy resulted in their rapid subsidence.

Hamrin et al. (1964) reported disorders of sense of taste and smell in 12 of their 19 patients with giant-cell arteritis. Two of the patients in this series had complete loss of sense of smell, and in both this appeared to be permanent. Both these patients had visual symptoms and severe symptoms arising from the cranial arteries. This would thus appear to be a feature of giant-cell arteritis when vessels of the calibre of the cranial arteries were mainly affected.

Abnormalities of the cranial arteries

By grading the degree of abnormality found in the cranial arteries on clinical examination, macroscopically, at biopsy and on histological examination it was possible to correlate the clinical features with the histological changes in the artery.

It has been shown that tenderness and palpable thickening of the temporal arteries, together with absent or reduced pulsation was highly likely to be due to an arteritis. It has also been found that the histological changes were most marked in those arteries which were most thickened and tender with absent pulsation. Complications such as visual impairment, anosmia and intellectual deterioration, which all probably result from occlusion of medium sized arteries, were much more frequently present in those patients who had very active changes in the temporal arteries. In these patients, as is well recognised, treatment with sufficiently high doses of corticosteroid to result in complete suppression of the disease must be instituted as an urgency, as complications frequently arise very rapidly. Fortunately in those patients where the clinical signs in the temporal arteries were not as obvious, the disease in the other arteries usually appeared to be less acute and complications arose less frequently and also

less rapidly. This probably accounts for the infrequency with which complications arising through occlusion of arteries have been recognised in the past in patients with polymyalgia rheumatica.

In some untreated patients with polymyalgia rheumatica and also in patients who had been treated with a dose of corticosteroid insufficient to suppress the arteritis completely, histological changes of active giant-cell arteritis have been found in cranial arteries which clinically appeared to be normal.

Large-vessel abnormalities

In this series of 80 patients, 25 had clinical abnormalities of the larger arteries. The incidence of large-vessel abnormalities was significantly higher in the patients who were considered to have definite arteritis than in the group without arteritis ($P < .001$); 14 (66%) of the patients with definite arteritis of whom 8 had positive cranial artery biopsies, 8 (47%) of the patients with possible arteritis and only 3(7%) of the patients without arteritis had clinical abnormalities of the large vessels. The most frequent abnormality was the presence of murmurs over the

larger arteries. These were much more common than in a control group of patients who were not considered to be suffering from vascular disease. The murmurs present in the patients in this series were, as a rule, much louder and more widespread than those found in the control patients.

Differences of blood pressure and oscillometric deflections between the two arms were only found in the patients who were considered to have definite or possible arteritis. The question of selection of patients for the various groups is obviously an important contributory factor, but cannot account entirely for these differences.

One patient (Case 33) developed clinical manifestations of the "Subclavian steal syndrome" (Toole, 1964). Similar features have been reported previously in a 52 year old woman with giant-cell arteritis by Aravanis and Michaelides (1961).

Of the six patients (Cases 20, 26, 28, 58, 76 and 78) with partial or complete occlusion of the subclavian arteries, one (Case 26) was considered to have possible arteritis and the other 5 definite arteritis; two of these (Cases 20 and 78) had histological changes of arteritis in biopsies of the temporal artery.

The three patients (Cases 28, 34 and 48) who developed abnormalities of the large vessels during the course of the

illness without evidence of involvement of the cranial arteries were aged 49, 54 and 61 years. They were younger than the patients who also had arteritis of the cranial arteries, the mean age of the three being 55 years as compared with 67 years for the whole group with arteritis. From this study it would appear that although arteritis occurs less frequently in younger patients, when it does occur the lesions are more likely to be in the larger arteries.

The incidence of large-vessel abnormalities found in this series is much higher than has usually been reported in other series of patients with giant-cell arteritis. Palm (1958) recorded large-vessel murmurs in 3 of 31 patients and Hollenhorst et al. (1960) reported that 6 of their 175 patients had clinical abnormalities of the larger arteries.

Features distinguishing patients with arteritis

In many patients polymyalgia rheumatica is a benign illness with complete spontaneous remission usually occurring within 2 years. Some patients, however, develop serious complications as a result of the development of arteritis of large and medium sized arteries.

The incidence of arteritis increased with increasing age, thus 60% of all the patients over the age of 60, and 77% of all those over the age of 70 were considered to have definite or possible arteritis. Only two of the fifteen patients with positive cranial artery biopsies were less than 60 years old at the onset of their polymyalgia rheumatica.

Most of the patients with giant-cell arteritis reported in the literature have also been over the age of 60. The mean age of the 240 patients reported by Roux (1954) was 68 years, of the 31 patients reported by Palm (1958) 73 years, and of the 35 patients reported by Russel (1959) also 73 years.

It has also been shown that although the constitutional symptoms were similar in patients with and without arteritis they were more frequently severe in those with arteritis.

The mean sedimentation rate was significantly higher in patients with definite arteritis. A sedimentation rate of over 80 mm. Westergren was highly likely to be associated with arteritis; thus 62% of the patients in the group with definite

arteritis had a sedimentation rate of over 80 mm. as compared with 17% in the group without arteritis ($P < .01$). A rapid rise in the sedimentation rate to more than 80 mm. was almost invariably followed by manifestations of arteritis.

A persistently elevated sedimentation rate for at least one month after the locomotor symptoms had subsided is a well recognised feature of polymyalgia rheumatica (Gordon, 1960), but in this study was found almost exclusively in the patients with arteritis.

A very significant difference was found in the incidence of an increased alpha 2 globulin fraction between patients with and without arteritis, and the presence or appearance of a raised alpha 2 globulin fraction should draw attention to the possibility of arteritis.

Treatment

Corticosteroids are now regarded as valuable in the treatment of giant-cell arteritis. The findings in this study show the importance of starting corticosteroid therapy as early in the disease as possible, and the need for using large doses to suppress all the inflammatory changes in the arteries. The dose required for this was found to be substantially greater than that required to suppress the locomotor symptoms

and in many instances to restore the sedimentation rate to normal. Although these patients have not yet been followed for a sufficiently long period to arrive at a definite conclusion, it would appear that it is also important to continue corticosteroid therapy until the disease has gone into remission.

Parsons-Smith (1959) reported that the prognosis for restoring vision was better the sooner corticosteroid therapy was started after the onset of visual loss, but suggested that it was neither practical nor advisable to start corticosteroid therapy in cranial arteritis before visual symptoms had appeared, and that it should be held in reserve for the moment when the blood supply to the eye became impaired. This is a very dangerous suggestion which, if followed, may result in mental deterioration, visual loss and other serious complications, and even death from a disease which is eminently treatable.

The effect of corticosteroid therapy on the histological changes in the temporal arteries is not clear from the literature. Roux (1954) found that in spite of clinical improvement, there was no difference in the histological appearance in the temporal artery at a second biopsy, after the patient had had corticosteroid therapy for 12 days. However, Harrison et al. (1955) found that after corticosteroid

therapy, there was striking regression of the inflammatory reaction in the artery at a second biopsy, with disappearance of the inflammatory cells, although the size of the lumen and the thickness of the intima remained unchanged.

The histological findings in arteries in this study agree with those of Harrison et al. In those patients who commenced corticosteroid therapy some months after the onset of the disease, permanent changes with residual occlusion of the lumen of the temporal artery by intimal proliferation were not prevented, in spite of complete suppression of the inflammatory changes, but in the one patient where suppressive corticosteroids were commenced very early in the disease, the vessel was restored to normal.

Incidence

The incidence of polymyalgia rheumatica is difficult to assess from the literature. There is no doubt that those who are aware of this disease, diagnose it not infrequently. In the majority of patients in this series the onset of the disease was after 1960.

From January, 1963 to July, 1964 a total of 677 patients with rheumatoid arthritis were admitted to the Devonshire Royal Hospital. These included patients of all ages and of

variable disease duration and many, who were in the inactive phase of the disease, had been admitted for rehabilitation. During the same period, 49 patients with polymyalgia rheumatica were admitted.

A further indication of the relative incidence of polymyalgia rheumatica may be gained by comparing the number of patients with polymyalgia rheumatica with the number of patients in the trial of "Gold Therapy in Rheumatoid Arthritis" arranged by the Research sub-committee of the Empire Rheumatism Council (1960). Patients were eligible for admission if they had had active rheumatoid arthritis for not less than one year and not more than five years, were aged 20 to 64 years, were attending for out-patient treatment and had not previously received gold therapy and had not received chloroquin or systemic steroids in the 3 months preceding admission to the trial. The trial was conducted at 24 of the largest rheumatology centres in Britain and it was found that the selection of 8 to 10 patients at each centre was not easy and the assembling of 200 patients occupied 18 months.

It would thus appear that polymyalgia rheumatica is one of the more common inflammatory rheumatic diseases occurring in the middle aged and elderly. It would also appear, from this study, that giant-cell arteritis occurs with much greater frequency than is generally recognised.

CHAPTER 9

SUMMARY AND CONCLUSIONS

A study has been made of 80 patients suffering from polymyalgia rheumatica. The criteria were a history of pain and stiffness affecting predominantly the shoulder and hip girdles and spine, in middle aged and elderly patients, who had morning stiffness lasting for at least 30 minutes, with the finding, on examination, of tenderness of central joints, tendons or ligaments, provided that there was no clinical, radiological or pathological evidence that the symptoms were due to any other defined inflammatory rheumatic syndrome. The findings suggested that the great majority of the patients studied were suffering from the same disease and that polymyalgia rheumatica was a disease entity and not a clinical syndrome.

Widespread focal tender areas at the bony attachments of tendons and ligaments were present in all patients. Two-thirds of the patients had transient synovitis, most often in the sterno-clavicular joints. Histological examination of the sterno-clavicular joints of 3 patients showed changes of active non-specific synovitis and in two of these there were also non-specific inflammatory changes in the capsule. Residual instability of the sterno-clavicular joint resulted in several patients in whom there had been tenderness or synovitis of

these joints. On radiological examination, it was found that eight patients had developed erosive changes in joints during the course of the illness, in seven these were considered to be manifestations of the disease.

No primary abnormality of muscle was demonstrated either clinically or by serum enzymes, electromyography or muscle biopsies, and it has been demonstrated that the pains, felt by the patient to be in the muscles, are largely referred from central joints, tendons and ligaments.

Twenty-one of the 80 patients with polymyalgia rheumatica were considered to have definite arteritis and another 17 were considered to have possible arteritis. Biopsies of the cranial arteries of 33 patients showed histological changes of giant-cell arteritis in 9, and non-specific arteritis in 6 patients. It has been shown that tenderness and palpable thickening of the temporal arteries together with absent or reduced pulsation is highly likely to be due to an arteritis, but histological changes of giant-cell arteritis have also been found in arteries which appeared to be normal on clinical examination. The abnormalities found in the arteries on histological examination were graded quantitatively and an attempt was made to compare the histological changes in the arteries with the clinical features and to assess the effect of corticosteroid

therapy on the histological changes in the arteries. The dose of corticosteroid required to suppress all the inflammatory changes in the arteries is substantially greater than that required to suppress the locomotor symptoms, and in many instances to restore the sedimentation rate to normal. In patients without arteritis systemic corticosteroids are rarely indicated.

Clinical abnormalities of the larger arteries, especially those arising from the aortic arch were present in 25 patients. The most frequent abnormality was the presence of a murmur over the vessel. The subclavian arteries were most frequently affected and in 4 patients there was evidence of partial and in 2 patients of complete occlusion of a subclavian artery. Widespread abnormalities of large vessels were present in a significantly higher proportion of the patients with definite arteritis than of those without arteritis and also of those in a control group. In several patients these large vessel abnormalities were considered to be due to arteritis. In 2 patients with clinical large-vessel occlusion histological changes of giant-cell arteritis were present in a temporal artery biopsy.

It has been demonstrated that there were no significant differences in the locomotor findings in patients with and without arteritis, and one patient with histological changes

of synovitis in the sterno-clavicular joint also had temporal giant-cell arteritis on biopsy, but the synovial histology was indistinguishable from the others.

In view of the histological demonstration of the co-existence of central synovitis and giant-cell arteritis and the fact that the manifestations in the locomotor system in patients with and without arteritis were indistinguishable, it is probable that polymyalgia rheumatica and giant-cell arteritis are manifestations of the same disease. It follows that giant-cell arteritis must be more common than is at present generally believed.

The duration of the disease in patients with polymyalgia rheumatica is frequently under 2 years but in those who develop arteritis or joint erosions it is almost invariably over 3 years.

In many patients polymyalgia rheumatica is a benign illness with complete spontaneous remission, but some patients develop serious complications from the arteritis. The findings in this study suggest that the patients with arteritis are, as a rule, older than those without arteritis and are usually over the age of 60. Positive temporal artery biopsies have been found almost exclusively in the patients over the age of 60. Among those with arteritis, abnormalities of the larger arteries were more frequent in the younger patients.

In those patients with arteritis the constitutional illness was, as a rule, more severe and the abnormalities of the sedimentation rate and serum proteins were greater. A persistently elevated sedimentation rate after the locomotor symptoms had subsided was almost invariably associated with arteritis. A sudden rise in the sedimentation rate, often associated with the appearance of abnormalities of the serum proteins and a fall in the haemoglobin value was almost invariably followed by manifestations of arteritis.

Increased awareness of the high prevalence of arteritis in patients with polymyalgia rheumatica is important in order that effective treatment may be instituted before the occurrence of serious complications of the arteritis.

REFERENCES

Ainsworth, R.W., Gresham, G.A. and Balmforth, G.V. (1961)

J. clin. Path., 14, 115.

Alestig, K. and Barr, J. (1963)

Lancet, 1, 1228.

Ali Ibn Isa: Memorandum Book of a Tenth-century Oculist (Translated by Wood, C.A., Chicago, North-Western University, 1936.), quoted by Hollenhorst, R.W., Brown, J.R., Wagener, H.P. and Shick, R.M. (1960).

Neurology (Minneap.), 10, 490.

Anderson, T. (1947)

Acta Med. Scand., 128, 151.

Ansell, B. and Bywaters, E.G.L. (1958)

Brit. med. J., 1, 372.

Aravanis, C. and Michaelides, G. (1961)

Arteriography, 12, 595.

Ask-Upmark, E. (1954)

Acta Med. Scand., 149, 161.

Ask-Upmark, E., and Fajers, C.M. (1956)

Acta Med. Scand., 155, 275

Auquier, L. and Peltier, A.P. (1962)

Rhumatol., 14, 255.

Bagratuni, L. (1953)

Ann. rheum. Dis., 12, 98.

Bagratuni, L. (1956)

Lancet, 2, 694.

Bagratuni, L. (1957)

Ann. rheum. Dis., 16, 104.

Bagratuni, L. (1963)

Brit. med. J., 1, 513.

Ball, J. (1950)

Lancet, 2, 520

Ball, J. and Lawrence, J.S., (1961)

Ann. rheum. Dis., 20, 235.

Ball, J. (1964) Personal Communication

Barber, H.S. (1957)

Ann. rheum. Dis., 16, 230

Barker, N.W. and Edwards, J.E. (1955)

Circulation, 11, 486.

Bennett, G. (1956)

Brit. J. Ophthal., 40, 430.

Berg, K. (1963)

T. Norske Laegeforen, 83, 19.

Bevan, F.A. (1955)

College of General Practitioners, Research News Letter, No. 9, 157.

Björkman, S.E. (1958)

Lancet, 2, 935.

Bonnin, J.G. (1960)

Brit. med. J., 2, 274.

Bordenave, Y.R. (1960)

Thesis for M.D., University of Clermont, France.

Borthne, A. (1962)

T. Norske Laegeforen, 18, 1206.

Böttiger, L.E. (1953)

Acta Med. Scand., 147, 133.

Bouchet, D.C. (1960)

Thesis, Bordeaux, 35, quoted by Serre, H., and Simon, L., (1963) A.I.R., 6, 355.

Bourgeois, M. (1958)

Thesis, Bordeaux, quoted by Serre, H., and Simon, L., (1963) A.I.R., 6, 355.

Boyle, A.C. and Beatty, D.C. (1961)

Proc. Roy. Soc. Med., 54, 681.

Brice, J.G., Dowsett, D.J. and Lowe, R.D. (1964)

Brit. med. J., 2, 1363.

British Medical Journal (1957), 2, 1483.

Brown, J.W. and Hampson, F. (1944)

Brit. Heart J., 6, 154.

Bruce, W. (1888)

Brit. med J., 2, 811.

Cameron, A. (1959)

Brit. med. J., 2, 1291

Cardell, B.S. and Hanley, T. (1951)

J. Path. Bact., 63, 587.

Carlander, O. (1961)

Svenska Lakartidningen, 58, 2109.

Cayla, J., Weissenbach, R., Basset, F. and Coste, F. (1964)

Rev. Rhum., 31, 1.

Chalmers, T.M., Alexander, W.R.M. and Duthie, J.J.R. (1964)

Ann. rheum. Dis., 23, 123.

Chasnoff, J. and Vorzimer, J.J. (1944)

Ann. intern. Med., 20, 323.

Cloake, Professor P.C.P. (1951)

Proc. Roy. Soc. Med., 44, 847.

Cobb, J. (1955)

J. Chron. Dis., 2, 50.

Cobb, J. (1956)

J. Chron. Dis., 3, 134.

Cooke, W.T., Cloake, P.C.P., Govan, A.D.T. and Colbeck, J.C. (1946)

Quart. J. Med., 15, 47.

Coomes, E.N. and Sharp, J. (1961)

Lancet, 2, 1328.

Coomes, E.N. (1964) Personal Communication

Coste, F., Delbarre, F., Auscher, C. and Lefebvre, Y. (1964)

Presse Med., 72, 135.

Crompton, M.R. (1959)

Brain, 82, 377.

Cruickshank, B. (1951)

Ann. rheum. Dis., 10, 393.

de Seze, S., Ryckewaert, A., Kahn, M.P., Mazabraud, A. and Lainee, R. (1961)

Rev. Rhum., 28, 562.

Desprages-Gotteron, R. (1962)

La Semaine des Hopitaux, 38, 332.

Dhotel, J. (1962) quoted by Serre and Simon (1963)

A.I.R., 6, 355.

Dupont, A. and Heerup, L. (1948)

Nord. Med., 40, 2098.

Duthie, J.J.R. and Chalmers, T.M. (1963)

Lancet, 1, 955.

Finlayson, R. and Robinson, J.O. (1955)

Brit. med. J., 2, 1595.

Fisher, C.M. (1961)

J.A.M.A., 175, 325.

Forestier, J. and Certonciny, A. (1953)

Rev. Rhum., 20, 854.

Forestier, J. and Certonciny, A. (1963)

Rev. Prat., 13, 1895.

Fumagalli, E. (1962) quoted by Serre and Simon (1963)

A.I.R., 6, 355.

Gelfand, M. (1955)

Brit. Heart J., 17, 264.

Gilmour, J.R. (1941)

J. Path. Bact., 53, 263.

Gilroy, J. and Meyer, J.S. (1962)

Circulation, 25, 300.

Good, M.S. (1959)

Ann. rheum. Dis., 18, 56.

Gordon, I. (1960)

Quart. J. Med., 29, 473.

Gordon, I., Rennie, A.M. and Branwood, A. W. (1964)

Ann. rheum. Dis., 23, 447.

Gordon, L.Z. and Thurber, D.C. (1946)

Arch. Path., 42, 402.

Gower, N.D. (1963)

Lancet, 1, 124.

Greenfield, J.G. (1951)

Proc. Roy. Soc. Med., 44, 855.

Hamrin, B., Jonsson, N. and Landberg, T. (1964)

Lancet, 1, 397.

Harris, R. (1962) Personal Communication

Harrison, C.V. (1948)

J. Clin. Path., 1, 197.

Harrison, R.J., Harrison, C.V. and Kopelman, H. (1955)

Brit. med. J., 2, 1593.

Hedges, T.R. (1964)

Arch. Ophthal., 71, 62.

Heptinstall, R.H., Porter, K.A. and Barkley, H. (1954)

J. Path. Bact., 67, 507.

Hollenhorst, R.W., Brown, J.R., Wagener, H.P. and Shick, R.M. (1960)

Neurology, 10, 490.

Holst, J.E. and Johansen, E. (1945)

Acta Med. Scand., 122, 258.

Horton, B.T. and Magath, T.B. (1937)

Proc. Staff Meeting, Mayo Clinic, 12, 548.

Horton, B.T., Magath, T.B. and Brown, G.E. (1932)

Proc. Staff Meeting, Mayo Clinic, 7, 700.

Hoyt, L.H., Perera, G.A. and Kauvar, A.M. (1941)

New England J. Med., 225, 283.

Hutchinson, J. (1890)

Arch. Surg., 1, 323.

Inada, K., Shimizu, H., Kobayashi, I., Ishiai, I. and Kawamoto, S. (1962)

Arch. Surg., 84, 306.

Jennings, G.H. (1938)

Lancet, 1, 424.

Johnston, T.B. (1938)

Gray's Anatomy, 27th Ed., pg. 1086.

Judge, R.D., Currier, R.D., Gracie, W.A. and Figley, M.M. (1962)

Amer. J. Med., 32, 379.

Kalmansohn, R.B. and Kalmansohn, R. (1957)

Circulation, 15, 237.

Kaye, S.L. (1949)

Lancet, 1, 1039.

Kellgren, J.H. (1938)

Clin. Sci., 3, 175.

Kellgren, J.H. (1964)

Textbook of Rheumatic Diseases, 3rd Ed. Edited by Copeman, W.S.C., pg. 25.

Kersley, G.D. (1951)

Proc. ii Congr. Europ. Reum., pg. 388, Barcelona.

Kersley, G.D. (1956)

Lancet, 2, 840.

Kimmelstiel, P., Gilmour, M.T. and Hodges, H.H. (1952)

Arch. Path., 54, 157.

Kirstein, L. (1962)

Lancet, 1, 102.

Kogstad, O. (1963)

T. Norske Laegeforen, 83, 534.

Kvalvik, K. (1957)

T. Norske Laegeforen, 77, 954.

Lancet, (1961), 1, 597.

Lander, H. and Bonnin, J.M. (1956)

J. Path. Bact., 71, 369.

Lansbury, J. (1956)

Amer. J. med. Sci., 232, 8.

Lawrence, J.S. (1964)

Textbook of Rheumatic Diseases, 3rd Ed. Edited by Copeman, W.S.C., pg. 93.

Levey, G.S., Carey, J.P. and Calabro, J.J. (1963)

Arthritis and Rheumatism, 6, 75.

Lomholt, G. (1963)

M.D. Thesis, Copenhagen, quoted by Wright, V., (1964) Personal communication.

MacGregor, G.A. (1961)

Lancet, 11, 1160.

McCormick, H.M. and Neubuerger, K.T. (1958)

J. Neuropath. Exper. Neurol., 17, 471.

Mason, R.M. (1963)

Medical Annual, 81, 431.

Meadows, S.P. (1954)

Trans. Ophthal. Soc. U.K., 74, 13.

Meulengracht, E. (1945)

Proc. ii Congr. Europ. Reum., pg. 479, Barcelona.

Meulengracht, E. (1950)

Ugesk. f. laeger, 112, 1711.

Meulengracht, E. and Schwartz, M. (1952)

Acta Med. Scand., 143, 350.

Morrison, A.N. and Abitbol, M. (1955)

Ann. Int. Med., 42, 691.

Nasu, T. (1963)

Angiology, 14, 225.

Norris, M. (1962)

Proc. Roy. Soc. Med., 55, 327.

Oldberg, S. (1942)

Nord. Med., 40, 2098.

Olhagen, B. (1963)

Acta Rheum. Scand., 9, 157.

Pahwa, J.M., Pandey, M.P.N. and Gupta, D.P. (1959)

Brit. med. J., 2, 1439.

Palm, E. (1958)

Acta Ophth., 36, 208.

Parsons-Smith, G. (1959)

Brit. J. Ophthal., 43, 204.

Paulley, J.W. (1956)

Lancet, 2, 946.

Paulley, J.W. and Hughes, J.P. (1960)

Brit. med. J., 2, 1562.

Paviat, J., Chevallier, R., Guichard, A. and Damez, M. (1934)

Lyon Medical, 154, 45.

Penn, I. (1963)

Brit. J. Surg., 50, 598.

Peterdorf, R.G. and Beeson, P.B. (1961)

Medicine, 40, 1.

Petersen, I. and Kugelberg, E. (1949)

J. Neurol. Neurosurg. Psychiat., 10, 118.

Porsman, V.A. (1951)

Proc. ii Congr. Europ. Reum., pg. 479, Barcelona.

Richardson, A.T. and Wynn Parry, C.B. (1957)

Ann. Phys. Med., 4, 41.

Riehl, J.L. (1963)

Neurology, 13, 873.

Robertson, K. (1947)

Brit. med. J., 2, 168.

Ropes, M.W., Bennett, G.A., Cobb, S., Jacox, R. and Jessar, R.A. (1958)

Bull. Rheumat. Dis., 9, 175.

Roux, J.L. (1954)

Helv. Med. Act. (Basel), 21, Suppl. 34.

Russel, R.W. Ross (1959)

Quart. J. Med., 28, 471.

Russel, R.W. Ross (1962)

Ann. Rheum. Dis., 21, 171.

Schmidt, M. (1930)

Brain, 53, 489.

Schrader, E.A. (1949)

Dtsch. med. Wschr., 74, 541.

Schrire, V. and Asherson, R.A. (1964)

Quart. J. Med., 33, 439.

Serre, H., Bertrand, L. and Simon, L. (1961)

Rev. Rhum., 28, 568.

Serre, H., Simon, L. and Barjon, C. (1962)

Bull. Mem. Med. Hop. Paris, 78, 24.

Serre, H. and Simon, L. (1962)

Rhumatol., 14, 5.

Serre, H. and Simon, L. (1963)

A.I.R., 6, 355.

Simmons, R.J. and Cogan, D.G. (1962)

Arch. Ophthal., 68, 8.

Small, J.M. and Geurileseu, K. (1963)

J. Neurol., Neurosurg. and Psychiat., 26, 257.

Spencer, W.H. and Hoyt, W.F. (1960)

Arch. Ophthal., 54, 862.

Strachan, R.W. (1964)

Quart. J. Med., 33, 57.

Stein, J.M. (1962)

J. Kensas M. Soc., 63, 330.

Todd, J.W. (1961)

Lancet, 2, 1111

Toole, J.F. (1964)

Lancet, 1, 872.

Veber, A. (1961)

Memoire pour le Certif. d'Et. Sup. de Rhumatologie, 72 p. dact., 1961.

Vereker, R. (1952)

J. ment. Sci., 98, 280.

Wagener, H.P. (1958)

Amer. J. med. Sci., 235, 220.

Weissenbach, R., Nobillot, A., Freneaux, R. and Coste, F. (1963)

Sem. Hop. Paris, 39, 2073.

Wheatley, D. (1956)

Lancet, 2, 840.

Wright, I. (1963)

J. Clin. Path., 16, 499.

Kellgren, J.H. (1962) Personal communication

The Research Sub-Committee of the Empire Rheumatism Council (1960)
Ann. rheum. Dis., 19, 95.

Snoan, S.G. (1963)
J. Oslo City Hosp., 13, 60.

APPENDIX I

SUMMARY OF REPORTED CASES

TABLE A

SUMMARY OF PUBLISHED ARTICLES ON POLYMYALGIA RHEUMATICA

Author	No. of Cases	Sex		Age			E.S.R.			Anaemia	Proteins		S.C.A.T.		Developed	
		M.	F.	Min.	Max.	Mean	Min.	Max.	Mean		Glob. raised	Alpha 2 raised	done	pos.	R.A.	Arteritis
Bruce (1888)	5	5	0	60	74											
Meulengracht (1945)	2	1	1	50	68	59										
Holst and Johansen (1945)	5	0	5	48	61	57	68	100								
Kersley (1951)	13	4	9	64	82	71	36	109	74	+						
Porsman (1951)	29	19	10					+100	+100							
Meulengracht and Schwartz (1952)	18	5	13	49	90		23	147	81							
Bagratuni (1953)	7	4	3	57	73		100	145								
" (1956 and 1957)																
" (1963)	50	12	38	19	78	60	25	148	97	15	12/12	22/24	34	7	?8	
Forestier and Certonciny (1953)	25	8	17													
" " (1963)	57															
Bevan (1955)	3	0	3	60	80		100	104		2	1/3					
Barber (1957)	12	2	10	46	68		45	110	79	5			10	0		
Bourgeois (1958)	11	7	4	64	81	72										
Gordon (1960)	21	10	11	49	82	68	42	122	70	13	9/9	6/7	21	0		
Bordenave (1960)	13	4	9	56	75	67										
Bouchet (1960)	12	6	6	52	74	67										
Boyle and Beatty (1961)	21	8	13	46	76	61	17	71	40			7/14	12	1		?1
Todd (1961)	20	4	16	61	78	68	75	138	110	13	14/17	8/12				
Carlander (1961)	11	2	9	51	75	68	71	135	102	10						1
de Seze et al. (1961)	1	0	1			57			120			1	1	0		1
Serre et al. (1961)																
" and Simon (1962)																
" " (1963)	40	22	18	50	84	66	20	140	64			+	28	0		2
Desprages-Gotteron (1962)	22			52	81	65										
Dhotel (1962)	35	14	21													
Fumagalli (1962)	25	10	15	56	81	68							25	0		
Borthne (1962)	1	1	0			52			110							
Auquier and Peltier (1962)	2	0	2	69	75	72	98	102	100				2	0		2
Levey et al. (1963)	1	0	1			68			62		1	1	1	0		
Alestig and Barr (1963)	10	5	5	55	88	70	24	147				10/10	9	0		7
Olhagen (1963)	15	4	11	60	78		77	140				15/15				7
Snoan (1963)	1	1	0			62			115			1				
Berg (1963)	5	0	5	49	66	60	78	118	97			2/4	4	0		
Duthie and Chalmers (1963)	1	0	1			62			102	1			1	0		1
Kogstad (1963)	20	4	16	50	81			+100		3	+	+	20	0		4
Weissenbach et al. (1963)	51	18	33	41	80	65	8	132	70	5			38	2		4
Cayla, Weissenbach et al. (1964)	3															
Coste et al. (1964)	23	8	15			±50						17/23				
Hamrin et al. (1964)	23	14	9	55	76	67	51	155				23/23	23	1		16
Gordon et al. (1964)	6	5	1	54	82	68	45	92	60	1			6	0		
Totals	587	197	331										177	11	8	46

TABLE B

LOCOMOTOR SYMPTOMS DESCRIBED IN SOME PUBLISHED CASES OF GIANT-CELL ARTERITIS

Author	Case No.	Sex	Age	Clinical Features
Paviat et.al.(1934)	1	M.	61	Polyarthralgia.
Hoyt et.al.(1941)	1	F.	58	Tender both temperomandibular joints.
	2	F.	61	Pain in shoulders, hips, back and swelling temperomandibular joints.
	3	M.	67	Tenderness and muscle pains, tenderness temperomandibular joint and side of neck.
Brown and Hampson (1944)	1	M.	61	Rheumatic pains in shoulders and knees.
Chasnoff and Varzimir (1944)	1	F.	64	Pain in back, shoulders, groins and neck with difficulty with walking.
Gordon and Thurber (1946)	1	M.	65	Pain both thighs and left shoulder.
Cooke et.al. (1946)	1	M.	66	
	2	F.	66	Severe "rheumatic" pains.
	3	F.	69	Joint swellings, generalised muscle pains and back stiffness.
	4	M.	71	"Rheumatoid" changes in wrists and prolonged vague muscle pains.
	5	M.	69	Joint pains and swellings and muscle pain and tenderness.
	6	F.	73	Joint swellings, "rheumatism" and general aches.
	7	F.	68	Rheumatism.
Anderson (1947)	1	M.	54	Rheumatic pains in the trunk and extremities.
Dupont and Heerup (1948)	1	F.	58	Rheumatic pain in back and groins, and pain and swelling of right knee.
Schrader (1949)	1	M.	78	History of polyarthritis.
	2	M.	68	Shoulder and hip girdle pain with tenderness at extremes of joint movement.
Kaye (1949)	5	M.	71	Arthritis of fingers, wrists, knees and ankles.
Greenfield (1951)	1	F.	70	Pain and stiffness in hips, knees and shoulders.
Roux (1954)	1	F.	70	Pain in knees, hips and shoulders.
Heptinstall et.al. (1954)	1	M.	74	Shoulder girdle pain.
	5	M.	72	Shoulder and hip pains.
	6	F.	75	Osteoarthritis of both hands and hips.
	8	M.	75	Pain and stiffness of neck.
	9	M.	67	Pain in shoulders and knees.
	12.	F.	65	Polyarthritis - atypical.
	14	M.	60	Shoulder and hip girdle pain and limitation.
Lander and Bonnin (1956)	1	F.	75	Mild arthritis of rheumatoid type.

TABLE B

LOCOMOTOR SYMPTOMS DESCRIBED IN SOME PUBLISHED CASES OF GIANT-CELL ARTERITIS

Author	Case No.	Sex	Age	Clinical Features
Kvalvik (1957)	1	M.	64	Pain and stiffness in large joints including knees and fingers; mild flexion contractures of fingers.
	2	M.	66	Pain and stiffness of neck and legs.
	3	M.	77	Pains in knees and shoulders with difficulty in dressing.
	4	F.	56	Pains in shoulders, arms, hips and back.
	5	M.	64	Pains in shoulders, back, neck, thighs, knees and morning stiffness.
	6	F.	63	Pain and stiffness of knees, shoulders, neck and back.
	7	F.	57	Joint pains.
Björkman (1958)	1	F.	66	Diffuse rheumatic pain in knees and shoulder joints.
	3	F.	65	Diffuse pain in back and both arms.
	5	F.	65	Diffuse rheumatic pain which was not localised to joints.
Parsons-Smith (1959)	12			"Generalised rheumatism".
Cameron (1959)	2	F.	71	Pain in back and left shoulder.
	4	F.	72	Widespread pains.
	6	F.	64	Developed "rheumatoid arthritis".
	9	M.	74	"Rheumatism" of neck, shoulders and legs.
Good (1959)				Of 20 patients, 10 had pain in muscles and limbs and 9 had pain in groins and neck.
Palm (1958)	1	M.	71	Pains in joints and limbs, and aching and stiffness in the muscles.
	5	F.	65	Polyarthritis with pains in knees, hips and neck.
Russel (1959)	17	M.	64	Pain, swelling and stiffness of hands, feet, elbows and wrists.
	22	M.	74	Aching in small joints of hands.
	32	F.	67	Vague joint pains, pain in neck and shoulders. Marked weakness and wasting of proximal muscles of arms and legs.
	34	M.	67	Pain, stiffness, weakness and wasting of muscles of shoulders and pelvis.
	35	F.	64	Muscle pain and limitation of back, shoulders and hips with weakness and wasting of muscles.
Russel (1962)	1	M.	80	Aching in arms and legs with marked proximal muscular weakness.
Paulley and Hughes (1960)	2	F.	63	Neck stiffness and occipital pain.
	7	F.	72	Pain and stiffness of neck, shoulders, hips, knees and ankles.
	8	M.	86	Pain in back and legs.
	10	M.	75	Generalised pains including shoulders.
	12	M.	69	Pain and stiffness of shoulders, back, thighs, calves and right wrist.
	13	F.	68	Pain and limitation of shoulders, neck, back and thighs.
	14	F.	70	Rheumatic pains in knees, back and shoulders.

TABLE B

LOCOMOTOR SYMPTOMS DESCRIBED IN SOME PUBLISHED CASES OF GIANT-CELL ARTERITIS

Author	Case No.	Sex	Age	Clinical Features
MacGregor (1961)	12	F.	64	Pain and stiffness of neck, shoulders, hips and thighs.
Stein (1962)	2	F.	74	Pain in neck.
	3	M.	64	Pain and swelling of ankles and shoulders - diagnosis "true polyarthritis"
Simmons and Cogan (1962)	3	F.	79	Diffuse arthritis with aching of large joints.
	4	F.	79	Aching of back muscles.
Norris (1962)	1	F.	56	Pain in neck, shoulders, elbows and knees.

APPENDIX II

RESULTS

TABLE C

CONSTITUTIONAL SYMPTOMS

Case No.	Diag.	Malaise	Anorexia	Dyspepsia	Depression	Sweating	Headache	Weight loss (lbs.)	Morning stiffness (hours)	Constitutional Illness (grade)
1	? G.C.A.	+	+				+	14	4	4
2	P.R.	+			+	+		4	4	2
3	G.C.A.	+	+	+	+		+	8	3	4
4	? G.C.A.	+	+	+	+		+	14	3	4
5	G.C.A.	+	+	+	+		+	7	4	4
6	P.R.	+	+					25	4	3
7	P.R.	+		+				21	3	3
8	P.R.	+		+	+			28	1	N.S.
9	? G.C.A.	+		+	+		+	9	3	3
10	P.R.	+	+	+	+			14	4	3
11	P.R.	+	+					20	4	3
12	P.R.	+						7	½	2
13	P.R.				+			0	2	N.S.
14	P.R.	+						17	2	2
15	G.C.A.	+	+		+	+	+	19	½	4
16	P.R.	+			+		+	28	4	2
17	? G.C.A.	+	+		+		+	0	4	3
18	P.R.				+		+	16	4	2
19	? G.C.A.	+			+		+	0	2	2
20	G.C.A.	+	+	+	+		+	22	1	3
21	G.C.A.	+	+		+		+	4	½	2
22	P.R.	+	+		+			14	3	3
23	? G.C.A.	+	+	+	+	+	+	28	4	4
24	P.R.	+	+		+			8	4	4
25	P.R.	+						7	3	2
26	? G.C.A.	+		+				7	4	2
27	? G.C.A.	+		+	+			0	3	3
28	G.C.A.	+			+			22	4	3
29	? G.C.A.	+	+		+		+	14	4	3
30	P.R.	+			+			0	5	2
31	P.R.	+	+	+	+		+	36	5	4
33	? G.C.A.	+	+		+	+		16	4	4
34	G.C.A.	+		+				12	5	2
35	P.R.			+	+	+		0	1	3
36	P.R.	+	+		+	+		11	4	3
37	P.R.	+	+					15	4	3
38	P.R.	+	+		+		+	30	4	4
39	? G.C.A.	+	+		+			14	6	4
40	P.R.	+			+			7	½	2
41	G.C.A.	+	+		+			20	4	3

TABLE C

CONSTITUTIONAL SYMPTOMS

Case No.	Diag.	Malaise	Anorexia	Dyspepsia	Depression	Sweating	Headache	Weight loss (lbs.)	Morning stiffness (hours)	Constitutional illness (grade)
42	? G.C.A.	+	+		+	+	+	35	3	4
43	P.R.	+	+		+			7	1	2
44	P.R.	+						9	5	4
45	G.C.A.	+	+		+		+	3	4	3
46	P.R.	+			+			0	1	2
47	P.R.	+		+	+			0	½	2
48	G.C.A.	+	+		+			14	1	2
49	P.R.	+		+		+		0	4	2
50	? G.C.A.	+		+	+		+	10	4	3
51	G.C.A.	+	+	+	+	+	+	0	1	2
52	P.R.	+			+			0	2	2
53	P.R.	+						9	3	2
54	P.R.	+	+		+			8	3	2
55	P.R.	+	+					28	4	4
56	P.R.	+						10	4	3
57	P.R.	+	+	+	+		+	0	3	3
58	G.C.A.	+		+	+		+	0	4	4
59	P.R.	+	+		+	+		10	4	3
60	P.R.	+	+		+			21	4	4
61	P.R.	+	+		+			3	4	2
62	? G.C.A.	+	+	+	+	+	+	17	6	3
63	P.R.				+			0	½	N.S.
64	P.R.	+		+				15	3	2
65	P.R.	+			+			16	4	3
66	P.R.	+		+		+		0	½	3
67	G.C.A.	+	+	+			+	21	1	4
68	G.C.A.	+	+	+	+	+	+	32	4	4
69	G.C.A.	+			+		+	0	1	2
70	P.R.	+					+	5	4	2
71	? G.C.A.	+	+					42	4	4
72	G.C.A.	+			+		+	16	½	2
73	? G.C.A.	+	+		+		+	18	3	3
74	P.R.	+	+	+	+			22	4	3
75	P.R.	+			+		+	15	6	2
76	G.C.A.	+	+		+		+	18	6	4
77	? G.C.A.	+	+	+			+	22	4	3
78	G.C.A.	+	+	+			+	5	1	3
79	G.C.A.	+	+	+	+		+	28	6	4
80	G.C.A.						+	0	2	N.S.
81	G.C.A.	+	+	+			+	14	1	3

TABLE D

CLINICAL COURSE

Case No.	Age	Duration before seen (months)	Date of onset	Duration of locomotor symptoms (months)	More than one flare-up	Persistent raised E.S.R.	Remission	Duration of illness (months)	Period of follow-up (months)
1	65	6	June 1961	27		+	+	39	39
2	53	3	May 1962	18			+	18	24
3	70	3	May 1962	21				29+	29
4	70	8	Feb. 1962	24		+		34+	34
5	66	12	Oct. 1961	24	+	+		38+	38
6	65	18	June 1961	26			+	24	27
7	73	18	May 1961	24				24+(d)	23
8	51	1	Nov. 1962	18	+		+	18	19
9	63	2	Aug. 1961	17		+		29+	29
10	59	8	July 1957	72	+		+	72	79
11	60	24	Jan. 1961	30		+		47+	47
12	60	11	June 1962	18	+		+	18	20
13	65	1	May 1963	10			+	10	19
14	52	6	May 1961	24			+	24	39
15	73	2	March 1963	9+				9+	9
16	51	60	Jan. 1958	72			+	72	78
17	58	22	Feb. 1960	48	+	+	+	57	57
18	51	7	Nov. 1962	22			+	22	22
19	74	4	March 1963	11			+	11	19
20	67	9	Dec. 1962	11	+	+		25+	25
21	83	37	July 1960	38		+		43+	43
22	72	4	April 1963	5+				5+	5
23	58	28	Oct. 1957	85+	+			85+	85
24	57	15	June 1962	29+				29+	29
25	64	6	March 1963	20			+	20	20
26	61	21	Dec. 1961	32+				32+	32
27	55	18	April 1962	27		+		30+	30
28	54	1	Sept. 1963	10		+		15+	15
29	71	4	July 1961	18	+	+	+	24	37
30	56	10	Jan. 1963	19+				19+	19
31	59	18	Dec. 1959	46			+	46	46
33	61	9	Feb. 1963	18		+		22+	22
34	61	8	Dec. 1962	18		+		24+	24
35	59	9	Feb. 1963	11			+	11	23
36	74	8	March 1963	16			+	16	16
37	63	3	Nov. 1961	35+				35+	35
38	58	5	Oct. 1961	18			+	18	25
39	59	4	July 1963	10			+	10	10
40	55	7	April 1963	19+	+			19+	19
41	67	30	April 1961	36	+	+	+	40	42

TABLE D

CLINICAL COURSE

Case No.	Age	Duration before seen (months)	Date of onset	Duration of locomotor symptoms (months)	More than one flare-up	Persistent raised E.S.R.	Remission	Duration of illness (months)	Period of follow-up (months)
42	52	24	Dec. 1961	34				34+	34
43	55	5	Feb. 1963	11	+		+	11	11
44	55	3	Nov. 1961	30			+	30	35
45	59	7	June 1963	6	+			18+	18
46	60	11	Dec. 1960	18		+		37+	37
47	67	8	May 1963	10			+	10	10
48	49	8	July 1963	16+				16+	16
49	63	8	Aug. 1963	9+				9+	9
50	61	18	Nov. 1960	49+	+			49+	49
51	50	13	Jan. 1963	12				22+	22
52	42	3	Jan. 1963	11			+	11	11
53	56	6	Jan. 1962	10			+	10	25
54	42	4	Oct. 1961	8			+	8	28
55	65	4	July 1961	8			+	8	31
56	54	12	Jan. 1960	48			+	48	49
57	55	11	March 1963	18			+	18	19
58	59	4	March 1958	19		+		72+	72
59	44	7	Nov. 1955	18			+	18	100
60	51	8	March 1956	36			+	36	96
61	62	5	Nov. 1962	12			+	12	16
62	57	19	Aug. 1962	24			+	24	24
63	45	6	Oct. 1963	12				15+	15
64	59	4	March 1963	17+				17+	17
65	69	3	Dec. 1963	6+				6+	6
66	62	15	Jan. 1963	22+				22+	22
67	70	12	June 1961	36		+		42	42
68	63	4	May 1962	27	+			29+	29
69	76	15	March 1963	16				20+	20
70	69	1	March 1964	7+				7+	7
71	54	18	April 1960	45		+		49+	49
72	64	7	Jan. 1964	8				10+	10
73	65	12	Aug. 1963	14			+	14	14
74	53	6	Jan. 1964	8+				8+	8
75	53	7	Jan. 1964	10+				10+	10
76	68	6	Feb. 1964	10+				10+	10
77	75	36	June 1961	38+				38+	38
78	69	84	Jan. 1957	94		+		94+	94
79	66	12	Aug. 1963	14				14+	14
80	68	2	July 1964	5+				5+	5
81	81	24	Sept. 1962	26+				26+	26

TABLE E

TENDER JOINTS, TENDER FOCAL AREAS AROUND JOINTS AND TENDER INTERSPINOUS LIGAMENTS

Case No.		Diag.	S.C.J. R.	S.C.J. L.	A.C.J. R.	A.C.J. L.	S.H.J. R.	S.H.J. L.	S.D.B.S. R.	S.D.B.S. L.	Wrists R.	Wrists L.	C.C.J. and M.S.J.	Ankles R.	Ankles L.	Knees R.	Knees L.	Hips R.	Hips L.	P.I.P. & M.C.P. R.	P.I.P. & M.C.P. L.	T.M.J. R.	T.M.J. L.	C.S.	D.S.	L.S.
1	?	G.C.A.	+	+	+	+										+	+	+	+					+	+	
2		P.R.	+	+	+	+					+	+						+						+		+
3		G.C.A.	+	+	+	+		+								+							+	+	+	+
4	?	G.C.A.	+	+	+	+	+	+			+	+				+			+	+	+			+		+
5		G.C.A.	+	+	+	+										+	+							+	+	+
6		P.R.	+	+	+	+					+	+				+	+	+						+		+
7		P.R.	+	+	+	+	+	+									+							+		+
8		P.R.	+			+		+	+	+						+	+		+					+		+
9	?	G.C.A.	+	+	+	+	+	+	+	+	+					+		+	+					+		+
10		P.R.			+	+	+	+				+				+		+	+					+		+
11		P.R.														+		+	+							
12		P.R.	+	+	+	+	+	+	+	+								+	+					+		+
13		P.R.	+				+		+																	
14		P.R.				+			+	+		+						+	+							+
15		G.C.A.					+	+								+	+	+	+					+		
16		P.R.	+	+	+									+	+									+		+
17	?	G.C.A.	+	+	+	+				+																+
18		P.R.	+	+	+	+	+	+					+			+	+	+	+					+		+
19	?	G.C.A.	+	+	+	+	+	+									+	+	+					+		
20		G.C.A.	+		+	+	+	+								+	+	+	+							
21		G.C.A.	+		+	+	+	+	+	+														+	+	
22		P.R.			+	+	+	+			+													+		+
23	?	G.C.A.	+	+	+	+					+	+		+		+	+	+	+	+	+					+
24		P.R.	+	+	+	+					+	+		+	+	+	+	+	+	+	+			+		+
25		P.R.	+	+			+							+	+		+	+	+							+
26	?	G.C.A.	+	+	+	+	+	+	+	+				+				+	+					+	+	+
27	?	G.C.A.				+	+											+	+					+	+	+
28		G.C.A.	+	+	+	+	+		+	+								+	+						+	+
29	?	G.C.A.	+	+			+	+			+	+				+	+							+		+
30		P.R.			+	+			+	+				+		+	+	+	+					+	+	+
31		P.R.	+	+	+	+	+	+						+		+	+	+	+					+	+	+
33	?	G.C.A.	+	+	+	+								+		+	+	+	+					+	+	+
34		G.C.A.		+	+				+	+						+	+	+	+						+	
35		P.R.	+			+						+		+		+	+	+	+					+	+	+
36		P.R.		+	+		+		+		+	+				+	+	+	+						+	+
37		P.R.	+	+			+	+			+	+				+	+							+		
38		P.R.		+	+	+	+	+										+	+							+
39	?	G.C.A.	+		+	+	+	+		+		+				+	+	+	+							
40		P.R.	+	+		+	+	+	+	+						+	+	+	+					+		

TABLE E

TENDER JOINTS, TENDER FOCAL AREAS AROUND JOINTS AND TENDER INTERSPINOUS LIGAMENTS

Case No.	Diag.	S.C.J. R.	S.C.J. L.	A.C.J. R.	A.C.J. L.	S.H.J. R.	S.H.J. L.	S.D.B.S. R.	S.D.B.S. L.	Wrists R.	Wrists L.	C.C.J. and M.S.J.	Ankles R.	Ankles L.	Knees R.	Knees L.	Hips R.	Hips L.	P.I.P. & M.C.P. R.	P.I.P. & M.C.P. L.	T.M.J. R.	T.M.J. L.	C.S.	D.S.	L.S.
41	G.C.A.					+	+				+				+	+	+	+							
42	? G.C.A.	+	+	+	+	+		+	+	+	+	+			+								+	+	+
43	P.R.	+			+	+	+											+							
44	P.R.	+	+	+	+	+	+	+	+	+	+				+	+	+	+					+		+
45	G.C.A.	+	+			+		+	+			+			+	+	+	+					+		+
46	P.R.					+	+								+		+	+					+		+
47	P.R.																+	+							
48	G.C.A.	+	+	+	+	+									+		+	+					+		
49	P.R.						+		+							+									
50	? G.C.A.			+	+	+		+	+	+	+	+			+				+				+	+	
51	G.C.A.					+	+			+	+				+	+	+	+					+	+	+
52	P.R.			+	+		+								+	+	+	+					+		+
53	P.R.	+		+											+	+							+		
54	P.R.									+													+	+	+
55	P.R.					+	+			+					+	+	+	+					+		+
56	P.R.	+	+									+					+	+					+	+	
57	P.R.	+	+	+	+			+	+			+			+	+	+	+			+	+	+	+	+
58	G.C.A.	+	+	+	+	+	+									+	+	+					+	+	+
59	P.R.	+				+	+	+	+						+	+					+	+	+		
60	P.R.	+	+	+	+	+	+										+	+					+		
61	P.R.				+	+	+								+	+	+	+					+	+	+
62	? G.C.A.	+	+	+	+	+	+			+	+		+		+	+	+	+			+	+	+	+	+
63	P.R.	+	+			+																			
64	P.R.	+	+	+	+	+		+	+	+		+			+	+	+	+							+
65	P.R.	+	+		+	+	+	+	+	+	+		+	+	+	+		+	+							
66	P.R.	+	+	+	+	+	+			+					+	+	+	+						+	
67	G.C.A.	+	+	+	+	+	+	+	+			+			+	+			+	+			+	+	+
68	G.C.A.	+	+	+	+	+	+	+	+		+	+			+	+	+	+						+	
69	G.C.A.		+		+										+	+	+	+							
70	P.R.			+	+	+	+				+				+		+			+			+		
71	? G.C.A.	+	+			+	+		+						+	+							+		
72	G.C.A.			+	+	+	+																+		
73	? G.C.A.				+	+			+														+	+	
74	P.R.				+	+									+	+	+	+					+		
75	P.R.			+	+	+	+		+	+	+				+	+	+	+					+		+
76	G.C.A.	+	+	+	+	+	+								+	+	+	+					+		+
77	? G.C.A.	+	+			+	+								+										+
78	G.C.A.				+																				
79	G.C.A.																+	+							
80	G.C.A.			+																			+		
81	G.C.A.	+	+										+			+									

TABLE F

PATIENTS WITH SYNOVIAL THICKENING OR EFFUSION OF JOINTS AND INSTABILITY OF THE STERNO-CLAVICULAR JOINTS

Case No.	Diag.	S.C.J. R.	S.C.J. L.	A.C.J. R.	A.C.J. L.	S.H.J. R.	S.H.J. L.	Knee R.	Knee L.	Wrist R.	Wrist L.	M.C.P. R.	M.C.P. L.	P.I.P. R.	P.I.P. L.	Unstable S.C.J. R.	Unstable S.C.J. L.
1	? G.C.A.							2	2								2
2	P.R.	3	2	2	2												
3	G.C.A.	2	3					2									
4	? G.C.A.	2	3		2			2		2	2						
5	G.C.A.	2	3		2			2	2							2	
6	P.R.	3	4	2	2			2	2	2	2						
7	P.R.	2	3	2	3												
8	P.R.								2								
9	? G.C.A.	3	3													3	3
10	P.R.							2									
11	P.R.							2									
13	P.R.	3														2	
15	G.C.A.							2	2								
16	P.R.	2															
17	? G.C.A.	2	2		2												
18	P.R.	2	2			2		2	2							3	3
20	G.C.A.							2	2								
21	G.C.A.	2															
23	? G.C.A.			2	2			3	2							3	2
24	P.R.	3	2	2	2			3	3	3	3	3	3			2	3
25	P.R.	2							2								
26	? G.C.A.	3	2	2													
28	G.C.A.	2	2													4	3
29	? G.C.A.	3	2					3	2	2	2						
30	P.R.			2	3			2	2								
31	P.R.	2	2														
33	? G.C.A.	2	3														
36	P.R.		2	2		2		2	2								
37	P.R.	3	3						3		2					3	4
39	? G.C.A.								2								
40	P.R.	2	2														
41	G.C.A.							2	2								
44	P.R.	2	2					3	3	2	2					3	2
45	G.C.A.	2	2					2	2							2	2
46	P.R.							2									
48	G.C.A.	2	2			2		2									
49	P.R.								2								
50	? G.C.A.			2	2			2		3	3			3			
53	P.R.	3						2	2								
55	P.R.							2	2								

TABLE F

PATIENTS WITH SYNOVIAL THICKENING OR EFFUSION OF JOINTS AND INSTABILITY OF THE STERNO-CLAVICULAR JOINTS

Case No.	Diagn.	S.C.J. R.	S.C.J. L.	A.C.J. R.	A.C.J. L.	S.H.J. R.	S.H.J. L.	Knee R.	Knee L.	Wrist R.	Wrist L.	M.C.P. R.	M.C.P. L.	P.I.P. R.	P.I.P. L.	Unstable S.C.J. R.	Unstable S.C.J. L.
56	P.R.	2	2													2	2
57	P.R.			2	2			2	2								
58	G.C.A.			2	2				2							3	2
59	P.R.	2				2	2										
60	P.R.	2															
62	? G.C.A.							3	3								
64	P.R.	2						2	2	2							
65	P.R.	2	2					2	2	2	2	2					
66	P.R.	2		2	2	2		3	3							2	2
67	G.C.A.							2	2					2	2		
68	G.C.A.							2	2								
70	P.R.					2		2			2		2				
71	? G.C.A.		2					2	2								
75	P.R.							2									
76	G.C.A.															2	2
77	? G.C.A.															2	
78	G.C.A.							3									
81	G.C.A.	3	4					3								3	3

Note: 1. In the scapulo-humeral and knee joints, the degree of synovial effusion is indicated.

2. In the other joints, the degree of synovial thickening is indicated.

TABLE G

RANGE OF SHOULDER ABDUCTION IN DEGREES

Case No.	Diagnosis	Right	Left	Case No.	Diagnosis	Right	Left
1	? G.C.A.	140	140	42	? G.C.A.	140	100
2	P.R.	180	180	43	P.R.	120	100
3	G.C.A.	120	100	44	P.R.	100	120
4	? G.C.A.	110	130	45	G.C.A.	80	90
5	G.C.A.	180	180	46	P.R.	180	70
6	P.R.	140	120	47	P.R.	180	180
7	P.R.	140	140	48	G.C.A.	130	110
8	P.R.	140	110	49	P.R.	180	70
9	? G.C.A.	50	40	50	? G.C.A.	120	180
10	P.R.	N.S.	N.S.	51	G.C.A.	180	180
11	P.R.	90	90	52	P.R.	170	170
12	P.R.	140	140	53	P.R.	160	180
13	P.R.	120	180	54	P.R.	180	180
14	P.R.	140	140	55	P.R.	70	60
15	G.C.A.	90	130	56	P.R.	180	180
16	P.R.	160	150	57	P.R.	160	150
17	? G.C.A.	180	70	58	G.C.A.	180	90
18	P.R.	110	100	59	P.R.	90	90
19	? G.C.A.	180	180	60	P.R.	40	40
20	G.C.A.	110	150	61	P.R.	90	90
21	G.C.A.	N.S.	N.S.	62	? G.C.A.	180	180
22	P.R.	150	160	63	P.R.	180	180
23	? G.C.A.	110	90	64	P.R.	110	150
24	P.R.	110	90	65	P.R.	100	120
25	P.R.	160	150	66	P.R.	100	100
26	? G.C.A.	90	110	67	G.C.A.	40	90
27	? G.C.A.	170	180	68	G.C.A.	120	160
28	G.C.A.	70	70	69	G.C.A.	160	170
29	? G.C.A.	100	160	70	P.R.	120	90
30	P.R.	130	120	71	? G.C.A.	120	90
31	P.R.	170	170	72	G.C.A.	110	100
33	? G.C.A.	120	120	73	? G.C.A.	120	120
34	G.C.A.	160	120	74	P.R.	90	180
35	P.R.	180	180	75	P.R.	100	80
36	P.R.	110	150	76	G.C.A.	130	90
37	P.R.	40	50	77	? G.C.A.	110	110
38	P.R.	100	90	78	G.C.A.	N.S.	N.S.
39	? G.C.A.	90	70	79	G.C.A.	40	40
40	P.R.	60	140	80	G.C.A.	180	180
41	G.C.A.	N.S.	N.S.	81	G.C.A.	160	180

TABLE H

SIGNS OF ARTERITIS

Case No.	Age	CRANIAL ARTERIES					UPPER LIMBS			LOWER LIMBS		
		Thickened	Tender	Reduced Pulsation	Biopsy done	Positive	Large Vessel Murmurs	Reduced B.P. Arms	Reduced Oscillometry Arms	Reduced Pulse	Reduced B.P.	Reduced Oscillometry
1	65									+		
3	70	++	+	+	+	+	+					
4	70				+							
5	66	++	++	++	+	+	+			+		
9	63			+								
14	52						+					
15	73	++	++	++	+	+				+	+	
19	74		+		+		+					
20	67			+	+	+	+	+	+			
21	83	++	++									
23	58			+	+		+					
26	61						+	+	+			
27	55		+	+	+							
28	54				+		+	+	+	+	+	+
29	71				+							
30	56						+					
33	61				+		+			+	+	+
34	61						+					
39	59				+		+					
41	67			+	+	+						
42	52			+	+							
45	59	++	++	++	+	+	+					
48	49				+		+					
49	63						+					
50	61		+		+		+					
51	50	+	+		+	+						
57	55		+		+							
58	59							+	+	+	+	+
62	57		+				+					
67	70			+	+	+						
68	63	+	+	+	+	+	+					
69	76	++	+	++	+	+						
72	64	++	+	+	+	+						
73	65	+	+	+	+							
74	53									+	+	+
76	68				+		+	+	+	+	+	+
77	77	+	+				+					
78	69				+	+	+	+	+	+		
79	66	+	+	+	+	+	+			+		
80	68	++	++	++	+	+	+			+		
81	81	+	+		+	+						

Note ++ thickening or tenderness denotes severe.
+ thickening or tenderness denotes minimal.
++ reduced pulsation denotes complete absence of pulsation.

TABLE I

ABNORMAL ARTERIES

Case No.		Diag.	CRANIAL ARTERIES						LARGE VESSELS								PERIPHERAL PULSES			
			Temporal R.	Temporal L.	Facial R.	Facial L.	Occipital R.	Occipital L.	Carotid R.	Carotid L.	Abdominal aorta	Subclavian R.	Subclavian L.	Axillary R.	Axillary L.	Femoral R.	Femoral L.	Dorsalis pedis R.	Dorsalis pedis L.	Posterior tibial R.	Posterior tibial L.
1	?	G.C.A.		T.2	T.2		T.2												-	-	
3		G.C.A.	Th.3	T.2			T.2					M.2	T.2			M.2					
4	?	G.C.A.	T.2																		
5		G.C.A.	Th.2	Th.3			Th.2		T.2			M.2	M.3	M.2	M.2			-	-		
9	?	G.C.A.		±																	
14		P.R.										M.2	M.3		M.3						
15		G.C.A.	Th.3	Th.3	-	-	-	-										-	-	-	-
19	?	G.C.A.		T.2																	
20		G.C.A.	±	-					M.2		M.3	M.3	M.4	-	-						
21		G.C.A.	Th.3	Th.3				Th.2													
23	?	G.C.A.		-									M.2								
26	?	G.C.A.										M.3	M.3		M.3						
27	?	G.C.A.		T.2		T.2	T.2	T.2													
28		G.C.A.									M.2	M.3	M.4	M.3	M.3				-		-
30		P.R.											M.2								
33	?	G.C.A.							M.2		M.3	M.3		M.3	M.2	M.2	M.2	-	-	-	-
34		G.C.A.							T.2		M.2			M.3	M.3		M.3				
39	?	G.C.A.	±						M.2	M.2		M.3	M.2								
41		G.C.A.		±																	
42	?	G.C.A.		±																	
45		G.C.A.	Th.3	Th.3			T.2	T.2	M.2		M.2	M.3	T.3				M.2				
48		G.C.A.							T.2		M.3,T.2	M.4	M.3	M.3	M.3	M.2					
49		P.R.							M.2			M.3									
50	?	G.C.A.	T.2	T.2				T.2								M.2					
51		G.C.A.	T.3				T.3														
57		P.R.	T.2																		
58		G.C.A.	T.3	T.3			T.3											-	-	-	-
62	?	G.C.A.	T.2	T.2				T.2				T.2	M.2				M.2				
67		G.C.A.	±	±	±	±		T.2			T.2										
68		G.C.A.	Th.2	Th.2	Th.3	Th.2	T.2				T.2	T.3	M.2	T.3		T.2	T.2				
69		G.C.A.	Th.3	Th.3	Th.3	Th.3															
72		G.C.A.	Th.2	Th.3		Th.2															
73	?	G.C.A.	Th.2	Th.2	T.2	T.2															
74		P.R.							M.2			M.2		M.2		M.2		-	-	-	-
76		G.C.A.	T.2	±					T.2	M.2	M.2		M.2	M.3	M.3	M.2	M.2	-	-	-	-
77	?	G.C.A.	Th.2	Th.2							T.2						M.2				
78		G.C.A.		Th.2											M.3	M.2	M.2		-	-	-
79		G.C.A.	T.2	Th.2		-		Th.2					M.2		M.2					-	-
80		G.C.A.	Th.3	Th.3			T.2	Th.3			T.2	M.2						-			
81		G.C.A.		Th.2																	

Note - denotes absent pulse.
± denotes reduced pulse.

TABLE J

TEMPORAL ARTERY BIOPSIES - MACROSCOPIC APPEARANCES

Case No.	Age	Diag.	Artery	Perivascular scarring	Artery thickened	Wall inflamed	Pulsation	Lumen occluded	Appeared abnormal	Histological result
3	70	G.C.A.	Occipital				±			G.C.A.
4	70	? G.C.A.	Temporal				+			
5	66	G.C.A.	Facial				+			Arteritis
			Temporal	3	4	3	-	+	+	G.C.A.
11	60	P.R.	Temporal				+			
15	73	G.C.A.	Temporal x 2	4	3		-	+	+	Arteritis
19	74	? G.C.A.	Temporal				+			
20	67	G.C.A.	Temporal				-	+	+	G.C.A.
23	58	? G.C.A.	Temporal				+			
24	57	P.R.	Temporal				+			
27	55	? G.C.A.	Temporal				±		±	
			Facial				+			
28	54	G.C.A.	Temporal				+			
29	71	? G.C.A.	Temporal				+			
33	61	? G.C.A.	Temporal				+			
34	61	G.C.A.	Temporal				+			
39	59	? G.C.A.	Temporal				+		±	
41	67	G.C.A.	Temporal				+			G.C.A.
42	52	? G.C.A.	Temporal			2	+			
45	59	G.C.A.	Temporal				+			Arteritis
48	49	G.C.A.	Occipital				+			
50	61	? G.C.A.	Temporal				+			
51	50	G.C.A.	Temporal			2	+			
			Temporal				+			Arteritis
57	55	P.R.	Temporal				+			
65	69	P.R.	Temporal				+			
67	70	G.C.A.	Temporal	4			-	+	+	Arteritis
68	63	G.C.A.	Temporal	3	3	3	±		+	G.C.A.
69	76	G.C.A.	Temporal	4	4	3	-	+	+	G.C.A.
72	64	G.C.A.	Temporal		3		±		+	G.C.A.
73	65	? G.C.A.	Temporal				+			
75	53	P.R.	Temporal	3			+		±	
76	68	G.C.A.	No artery							
78	69	G.C.A.	Temporal			2	+		±	Arteritis
79	66	G.C.A.	Temporal	3			±		±	Arteritis
80	68	G.C.A.	Temporal	2	4	4	-	+	+	G.C.A.
81	81	G.C.A.	Temporal		2	2	±		+	G.C.A.

Pulsation ± denotes reduced pulsation.

Abnormal appearance ± denotes doubtful abnormality.

TABLE K

HISTOLOGICAL FINDINGS IN THE CRANIAL ARTERIES

Case No.	Age	Artery	Intima thickened 0 - 4	Lumen occluded	Thrombus	Elastica destroyed 0 - 4	Giant-cells	Media destroyed 0 - 4	Inflammatory cell infiltration	
									Media 0 - 4	Adventitia 0 - 4
3	70	Occipital	3	0	0	3	+	3	3	3
4	70	Temporal	2	0	0	1	0	0	0	0
5	66	Facial	2	0	0	0	0	0	2	2
		Temporal	4	+	0	4	+	3	4	4
11	60	Temporal	2	0	0	3	0	1	0	0
15	73	Rt.Temporal	2	+	+	2	0	2	0	0
		Lt.Temporal	4	+	0	3	0	3	1	1
19	74	Temporal	2	0	0	1	0	0	0	0
20	67	Temporal	3	0	0	3	+	3	3	2
23	58	Temporal	2	0	0	0	0	0	0	0
24	57	Temporal	2	0	0	1	0	0	0	0
27	55	Temporal	2	0	0	1	0	0	0	0
		Facial	1	0	0	0	0	0	0	0
28	54	Temporal	0	0	0	0	0	0	0	0
29	71	Temporal	1	0	0	0	0	0	0	0
33	61	Temporal	2	0	0	2	0	0	0	0
34	61	Temporal	2	0	0	1	0	0	0	0
39	59	Temporal	1	0	0	2	0	0	0	0
41	67	Temporal	3	0	0	3	+	3	2	2
42	52	Temporal	2	0	0	1	0	0	0	0
45	59	Temporal	2	0	0	1	0	0	0	2
48	49	Occipital	1	0	0	0	0	0	0	0
50	61	Temporal	2	0	0	1	0	0	0	0
51	50	Temporal	3	0	0	2	0	3	0	0
57	55	Temporal	1	0	0	3	0	0	0	0
65	69	Temporal	2	0	0	1	0	0	0	0
67	70	Temporal	4	+	0	4	0	3	0	0
68	63	Temporal	3	0	0	3	+	3	3	3
69	76	Temporal	4	+	0	4	+	4	3	3
72	64	Temporal	4	+	0	4	+	4	4	4
73	65	Temporal	2	0	0	1	0	0	0	1
75	53	Temporal	2	0	0	1	0	0	0	0
78	69	Temporal	3	0	0	2	0	2	0	0
79	66	Temporal	3	0	0	3	0	3	2	2
80	68	Temporal	4	+	0	4	+	4	4	4
81	81	Temporal	3	0	0	3	+	2	2	2

TABLE K

HISTOLOGICAL FINDINGS IN THE CRANIAL ARTERIES

Case No.	Fibrosis of Vessel Wall 0 - 4	Calcification of Elastica 0 - 4	Histological Diagnosis	Degree of Activity 0 - 4	Final Diagnosis
3	2		G.C.A.	3	G.C.A.
4	0		Normal	0	? G.C.A.
5	0		Arteritis	2	G.C.A.
	0		G.C.A.	4	G.C.A.
11	0	2	Senile changes	0	P.R.
15	2		Arteritis	0	G.C.A.
	3		Arteritis	1	G.C.A.
19	0		Normal	0	? G.C.A.
20	1		G.C.A.	3	G.C.A.
23	0		Normal	0	? G.C.A.
24	0		Normal	0	P.R.
27	0		Normal	0	? G.C.A.
	0		Normal	0	? G.C.A.
28	0		Normal	0	G.C.A.
29	0		Normal	0	? G.C.A.
33	0		Normal	0	? G.C.A.
34	0		Normal	0	G.C.A.
39	0		Normal	0	? G.C.A.
41	0		G.C.A.	2	G.C.A.
42	0		Normal	0	? G.C.A.
45	0		G.C.A.	2	G.C.A.
48	0		Arteritis	0	G.C.A.
50	0		Normal	0	G.C.A.
51	3		Normal	0	P.R.
57	0	3	Normal	0	P.R.
65	0		Arteritis	0	G.C.A.
67	4		G.C.A.	3	G.C.A.
68	1		G.C.A.	4	G.C.A.
69	0		G.C.A.	4	G.C.A.
72	0		? Arteritis	1	? G.C.A.
73	0		Normal	0	P.R.
75	0		Arteritis	0	G.C.A.
78	3		Arteritis	1	G.C.A.
79	2		G.C.A.	4	G.C.A.
80	0		G.C.A.	3	G.C.A.
81	0				

TABLE L

ABNORMALITIES OF LARGE VESSELS

Case No.	Diag.	MURMURS									TENDERNESS							REDUCED OR ABSENT PULSATION							
		Carotid		Sub-clavian		Axillary		Femoral		Abdominal aorta	Carotid		Sub-clavian		Femoral		Abdominal aorta	Carotid		Sub-clavian		Axillary		Femoral	
		R.	L.	R.	L.	R.	L.	R.	L.		R.	L.	R.	L.	R.	L.		R.	L.	R.	L.	R.	L.	R.	L.
3	G.C.A.			2					2				3	2											
5	G.C.A.			2	3	2	2				2														
14	P.R.			2	3		3														±		±		
20	G.C.A.	2		3	4					3										-	±	-	-		
23	? G.C.A.				2																±		-		
26	? G.C.A.			3	3		3																		
28	G.C.A.			3	4	3	3			2											±		±	±	±
30	P.R.				2																				
33	? G.C.A.	2		3		3	2	2	2	3														±	±
34	G.C.A.					3	3		3	2	2														
39	? G.C.A.	2	2	3	2																				
45	G.C.A.	2		3	2				2	2	2		2	3			3								
48	G.C.A.			4	3	3	3	2		3	2						2								
49	P.R.	2		3																					
50	? G.C.A.							2																	
58	G.C.A.																							±	±
62	? G.C.A.				2				2				2	2											
67	G.C.A.																2								
68	G.C.A.				2								3		2	2	2	±							
74	P.R.	2		2		2		2																	
76	G.C.A.		2		2	3	3	2	2	2	2	2													
77	? G.C.A.								2								2								
78	G.C.A.						3	2	2															±	
79	G.C.A.				2		2																		
80	G.C.A.			2													2								

NOTE Cases 58, 67 and 78 were only seen personally after the symptoms of arteritis had subsided.

OTHER ABNORMALITIES

1. A thrill was palpable over the subclavian artery in cases 14, 20, 28 and 48.
2. A thrill was palpable over the left axillary artery in Cases 76 and 78.
3. The right carotid artery was felt to be dilated and tortuous in cases 48 and 79.
4. The left carotid artery was felt to have reduced pulsation in case 78.

TABLE M

Case No.		Diag.	Highest E.S.R.	LABORATORY RESULTS: W.B.C. above 10,000	Haemo-globin under 75%	Glob. over 3.4 gm.%	Raised alpha 2	Raised gamma	OTHER INVESTIGATIONS PERFORMED: L.E. cells	A.N.F.	A.S.O.	Trans-aminases	Aldo-lase	Creatine kinase	E.M.G.	Muscle biopsy
1	?	G.C.A.	80			3.6										
2		P.R.	31						+							
3		G.C.A.	133		72	3.6	+									
4	?	G.C.A.	95			3.5					+					
5		G.C.A.	110		56	3.7	+			+		+	+	+	+	+
6		P.R.	31						+						+	
7		P.R.	68			3.5		+	+							
8		P.R.	25												+	
9	?	G.C.A.	120		61	4.8	+									
10		P.R.	60						+							
11		P.R.	80						+							
12		P.R.	55							+						
13		P.R.	40													
14		P.R.	80		66											
15		G.C.A.	125	14,100		4.4	+		+							+
16		P.R.	25						+	+						+
17	?	G.C.A.	62		62	4.2									+	
18		P.R.	25												+	
19	?	G.C.A.	25												+	+
20		G.C.A.	109			4.6	+	+			+		+			
21		G.C.A.	32													
22		P.R.	46													
23	?	G.C.A.	82							+						
24		P.R.	68		72	3.5		+			+	+	+			
25		P.R.	40											+		
26	?	G.C.A.	78		56	4	+	+								
27	?	G.C.A.	77				+			+		+	+	+	+	
28		G.C.A.	85			3.9	+								+	
29	?	G.C.A.	50										+	+		
30		P.R.	58		68						+	+				
31		P.R.	61									+			+	+
33	?	G.C.A.	40							+	+	+	+		+	+
34		G.C.A.	120		65	4.8	+	+							+	+
35		P.R.	16								+		+			
36		P.R.	40				+									
37		P.R.	100		64	4	+	+								
38		P.R.	87													
39	?	G.C.A.	37							+			+		+	+
40		P.R.	36								+					
41		G.C.A.	54													

TABLE M

Case No.		Diag.	Highest E.S.R.	W.B.C. above 10,000	Haemo-globin under 75%	Glob. over 3.4 gm.%	Raised alpha 2	Raised gamma	L.E. cells	A.N.F.	A.S.O.	Trans-aminases	Aldo-lase	Creatine kinase	E.M.G.	Muscle biopsy
			LABORATORY RESULTS						OTHER INVESTIGATIONS PERFORMED							
42	?	G.C.A.	60						+	+	+				+	
43		P.R.	28													
44		P.R.	55		69											
45		G.C.A.	20							+						
46		P.R.	46													
47		P.R.	45													
48		G.C.A.	115				+	+	+				+	+		+
49		P.R.	45													
50	?	G.C.A.	126			4	+	+	+		+					
51		G.C.A.	17								+					+
52		P.R.	60													
53		P.R.	64						+							
54		P.R.	40	12,100												
55		P.R.	73	10,400	73				+			+				+
56		P.R.	35		62	4.1			+							+
57		P.R.	30								+	+				
58		G.C.A.	87						+							
59		P.R.	70						+							
60		P.R.	69													
61		P.R.	26													+
62	?	G.C.A.	14													
63		P.R.	30													
64		P.R.	92		62	3.7				+	+					
65		P.R.	43							+	+	+			+	+
66		P.R.	112		56		+			+	+			+		
67		G.C.A.	108			3.9	+	+		+		+	+	+		
68		G.C.A.	115		63	4.3	+	+		+	+			+	+	+
69		G.C.A.	85		74		+					+		+	+	+
70		P.R.	65						+	+					+	+
71	?	G.C.A.	124		62	5.4										
72		G.C.A.	72	12,500			+		+	+						
73	?	G.C.A.	65													
74		P.R.	110			3.9	+									+
75		P.R.	33													+
76		G.C.A.	80		69		+							+		
77	?	G.C.A.	53		68											
78		G.C.A.	50													
79		G.C.A.	103		68									+		
80		G.C.A.	25				+									
81		G.C.A.	20												+	

TABLE N

JOINTS, TENDONS AND LIGAMENTS INJECTED

Case No.	Diag.	S.C.J. R.	S.C.J. L.	A.C.J. R.	A.C.J. L.	S.H.J. R.	S.H.J. L.	C.S.	D.S.	L.S.	Shoulder tendons R.	Shoulder tendons L.	Hip Girdle R.	Hip Girdle L.	Wrist tendons R.	Wrist tendons L.	Knee ligaments R.	Knee ligaments L.	Other
2	P.R.	+																	
3	G.C.A.	+	+		+	+			+	+									
4	? G.C.A.	+	+	+	+	+	+	+		+									
5	G.C.A.	+	+	+	+			+		+									
6	P.R.	+	+	+	+														
7	P.R.	+		+															
8	P.R.			+			+					+							
9	? G.C.A.		+		+														
10	P.R.				+														
12	P.R.										+	+							
13	P.R.	+									+								
16	P.R.				+														
17	? G.C.A.		+		+														
18	P.R.		+		+				+	+	+	+	+						
19	? G.C.A.											+							
20	G.C.A.			+							+							+	
21	G.C.A.								+		+	+							
22	P.R.			+							+	+							
23	? G.C.A.			+				+											
24	P.R.	+	+								+		+	+	+	+			
26	? G.C.A.	+		+			+					+							
27	? G.C.A.										+								
28	G.C.A.								+	+									
30	P.R.					+	+				+	+					+		
33	? G.C.A.	+	+	+					+	+	+	+	+				+		C.C.J.
34	G.C.A.						+					+		+					
35	P.R.				+				+										
36	P.R.	+		+							+								
40	P.R.	+		+							+	+							
41	G.C.A.														+				
42	? G.C.A.				+			+			+								C.C.J.
49	P.R.				+		+					+							
50	? G.C.A.					+									+				
53	P.R.																		
55	P.R.					+	+												
57	P.R.								+										
64	P.R.			+		+	+				+						+	+	T.M.J.
70	P.R.						+					+							
75	P.R.			+							+	+							
80	G.C.A.							+											

A P P E N D I X III

CASE HISTORIES

CASE 1

Mrs. O.A., aged 65, was well until June 1961, when she suddenly developed severe generalised headache, most marked in the temporal regions and over the lower jaws. This headache was continuous and not relieved by analgesics. One week later, she developed a painful, stiff neck with bilateral shoulder girdle pain and limitation of shoulder movement so that she was unable to elevate her arms above the horizontal. Within a few days, this was followed by bilateral hip girdle and knee pain. Morning stiffness lasted 4 hours. From the onset of the locomotor symptoms, she started feeling ill with malaise, tiredness, loss of appetite and loss of 14 pounds in weight within a few weeks. In August 1961, she was admitted to another hospital for investigation for suspected myelomatosis, but this was not confirmed. The only abnormal finding was an E.S.R. of 44 mm. in one hour, and the severe pain in the neck and the headaches were presumed to be due to the cervical spondylosis revealed by the radiological examination. While in hospital, she developed blurring of vision of both eyes, which persisted for 6 months. The headaches improved after 4 months. She attended the Rheumatology Out Patient Department in January 1962, when she was already improving.

Examination

She looked pale but there were no systemic abnormalities. The cranial arteries were not examined. In the locomotor system, there was evidence of generalised osteoarthrosis. The cervical spine was limited and tender and there were multiple tender areas over the dorsal interspinous ligaments. Both sterno-clavicular and acromio-clavicular joints were tender and total shoulder abduction was 140° on each sides. There were minimal effusions of both knees and there were multiple tender focal areas on the bony points around the pelvis.

Investigations

E.S.R. 80 mm. in one hour
Serum albumin 4.5 gm.%
Serum globulin 3.6 gm.%
S.C.A.T. negative

Radiological Examination

There was widespread degenerative disc disease with generalised osteoarthrosis and osteoporosis of the spine.

Course

She continued to improve slowly. The locomotor symptoms cleared in 27 months and, within 40 months, she was in complete clinical remission.

Comment

History of onset was typical of giant-cell arteritis with objective findings of polymyalgia rheumatica.

Diagnosis

Polymyalgia rheumatica with possible giant-cell arteritis.

CASE 2

Mrs. J.C., aged 53, was in good health until May 1962, when she had gradual onset of pain in the right shoulder girdle and right wrist. Later, she developed pain in the left shoulder girdle, neck, lumbar region, left wrist, and pain and swelling of both knees. The pain and swelling of the knees subsided in 2 months. These other symptoms became progressively worse for 3 months and, at that time, morning stiffness and morning exacerbation of symptoms lasted for 4 hours. Her general health was poor from the onset; she felt tired, lacking in energy and lost 4 pounds in weight within the first 3 months. With the exacerbation of her symptoms, she became depressed.

Examination

In August 1962, there was no abnormality of the viscera. The cervical and lumbar regions of the spine were limited and painful on movement. There was tenderness over the L4-L5 interspinous ligament. The right wrist had an area of focal tenderness at the insertion of the flexor carpi ulnaris tendon. Both sterno-clavicular joints had synovial

thickening, more on the right than the left, and were tender. There was also tenderness over the acromio-clavicular joints. Shoulder girdle range was full. The right hip joint was painful at the extremes of movement. There were no objective signs around the left wrist and knees.

Investigations

E.S.R. 31 mm. in one hour
Haemoglobin 96%
S.C.A.T. negative

Radiological Examinations

There was evidence of degenerative disc disease of the cervical spine and minor osteoarthritic changes of the knees.

Treatment and Course

She was admitted to hospital for 3 weeks and had an injection of hydrocortisone and Lignocaine into the right sterno-clavicular joint. By December 1962, her symptoms were much improved and, in November 1963, she was in complete clinical remission.

Comment

This patient had polymyalgia rheumatica which was in complete clinical remission within 18 months.

Diagnosis

Polymyalgia rheumatica.

CASE 3

Mrs. A.F., aged 70, in May 1962 suddenly developed severe pain and limitation of both shoulder girdles and pain in the neck radiating to the occipital region. She felt tired and depressed with loss of appetite. The symptoms rapidly got worse and, a month later, she developed pain in the lumbar region, in both knees and over the left temporo-mandibular joint. Morning stiffness lasted for 3 hours and she lost 8 pounds in weight.

Examination

There were no systemic abnormalities. There was tenderness and synovial thickening of both sterno-clavicular joints, more on the left than the right. Both acromio-clavicular joints were tender. The left scapulo-humeral joint range of movement was reduced to three-quarters and total abduction was 120° on the right and 100° on the left. The cervical and lumbar spine were limited, with tenderness in the upper cervical region and over the D3-D4, D5-D6 and L4-L5 interspinous ligaments.

Investigations

E.S.R. 133 mm. in one hour
Haemoglobin 72%
Serum albumin 3 gm.%
Serum globulin 3.6 gm.%
S.C.A.T. negative.

Radiological changes of degenerative disc disease and generalised osteoarthrosis were present.

Course

Her locomotor symptoms improved very slowly. In November 1962, she had double vision for 2 weeks, in June 1963, slight temporal pain and tenderness for several months, in November 1963, blurring of vision of the right eye for 2 months and, in February 1964, marked photophobia. In December 1963, she was found to have minimal tenderness over the right occipital artery. A biopsy specimen of this artery had the histological changes of giant-cell

arteritis. Prednisolone, 8 mg. daily, was begun in January 1964 which resulted in suppression of the locomotor symptoms. In September 1964, she had a recurrence of bitemporal headaches and, on examination, she had thickening and tenderness of the right temporal artery. The dose of Prednisolone was increased to 16 mg. daily, resulting in improvement of the headache and the temporal artery changes.

Comment

This case presented with the typical clinical picture of polymyalgia rheumatica and, some time later, developed symptoms and signs of giant-cell arteritis, which was confirmed histologically.

Diagnosis

Polymyalgia rheumatica with definite giant-cell arteritis.

CASE 4

Mrs. E.F., aged 70, developed bilateral shoulder girdle pain and limitation of movement in February 1962, while confined to bed with varicose eczema. This was followed, within a few weeks, by pain in the cervical, dorsal and lumbar regions. She also had pain in the fingers, wrists and left knee, but no swelling. These symptoms became worse over 2 months. Morning stiffness persisted for 3 hours. There was marked deterioration of her general health from the onset with malaise, anorexia, depression and loss of 14 lbs. in weight over 3 months. In July 1962, she was admitted to a general hospital for investigation. Movement in both shoulders was very limited and her E.S.R. was 95 mm. in one hour. Prednisolone, 15 mg. daily, resulted in moderate symptomatic improvement. When she was transferred to the Devonshire Royal Hospital in September 1962 she was already much improved.

Examination

There were no systemic abnormalities. In the locomotor system, there was evidence of generalised osteoarthrosis and both sterno-clavicular joints and the left acromio-clavicular joint had a moderate degree of synovial thickening with tenderness. Total shoulder abduction was 110° on the right and 130° on the left. There was a minimal effusion of the right knee and tender focal areas on the trochanters. The C4-C5, C7-T1 and L3 to L5 interspinous ligaments were tender. Following injection of hydrocortisone and Lignocaine into the tender sterno-clavicular joints, shoulder pain and range of movement were much improved. The dose of Prednisolone was gradually reduced to 4 mg./day. When discharged after three months, she was much improved and range of shoulder girdle movement was almost full.

Investigations

Highest E.S.R. 95 mm. in one hour
Haemoglobin 75%
S.C.A.T. negative

There were no radiological changes in the joints apart from evidence of degenerative joint disease.

Course

Her general health and locomotor symptoms continued to improve. In November 1963, she developed right frontal and temporal headache and photophobia. On examination in February 1964, there was tenderness over the right temporal artery but no thickening of the vessel wall. The E.S.R. was still 34 mm. in one hour. A right temporal artery biopsy was performed but this showed no evidence of arteritis. The temporal headache was relieved following the temporal artery biopsy. In December 1964, she was in complete clinical remission.

Comment

This patient had symptoms of polymyalgia rheumatica, which went into remission in 3 years. During the illness, she had an episode of temporal headache of the type associated with arteritis.

Diagnosis

Polymyalgia rheumatica with possible arteritis.

CASE 5

Mrs. M.M., aged 66, was well until October 1961, when she had gradual onset of pain and limitation of movement of the shoulders and pain of the dorsal and lumbar regions. This was followed by pain and swelling of the knees. Morning stiffness persisted for 4 hours. Weight loss was 7 pounds over several months. She was referred to the Physical Medicine Out Patient Department in October 1962 with a diagnosis of osteoarthrosis.

Examination

There were no systemic abnormalities apart from a raised blood pressure of 180/90. In the locomotor system, she had moderately severe generalised osteoarthrosis. There was synovial thickening and tenderness of both sterno-clavicular joints and tenderness of both acromio-clavicular joints, but shoulder girdle range was full. There were small effusions of both knees. The C7 to D4 and L4 to S1 interspinous ligaments were tender.

Investigations

E.S.R. 57 mm. in one hour
Haemoglobin 90%
S.C.A.T. negative

Course

She slowly improved and, in October 1963, joint symptoms were much improved and the E.S.R. was down to 11 mm. in one hour. In May 1964, she started feeling ill again and developed slight right-sided headaches. The locomotor symptoms were then in complete remission. In July 1964, she developed severe bitemporal headaches with scalp tenderness and marked deterioration of general health. When seen in September 1964, both temporal arteries were thickened and tender with reduced pulsation. There were loud murmurs over both subclavian arteries and the left carotid artery was tender.

Investigations

E.S.R. 110 mm. in one hour
Haemoglobin 76%
Serum albumin 3.2 gm.%
Serum globulin 3.7 gm.%
Alpha 2 globulin - marked increase.

Histological changes of the anterior branch of the left temporal artery were those of a very acute giant-cell arteritis.

Treatment with Corticotrophin gel, 60 units daily, resulted in suppression of vascular symptoms.

Comment

Following a typical episode of polymyalgia rheumatica, this patient developed giant-cell arteritis which was proved histologically.

Diagnosis

Polymyalgia rheumatica with definite giant-cell arteritis.

CASE 6

Mrs. E.M., aged 65, was well until June 1961, when she suddenly began to have pain in the neck and both shoulder girdles. These pains rapidly increased in intensity and were accompanied by increasing limitation of shoulder movement. Within a few weeks, she also developed pain in the dorsal and lumbar regions, and pain and swelling in both wrists and knees. Morning stiffness persisted for 4 hours. Her general health was poor from the onset with fatigue, anorexia and loss of 25 pounds in weight in 12 months. She was admitted to the Devonshire Royal Hospital in November 1962, when her general health was already improving.

Examination

She was an ill looking woman but had no systemic abnormalities. In the locomotor system, there was marked thickening of both sterno-clavicular joints and minimal thickening of the acromio-clavicular joint with tenderness of these joints. The range of shoulder girdle movement was limited with total abduction to 140° on the right and 120° on the left. There were small effusions with synovial thickening of both knees. There was evidence of tenosynovitis in the tendons around both wrists with multiple focal tender areas at the insertion of several tendons around the wrists, but no apparent synovial thickening of the wrist joints. Multiple focal tender areas were present around the pelvis.

Investigations

E.S.R. 31 mm. in one hour
S.C.A.T. negative
Serum albumin 3.6 gm.%
Serum globulin 3.2 gm.%

On radiological examination, there were no erosive changes in the joints. There was an effusion of the left sterno-clavicular joint, which was aspirated and, on culture, was sterile.

Course

She rapidly improved and, in May 1963, was in complete clinical remission.

Diagnosis

Polymyalgia rheumatica.

CASE 7

Mrs. M.L., aged 73, was admitted to the Devonshire Royal Hospital in November 1962. She had been well until May 1961, when she had gradually developed bilateral shoulder girdle pain and limitation of movement, and pain in the neck, lumbar region and in both buttocks. Her shoulder movement became so limited that she was unable to comb her hair. Morning stiffness persisted for 3 hours. In May 1962, her left knee became painful and swollen. Her general health was poor from the onset of the illness and, when seen 18 months after this, she had lost 21 pounds in weight. There was a history of hypertension for 10 years, angina pectoris for 3 years, a gastric ulcer 10 years previously and renal calculi had been demonstrated on radiological examination.

Examination

Blood pressure was 220/100. The transverse diameter of the heart was increased. In the locomotor system, there was evidence of generalised osteoarthrosis. The cervical spine and lumbar spine were limited and painful, and there was a moderate degree of synovial thickening of the left sterno-clavicular joint and a minimal degree on the right. Both acromio-clavicular joints were tender. The total range of shoulder abduction was 140° on each side.

Investigations

E.S.R. 68 mm. in one hour
S.C.A.T. negative
Blood urea 53 mg.%
Serum albumin 3.5 gm.%
Serum globulin 3.5 gm.%

On radiological examination, she had evidence of generalised osteoarthrosis and osteoporosis of the spine.

Course

Following injection of hydrocortisone and Lignocaine into the right sterno-clavicular and right acromio-clavicular joints, the shoulder girdle pain and limitation of movement were improved. When discharged in February 1963, her general health was much improved and range of shoulder movement full. The E.S.R. was still 53 mm. in one hour. One month later, she died suddenly from a cerebral vascular lesion.

Diagnosis

Polymyalgia rheumatica.

CASE 8

Mrs. V.O., aged 51, was well until November 1962 when she gradually developed pain and limitation of movement of the lumbar region followed, a week later, by pain and limitation of both shoulders, pain in the neck and pain over the left trochanter. Morning stiffness persisted for 1 hour. These symptoms deteriorated for 1 month and then slowly started to improve. There was slight deterioration of her general health from the onset with dyspepsia and depression.

Examination (December 1962)

There were no systemic abnormalities. There was tenderness over the right sterno-clavicular joint, left acromio-clavicular joint, both subdeltoid bursae and limitation of movement of the left scapulo-humeral joint. Shoulder abduction on the left was to 135°. There was tenderness of the ligaments around both knees with a minimal effusion of the right knee. There was tenderness over the interspinous ligaments in the cervical and lumbar regions and tenderness over the left trochanter.

Investigations

E.S.R. 25 mm. in one hour
S.C.A.T. negative

Course

She slowly improved and, in April 1964, was in complete clinical remission.

Diagnosis

Polymyalgia rheumatica.

CASE 9

Mrs. A.H., aged 63, suddenly developed pain and limitation of movement of the shoulders, neck and hips, associated with morning stiffness, in August 1961. Her shoulders rapidly became more limited in movement over 2 weeks so that she was unable to abduct her shoulders more than one quarter. She felt ill, tired and depressed from the onset and lost 9 pounds in weight during the first 2 months of the illness. She was seen by Dr. J. Sharp at the Withington Hospital in October 1961, when both sterno-clavicular joints had synovial thickening and were tender. Both acromio-clavicular joints and subdeltoid bursae were also tender. She continued to deteriorate for the next 2 months and, when seen in December 1961, the total range of shoulder abduction was to 55° on the right and 45° on the left. The E.S.R. was 100 mm. in one hour, serum albumin 2.9 gm.% and serum globulin 3.9 gm.% with an increase of the alpha 2 globulin fraction on protein electrophoresis.

She was admitted to the Devonshire Royal Hospital in January 1962 for 4 months. The E.S.R. remained persistently elevated, the highest value being 120 mm. in one hour. While in hospital, she had flashes of light in the lateral field of vision of the left eye with blurring of vision lasting for about 10 minutes, but no headaches. She was treated with initial bed rest,

injections of hydrocortisone into tender joints and mobilising exercises, followed by gradual progressive increase in activity. On discharge, her general health and locomotor symptoms were somewhat improved but her E.S.R. was still 100 mm. in one hour.

She continued to make slow progress and, when seen personally in January 1963, was feeling well but movement in both shoulders was still limited, total range of abduction being 100° on the right and 90° on the left. The left temporal artery pulsation was reduced but the vessel wall was not thickened. When reviewed in January 1964, her general health was excellent. She had regained all the weight she had lost and was asymptomatic apart from occasional twinges of pain in the neck and hip girdles. Range of shoulder movement was full. On examination, both sterno-clavicular joints were moderately unstable.

Investigations

E.S.R. 40 mm. in one hour
Haemoglobin 82%
S.C.A.T. negative

She failed to attend at subsequent appointments.

Comment

Mrs. A.H. had severe polymyalgia rheumatica and, at the most recent review, was asymptomatic, but the E.S.R. was still 40 mm. in one hour. The history of visual impairment, together with the reduced pulsation in the left temporal artery, may have been due to arteritis.

Diagnosis

Polymyalgia rheumatica with possible arteritis.

CASE 10

Mrs. L.M., aged 59, had always enjoyed good health until July 1957, when she suddenly developed pain and limitation of movement of both shoulders, which rapidly became worse. A month later, she developed bilateral hip girdle pain more on the right than on the left side, felt mainly over the iliac crests and in the buttocks. At the same time, she developed lumbar backache and pain and limitation of the neck; the neck pains radiating to the suboccipital region and over the vertex to the forehead. Morning stiffness, mainly of the shoulder girdles, persisted for 4 hours. Soon after the onset, she started feeling ill and depressed, and lost 14 pounds in weight in the first 3 months. She remained unchanged for a few months and then slowly improved.

In March 1958, when seen at the Withington Hospital by Dr. J. Sharp, she was found to have marked limitation of the shoulder girdles and lumbar spine with tenderness of the surrounding muscles and also slight limitation of the cervical spine. Peripheral joints were not affected. The E.S.R. was 60 mm. in one hour, haemoglobin 76%, W.B.C. 7,000, serum albumin 3.7 gm.%, serum globulin 2.7 gm.% and S.C.A.T. negative. She was treated symptomatically and slowly improved. By October 1958, she was almost asymptomatic and the E.S.R. was 30 mm. in one hour. In August 1959, she had an exacerbation of symptoms affecting mainly the upper cervical spine with occipital headaches. The E.S.R. went up to 55 mm. in one hour. She slowly improved over the months but the E.S.R. remained persistently elevated.

When reviewed personally in March 1963, her general health was excellent. She was asymptomatic apart from occasional slight pain of the left wrist and the right hip girdle. On examination, there were no systemic abnormalities. In the locomotor system, there were no abnormalities apart from evidence of generalised osteo-arthrosis and tenderness over the L4-L5 interspinous ligament.

Investigations

E.S.R. 55 mm. in one hour
Haemoglobin 96%
W.B.C. 5,300
Serum albumin 4.4 gm.%
Serum globulin 3.2 gm.%
Electrophoresis normal
S.C.A.T. negative

When reviewed again in February 1964, she was in complete clinical remission and the E.S.R. was 0.

Diagnosis

Polymyalgia rheumatica.

CASE 11

Mrs. A.T., aged 60, was well until January 1961, when she gradually developed increasing pain and limitation of the shoulder girdles, so that she was unable to elevate her arms above the horizontal, and also bilateral hip girdle pain radiating down the lateral aspect of the thighs to the knees. These symptoms were associated with morning stiffness lasting for 4 hours. She felt ill, tired and weak from the onset and lost 20 pounds in weight over the first 6 months. In September 1961, she was admitted to the Derby Royal Infirmary under the care of Dr. E.J.S. Woolley and was found to have tenderness of the deltoids and the medial aspect of the thighs. The results of investigations on admission were: E.S.R. 80 mm. in one hour, haemoglobin 86% and protein 7 gm.% with a normal electrophoresis. In hospital, she had a mild pyrexia for 2 weeks. She was considered to be suffering from polymyalgia rheumatica and was treated with Prednisolone 15 mgm. daily. Within a few days, she was asymptomatic. The dose of Prednisolone was slowly reduced and discontinued in March 1963.

She was seen personally in May 1963, when her general health was good and, apart from pain in the left knee, she was asymptomatic. On examination, there were no systemic or vascular abnormalities. In the locomotor system, she had minimal polyarticular osteoarthrosis and an effusion of the left knee. There were no vascular abnormalities.

Investigations (May 1963)

E.S.R. 80 mm. in one hour
S.C.A.T. negative

In view of the persistently elevated E.S.R. in spite of the remission of symptoms, a temporal artery biopsy was performed, but this vessel showed no histological evidence of arteritis. The pain in the knee subsided within a few weeks. At the most recent review in December 1964, she was completely asymptomatic and her general health was excellent, but the sedimentation rate was still elevated to 41 mm. in one hour.

Diagnosis

Polymyalgia rheumatica.

CASE 12

Mrs. E.P., aged 60, enjoyed good health until June 1962, when she gradually developed shoulder girdle pain followed, in a few weeks, by upper dorsal and lumbar backache. Morning stiffness lasted for half an hour. Her general health remained good apart from slight malaise. She attended the University of Manchester, Rheumatism Research Centre in February 1963, when she had limitation of both shoulders and of the spine. The E.S.R. was 55 mm. in one hour and S.C.A.T. negative.

She was admitted to the Devonshire Royal Hospital in May 1963. She had no systemic abnormalities apart from a raised blood pressure of 200/100. The sterno-clavicular, acromio-clavicular and shoulder joints were all tender and total shoulder abduction was limited to 140° on each side. The C4-C7 interspinous ligaments were tender.

When discharged after 6 weeks, she was almost asymptomatic and the E.S.R. was 11 mm. in one hour. She was reviewed in February 1964, when she was in complete clinical remission. The E.S.R. was then 13 mm. in one hour.

Diagnosis

Polymyalgia rheumatica.

CASE 13

Mr. D.M., aged 65, had suffered from gout for 20 years, the joints affected being the right wrist and fingers. He attended the Devonshire Royal Hospital Rheumatology Out Patient Department in March 1963, when his gout was under control with Benemid. Investigations in March were: E.S.R. 5 mm. in one hour, haemoglobin 110% and serum uric acid 5.8 mg.%. In April 1963, he was involved in a motor car accident and sustained a whip-lash injury of the neck. One week later, both shoulders became painful and limited on movement with morning stiffness lasting up to 2 hours. The right shoulder became progressively more limited and painful. His general health deteriorated and he became excessively depressed.

He was seen in July 1963, when his cervical spine was limited and painful on movement. The right sterno-clavicular joint had a moderate degree of synovial thickening and was warm and tender. The total range of right shoulder abduction was limited to 105°. There was also tenderness over the right acromio-clavicular joint and the right subdeltoid bursa. The D9-D10 interspinous ligament was tender.

Investigations

E.S.R. 40 mm. in one hour
Serum uric acid 5.1 mg./100 ml.
24-hour urinary uric acid 0.4 gm.
S.C.A.T. negative.

Course

Following injection of hydrocortisone into the right sterno-clavicular joint and subdeltoid bursa symptoms in the shoulder were somewhat improved. In March 1964, his polymyalgia rheumatica was in complete clinical remission.

Comment

Mr. D.M. had gout, but developed joint symptoms with prolonged morning stiffness, which had never been a feature of his attacks of gout. This was also associated with a raised sedimentation rate and, in view of these, he was considered to be suffering from an inflammatory polyarthritis.

Diagnosis

Polymyalgia rheumatica.

CASE 14

Mrs. E.B., aged 52, developed lumbar backache and bilateral hip girdle pain in May 1961. This was followed within a few weeks by cervical and bilateral shoulder girdle pain. These pains gradually increased in intensity so that she had difficulty in rising from a chair and in walking. Morning stiffness persisted for 2 hours. From the onset, she felt ill and lacking in energy. Weight loss was 17 pounds within 6 months. She attended the Rheumatology Out Patient Department in November 1961, when she was found to have mild painful restriction of movement of the shoulder girdle joints. There was tenderness around the knees and on the pelvic bony points. The E.S.R. was 80 mm. in one hour, haemoglobin 75% and S.C.A.T. negative. She slowly improved and, when seen personally in August 1963, she still had bilateral hip girdle pain and painful wrists. Her general health was much improved and she had regained all the weight she had lost.

Examination

In August 1963, she looked well. Blood pressure was 140/80 in both arms. Oscillometry was normal in both arms. A moderately loud murmur was audible over the right subclavian artery and over the left subclavian artery there was a loud murmur, accompanied by a palpable thrill. In the locomotor system, she had bilateral tenosynovitis on the radial aspect of both wrists. There was also tenderness over both acromio-clavicular joints, over both femoral trochanters and over the L5-S1 interspinous ligament.

Investigations

E.S.R. 35 mm. in one hour
Haemoglobin 96%
S.C.A.T. negative

Course

In February 1964, she was in complete clinical remission, but the murmurs over the subclavian arteries were still present.

Comment

This patient had polymyalgia rheumatica. She was found to have bilateral subclavian artery murmurs on personal examination, when almost in remission. Since no information was available as to the time of onset of these subclavian murmurs, they were presumed to be due to atherosclerosis.

Diagnosis

Polymyalgia rheumatica.

CASE 15

Mr. J.L., aged 73, was well until March 1963, when he noted pain and limitation of the neck and shoulders and a few days later similar, but more severe, symptoms in the buttocks and thighs, and was unable to walk without sticks. He had morning stiffness lasting for half an hour. He began to feel ill, became depressed, lost his appetite and his weight fell 19 pounds during the next 6 weeks. During this period, he began to suffer severe pains in the temporal and frontal regions and over the maxillae. He attended the Devonshire Royal Hospital in May 1963.

Examination

He looked ill and pale. The blood pressure was 200/120. The superficial temporal and facial arteries were tender, thickened, tortuous and pulseless. The dorsalis pedis pulses were not felt. The right biceps jerk was absent and the right supinator jerk reduced. The cervical spine was limited and painful on movement. Both shoulder and shoulder girdle joints were limited in movement with total abduction to 90° on the right and 130° on the left. Both hip joints were limited with pain at the extremes of movement. There were minimal effusions of both knees.

Investigations

E.S.R. 125 mm. in one hour
Haemoglobin 96%
W.B.C. 8,000
S.C.A.T. negative
Serum albumin 2.9 gm.%
Serum globulin 4.4 gm.% with a moderate increase of the alpha 2 globulin fraction on electrophoresis.

Course

Prednisolone, 20 mg. daily, was started and after 3 doses the locomotor symptoms subsided, but a few days later he developed episodes of loss of vision lasting a few minutes, and also had hallucinations, which occurred intermittently for some weeks, of a woman's hand in the right temporal field.

He was admitted to hospital and anti-coagulated with Synthrone and the dose of Prednisolone was increased to 60 mg. daily with clinical suppression of the disease and the E.S.R. became normal. During August, he developed intermittent claudication of the thighs and severe wasting of the muscles, particularly of the quadriceps muscles, which became progressively worse. In September, he developed corticosteroid induced diabetes which was controlled by Tolbutamide, 2 gm. daily. He steadily deteriorated and, by early December, was unable to stand and could not sit up without support owing to weakness of his trunk muscles. He was readmitted to hospital gravely ill. Crepitations were audible at the bases of both lungs. Chest X-ray showed cardiac enlargement with generalised bronchitic changes and a left pleural effusion. In spite of increased doses of corticosteroids and antibiotics, he died.

Post Mortem Examination (Dr. J. Davson)

The cause of death was found to be non-reactive miliary tuberculosis and acute pancreatitis. Both temporal arteries had evidence of arteritis. The histology of the temporal arteries is described on page 151. The histological changes in the muscles are described on page 136.

Comment

The increasing muscular weakness was considered to be due to an arteritis of the intramuscular arteries and was thus treated with increasing doses of corticosteroids whereas, in fact, this was probably due to a steroid myopathy.

Diagnosis

Polymyalgia rheumatica with definite arteritis.

CASE 16

Miss C.G., aged 51, was well until January 1958, when she developed pain and limitation of movement of both shoulders so that she was unable to elevate her arms above the horizontal. One month later, she developed bilateral hip girdle pain, pain in the knees and pain and limitation of movement of the neck. Morning stiffness persisted for 4 hours. At the onset, she started feeling ill, tired and depressed, and lost 28 lbs. in weight over 3 years, most of the weight loss being in the first few months. She was first seen personally in June 1963, when she was much improved.

Examination (June 1963)

There were no systemic abnormalities apart from a blood pressure of 220/110. In the locomotor system, the cervical and lumbar spines were limited and painful. Both sterno-clavicular joints and the right acromio-clavicular joint were tender with minimal synovial thickening of the right sterno-clavicular joint. Total shoulder abduction was 160° on the right and 150° on the left. There was also tenderness at the insertion of the right tendo Achillis.

Investigations

E.S.R. 25 mm. in one hour
S.C.A.T. negative

Course

She continued to improve and, in January 1964, was in complete clinical remission.

Diagnosis

Polymyalgia rheumatica.

CASE 17

Mrs. N.B., aged 58, was first seen personally in June 1963. In February 1960, she suddenly developed severe headache, which was present throughout the day with photophobia, severe constitutional illness, marked depression and loss of weight. At the same time, she had severe lumbar backache. These symptoms gradually became worse. In May 1960, she lost consciousness for 5 hours. She was admitted to the Manchester Royal Infirmary in June 1960 for investigation of suspected brain tumour. All investigations were normal apart from the E.S.R., which was 62 mm. in one hour, and the haemoglobin which was 62%. Serum albumin was 3.9 gm.%; serum globulin was 4.2 gm.%. These symptoms had improved by August 1960 and she remained reasonably well, but her E.S.R. was still elevated in July 1961. In April 1962, she suddenly developed pain and stiffness of the neck and lumbar region. A week later, she developed bilateral shoulder girdle pain with limitation of shoulder movement and pain on the radial aspect of the left wrist. Morning stiffness persisted for 4 hours. These symptoms remained unchanged for 3 months and then she slowly started to improve. She attended the University of Manchester, Rheumatism Research Centre in December 1962, where the diagnosis of polymyalgia rheumatica was made. In June 1963, when seen personally, she was much improved.

Examination

She was an obese, depressed woman. Blood pressure was 190/110. In the locomotor system, the sterno-clavicular joints and acromio-clavicular joints were tender. The right shoulder had a full range of movement with pain at the extremes, but the left shoulder was limited with total abduction to 110°.

Investigations

E.S.R. 36 mm. in one hour
Haemoglobin 90%
S.C.A.T. negative

Radiological examination revealed no changes apart from evidence of a minimal degree of degenerative joint disease.

Course

She slowly improved and, in November 1964, was in complete clinical remission.

Diagnosis

Polymyalgia rheumatica with possible cranial arteritis at the onset.

CASE 18

Miss G.F., aged 51, was well until November 1962, when she suddenly developed severe pain in the neck, with bilateral shoulder girdle pain and limitation of movement, followed by slight bilateral hip girdle pain. Morning stiffness persisted for 4 hours. She attended the University of Manchester, Rheumatism Research Centre in May 1963, where the diagnosis of polymyalgia rheumatica was made. Her general health remained fairly good, but she lost 16 pounds in weight in 8 months. She was admitted to the Devonshire Royal Hospital in June 1963.

Examination

There were no systemic abnormalities. In the locomotor system, both sterno-clavicular joints had synovial thickening. Both acromio-clavicular joints were tender and there was an effusion of the right shoulder joint. The range of shoulder movement was restricted on both sides with total abduction being 110° on the right and 105° on the left. There were effusions of both knees and multiple focal tender areas around the pelvis. The cervical and lumbar regions of the spine were limited and painful on movement with multiple tender interspinous ligaments.

Investigations

E.S.R. 25 mm. in one hour
S.C.A.T. negative

Course

She slowly improved and, in September 1964, was in complete remission.

Diagnosis

Polymyalgia rheumatica.

CASE 19

Mrs. H.K., aged 74, had had several episodes of skeletal pain on and off for several years due to severe degenerative joint disease. In March 1963, she gradually developed right hip girdle pain, and pain and limitation of movement of the right shoulder girdle and neck. Morning stiffness persisted for 2 hours. In April 1963, she developed bitemporal pain and severe tenderness so that the pressure of the pillow, when lying down, was almost unbearable. She was admitted to the Devonshire Royal Hospital in July 1963. Her general health was good, apart from tiring very rapidly.

Examination

There were no systemic abnormalities apart from a blood pressure of 170/100. The left temporal artery was tender but not thickened. In the locomotor system, she had evidence of generalised osteoarthrosis. Both sterno-clavicular joints and acromio-clavicular joints were tender. Both shoulders had a full range of movement with painful arcs due to the presence of painful lesions of both biceps tendons. There were also tender focal areas around the pelvis with pain at the extremes of hip movement.

Investigations

E.S.R. 25 mm. in one hour
S.C.A.T. negative

There were no changes apart from evidence of degenerative joint disease on radiological examination. A left temporal artery biopsy was performed, which relieved her left temporal headache, but the artery was normal on histological examination. The right temporal pain persisted for another 2 months.

Course

In October 1964, she was in complete clinical remission.

Diagnosis

Polymyalgia rheumatica with possible arteritis.

CASE 20

Mrs. R.T., aged 67, had been well, apart from having suffered from pernicious anaemia, until December 1962, when she woke up one morning with pain and stiffness in the groins. A few days later, she developed severe pain and limitation of movement of both shoulder girdles. This was associated with malaise, loss of appetite and depression. After a few weeks, she started to improve. In June 1963, she began to feel more ill again and developed increasing pain in the hips and pain and limitation of movement of the shoulders, so that she was unable to elevate her arms above the horizontal. She also had pain in the right knee. Morning stiffness lasted for 1 hour. Her weight fell 22 pounds over 8 months. She did not have headaches or visual disturbances.

Examination (august 1963)

The blood pressure in the right arm was 150/76. Loud murmurs were audible over both subclavian arteries. The posterior branch of the left superficial temporal artery could not be felt, but there was no tenderness in this region. There was minimal synovial thickening of the right sterno-clavicular joint with tenderness and

limitation of both shoulder joints. The total range of shoulder abduction was 110° on the right and 150° on the left. There were multiple tender focal areas around the pelvis and both knees had minimal effusions.

Investigations

E.S.R. 109 mm. in one hour
Serum albumin 3.5 gm.%
Serum globulin 4.6 gm.%
The alpha 2 and gamma globulin fractions were increased on electrophoresis.
S.C.A.T. negative

Course

Following injection of hydrocortisone into the tender joints and ligaments and a progressive mobilising programme, she rapidly improved and, when discharged after 10 weeks, she was almost asymptomatic and shoulder range was full on both sides. Her E.S.R. was still 93 mm. in one hour on discharge. Three days after discharge, she began to feel ill with dizziness, drowsiness and pain in the neck and supra-clavicular regions.

She was readmitted to hospital, when she was found to have a patchy erythematous rash over the thighs and neck. She had a pyrexia of 103° F. There was clinical evidence of occlusion of both subclavian arteries and a moderately loud murmur was audible over the abdominal aorta. A biopsy of the left superficial temporal artery showed evidence of giant-cell arteritis.

She was treated with Prednisolone, which resulted in rapid symptomatic improvement. Six weeks later, weak pulsation in the right radial artery was palpable. The blood pressure was only obtainable by palpation and was 100 systolic in the right arm and 90 in the left arm. The blood pressure was 170/100 in both popliteal fossae.

When she was reviewed again in July 1964, both radial pulses were weak but palpable. There were still loud murmurs over both subclavian arteries and the abdominal aorta.

Comment

This patient had typical polymyalgia rheumatica. She subsequently developed bilateral occlusion of the subclavian arteries. A biopsy of the temporal artery showed histological changes of giant-cell arteritis.

Diagnosis

Polymyalgia rheumatica, with definite arteritis.

CASE 21

Mr. M.A., aged 83, had had skeletal pains due to degenerative joint disease for 40 years. In July 1960, he developed pain with morning stiffness in both shoulders, which was treated with several injections of hydrocortisone. In January 1961, he developed severe bitemporal throbbing pain and tenderness. At the same time, he started feeling ill, with loss of appetite and loss of weight. He was admitted to his local hospital where both temporal arteries were found to be thickened and tender. He was treated with Prednisolone, 20 mg. daily, which resulted in complete relief of all his symptoms. In August 1961, the Prednisolone was discontinued and, within a few days, he developed pain and tenderness of the muscles of the shoulder and hip girdles. A few days later, he again developed temporal headaches and started feeling ill.

He continued to deteriorate until April 1962, when he was seen by Dr. J. Sharp. On examination, both shoulders were painful on movement and tender. Both acromio-clavicular joints were tender and the right sterno-clavicular joint had evidence of synovial thickening and was tender. Prednisolone, 6 mg. daily was prescribed and his general health and temporal headaches slowly improved.

He was seen personally in August 1963, when he still complained of slight bilateral shoulder girdle pain, pain in the region of the right hip, in both knees and severe pain in the mid-dorsal region, all associated with morning stiffness persisting for half an hour.

Examination

There was minimal thickening of the vessel wall of the left temporal artery with tenderness. In the locomotor system, he had evidence of polyarticular osteoarthrosis. The right sterno-clavicular joint was slightly thickened and tender and there was marked tenderness over the D4-D5 interspinous ligament. Following infiltration of the interspinous ligament with hydrocortisone, the pain was completely relieved.

Investigations

E.S.R. 32 mm. in one hour
Haemoglobin 100%
S.C.A.T. negative

Diagnosis

Polymyalgia rheumatica and giant-cell arteritis.

CASE 22

Mr. P.G., aged 72, was admitted to the Devonshire Royal Hospital in August 1963. In April 1963, he developed pain and limitation of movement of the neck with left shoulder girdle pain. Three weeks later, he developed lumbar backache, pelvic girdle pain and pain in the knees. Both second metacarpo-phalangeal joints were painful for about 2 months. Morning stiffness persisted for 3 hours. He felt unwell from the onset with malaise, depression, anorexia, and he lost 14 pounds in weight during 4 months.

Examination

There were no systemic abnormalities apart from an enlarged prostate gland. In the locomotor system, his cervical spine and lumbar spine were limited and painful. There was slight tenderness on the radial aspect of the right wristjoint but no synovial thickening or limitation. Both shoulder girdles were limited, abduction being 150° on the right and 160° on the left. There were also signs of multiple painful tendon lesions around the shoulders.

Investigations

E.S.R. 46 mm. in one hour
S.C.A.T. negative

Course

Following injection of hydrocortisone and Lignocaine into the tendon lesions around the shoulders, the pain and range of movement were improved. He was not reviewed but, in March 1964, wrote that he was virtually asymptomatic.

Diagnosis

Polymyalgia rheumatica.

CASE 23

Mrs. L.P., aged 58, was well until October 1957, when she rapidly developed pain and limitation of movement of the shoulders, neck, back and hips with morning stiffness lasting for about 2 hours. Her shoulders became so limited that she was unable to elevate them to the horizontal. She felt ill, depressed and lost weight. She was treated with corticosteroids with benefit from March 1958 to June 1960. When the corticosteroids were discontinued, she developed severe headache with very tender swellings "like a string of peas" in both temporal and occipital regions. This was accompanied by severe constitutional illness, but she had no visual disturbances. She lost 28 lbs. in weight over a few months. These tender swellings started to improve after 3 months.

She was admitted to the Manchester Royal Infirmary in October 1960 under the care of Professor J.H. Kellgren. On examination, the sterno-clavicular and acromio-clavicular joints were tender and limited with synovial thickening. There was focal tenderness of the right iliac crest. The E.S.R. was 82 mm. in one hour, haemoglobin 70%, serum albumin 3.5 gm.% and serum globulin 3.4 gm.%. On radiological examination, there was an early erosion of the left sacro-iliac joint. A diagnosis of polymyalgia rheumatica was made. She was very much improved on discharge from hospital after 4 months and her E.S.R. had come down to 28 mm. in one hour. She remained well until July 1962, when she became ill again and lost 14 lbs. in weight over a few months. She developed pain in the neck, shoulders and wrists, and pain and swelling of the knees and feet. Morning stiffness persisted for up to 2 hours.

She was admitted to the Devonshire Royal Hospital in August 1963, when she was first seen personally.

Examination

Soft murmurs were audible over the left subclavian and right carotid arteries. The pulsation of the right superficial temporal artery was reduced and the anterior branch of the left temporal artery could not be palpated. The cervical spine was painful and limited on movement. There was tenderness at the insertions of tendons around the wrists. The sterno-clavicular and acromio-clavicular

joints were tender and had evidence of synovial thickening. The left shoulder joint was slightly limited. Both knees had evidence of synovial thickening and there were tender focal areas around the pelvis with marked tenderness over the pubic symphysis.

Investigations

E.S.R. 32 mm. in one hour.
S.C.A.T. negative.

Radiological examination - There was still minimal erosion of the left sacro-iliac joint, but there were gross erosive changes of the pubic symphysis.

A biopsy of the anterior branch of the left temporal artery was performed, but only a very small thin walled artery, which was normal on histological examination, was found.

Course

Although her general health has improved, she has continued to have joint symptoms. At the most recent review in November 1964, she still had pain in the knees with morning stiffness persisting for 1 hour. A soft murmur was still audible over the right carotid artery. Both sterno-clavicular joints were moderately unstable. The right knee had evidence of synovial thickening and effusion. The E.S.R. was 37 mm. in one hour and S.C.A.T. negative.

Comment

Mrs. L.P. was considered to have polymyalgia rheumatica with joint erosions. The history of headaches in 1960 was typical of temporal arteritis .

Diagnosis

Polymyalgia rheumatica and possible arteritis.

CASE 24

Miss E.H., aged 57, was well until June 1962, when, following a period of mental stress, she rapidly developed bilateral hip girdle and lumbar pain, followed by pain and limitation of movement of the neck and shoulders, which became so limited that she was unable to elevate her arms to the horizontal. In February 1963, both knees and wrists became swollen and painful. Morning stiffness persisted for up to 4 hours. She felt ill, tired, lacking in energy and depressed from the onset and lost 8 pounds in weight within the first 4 months. She was admitted to the Devonshire Royal Hospital in September 1963, when her symptoms were relatively unchanged.

Examination

She was a very anxious woman. There were no systemic abnormalities apart from moderate enlargement of the axillary glands. On examination of the locomotor system, the whole spine was limited and painful on movement, with multiple tender interspinous ligaments. Both wrists were thickened, limited and tender with most of the tenderness being in the tendon sheaths around the wrists. There was marked limitation of movement of the shoulder girdle with total abduction on the right being 115° and 95° on the left. Both acromio-clavicular joints were thickened and tender, and there was marked synovial thickening of both sterno-clavicular joints. There were effusions in the tibialis anterior tendon sheaths of the ankle. Both knees had synovial thickening and effusion, and there were multiple tender focal areas around the knees and pelvis.

Investigations

E.S.R. 68 mm. in one hour
Haemoglobin 72%
Serum albumin 3.8 gm.%
Serum globulin 3.5 gm.% with an increase of the gamma globulin fraction on electrophoresis.
L.E. cell test and S.C.A.T. were both negative.

There were no erosive changes on radiological examination.
A biopsy of the right sterno-clavicular joint showed histological changes of very active synovitis.

Course

She was initially treated with bed rest, active mobilising exercises and had multiple injections of hydrocortisone into tender focal areas. However, her general health remained unchanged. She continued to lose weight and her sedimentation rate remained elevated. After 10 weeks, Prednisolone, 8 mg. daily, was commenced, resulting in slow improvement. On discharge in February 1964, she was much improved, but there was still evidence of activity in several joints and her E.S.R. was 30 mm. in one hour.

She remained unchanged until June 1964, when she developed increased pain and swelling of the wrists and fingers. When reviewed in July 1964, there was synovial thickening of both wrists and the metacarpo-phalangeal joints of both hands. Both knees had effusions and the right temperomandibular joint was tender. Both sterno-clavicular joints were unstable. The E.S.R. was 50 mm. in one hour and the S.C.A.T. was negative. On radiological examination, there was a large erosion of the medial aspect of the right clavicle, several erosions of the metacarpo-phalangeal joints of both hands and an erosion of the right middle proximal interphalangeal joint.

Comment

This patient who, at the onset, appeared to have polymyalgia rheumatica, has recently developed features suggestive of rheumatoid arthritis. Her S.C.A.T. has remained negative. She is being kept under observation.

Diagnosis

Possible polymyalgia rheumatica.

CASE 25

Mr. E.B., aged 64, was well until March 1963, when he developed bilateral hip girdle pain, followed a week later by pain in the neck and both shoulder girdles, and mid-dorsal and lumbar backache. He also had pain under both heels and in the right knee. Morning stiffness persisted for 3 hours. These symptoms became worse for 2 months, when he began to feel ill, tired and lacking in energy, and lost 7 pounds in weight over a few months. He was seen in September 1963.

Examination

His blood pressure was 160/90. In the locomotor system, he had moderate limitation of spinal movement with tenderness over the L5-S1 interspinous ligament. There was minimal synovial thickening and tenderness of the left sterno-clavicular joint. Both shoulder girdles were limited with total abduction on the right to 160° and on the left to 150°. There were tender focal areas around the pelvis and tenderness under both heels.

Investigations

E.S.R. 40 mm. in one hour
S.C.A.T. negative

Course

Within a few months, he began to improve spontaneously and, when seen in October 1964, was in complete clinical remission. His E.S.R. was 20 mm. in one hour.

Diagnosis

Polymyalgia rheumatica.

CASE 26

Mr. J.L., aged 61, gradually developed bilateral hip girdle pain in December 1961. In February 1962, he developed bilateral shoulder girdle, cervical and upper dorsal pain. These were associated with morning stiffness lasting for 4 hours. His general health deteriorated over the next few months.

He was seen by Dr. J. Sharp in September 1962. His right radial pulse was weak and the left brachial and radial pulses were not palpable. His blood pressure was 105/80 in the right arm and could not be obtained in the left arm. Both shoulders were limited, there were multiple focal tender areas around the pelvis and his whole spine was limited and painful on movement. His E.S.R. was 60 mm. in one hour and haemoglobin 89%. His general health and hip girdle pain slowly improved, but his shoulder girdle pain became progressively worse.

He was seen personally in September 1963.

Examination

He had widespread psoriasis.
Blood pressure: arms - right 100/90, left 90/80
Oscillometry: arms - right 10/110, left 4/90
There were moderately loud murmurs over both subclavian and the left brachial arteries. His cervical spine was very limited and his dorsolumbar region slightly limited. Both sterno-clavicular joints had a moderate degree of synovial thickening. The sterno-clavicular, acromio-clavicular and shoulder joints were tender and limited in range, with abduction to 90° on the right and 110° on the left. There were multiple focal tender areas around the pelvis.

Investigations

E.S.R. 78 mm. in one hour
S.C.A.T. negative
Serum albumin 3.3 gm.%
Serum globulin 4 gm.% with increased alpha 2 and gamma globulin fraction.

There were no abnormalities on radiological examination.

Course

He slowly improved and, when reviewed in August 1964, his general health was improving, but his shoulders were still limited in range. On examination, the murmurs over the subclavian arteries were still present and the left brachial pulse was more easily palpable. The upper part of the left carotid artery was dilated but not tender. Oscillometric deflections in the arms were 6/100 on the right and 5/90 on the left side. His E.S.R. was 70 mm. in one hour, haemoglobin 82% and S.C.A.T. negative. Radiological examination now revealed an erosion of the right acromio-clavicular joint. (Fig. 12)

Diagnosis

Polymyalgia rheumatica and possible arteritis.

CASE 27

Mrs. S.J., aged 55, had had symptoms due to severe osteoarthrosis of the hips and degenerative disc disease of the spine for 15 years. In April 1962, she developed severe pain and limitation of the shoulders and neck, and pain in the lumbar region and both groins associated with morning stiffness persisting for 3 hours. At the same time, she began to feel ill and very tired. She was admitted to her local hospital where her E.S.R. was found to be elevated to 55 mm. in one hour. She was considered to have osteoarthrosis with psychological overlay and was investigated for malignant disease. After 6 months, her general health slowly began to improve. She was admitted to the Devonshire Royal Hospital in September 1963.

Examination

Blood pressure was 130/80. The right temporal artery had reduced pulsation and the left temporal artery pulsation was not palpable. In the locomotor system, there was marked dorso-lumbar scoliosis and limitation of movement of the spine with tenderness over multiple interspinous ligaments. There was minimal synovial thickening of the left acromio-clavicular joint and tenderness of both acromio-clavicular joints. The right shoulder was slightly limited with pain at the extremes of movement and evidence of a biceps tendinitis. Both hip joints were limited due to osteoarthrosis and there were multiple tender focal areas around the pelvis.

Investigations

E.S.R. 77 mm. in one hour
S.C.A.T. negative

There was a slight increase of the alpha 2 globulin fraction on electrophoresis.

Radiological examination showed evidence of severe degenerative disc disease of the spine and severe osteoarthrosis of both hips.

A biopsy of the left temporal artery was performed but only a very small thin-walled artery was found which was normal on histological examination.

Course

Her general health and joint symptoms continued to improve. In January 1964, she developed impaired hearing of the left ear and transient blurring of the left eye. These symptoms improved after 4 months. When reviewed in May 1964, both facial and the left occipital arteries were tender, but a biopsy of the left facial artery showed no histological changes of arteritis. At the most recent review in November 1964, her general health was excellent and she was virtually asymptomatic. Her E.S.R. was still elevated at 44 mm. in one hour.

Diagnosis

Polymyalgia rheumatica and possible arteritis.

CASE 28

Mrs. H.H., aged 55, was well until September 1963, when she rapidly developed severe pain and limitation of both hips, knees and the lumbar region of her spine. Two weeks later, she developed severe bilateral shoulder girdle pain and pain in her neck. Morning stiffness persisted for 4 hours. She felt unwell from the onset and became very depressed. She was admitted to the Devonshire Royal Hospital in October 1963.

Examination

Her blood pressure was 130/70 in both arms. A soft murmur was audible over the abdominal aorta. The dorsal and lumbar regions of her spine were limited and painful on movement with multiple tender focal areas over the interspinous ligaments in these regions. Both shoulders were slightly limited in range with tenderness over the sterno-clavicular and acromio-clavicular joints. There were effusions of both knees and multiple tender focal areas around the bony points of the pelvis.

Investigations

E.S.R. 60 mm. in one hour
Haemoglobin 76%
Serum albumin 3.2 gm.%
Serum globulin 3.9 gm.%
S.C.A.T. negative

A routine biopsy of the right temporal artery showed no histological abnormality.

Course

While in hospital, she developed increasing pain in both shoulder girdles, which became more limited so that total abduction was reduced to 70° on each side. Both sterno-clavicular joints also developed evidence of synovial thickening and her sedimentation rate rose to 85 mm. in one hour. After 9 weeks in hospital, she slowly began to improve and, on discharge in February 1964, was much improved, although her shoulders were still limited in range. Her sedimentation rate was 25 mm. in one hour on discharge. Five months later, she developed clinical evidence of large vessel arteritis; the details of this are described on page 167.

Diagnosis

Polymyalgia rheumatica and large vessel arteritis.

CASE 29

Mrs. A.B., aged 71, was well until July 1961, when she developed lumbar and hip girdle pain. In September, both knees became swollen and painful and, a month later, she developed pain and limitation of the neck and shoulders. At this stage, she felt ill, depressed and lost 7 pounds in weight. Morning stiffness of the joints lasted for 4 hours.

She was seen by Dr. J. Sharp in December 1961, when there was marked synovial thickening and tenderness of both sterno-clavicular joints. Both shoulders were limited, with total range of abduction to 90° on each side. There were effusions in both knees and there were multiple focal tender areas around the pelvis. The E.S.R. was 50 mm. in one hour and haemoglobin 84%. On radiological examination, there was a cyst in the right third metacarpal. (Fig. 14) There was also slight sclerosis of the right lower sacro-iliac joint. (Fig. 20)

She slowly improved and, when seen again in February 1962, both wrists were slightly thickened, tender and limited. When seen again in January 1963, the thickening of the wrists had subsided, but the metacarpo-phalangeal joints were slightly thickened and tender. Radiological examination of the hands now showed erosions of the metacarpo-phalangeal joints. (Fig. 15 and 18) She slowly continued to improve until June 1963, when she developed severe left occipital pain and tenderness with loss of hair from this region. This pain persisted for 4 months and then slowly began to improve.

She was seen personally in October 1963, when her general health was much improved. She still had slight pain in the knees, both shoulders and the right wrist joint.

Examination

Her blood pressure was 180/110 in both arms. In the locomotor system, she had evidence of generalised osteo-arthrosis. The right wrist joint was slightly limited but not tender. The right sterno-clavicular joint was slightly thickened and tender with slight limitation of the right shoulder girdle.

Investigations

E.S.R. 20 mm. in one hour
Haemoglobin 99%
S.C.A.T. negative

Course

She continued to improve and, in February 1964, was in clinical remission. When reviewed again in May 1964, she was well but her E.S.R. had gone up to 35 mm. in one hour. In July, she still felt well but had developed a continual "buzzing" in the head, more on the left side, and also had occasional pain at the angle of the jaw on the left side. Her E.S.R. had gone up to 95 mm. in one hour and the haemoglobin was 79%. She began to feel ill and lost 19 pounds in weight during the next 4 months.

On examination in January 1965, the right carotid and subclavian arteries were tender and there were murmurs over both subclavian arteries. A biopsy of the left facial artery was performed, but this showed no evidence of arteritis. The E.S.R. was 75 mm. in one hour, haemoglobin 87% and S.C.A.T. negative. Radiological examination now revealed increased sclerosis of the sacro-iliac joints and healing of the erosions of the hands. (Fig. 21, 16, 19)

Comment

Mrs. A.B. commenced with the typical clinical picture of polymyalgia rheumatica, subsequently developed erosive changes of joints and then developed features suggestive of arteritis.

Diagnosis

Polymyalgia rheumatica and possible arteritis.

CASE 30

Mrs. E.B., aged 56, had had lumbar backache on and off for 15 years. Her general health had always been good until January 1963, when she developed bilateral shoulder girdle pain, increased pain in the lumbar region and bilateral hip girdle pain. Her shoulders became so limited that she was unable to abduct them more than about 30°. Morning stiffness persisted for about 4 hours. She felt ill, tired and lacking in energy from the onset. She was admitted to the Devonshire Royal Hospital in February 1964.

Examination

There were no systemic abnormalities.
Locomotor system: There was synovial thickening and tenderness of both acromio-clavicular joints. Both sterno-clavicular joints were tender. Range of shoulder abduction was 130° on the right and 120° on the left. There were several tender interspinous ligaments in the cervical and lumbar regions. Both knees had small synovial effusions and there were multiple focal tender areas around the pelvis.

Investigations

E.S.R. 58 mm. in one hour
Haemoglobin 68%
S.C.A.T. negative

Course

Following injections of hydrocortisone into the tender focal areas, she was much improved symptomatically, but when discharged after 6 weeks her E.S.R. was unaltered. She was reviewed in August 1964, when her general health and joint symptoms were improving. The E.S.R. was still elevated at 48 mm. in one hour.

Diagnosis

Polymyalgia rheumatica.

CASE 31

Mrs. D.B., aged 59, was well until December 1959, when she rapidly developed severe pain and limitation of movement of the neck and shoulder girdles, and pain in the hip girdles, knees, ankles and hands. These symptoms became worse for a few weeks and then remained unchanged. Morning stiffness persisted for up to 5 hours. From the onset, she felt ill, weak and tired with loss of appetite and severe depression. She remained unchanged and, when admitted to the Manchester Royal Infirmary in May 1961, had lost 36 pounds in weight. On examination, her whole spine was limited and painful with multiple tender focal areas over the interspinous ligaments. Both sterno-clavicular and acromio-clavicular joints had evidence of synovial thickening and were tender. There were multiple focal tender areas around the knees and pelvis. Results of investigations were: E.S.R. 61 mm. in one hour, haemoglobin 88% and S.C.A.T. negative. A diagnosis of polymyalgia rheumatica was made.

Course

On discharge from hospital after 4 months, she was much improved but still had slight limitation of movement of the shoulder girdles. Her E.S.R. was 14 mm. in one hour. She was reviewed personally in October 1963, when she still complained of widespread pains and of severe depression.

Examination

There were no systemic abnormalities. There was evidence of mild generalised osteoarthrosis, but no signs of inflammatory activity in any joints or tender focal areas.

Investigations

E.S.R. 12 mm. in one hour
S.C.A.T. negative

Diagnosis

Polymyalgia rheumatica.

CASE 33

Mr. G.P., aged 61, had always enjoyed excellent health. In December 1962, he began to feel excessively tired and lost his appetite. In February 1963, he awoke one morning with severe pain and limitation of movement of both shoulders, pain in the dorsal region, both hip girdles and knees. These symptoms increased in intensity for 2 months and then remained unchanged. Morning stiffness persisted for 4 hours. From the onset, he felt ill with malaise, depression and excessive sweating. He lost 16 pounds in weight over a few months. He was admitted to the Devonshire Royal Hospital in October 1963.

Examination

He was a well-preserved, ill-looking man. In the locomotor system, the cervical and dorsal spine were very limited and painful on movement with multiple tender focal areas over the interspinous ligaments. Both sterno-clavicular joints had synovial thickening and were tender. Both acromio-clavicular joints were tender and there was marked tenderness at the extremes of shoulder movement. There were multiple tender focal areas around the knees and pelvis. Loud murmurs were audible over several large vessels. Details of these and the course of the vascular disease are described on page 169.

Investigations

E.S.R. 40 mm. in one hour
S.C.A.T. and A.N.F. negative

A biopsy of the left sterno-clavicular joint was performed and the histological changes were those of a very active synovitis.

A biopsy of the left temporal artery showed no histological evidence of arteritis.

Course

Following injection of hydrocortisone into multiple tender areas, his locomotor symptoms were much improved. In January 1964, when he commenced Prednisolone, 20 mg. daily, for suspected large vessel arteritis, the locomotor symptoms were completely suppressed.

When reviewed in December 1964, he was still having Prednisolone, 18 mg. daily, and there were no locomotor symptoms, but he still had evidence of widespread large vessel disease.

Diagnosis

Polymyalgia rheumatica and possible arteritis.

CASE 34

Mr. H.B., aged 61, was well until March 1963, when he gradually developed bilateral hip girdle pain. These symptoms became worse for 3 months and then slowly began to improve. In August 1963, he suddenly developed severe pain in the neck, mid-dorsal region and both shoulders. His shoulders rapidly became limited in range. Morning stiffness persisted for 5 hours and was so severe that he was unable to dress without assistance in the mornings. His general health was poor from the onset and he lost 12 pounds in weight in the first 9 months. He was admitted to the Devonshire Royal Hospital in November 1963.

Examination

There were no systemic abnormalities. His whole spine was limited and painful on movement with multiple tender inter-spinous ligaments. Both sterno-clavicular and acromio-clavicular joints were very tender. Range of shoulder abduction was to 160° on the right and 120° on the left. There were multiple tender focal areas around the pelvis and knees.

Investigations

E.S.R. 90 mm. in one hour
Haemoglobin 103%
W.B.C. 8,600
S.C.A.T. negative

A biopsy of the left temporal artery showed no evidence of arteritis.

Course

He was treated with initial bed rest, mobilising exercises and injections of hydrocortisone into tender focal areas. He rapidly improved and, within 3 weeks, his E.S.R. had dropped to 18 mm. in one hour. On discharge, in December, he was much improved. He remained well until June 1964, when he began to feel ill again and lost 15 pounds in weight within a few weeks. When seen at the end of June his E.S.R. was 120 mm. in one hour, haemoglobin 65%, serum albumin 3.3 gm.%, serum globulin 4.8 gm.% and, on plasma electrophoresis, both the alpha 2 and gamma globulin fractions were increased. No cause for his deterioration was apparent but, 3 months later, moderately loud murmurs were audible over both axillary arteries, the abdominal aorta and both femoral arteries. The right carotid artery was also tender to palpation. His haemoglobin had been restored to 84% by a course of intravenous iron and his E.S.R. was then 80 mm. in one hour.

Comment

Mr. H.B. had typical polymyalgia rheumatica and as his locomotor symptoms were subsiding he developed constitutional illness, a marked rise in the E.S.R., anaemia and abnormalities of plasma proteins, followed by clinical evidence of large vessel abnormalities, which were presumed to be due to large vessel arteritis.

Diagnosis

Polymyalgia rheumatica and large vessel arteritis.

CASE 35

Mrs. E.W., aged 59, developed bilateral shoulder girdle and mid-dorsal pain, associated with morning stiffness, in February 1963. This was followed by hip girdle pain. She attended the Physical Medicine Out Patient Clinic in November 1963, when she was already improving.

Examination

There were no systemic abnormalities. There were multiple focal tender areas over the dorsal and lumbar interspinous ligaments. The right sterno-clavicular, left acromio-clavicular and the manubrio-sternal joints were tender. There were focal tender areas around the left wrist, both knees and the pelvis.

Investigations

E.S.R. 16 mm. in one hour.
S.C.A.T. negative

Course

When seen one month later, she was in complete clinical remission.

Diagnosis

Polymyalgia rheumatica.

CASE 36

Mrs. R.W., aged 74, began to feel unwell in March 1963. A month later, her right shoulder became painfully limited in movement. This was followed, within a few weeks, by painful limitation of movement of the left shoulder, pelvic girdle pain and pain in the dorsal region. She gradually deteriorated for 6 months and lost 11 pounds in weight during this period. Morning stiffness persisted for 4 hours. She was admitted to the Devonshire Royal Hospital in November 1963 for 5 weeks.

Examination

Her blood pressure was 220/120. An aortic systolic murmur, which was conducted to the neck, was present. The left sterno-clavicular and right acromio-clavicular joints were tender and had evidence of synovial thickening. There was an effusion of the right shoulder joint. Total shoulder abduction was to 110° on the right and 150° on the left. There were small effusions of both knees, multiple tender focal areas around the knees and pelvis, and focal tender areas around the wrists.

Investigations

E.S.R. 40 mm. in one hour. Slight increase of alpha 2 globulin.
S.C.A.T. negative
Serum alkaline phosphatase 18 K.A. units.
X-rays revealed extensive changes of Paget's disease in the skull, pelvis and spine.

Course

Following injections of hydrocortisone into the tender focal areas around the shoulders, her symptoms were much improved. When reviewed in July 1964, she was in clinical remission.

Diagnosis

Polymyalgia rheumatica and Paget's disease.

CASE 37

Mrs. E.D., aged 63, was well until November 1961, when she gradually developed dorsal backache followed, a week later, by pain and limitation of movement of both shoulders and, a few days later, by pain in both buttocks. Morning stiffness lasted for 4 hours. From the onset, she felt tired and lost 15 pounds in weight over the first few months.

She was admitted to the Devonshire Royal Hospital under the care of Dr. J. Sharp in April 1962 for 3 months. On examination, both sterno-clavicular joints had marked synovial thickening and were tender. Both shoulder joints were limited and the range of shoulder abduction was to 40° on the right and 50° on the left side. There was tenderness around both wrists and also over both ischial tuberosities. There was a moderate effusion of the left knee. Her E.S.R. was 100 mm. in one hour and haemoglobin 64%. The S.C.A.T. was negative, serum albumin was 3 gm.% and serum globulin 4 gm.%. On plasma electrophoresis, the alpha 2 globulin fraction showed a marked increase and a slight increase of the gamma globulin fraction. There were no abnormalities on radiological examination. As she did not respond to conservative treatment, Prednisolone, 10 mg. daily, was prescribed, following which she slowly improved.

She was seen personally for the first time in November 1963. Her general health was then much improved but she still had painful limitation of movement of both shoulders and pain in the left knee. She was still having Prednisolone, 8 mg. daily.

Examination.

There were no systemic abnormalities. Two nails of the right hand had linear pitting, characteristic of psoriatic nail changes. Several of the terminal interphalangeal joints were unstable and both wrist joints were slightly limited in movement. Both sterno-clavicular joints were highly unstable. The left shoulder joint was limited, with shoulder abduction to 120°. There was synovial thickening and a moderate effusion of the left knee.

Investigations

E.S.R. 40 mm. in one hour
Haemoglobin 80%
On radiological examination, there were erosions of both acromio-clavicular joints.

When reviewed in November 1964, she was unchanged but radiological examination now revealed erosions of both acromio-clavicular joints, the right sterno-clavicular joint, both wrists, the right sacro-iliac joint and the pubis.

Comment

Mrs. E.D. commenced as a typical case of severe polymyalgia rheumatica but subsequently developed clinical features not unlike those of psoriatic arthropathy.

Diagnosis

Possible psoriatic arthropathy.

CASE 38

Mrs. G.W., aged 58, was well until October 1961, when she developed pain in the neck followed by bilateral shoulder and hip girdle pain, and pain in the knees. Morning stiffness persisted for 4 hours. Her general health rapidly deteriorated from the onset, and she began to feel ill, tired and depressed, and lost 30 pounds in weight over 5 months. She was seen by Dr. J. Sharp in March 1962, when both sterno-clavicular, both shoulder and the left acromio-clavicular joints were tender. Shoulder abduction was to 100° on the right and 90° on the left. There was tenderness over both ischial tuberosities. Her E.S.R. was 87 mm. in one hour and the S.C.A.T. was negative. In July, she started to improve and, when admitted to the Devonshire Royal Hospital for 6 weeks in August 1962, was much improved. By April 1963, she was completely asymptomatic.

She was reviewed personally in November 1963, when she was completely asymptomatic and her E.S.R. was 18 mm. in one hour.

Diagnosis

Polymyalgia rheumatica.

CASE 39

Mrs. A.R., aged 59, was well until July 1963, when she developed pain in both buttocks followed, 4 weeks later, by severe pain and limitation of both shoulders, pain in the left knee and, 8 weeks later, by pain of the ulnar aspect of the left wrist. Morning stiffness persisted for more than 4 hours. Her general health began to deteriorate 2 months after the onset, when she began to feel ill, tired and depressed, and lost 14 pounds in weight over 3 months. She was admitted to the Devonshire Royal Hospital in November 1963.

Examination

Her blood pressure was 150/90 in both arms. There was a moderately loud murmur over the right subclavian artery and a softer murmur over the right carotid artery. The pulsation in the right temporal artery was reduced. There was minimal synovial thickening and tenderness of the left sterno-clavicular joint. Both acromio-clavicular joints were tender and both shoulders were limited with total abduction to 95° on the right and 70° on the left. There was tenderness at the insertion of the left extensor carpi ulnaris tendon at the wrist. The left knee had a moderate effusion and there were tender focal areas around the pelvis.

Investigations

E.S.R. 37 mm. in one hour
S.C.A.T. negative

A biopsy of the anterior branch of the right superficial temporal artery showed no histological changes of arteritis.

Course

Following injection of hydrocortisone into the focal tender areas around the shoulders, her symptoms were much improved. When reviewed in May 1964, she was completely asymptomatic, and the murmurs were no longer audible over the large vessels. The E.S.R. was 12 mm. in one hour.

Comment

Mrs. A.R. was originally considered to have possible arteritis, but the course of her disease was not compatible with this diagnosis. She was, however, included in the group with possible arteritis in this study.

Diagnosis

Polymyalgia rheumatica.

CASE 40

Mr. C.D., aged 55, was well until April 1963, when he developed bilateral hip girdle pain, followed by bilateral shoulder pain, pain in the neck, left knee and right elbow. Morning stiffness lasted for half an hour. There was slight deterioration of his general health from the onset, with mild depression and loss of 7 pounds in weight over the first 3 months. He was seen in the Physical Medicine Out Patient Clinic in November 1963.

Examination

He had no systemic abnormalities. The sterno-clavicular, acromio-clavicular and shoulder joints were tender with minimal synovial thickening of the sterno-clavicular joints. Shoulder range of movement was very limited with total abduction on the right to 60° and 140° on the left. There were multiple focal tender areas around the hips and knees.

Investigations

E.S.R. 36 mm. in one hour
Haemoglobin 90%
S.C.A.T. negative

Course

Following injections of hydrocortisone into several tender focal areas, his symptoms were much improved. He continued to improve slowly and, at his most recent review in November 1963, was almost asymptomatic and his E.S.R. was 30 mm. in one hour.

Diagnosis

Polymyalgia rheumatica.

CASE 41

Mrs. H.L., aged 67, was well until April 1961, when she developed shoulder girdle pain and limitation of movement. Soon after, she developed pain in the neck and bilateral hip girdle pain. Her general health deteriorated and she began to feel ill. She was admitted to her local hospital for investigation and the only abnormal finding was an elevated E.S.R. of 54 mm. in one hour. The diagnosis on discharge was "cervical spondylosis and acute fibrositis". Over the first 4 months, she lost 20 pounds in weight. In September 1961, treatment with corticosteroids was begun with marked symptomatic improvement. She continued to take these until June 1963, and when these were discontinued she began to feel ill and tired, and again developed pain in the shoulder and hip girdles and also of the left wrist. Morning stiffness persisted for up to 4 hours. She was admitted to the Devonshire Royal Hospital in November 1963.

Examination

No systemic abnormalities were found. On palpation, reduced pulsation, but no tenderness, of the anterior branch of the left superficial temporal artery was felt. Both shoulders had a full range of movement, but had evidence of bilateral supraspinatus tendinitis. There was tenderness over the radial aspect of the left wrist. Both knees had minimal effusions and tender focal areas were present over both ischial tuberosities.

Investigations

E.S.R. 40 mm. in one hour
Haemoglobin 96%
S.C.A.T. negative

A biopsy of the anterior branch of the left superficial temporal artery showed histological changes of giant-cell arteritis, but there was little evidence of activity.

Course

She rapidly improved spontaneously and, within 4 weeks, her E.S.R. had dropped to 20 mm. in one hour. When discharged 2 weeks later, she was almost in remission. She was reviewed in November 1964, when she was in clinical remission.

Diagnosis

Polymyalgia rheumatica and giant-cell arteritis.

CASE 42

Mrs. L.G., aged 52, was well until December 1961, when she developed mid-dorsal backache followed, one month later, by pain and limitation of both shoulders and the neck. A few weeks later, both elbows and the ulnar borders of both wrists became painful. Morning stiffness persisted for 3 hours. She began to feel ill with marked malaise, sleeplessness due to pain, loss of appetite and severe depression. Her symptoms became worse until February 1963. She had also lost 35 pounds in weight over the preceding 12 months. She was admitted to the Devonshire Royal Hospital in December 1963.

Examination

Her blood pressure was 140/80. Pulsation in the left temporal artery was reduced. Both sterno-clavicular and acromio-clavicular joints were tender. Shoulder abduction was limited to 140° on the right and to 100° on the left. There was also tenderness over both subdeltoid bursae, several costochondral junctions, multiple interspinous ligaments and at the ulnar borders of both wrists.

Investigations

E.S.R. 60 mm. in one hour
S.C.A.T. negative

A biopsy of the left temporal artery showed no evidence of arteritis.

Course

Following injection of hydrocortisone into several tender focal areas, her symptoms were improved. In March 1964, she developed right occipital and frontal headaches, which persisted for several weeks. At the same time, she developed vertigo which occurred on sitting up from the lying position. When seen in October 1964, she still had slight shoulder girdle pain and her E.S.R. was 24 mm. in one hour.

Diagnosis

Polymyalgia rheumatica and possible arteritis.

CASE 43

Mr. W.E., aged 55, was well until February 1963, when he developed left hip girdle and lumbar pain. Two months later, he developed pain in the neck and shoulder girdles, which became limited in movement. Morning stiffness persisted for 1 hour. In March 1963, he began to feel ill, tired and depressed, and he lost 7 pounds in weight over a few months. He was seen by Dr. J. Sharp in June 1963, when he was already improving. The right sterno-clavicular and left acromio-clavicular joints were tender. Both shoulders were limited with the range of abduction to 120° on the right and to 100° on the left. There was also a tender focal area on the left trochanter. His E.S.R. was 28 mm. in one hour and S.C.A.T. was negative. He continued to improve and, when seen personally in January 1964, he was in clinical remission. The E.S.R. was 15 mm. in one hour.

Diagnosis

Polymyalgia rheumatica.

CASE 44

Mrs. A.J., aged 55, suddenly developed upper lumbar backache and pelvic girdle pain in November 1961. A week later, her neck became painful and she developed shoulder girdle pain and limitation of movement. Within 2 months, these pains had become so severe that she could hardly move. In January 1962 both knees and, in February, her left wrist became painful. Morning stiffness lasted for up to 5 hours. She began to feel ill, tired and weak one month after the onset of her symptoms. During the first 2 months, she lost 7 pounds in weight. She was admitted to the Devonshire Royal Hospital in May 1962 for 10 weeks. On examination, both sterno-clavicular joints were tender and had synovial thickening. The acromio-clavicular and shoulder joints were tender and limited. Both wrists were tender and there were synovial effusions of both knees. The cervical and lumbar regions of the spine were also tender and limited. Her E.S.R. was 55 mm. in one hour, haemoglobin 69% and S.C.A.T. negative. On discharge, she was much improved and maintained this progress. When seen personally in January 1964, she was much improved, but still had shoulder girdle pain.

Examination

There were no systemic abnormalities. Both sterno-clavicular joints were moderately unstable and there were minimal effusions of both knees.

Investigations

E.S.R. 30 mm. in one hour
Haemoglobin 90%
S.C.A.T. negative

There were no erosive changes on radiological examination.

Course

When reviewed in October 1964, she was in clinical remission and her E.S.R. was normal.

Diagnosis

Polymyalgia rheumatica.

CASE 45

Mrs. E.S., aged 59, was well until June 1963, when she developed pain and limitation of the right shoulder. This improved within a few months. In December 1963, she awoke one morning with severe bilateral shoulder girdle, cervical, lumbar and hip girdle pain. A week later, her knees became painful and by then her shoulders were so limited that she was unable to elevate her arms to the horizontal. Morning stiffness persisted for 4 hours. At the same time, she began to feel ill with malaise, poor appetite and severe depression. In January 1964, she developed severe frontal and temporal headaches, which were throbbing in character.

Examination

When seen two days after the onset of her headaches, both temporal arteries were tender and thickened with redness of the overlying skin. Details of the vascular manifestations are described on page 165.

On examination of the locomotor system, both sterno-clavicular joints had evidence of minimal synovial thickening and were tender. The right shoulder and both subdeltoid bursae were tender. Range of shoulder abduction was to 80° on the right and 90° on the left. There was an effusion of the right knee and there were multiple focal tender areas over the cervical and lumbar interspinous ligaments, around the pelvis and the knees.

Investigations

E.S.R. 20 mm. in one hour
Haemoglobin 100%
Serum albumin 3.9 gm.%
Serum globulin 3 gm.% with a normal electrophoresis
S.C.A.T. negative.

Course

Following treatment with Prednisolone, 80 mg. daily, all her locomotor symptoms were suppressed within a few days. When reviewed in December 1964 after the dose of Prednisolone had been reduced, both sterno-clavicular joints were unstable and had evidence of minimal synovial thickening.

Diagnosis

Polymyalgia rheumatica and definite arteritis.

CASE 46

Mrs. M.G., aged 60, gradually developed pain and limitation of movement of the neck in December 1960. In March 1961, her knees slowly became painful and swollen, followed by pain and limitation of both shoulder girdles. In August 1961, she developed lumbar backache and hip girdle pain. Her general health remained good until May 1961, when she began to feel ill with tiredness, loss of energy and depression.

She attended the University of Manchester Rheumatism Research Centre. On examination, both shoulders were found to be limited with abduction to 70° on the right. There was an effusion of the right knee and focal tender areas around the pelvis. Her E.S.R. was 46 mm. in one hour, haemoglobin 76% and S.C.A.T. negative. In December 1961, she began to improve and by June 1962 was completely asymptomatic.

She was seen personally in January 1964, when her general health was excellent and there were no abnormalities apart from evidence of generalised osteoarthrosis. Her E.S.R. was however still elevated at 37 mm. in one hour.

Diagnosis

Polymyalgia rheumatica.

CASE 47

Mrs. A.B., aged 67, was well until May 1963, when she developed bilateral hip girdle pain. These symptoms gradually improved until September 1963, when she developed pain in the neck and shoulder girdles. Morning stiffness lasted for half an hour.

She was seen by Dr. J. Sharp in January 1964, when the cervical and lumbar regions of the spine were limited and painful on movement and there were tender focal areas on the bony points of the pelvis. The E.S.R. was 45 mm. in one hour, haemoglobin 94% and S.C.A.T. negative.

When seen personally in March 1964, she was improved, but still had slight shoulder and hip girdle pain.

Examination

Her blood pressure was 200/90. She had evidence of generalised osteoarthrosis and tender focal areas on the bony points of the pelvis.

Investigations

E.S.R. 26 mm. in one hour
Haemoglobin 90%
S.C.A.T. negative

Radiological examination showed evidence of degenerative joint and disc disease.

Diagnosis

Polymyalgia rheumatica.

CASE 48

Mrs. A.T., aged 49, was well until February 1963, when she became depressed. In July 1963, she began to feel tired and, in October, gradually developed bilateral hip girdle pain. In November, she developed pain in the neck and both shoulder girdles, which progressively became more limited in movement. Morning stiffness persisted for 1 hour. She attended the Devonshire Royal Hospital in February 1964, by which time she had lost 14 pounds in weight.

Examination

Her blood pressure was 140/90 in both arms. The vascular manifestations are described on page 168. In the locomotor system, both sterno-clavicular joints had evidence of synovial thickening, both acromio-clavicular joints were tender and there were effusions in the right shoulder and right knee joints. Her cervical spine was limited and painful on movement and there were multiple tender focal areas on the bony points of the pelvis. Range of shoulder abduction was to 130° on the right and 110° on the left side.

Investigations

E.S.R. 65 mm. in one hour
Haemoglobin 85%
S.C.A.T. negative

Course

She remained unchanged for 6 months and then developed clinical evidence of widespread large vessel abnormalities (described on page 168).

Diagnosis

Polymyalgia rheumatica and large vessel arteritis.

CASE 49

Mrs. F.C., aged 63, had had lumbar backache on and off for 30 years. She had also had several attacks of cholecystitis. In August 1963, her left knee suddenly became painful and swollen. Two weeks later, she developed pain in the neck and both shoulders and her left shoulder became very limited in movement. Morning stiffness persisted for up to 2 hours. In November 1963, she began to feel tired and to sweat excessively. She was admitted to the Devonshire Royal Hospital in February 1964 for 6 weeks.

Examination

Her blood pressure was 160/90 in both arms. There were systolic murmurs over the right subclavian and carotid arteries. In the locomotor system, she had evidence of generalised osteo-arthrosis. The left shoulder was very limited with total abduction to 70° and there were also multiple tender focal areas around the shoulder. The right shoulder was also tender but not limited, and there was an effusion of the left knee.

Investigations

E.S.R. 45 mm. in one hour
S.C.A.T. negative

Course

Following several injections of hydrocortisone into the tender focal areas around the left shoulder, this slowly became less painful.

On discharge, her general health was much improved, but her left shoulder was still limited in movement. Her E.S.R. had come down to 5 mm. in one hour.

Diagnosis

Polymyalgia rheumatica.

CASE 50

Mrs. G.G., aged 61, was well until November 1960 when, following a period of severe mental stress, she developed pain in the neck and both shoulders. At the same time, she began to feel ill and lost 10 pounds in weight over a few months. Several months later, she developed pain in both wrists and the right ring finger. Morning stiffness persisted for 4 hours. She remained unchanged until April 1962, when she was admitted to the Devonshire Royal Hospital under the care of Dr. R. Harris. She had previously had psoriasis. On examination, both shoulder girdles were slightly limited in movement with evidence of synovial thickening of the right acromio-clavicular joint. Both wrists were slightly limited and tender. Her E.S.R. was 103 mm. in one hour, haemoglobin 80% and S.C.A.T. negative. There were no abnormalities on radiological examination. She remained unchanged and was first seen personally when she was readmitted to hospital in February 1964.

Examination

She was an obese, anxious woman. Both wrists had synovial thickening and were limited and tender. The proximal interphalangeal joint of the right ring finger also had moderate synovial thickening. Both acromio-clavicular joints were tender and the left had synovial thickening. The right shoulder

was limited with range of total abduction to 120°. There was a minimal synovial effusion of the right knee and her cervical spine was limited and painful on movement.

Investigations

E.S.R. 126 mm. in one hour
Haemoglobin 76%
S.C.A.T. negative
Serum albumin 3.6 gm.%
Serum globulin 4 gm.%

There was an increase of the alpha 2 and gamma globulin fractions on plasma electrophoresis.

Radiological examination revealed erosions of both wrists, of several metacarpo-phalangeal joints and the proximal interphalangeal joint of the right ring finger.

Course

Since there was no response to conservative treatment, Prednisolone, 7.5 mg. daily, was commenced, but when discharged from hospital after 5 weeks she was unchanged and her E.S.R. was still 113 mm. in one hour. She remained unchanged until August 1964, when she began to feel very ill and, in September, developed severe left temporal throbbing pain and tenderness, and slight right temporal pain. This was slightly improved when the dose of Prednisolone was increased to 12.5 mg. daily.

She was seen personally in November 1964, when her headache was somewhat improved. On examination, both temporal and the left occipital arteries were tender, and the left temporal artery was possibly thickened. Her E.S.R. was 80 mm. in one hour. A biopsy of the left temporal artery showed no evidence of arteritis.

Comment

Mrs. G.G. had features both of polymyalgia rheumatica and psoriatic arthropathy. She also developed severe temporal headache, but a temporal artery biopsy showed no evidence of arteritis. The correct diagnosis is at present still in doubt. She has been classified in the group with polymyalgia rheumatica and possible arteritis.

CASE 51

Mrs. C.P., aged 50, was well until January 1963, when she developed upper lumbar backache, followed by pain and limitation of movement of her neck and both shoulders. Her shoulders became so limited over 4 weeks that she was unable to elevate her arms above the horizontal. Morning stiffness lasted for 1 hour. In April, treatment with Prednisolone, 10 mg. daily, was commenced, which resulted in marked symptomatic improvement. In December 1963, she developed hip girdle pain and, during the next month, there was marked deterioration of her general health. In January 1964, she developed a painful tender area of the right parietal region. She was admitted to the Devonshire Royal Hospital in February 1964 for 4 weeks.

Examination

There were no systemic abnormalities. There was a localised tender area of the right parietal region, which appeared to be a thrombosed vessel $\frac{3}{4}$" long. In the locomotor system, she had multiple tender focal areas over the interspinous ligaments, around the shoulders, around the pelvis and around both wrist joints.

Investigations

E.S.R. 17 mm. in one hour
S.C.A.T. negative

A right temporal artery biopsy was performed, but this showed no evidence of arteritis.

Course

She remained unchanged until September 1964, when the dose of Prednisolone was gradually reduced from 10 mg. to 5 mg. daily. Following this, she developed right temporal and right occipital headaches and there was deterioration of her general health. On examination, the right temporal artery was tender and had reduced pulsation. Another biopsy of the anterior branch of the right temporal artery was performed and this section showed histological changes of arteritis, but no evidence of inflammatory activity. Following the biopsy, her right temporal headache cleared.

Diagnosis

Polymyalgia rheumatica and arteritis.

CASE 52

Mr. E.R., aged 42, was well until January 1963, when he suddenly developed pain in the lumbar region. This was followed, within a few weeks, by pain in the cervical and dorsal regions, hip girdle pain and pain in the knees, wrists and fingers. Morning stiffness persisted for 2 hours. His general health deteriorated but he did not lose weight.

He was seen by Dr. J. Sharp in March 1963, when he had tenderness of both acromio-clavicular and the right shoulder joints. There was slight limitation of shoulder movement. There were also multiple tender focal areas of the cervical and lumbar interspinous ligaments and around the pelvis and knees. The E.S.R. was 60 mm. in one hour and S.C.A.T. negative. Soon after, he began to improve and was completely asymptomatic in December 1963.

He was reviewed personally in February 1964.

Examination

There were no abnormal findings and his E.S.R. was 7 mm. in one hour.

Diagnosis

Polymyalgia rheumatica.

CASE 53

Mrs. L.S., aged 56, developed painful limitation of movement of her neck and both shoulders in January 1962. A month later, she developed pain and swelling of both knees and her general health began to deteriorate. Morning stiffness lasted for 3 hours.

She was seen by Dr. J. Sharp in June 1962, when she was found to have tender swelling of the right sterno-clavicular joint and both shoulders were slightly limited in motion.

There were effusions of both knees. The E.S.R. was 64 mm. in one hour, haemoglobin 64% and S.C.A.T. negative. There were no erosive changes on radiological examination. She slowly improved and, by November 1962, had recovered completely.

She was reviewed personally in February 1964, when there were no abnormal physical signs. Her E.S.R. was 16 mm. in one hour and the S.C.A.T. was negative.

Diagnosis

Polymyalgia rheumatica.

CASE 54

Miss W.D., aged 42, suddenly developed lower dorsal backache in October 1961. This was followed, within a few days, by fatigue, depression, loss of appetite and loss of weight. Three weeks later, she developed pain in the wrists, ankles and right knee. Morning stiffness lasted for 2 hours. She was seen by Professor J.H. Kellgren in January 1962 and admitted to the Devonshire Royal Hospital in February 1962 for 4 weeks.

Examination

Her whole spine was limited and painful on movement. There were tender tendon lesions around the right elbow and right wrist.

Investigations

E.S.R. 40 mm. in one hour
W.B.C. 12,100
S.C.A.T. negative

Course

On discharge, she was much improved and, by June 1962, was completely asymptomatic. When reviewed in February 1964, she was in excellent health and there were no abnormal findings.

Diagnosis

Polymyalgia rheumatica.

CASE 55

Mr. A.H., aged 65, awoke in July 1961 with severe pain and stiffness of both groins. Within a few days, he began to feel ill, tired and lost his appetite. Three days later, he developed severe shoulder girdle and cervical pain, and pain with swelling of the knees. Morning stiffness lasted for 4 hours. He lost 16 pounds in weight over a few weeks and, throughout his illness, lost 28 pounds.

He was admitted to the Manchester Royal Infirmary in the care of Professor J.H. Kellgren in November 1961. On examination, both shoulders were very limited with total range of abduction on the right being 70° and, on the left, 60°. There were effusions of both knees and slight thickening of the right wrist joint. The cervical and lumbar regions of the spine were painfully limited. There were tender focal areas around the pelvis. His E.S.R. was 73 mm. in one hour, haemoglobin 73%, W.B.C. 10,400 and S.C.A.T. negative. By March 1962, he had recovered completely.

When reviewed personally in February 1964, he was in clinical remission.

Diagnosis

Polymyalgia rheumatica.

CASE 56

Mrs. H.W., aged 54, began to feel progressively more tired and lacking in energy in January 1960. In July, she gradually developed bilateral hip girdle pain and lumbar backache, with morning stiffness lasting for 4 hours. In February 1961, she gradually developed bilateral shoulder girdle pain and limitation, and pain in the neck. She was seen by Professor J.H. Kellgren at the University of Manchester, Rheumatism Research Centre, in November 1962.

On examination, her whole spine was limited and painful on movement. The right sterno-clavicular joint was thickened and tender and there were multiple tender focal areas around the pelvis. Her E.S.R. was 44 mm. in one hour, haemoglobin 62%, serum albumin 4.1 gm.% and serum globulin 4.1 gm.%. The S.C.A.T. was negative.

She slowly improved and, when reviewed personally in February 1964, she still had mild shoulder girdle and hip girdle pain.

Examination

Both sterno-clavicular joints were unstable and the right was slightly thickened. There were multiple focal tender areas around the pelvis.

Investigations

E.S.R. 20 mm. in one hour
Haemoglobin 98%
W.B.C. 10,600
S.C.A.T. negative

Diagnosis

Polymyalgia rheumatica.

CASE 57

Mrs. E.R., aged 55, was well until March 1963, when she awoke one morning with severe pain in the neck radiating over the vertex to the temporal and frontal regions. At the same time, she developed severe dorsal and lumbar backache, and bilateral hip girdle pain. These pains were associated with morning stiffness lasting for about an hour. She felt ill from the onset with severe malaise, dyspepsia and depression. She was admitted to a psychiatric hospital for 9 weeks and treated with electroconvulsive therapy. During this time, she improved slowly, but there was no dramatic improvement. By December 1963, she was almost asymptomatic but, following a cold, had a recurrence of symptoms with pain in the shoulder and hip girdles, neck and back. This was accompanied by morning stiffness lasting for 3 hours, depression and constitutional symptoms. She was admitted to the Devonshire Royal Hospital in February 1964.

Examination

She was a very anxious woman. The blood pressure was 170/90 in both arms. Both acromio-clavicular joints had synovial thickening and were tender. There was also tenderness over the sterno-clavicular and shoulder joints. Shoulder abduction was to 160° on the right and 150° on the left. There were minimal effusions of both knees and multiple tender focal areas were present around the knees, pelvis and over the cervical and lumbar interspinous ligaments. Both temperomandibular joints were tender.

Investigations

E.S.R. 30 mm. in one hour
S.C.A.T. negative

Radiological examination revealed porosis of her spine
A biopsy of a temporal artery showed no histological evidence of arteritis.

Course

Following injections of hydrocortisone into multiple tender focal areas, her symptoms were much improved and, in June 1964, she was in clinical remission.

Diagnosis

Polymyalgia rheumatica.

CASE 58

Mrs. I.P., aged 59, developed bilateral shoulder girdle pain and pain in the neck in March 1958. In June 1958, she rapidly developed lumbar backache, hip girdle pain and pain in the knees, making it difficult for her to walk. These symptoms were associated with morning stiffness lasting for 4 hours. In June, her general health began to deteriorate and she felt excessively tired.

She was admitted to the Manchester Royal Infirmary in the care of Professor J.H. Kellgren in July 1958 for 5 months. There were no systemic abnormalities on examination. Both sterno-clavicular, acromio-clavicular and left shoulder joints were tender with synovial thickening of the acromio-clavicular joints. Shoulder abduction was limited to 90° on the left side. There was an effusion of the left knee and her whole spine was limited with multiple tender focal areas over the interspinous ligaments. There were also tender focal areas around the pelvis. Her E.S.R. was 87 mm. in one hour, haemoglobin 76% and S.C.A.T. negative.

For the first few weeks, she continued to deteriorate and then slowly began to improve. In October, Prednisolone, 7.5 mg. daily, was prescribed to hasten recovery. In December, she suddenly developed very severe right occipital and bilateral temporal pain and tenderness, which was so severe that pethidine was required to control the pain. There was no visual disturbance. These pains persisted for several months. In February 1959, when she increased her activities, she developed intermittent claudication in the thighs and calves.

On examination, her feet were cold and pale, becoming dusky on dependency. The femoral pulse was weak on the right but not felt on the left. The dorsalis pedis pulses were weakly palpable, but the posterior tibials were not felt. Oscillometric deflection was 3 units in each calf. Her E.S.R. was then still 51 mm. in one hour. By June 1959, she was asymptomatic apart from the intermittent claudication, which was also improved. The Prednisolone was discontinued without recurrence of symptoms. In January 1960, she was in clinical remission but her E.S.R. was 44 mm. in one hour.

She was reviewed personally in February 1964, when her general health was excellent. She still developed intermittent claudication of the calves on walking rapidly.

Examination

Her blood pressure was 180/80 in the right arm and 160/90 in the left arm.
Oscillometry arms - right 11/130 left 9/110
calves - right 8/120 left 8/110
Both sterno-clavicular joints were moderately unstable.

Investigations

E.S.R. 26 mm. in one hour
S.C.A.T. negative

Comment

Although Mrs. I.P. did not have a temporal artery biopsy, her history and physical signs were typical of arteritis.

Diagnosis:

Polymyalgia rheumatica and definite arteritis.

CASE 59

Mr. W.M., aged 44, gradually developed pain and limitation of movement of his right shoulder in November 1955. In January 1956, he developed pain in the neck followed by pain in the dorsal region, around the left shoulder, the hip girdles and both knees. These pains became so severe that he was unable to get out of bed or dress without assistance. Morning stiffness persisted for 4 hours. He had severe constitutional illness with malaise, depression, anorexia, loss of 10 pounds in weight and excessive sweating.

He attended the University of Manchester, Rheumatism Research Centre in June 1956, when he was already improving. On examination, both shoulders were limited with abduction to 90° on each side. There was synovial thickening of the right sterno-clavicular joint and left elbow. There were tender focal areas around the wrists, over the cervical interspinous ligaments and both temperomandibular joints were tender. Both knees had synovial effusions. The E.S.R. was 70 mm. in one hour and the S.C.A.T. was negative. In March 1957, he was almost asymptomatic.

He was reviewed personally in February 1964, when he was in clinical remission. No abnormal physical signs were present. The E.S.R. was 11 mm. in one hour.

Diagnosis

Polymyalgia rheumatica.

CASE 60

Mrs. C.L., aged 51, suddenly developed severe pain in both buttocks and knees in March 1956. In June 1956, she developed bilateral shoulder girdle pain and limitation of movement so that she was unable to dress herself. Morning stiffness persisted for 4 hours. In May, she began to feel ill with malaise, severe depression, anorexia and lost 21 pounds over 4 months.

She was seen at the University of Manchester, Rheumatism Research Centre in November 1956. On examination, she had no systemic abnormalities. Both shoulders were very limited in range with total abduction to 40° on each side. The sterno-clavicular and acromio-clavicular joints were tender. The cervical spine was limited and painful on movement and there were focal tender areas around the pelvis. The E.S.R. was 69 mm. in one hour and the S.C.A.T. was negative. She was completely asymptomatic within 3 years.

When seen personally in February 1964, she was completely asymptomatic and there were no abnormalities apart from evidence of generalised osteoarthrosis.

Diagnosis

Polymyalgia rheumatica.

CASE 61

Mr. J.D., aged 62, suddenly developed right hip girdle pain in November 1962. A month later, he developed cervical and bilateral shoulder girdle pain. His shoulders became so limited that he was unable to elevate them above the horizontal. Morning stiffness lasted for 4 hours. In February 1963, he began to improve slowly.

He attended the University of Manchester, Rheumatism Research Centre in April 1963. On examination, his whole spine was limited and painful on movement. Both shoulder girdles were also limited and painful on movement with total abduction to 90° on each side. There were small effusions

of the knees and multiple focal tender areas around the pelvis. His E.S.R. was 26 mm. in one hour and S.C.A.T. negative. He was treated with Butazolidin, 300 mg. daily with benefit. In June 1963, he was almost asymptomatic.

When seen personally in February 1964, he was in clinical remission. The E.S.R. was 17 mm. in one hour.

Diagnosis

Polymyalgia rheumatica.

CASE 62

Mrs. G.J., aged 57, suddenly developed lumbar backache and hip girdle pain in August 1962. A few days later, her neck and both shoulders became painfully limited. Over the next few weeks, she developed pain and swelling of both knees, pain in the wrists and fingers and over both temperomandibular joints. From the onset, she felt ill, depressed, sweated excessively and lost 17 pounds in weight over a few weeks. Morning stiffness persisted for up to 6 hours. In September 1962, she developed very painful tender areas of the scalp behind the ears and over the vertex. These pains were present continuously for several months and then cleared spontaneously. Following this episode, she slowly began to improve. She was admitted to the Devonshire Royal Hospital in March 1964 for 4 weeks.

Examination

She was a very anxious woman. There were soft murmurs over the left subclavian and left femoral arteries. The left temporal and occipital arteries were tender, but not thickened. Both sterno-clavicular, acromio-clavicular and temperomandibular joints were tender. There were multiple tender interspinous ligaments. Both knees had moderate effusions.

Investigations

E.S.R. 14 mm. in one hour
S.C.A.T. negative

Radiological examination revealed generalised osteoporosis of the spine.

Course

She slowly improved and, when reviewed in July 1964, was in remission.

Diagnosis

Polymyalgia rheumatica and possible arteritis.

CASE 63

Mrs. M.P., aged 45, suddenly developed right shoulder girdle pain in October 1963. This gradually became worse and was associated with slight limitation of shoulder movement. Two months later, she developed transient pain in the fingers, which cleared in 2 weeks. In January 1964, she developed slight left shoulder girdle pain. Morning stiffness persisted for half an hour. Her general health remained good. She was first seen in March 1964.

Examination

Both sterno-clavicular joints were tender. There were signs of right supraspinatus tendinitis. Shoulder range was full.

Investigations

E.S.R. 30 mm. in one hour
S.C.A.T. negative

Course

She slowly improved and, when reviewed in June 1964, was almost asymptomatic.

Diagnosis

Polymyalgia rheumatica.

CASE 64

Mrs. S.C., aged 59, had had psoriasis for 30 years, but this had been in remission for 3 years. In March 1963, she began to feel excessively tired. In April, she suddenly developed bilateral hip girdle pain, followed one month later by bilateral shoulder girdle pain and limitation of movement. Morning stiffness persisted for 3 hours. She lost more than 14 pounds in weight over the first few months. In March 1964, she was admitted to the Devonshire Royal Hospital for 6 weeks.

Examination

Her whole spine was moderately limited in range. Both sterno-clavicular joints were tender and the right was thickened. There was also tenderness over the acromio-clavicular and shoulder joints. Both shoulders were limited with range of abduction to 110° on the right and 150° on the left. Both knees had effusions and the hips were tender at the extremes of movement, with multiple focal tender areas around the pelvic bony points.

Investigations

E.S.R. 92 mm. in one hour
Haemoglobin 76%
S.C.A.T. negative
Serum albumin 4.1 gm.%
Serum globulin 3.7 gm.%

The radiological changes were those of severe polyarticular osteoarthrosis.

Course

Following injections of hydrocortisone into several tender focal areas, her symptoms were much improved. When discharged, her E.S.R. was still 60 mm. in one hour.

She was reviewed in August 1964, when her general health was much improved, although she still had joint symptoms. On examination, the sterno-clavicular joints and acromio-clavicular joints were still tender and range of shoulder abduction was to 115° on the right and 180° on the left. The right wrist joint was slightly limited, tender and thickened, and there was a minimal effusion of the left knee. The E.S.R. was 32 mm. in one hour, haemoglobin 82% and S.C.A.T. negative.

Diagnosis

Polymyalgia rheumatica and psoriasis.

CASE 65

Mrs. E.B., aged 69, had had symptoms due to osteoarthrosis of her knees for many years. In December 1963, her general health began to deteriorate. Two weeks later, she suddenly developed lumbar backache, increased pain in both knees and, a week later, pain in both shoulder girdles, which became progressively more limited in movement. Morning stiffness persisted for 4 hours. In March 1964, she developed pain in both wrists and the metacarpo-phalangeal joints of both hands. During the first 5 months, she lost 16 pounds in weight. She was admitted to the Devonshire Royal Hospital in April 1964 for 7 weeks.

Examination

Her blood pressure was 200/110. There was a moderately loud aortic systolic murmur. There was slight tenderness in the region of the posterior branch of the right superficial temporal artery. In the locomotor system, she had evidence of generalised osteoarthrosis. The right second and third metacarpo-phalangeal joints and both wrists were slightly thickened, tender and limited. Both sterno-clavicular joints were tender with minimal thickening on the left. Both shoulders were limited with range of abduction to 105° on the right and 120° on the left. Both knees had minimal effusions.

Investigations

E.S.R. 43 mm. in one hour
S.C.A.T. positive 1/64

On radiological examination, there were no changes, apart from evidence of degenerative joint disease.

A biopsy of the right temporal artery showed no evidence of arteritis.

Course

Following admission, she rapidly improved and, within a week, the pain and swelling of the wrists and metacarpo-phalangeal joints had cleared completely. On discharge, she was much improved and shoulder range was almost full, but her E.S.R. was still 40 mm. in one hour. Unfortunately, she was not able to attend for review, but wrote in October 1964 saying that she was getting on well.

Comment

This patient had the clinical features of polymyalgia rheumatica, but also had transient synovial thickening of the wrists and some metacarpo-phalangeal joints. She also had a positive S.C.A.T. It is impossible, at this stage, to classify her definitely as having either polymyalgia rheumatica or rheumatoid arthritis, although her clinical picture was more suggestive of polymyalgia rheumatica.

Diagnosis

Polymyalgia rheumatica.

CASE 66

Mrs. M.B., aged 62, was found to be suffering from Addison's disease in 1953. She had been maintained satisfactorily on cortisone, 50 mg. daily, and additional salt. In January 1963, she noted malaise, excessive tiredness, depression and increased sweating. Two months later, she developed lumbar and hip girdle pain, followed, a week later, by pain in the neck, shoulders and knees, which was associated with severe morning stiffness lasting for half an hour. She was admitted to her local hospital and, following an increase of the cortisone to 75 mg. daily and the addition of Fludrocortisone, 0.1 mg. daily, she was somewhat improved. She remained unchanged for 6 months and then had an exacerbation of symptoms with pain also in the right wrist. She was admitted to the Devonshire Royal Hospital in April 1964 for 14 weeks under the care of Dr. J. Sharp.

Examination

Both sterno-clavicular and acromio-clavicular joints were tender and thickened. There was an effusion of the right shoulder joint with bilateral shoulder girdle limitation, total abduction being 105° on the right and 100° on the left. There was tenderness over the right third, fourth and fifth costochondral junctions. There

were tender focal areas at the insertion of tendons around the right wrist joint. There were synovial effusions in both knees and multiple tender focal areas around the pelvis.

Investigations

E.S.R. 112 mm. in one hour
Haemoglobin 56%
S.C.A.T. negative
Serum albumin 3 gm.% and serum globulin 3 gm.% with a slightly increased alpha 2 fraction on electrophoresis.

On radiological examination, there was marked erosion of the right and minimal erosion of the left acromio-clavicular joints, these changes having appeared since previous films in March 1963. There was partial fusion of the right sacro-iliac joint, which appeared to be of long duration and it was considered that it might possibly be attributed to earlier tuberculosis of the joint, rather than a spondylitic process.

Course

It was found necessary to add Prednisolone, 11 mg. daily, to her therapy and, with this, she made satisfactory progress. At the time of discharge, she was much improved and virtually free of pain.

She was reviewed in November 1964, when her joint symptoms and general health were much improved. Her E.S.R. was 40 mm. in one hour, haemoglobin 90% and S.C.A.T. negative.

Diagnosis

Polymyalgia rheumatica and Addison's disease.

CASE 67

Mrs. A.H., aged 70, suddenly developed pain in the neck and shoulder girdles in June 1961. A few weeks later, she developed bilateral hip girdle pain, pain in the lower dorsal region and both knees. Morning stiffness lasted for about 1 hour and was so severe that she had difficulty in getting out of bed in the mornings.

In June 1962, she attended the University of Manchester, Rheumatism Research Centre, when she was found to have tenderness of both acromio-clavicular and sterno-clavicular joints and synovial thickening of the right elbow and both knees. The E.S.R. was 51 mm. in one hour and haemoglobin 76%.

In July 1962, she developed severe throbbing headache and tenderness in both temporal and occipital regions and also over the mandible. These pains were present throughout the day, aggravated by lying down and improved by sitting up. The tenderness in the occipital region was so severe that she was unable to lie on her back. Analgesics did not affect the pains. One week after the onset of the headaches, she suddenly developed diplopia which cleared in 3 weeks. At the same time, she had occasional photopsiae. The headache and tenderness improved after 4 months.

She was admitted to the Manchester Royal Infirmary in December 1962 under the care of Professor J.H. Kellgren. Until then, she had lost 21 pounds in weight. On examination, both shoulders were very limited with total abduction to 40° on the right and 90° on the left. The proximal interphalangeal joints were slightly thickened and there were multiple tender focal areas over the interspinous ligaments. Her E.S.R. was 70 mm. in one hour, haemoglobin 78%, serum albumin 3.6 gm.% and serum globulin 3.9 gm.% with increased alpha 2 and gamma globulin fractions. While in hospital, her sedimentation rate rose to 108 mm. in one hour and then began to fall and, on discharge, was 54 mm. in one hour. She continued to improve slowly but, in March 1964, had an exacerbation of locomotor pain and, at the same time, began to have transient episodes of left homonomous hemianopia lasting up to 15 minutes. These only came on while she was erect and cleared more rapidly on lying down.

She was seen personally in April 1964 and admitted to the Devonshire Royal Hospital for further investigations.

Examination

She had complete alopecia. There was considerable reduction in pulsation of all the cranial arteries, but no tenderness or thickening. These arteries did not appear to be situated in the usual sites. She was tender in the region of the lower abdominal aorta. In the locomotor system, she had evidence of generalised osteoarthrosis but no evidence of inflammatory activity.

Investigations

E.S.R. 41 mm. in one hour
Haemoglobin 92%
S.C.A.T. negative

A biopsy of the left temporal region was performed and 3 strands of tissue removed. One of these was an artery with the lumen reduced in size and the wall largely replaced by fibrous tissue, and another was considered to be an artery, which was completely occluded and largely replaced by fibrous tissue. These were considered to represent the healed "burnt out" sequelae of an old arteritis.

Course

Following treatment with Prednisolone, 8 mg. daily, her visual symptoms cleared and her E.S.R. fell to 13 mm. in one hour.

Diagnosis

Polymyalgia rheumatica and definite arteritis.

CASE 68

Mrs. S.D., aged 63, developed pain and swelling of the hands, wrists, knees and ankles, and pain in the shoulders and neck, associated with morning stiffness, poor general health and depression, in May 1962.

She was seen by Dr. J. Sharp in September 1962 when the only abnormal physical signs were the presence of tenderness around the wrists and the acromio-clavicular joints. The E.S.R. was 42 mm. in one hour and S.C.A.T. negative. She slowly improved and, in June 1963, her E.S.R. was 16 mm. in one hour.

In September 1963, she awoke with severe pain in the neck and both shoulders, followed, within a few days, by hip girdle pain and increased pain in the knees. In October 1963, she developed generalised headache and, in March 1964, severe bitemporal pain and tenderness and pain over the lower jaws. At the same time, she developed photophobia. Her general health rapidly deteriorated and she lost 40 pounds in weight over 2 months. She became very depressed, her skeletal pains increased in intensity and morning stiffness persisted for 5 hours. She was admitted to the Devonshire Royal Hospital in April 1964 for 3 months.

Examination

She was an ill-looking woman. The blood pressure was 150/70 in both arms. There was a systolic murmur over the left subclavian artery and the pulsation in the right carotid artery appeared to be reduced. She was tender over the abdominal aorta and over both femoral arteries. The temporal and facial arteries were thickened and tender with reduced pulsation and the occipital arteries were tender. Her whole spine was limited with multiple tender interspinous ligaments. The sterno-clavicular and acromio-clavicular joints were tender and total range of shoulder abduction was reduced to 125° on the right and 160° on the left side. There was focal tenderness at the insertion of the left extensor carpi ulnaris tendon at the wrist. There were minimal effusions in both knees and multiple tender focal areas around the shoulders, knees and pelvis.

Investigations

E.S.R. 115 mm. in one hour
Haemoglobin 63%
Serum albumin 3.3 gm.% and
Serum globulin 4.3 gm.% with an increase of alpha 2 and gamma globulin fractions
S.C.A.T. negative

A biopsy of the right temporal artery showed histological changes of active giant-cell arteritis.

Course

Following treatment with Prednisolone, 20 mg. daily, she improved. When reviewed 2 months later in October 1964, all inflammatory manifestations in the joints and arteries were suppressed.

Diagnosis

Polymyalgia rheumatica and giant-cell arteritis.

CASE 69

Mr. P.W., aged 76, had always enjoyed good health and had worked as an accountant and played chess for his county until a few months before the onset of his illness. In March 1963, he noticed that his temporal arteries had become very prominent and slightly tender. A month later, he developed bilateral shoulder and hip girdle pain, which gradually increased in intensity and, within a short period, his memory and intellect began to deteriorate. In September 1963, he developed pain in the lumbar region and both knees and, at the same time, he began to feel excessively tired and lacking in energy. He was admitted to the Devonshire Royal Hospital, under the care of Dr. J. Sharp, in April 1964 for 4 weeks.

Examination

He was an ill-looking man with evidence of marked intellectual impairment. The blood pressure was 130/70 in both arms. His radial arteries were tortuous with palpable vessel walls. Both facial and temporal arteries were very thickened with absent pulsation. Both shoulders had an almost full range of movement with painful arcs on abduction. The left acromio-clavicular joint was tender and the left sterno-clavicular joint slightly unstable. There were multiple focal tender areas around the knees and pelvis.

Investigations

E.S.R. 85 mm. in one hour
Haemoglobin 74%
S.C.A.T. negative
Serum albumin 3.7 gm.% and
Serum globulin 3.4 gm.% with an increase of alpha 2 globulin fraction.

A biopsy of the left temporal artery showed histological changes of active giant-cell arteritis, with complete occlusion of the lumen of the artery by intimal proliferation.

Course

Following treatment with Prednisolone, 20 mg. daily, his general health and locomotor symptoms improved within a few days and his E.S.R. dropped to 20 mm. in one hour within a week. The thickening of the temporal arteries slowly subsided, but pulsation did not return. The Prednisolone was reduced to 15 mg. daily after 3 weeks and, in November, to 10 mg. daily and, on this dose, he remained well and his E.S.R. remained around 10 mm. in one hour. At the most recent review in January 1965, he was well, but there had been no improvement in his intellectual state. His temporal arteries were felt as thin non-pulsating cords. A repeat biopsy of the right temporal artery in January 1965 showed histological changes of active, low-grade giant-cell arteritis.

Diagnosis

Polymyalgia rheumatica and giant-cell arteritis.

CASE 70

Miss M.B., aged 70, had been treated for hypertension for several years. In March 1964, she suddenly developed bilateral hip girdle pain followed, a week later, by pain in the neck and bilateral shoulder girdle pain and limitation of movement. There was associated morning stiffness lasting for 4 hours. Her general health deteriorated slightly and she lost 4 pounds in weight. She was admitted to the Devonshire Royal Hospital in April 1964.

Examination

Her blood pressure was 200/90 in both arms and there were multiple premature beats. There was a soft murmur over the right subclavian artery. Both acromio-clavicular and shoulder joints were tender and limited, with total abduction to 120° on the right and 90° on the left. There were effusions in the right shoulder and right knee joints. Both hip joints were slightly limited in range and there were multiple focal tender areas around the pelvic bony points. There was also tenderness over the C7-T1 interspinous ligament.

Investigations

E.S.R. 65 mm. in one hour
S.C.A.T. positive 1/32

On radiological examination, there were no changes apart from evidence of degenerative joint disease.

Course

Following injections of hydrocortisone into the left shoulder and subdeltoid bursa, her left shoulder pain and limitation of movement were improved. While in hospital, she developed transient synovial thickening of the left wrist and left second and third metacarpo-phalangeal joints. This subsided within a few weeks and did not recur. At the most recent review in October 1964, her symptoms were virtually in remission and her E.S.R. was 10 mm. in one hour.

Comment

The clinical features in this patient were similar to those of the other patients in the series, in spite of the positive S.C.A.T.

Diagnosis

Polymyalgia rheumatica.

CASE 71

Mrs. F.S., aged 54, developed bilateral shoulder girdle pain and limitation of movement of the shoulders in April 1960, a few weeks after the sudden death of her husband. This was followed by pain in both knees and the left ankle. Morning stiffness persisted for 4 hours. There was marked deterioration of her general health and she lost 42 pounds in weight over several months.

She attended the University of Manchester, Rheumatism Research Centre in October 1961. On examination, both sterno-clavicular and shoulder joints were tender with synovial thickening of the left sterno-clavicular joint. The range of shoulder movement was limited with total abduction to 120° on the right and 90° on the left. The left elbow was tender and limited and there were effusions in both knees. The cervical spine was limited and painful on movement. Her E.S.R. was 125 mm. in one hour, haemoglobin 62% and S.C.A.T. negative.

When seen again in April 1962, she was slightly improved, but her E.S.R. was still 124 mm. in one hour, haemoglobin 70%, serum albumin 3.8 gm.% and serum globulin 5.4 gm.%. She improved very slowly until January 1964, since when her progress has been more rapid. In April 1964, she had an episode of diplopia, which persisted for 2 weeks.

She was reviewed personally in May 1964, when her general health was much improved and her joint symptoms moderately improved.

Examination

Her blood pressure was 180/100 in both arms. The pulsation in the anterior branch of the right superficial temporal artery was reduced and there was possible thickening in the region of the artery. Both sterno-clavicular joints were tender and shoulder range of movement was slightly limited on both sides. There was a small effusion in the right knee.

Investigations

E.S.R. 102 mm. in one hour
Haemoglobin 83%
W.B.C. 7,700
S.C.A.T. negative

Diagnosis

Polymyalgia rheumatica and possible arteritis.

CASE 72

Mr. J.K., aged 64, suddenly developed pain over the left trochanter in December 1963 following a period of mental and physical stress. A few weeks later, he developed lower cervical and bilateral shoulder girdle pain and limitation of movement. Associated morning stiffness lasted for half an hour. In January, he also developed continuous bitemporal pains and became excessively tired, lacking in energy and depressed. He lost 16 pounds in weight during the next 6 months and, in May, developed intermittent claudication of the calves. He was admitted to the Manchester Royal Infirmary in June 1964 under the care of Professor J.H. Kellgren, where he was seen personally.

Examination

The blood pressure was 130/65 in both arms. Both temporal arteries were moderately thickened and tender with reduced pulsation. Both facial arteries were thickened and tender with absent pulsation. The

dorsalis pedis pulsation could not be felt. Both shoulders were limited with total range of abduction to 110° on the right and 105° on the left. His cervical spine was slightly limited in movement and there were tender focal areas over the C7 to T2 inter-spinous ligaments.

Investigations

E.S.R. 72 mm. in one hour
Haemoglobin 82%
W.B.C. 12,500
S.C.A.T. negative
Serum albumin 3.6 gm.% and
Serum globulin 3.3 gm.% with an increased alpha 2 globulin fraction.

A biopsy of the left temporal artery showed changes of active giant-cell arteritis with complete occlusion of the lumen by intimal proliferation.

Course

Following treatment with Prednisolone, 20 mg. daily, his locomotor symptoms were suppressed within a day, but the thickening of the temporal arteries remained unchanged for several days. The Prednisolone was increased to 80 mg. daily and, following this, the thickening and tenderness of his temporal arteries rapidly subsided.

Diagnosis

Polymyalgia rheumatica and giant-cell arteritis.

CASE 73

Mrs. M.A., aged 65, had been well until August 1963, when she developed pain behind the knees and lumbar backache. At the same time, she began to feel unwell and excessively tired. In October, she developed pain, swelling and limitation of movement of both temperomandibular joints. Four days later, she developed very severe bitemporal headaches with marked local tenderness. These headaches usually came on in the afternoon, persisted through the night and were improved in the morning. During this time, she had a persistent pyrexia from 100° to 102°F., felt ill and lost 18 pounds in weight in 3 months. In December, when her headaches began to improve, she developed bilateral shoulder girdle pain and limitation of movement, with morning stiffness lasting 2 hours. In March 1964, she slowly began to improve but, in June, developed bilateral hip girdle pain.

She attended the University of Manchester, Rheumatism Research Centre in June 1963. On examination, her temporal arteries had reduced pulsation. The left acromio-clavicular joint was thickened and tender, and the left sterno-clavicular joint and cervical spine were tender. Both shoulders were limited with abduction to 120° on each side. The E.S.R. was 63 mm., haemoglobin 82%, W.B.C. 5,200 and S.C.A.T. negative.

She was seen personally in August 1964, when she still had shoulder girdle pain and morning stiffness lasting half an hour.

Examination

There were no systemic abnormalities. Both facial arteries were tender and both temporal arteries tender, and possibly thickened. The left acromio-clavicular and shoulder joints were tender and slightly limited. There were multiple tender focal areas around the pelvis and the cervical spine was moderately limited on movement. The E.S.R. was 49 mm. in one hour.

Course

She was admitted to the Devonshire Royal Hospital in September 1964 for a temporal artery biopsy, when her general health was already much improved.

On examination, there was minimal tenderness of the right temporal artery but no thickening. Her E.S.R. was then 15 mm. in one hour, haemoglobin 90%, W.B.C. 4,500 and S.C.A.T. negative. Serum albumin was 4.9 gm.% and serum globulin 3.3 gm.% with normal electrophoresis. A biopsy of the anterior branch of the right temporal artery was performed, but this showed no evidence of arteritis. Subsequently, more sections were cut from the same biopsy and these showed a small area of lymphocytic and plasma cell infiltration in the adventitia, which may represent a very mild arteritic lesion.

Comment

In this study, Mrs. M.A. was classified in the group with possible arteritis, but it is now considered that her clinical picture was sufficiently characteristic of arteritis for her to have been classified in the definite arteritis group.

Diagnosis

Polymyalgia rheumatica and possible arteritis.

CASE 74

Mrs. V.E., aged 53, had been well until January 1964, when she developed mild bilateral hip girdle pain. In March she developed cervical pain followed by pain in both shoulders and knees and, in June, she developed lumbar backache. These symptoms were associated with morning stiffness lasting 4 hours, which was so severe that she had difficulty in getting out of bed in the morning. Her general health deteriorated and she began to feel excessively tired. During 6 months, she lost 22 pounds in weight. She had had psoriasis until 15 years previously.

She was seen at the University of Manchester, Rheumatism Research Centre in June 1964 and admitted to the Devonshire Royal Hospital for 6 weeks in July.

Examination

The blood pressure was 150/80 and soft murmurs were audible over the right subclavian, axillary, carotid and the left femoral arteries. Both dorsalis pedis and posterior tibial pulses could not be felt. Oscillometric deflections were reduced in the calves, the values being 3/100 in the right and 1.5/70 in the left calf. In the arms, the values were 8/140 in each arm. In the locomotor system, she had evidence of mild generalised osteoarthrosis. The lumbar spine was moderately limited and painful on movement. The left acromio-clavicular and right shoulder joints were tender with multiple focal tender areas around the shoulders. Shoulder abduction was to 90° on the right and 180° on the left. There were multiple focal tender areas around the pelvis and knees.

Investigations

E.S.R. 110 mm. in one hour
Haemoglobin 87%
S.C.A.T. negative
Serum albumin 4.1 gm.%
Serum globulin 3.9 gm.% with increased alpha 2 globulin fraction on electrophoresis.

Course

In hospital, her locomotor symptoms and general health rapidly improved but, when discharged, her E.S.R. was still 70 mm. in one hour.

Comment

Mrs. V.E. has signs of vascular disease, the nature of which is not clear. She has been classified in the group without arteritis, but it will not be surprising if she does develop features more suggestive of arteritis.

Diagnosis

Polymyalgia rheumatica.

CASE 75

Mr. A.G., aged 53, suddenly developed bilateral hip girdle and right knee pain in January 1964. Two months later, he gradually developed bilateral shoulder girdle pain and pain in the neck followed, a month later, by lumbar backache and, in April, by pain in both wrists. He was stiff in the morning for up to 6 hours. His general health deteriorated with depression, malaise and loss of 14 pounds in weight in 6 months. He was admitted to the Devonshire Royal Hospital under the care of Dr. J. Sharp in July 1964 for 7 weeks.

Examination

His blood pressure was 160/100 in both arms. There were no systemic abnormalities. His whole spine was moderately limited and painful on movement with multiple focal tender areas in the cervical, dorsal and lumbar regions. There were multiple focal tender areas at the insertions of tendons around the wrists, shoulders, pelvis and knees. Both acromio-clavicular joints were tender and there was a minimal effusion in the right knee.

Investigations

E.S.R. 33 mm. in one hour
Haemoglobin 90%
S.C.A.T. negative
Serum albumin 4.1 gm.%
Serum globulin 3.3 gm.% with normal electrophoresis.

Course

Following injections of hydrocortisone into multiple focal tender areas, he was much improved. After his discharge from hospital, he developed herpes zoster of the dorsal region. This was associated with an exacerbation of his locomotor symptoms and the onset of frontal headaches. When seen in November 1964, he had slight tenderness over both temporal and the right occipital arteries. His E.S.R. was then 15 mm. in one hour. He was readmitted to hospital and a right temporal artery biopsy performed, but this showed no histological evidence of arteritis.

Diagnosis

Polymyalgia rheumatica.

CASE 76

Mrs. M.F., aged 68, had been well until February 1964, when she awoke during the night with severe pain in the neck radiating to the occipital region and vertex, pain in the shoulder and hip girdles, lumbar region and knees. Associated morning stiffness lasted almost all day at the onset. She felt very ill and depressed from the onset and rapidly deteriorated during the first 6 weeks, which she spent in bed at home. During this time, she lost 18 pounds in weight. She was admitted to hospital at the end of March and had numerous investigations for suspected carcinomatosis, which were all negative. A subtotal thyroidectomy was performed for an adenoma of the thyroid, but this resulted in no improvement.

She was admitted to the Devonshire Royal Hospital in August 1964 for 7 weeks, when she was unchanged. In May, she had developed a throbbing sensation in the left side of the head and in the ear synchonous with her pulse. At about the same time, she had developed impaired vision of the left eye.

Examination

Her blood pressure was 140/80 in the right and 120/80 in the left arm. Oscillometric deflections were 6/90 in the right and 3/80 in the left calf. The left axillary pulse was reduced and had a palpable thrill, and the left temporal artery had possible reduced pulsation. Both dorsalis pedis and posterior tibial arteries were not palpable. There was a moderately loud murmur over the right axillary and a loud high-pitched murmur over the left axillary artery. There were also murmurs over the left carotid, the abdominal aorta and both femoral arteries. Both sterno-clavicular and acromio-clavicular joints were tender and shoulder abduction was limited to 130° on the right and 90° on the left side. There were multiple focal tender areas around the knees and pelvis.

Investigations

E.S.R. 79 mm. in one hour
Haemoglobin 69%
S.C.A.T. negative
Serum albumin 4.1 gm.%
Serum globulin 3.3 gm.%
Alpha 2 globulin fraction increased.

She was seen by an ophthalmologist, who found that one of the superior branches of the retinal artery was occluded.

A biopsy of the left temporal artery was performed, but no artery was found in the tissues removed.

Course

Following treatment with Prednisolone, 10 mg. daily, there was a remarkable improvement in her general health and her locomotor symptoms subsided. She remained well and her E.S.R. remained normal. The vascular murmurs remained unchanged and her vision improved subjectively. In January 1965, she again developed impaired vision of the left eye. On examination in February 1965, there was thickening and tenderness in the region of the right temporal artery. A murmur was audible over the right internal carotid artery, which had not previously been recorded and she had developed a superior temporal field defect of the left eye. Her E.S.R. was 8 mm. in one hour.

Comment

Although a positive temporal artery biopsy was not obtained, her clinical features were characteristic of giant-cell arteritis.

Diagnosis

Polymyalgia rheumatica and definite arteritis.

CASE 77

Mr. R.I., aged 75, had had symptoms due to degenerative joint disease for 30 years. Unfortunately, it was impossible to obtain a reliable history due to his poor memory. During 1961, he developed pain and limitation of the shoulders and also pain in the neck, hands and hip girdles associated with morning stiffness lasting more than 3 hours. His general health deteriorated and he lost more than 20 pounds in weight. In March 1964, he developed severe bitemporal pain and tenderness, which persisted for several months. During this time, his memory and hearing deteriorated. He was seen in August 1964.

Examination

His blood pressure was 250/100 in both arms. His radial arteries were tortuous and the vessel walls were palpable. Both temporal arteries had localised thickened and tender areas. Both sterno-clavicular joints were tender and the right was unstable. Both shoulders were tender and limited with total abduction to 110° on each side.

Investigations

E.S.R. 53 mm. in one hour
Haemoglobin 68%
S.C.A.T. negative

Prednisolone therapy was advised, but he refused to have any treatment.

Diagnosis

Polymyalgia rheumatica and possible arteritis.

CASE 78

Mrs. G.P., aged 69, had been well until January 1957, when she developed lumbar and hip girdle pain associated with morning stiffness lasting an hour. In March, she developed a persistent generalised headache. She attended the Devonshire Royal Hospital in May 1957, when her E.S.R. was 40 mm. in one hour. In August, her headaches became more severe and were accompanied by nausea and vomiting. Soon after, she developed a continuous noise "like an engine" in the head. In September 1957, she suddenly developed impaired vision of the left eye, due to occlusion of the retinal artery. Her vision returned within a few hours and was apparently normal within a few weeks. In November, she suddenly developed ptosis of the left eyelid and diplopia. She was referred to the Manchester Royal Infirmary in January 1958. A murmur was audible over both eyeballs. An intracranial aneurysm was suspected and a carotid angiogram performed. This showed the left internal carotid artery to be very tortuous and irregular in calibre in its upper part.

Within a few months, her headaches and visual defects had cleared completely, but her locomotor symptoms improved very slowly. Over the years, her E.S.R. remained persistently elevated between 40 mm. and 50 mm. in one hour. In September 1963, she began to suffer from loss of balance and to fall backwards at times. (This history was obtained from the hospital records.)

She was first seen personally in August 1964, when her general health was good, but her memory poor. She still had occasional pain in the left knee and lumbar backache.

Examination

Her blood pressure was 150/90 in the right and 110/60 in the left arm. The left carotid artery pulsation was reduced. There were murmurs over the left axillary and both femoral arteries. The left dorsalis pedis and both posterior tibial arteries were not palpable.

Apart from an effusion in the left knee and evidence of generalised osteoarthrosis, there were no abnormalities in the locomotor system.

Investigations

E.S.R. 50 mm. in one hour
Haemoglobin 91%
S.C.A.T. negative

A biopsy of the right temporal artery was performed, which showed changes which were presumed to be due to a healed arteritis. (Fig. 45)

Diagnosis

Polymyalgia rheumatica and definite arteritis.

CASE 79

Mrs. G.A., aged 66, was well until August 1963, when she gradually developed lower cervical, shoulder girdle and lumbar pain, followed within a few weeks by hip girdle pain. She gradually deteriorated for 2 months and her shoulders became so limited that she was unable to abduct them more than a few degrees. Morning stiffness persisted for up to 6 hours. Her general health began to deteriorate from the onset and she lost 28 pounds in weight. In September 1963, she developed very severe headache and felt tender swellings in the temporal and occipital regions, which persisted for 3 months before they began to improve.

She was admitted to the Harrogate Royal Bath Hospital in October 1963 for 4 months. Her E.S.R. was found to be 88 mm. in one hour and haemoglobin 77%. In December 1963, she began to have transient blurring of vision of the right eye lasting a few minutes and her E.S.R. rose to 103 mm. in one hour. In January 1964, she had an episode of complete loss of vision in the right eye, which

persisted for 1 hour. This came on while doing exercises in a warm pool. In February, treatment with Prednisolone, 12 mg. daily, was commenced following which she slowly improved.

She was referred to the Manchester Rheumatism Research Centre in July 1964 and seen personally in August 1964. Her main complaint was of extreme exhaustion.

Examination

Her blood pressure was 160/80 in both arms. The left temporal and occipital arteries were slightly thickened, tender and not pulsating. The right temporal artery was tender. The right carotid artery was dilated and tortuous. The right dorsalis pedis and the left posterior tibial arteries were not palpable. A soft murmur was audible over the right axillary artery. In the locomotor system, the lumbar spine was limited with tenderness over the L2-L4 interspinous ligaments. The left acromio-clavicular joint was tender and there were tender focal areas around the pelvis.

Investigations

E.S.R. 61 mm. in one hour
Haemoglobin 86%
S.C.A.T. negative.

A biopsy of the right temporal artery was performed, which showed evidence of almost quiescent arteritis.

Course

Following increase of the Prednisolone to 20 mg. daily, her general health rapidly improved and, in October 1964, her E.S.R. was 5 mm. in one hour.

Diagnosis

Polymyalgia rheumatica and definite arteritis.

CASE 80

Mr. J.G., aged 68, was referred to the Devonshire Royal Hospital with suspected degenerative disc disease of the cervical spine in September 1964. In the middle of July 1964, while fixing an electric wire under a shelf, he twisted his neck and felt a sudden severe pain with limitation of the lower cervical region. This pain rapidly got worse over the next few days and was aggravated by neck movements. There was associated morning stiffness and exacerbation lasting about 2 hours. A few days later, the pain radiated to the occipital and both fronto-temporal regions. This headache was throbbing in character. When seen in the Out Patient Department 2 months later, he had painful limitation of the neck and slight tenderness in the region of the temporal arteries. In view of the morning stiffness, he was thought to have polymyalgia rheumatica with possible temporal arteritis.

He was admitted to hospital 2 weeks later.

Examination

He had thickening and tenderness of both temporal and occipital arteries. He also had diplopia and an inferior field defect of the right eye. The cervical spine was limited and painful on movement with tenderness over the C4-C5 interspinous ligament. There was slight tenderness over both temporomandibular and the right acromio-clavicular joints, but no other focal tender lesions.

Investigations

The E.S.R. was 25 mm. in one hour and the electrophoresis showed a slight increase in alpha 2 globulin when seen in the Out Patient Department. On admission, the E.S.R. was 10 mm. in one hour and remained persistently normal. A biopsy of the temporal artery showed evidence of active giant-cell arteritis.

Course

He was treated with Prednisolone, 60 mg. daily. The thickening and tenderness of the temporal arteries rapidly subsided and the visual field of the right eye improved, but did not return to normal.

Comment

This patient presented with several unusual features. The history at onset of cervical pain and limitation was typical of that usually found in cervical degenerative disc disease. However, the presence of morning stiffness led to the suspicion that there might be an inflammatory component. Furthermore, on admission, the sedimentation rate was normal in spite of the presence of a very active arteritis.

Diagnosis

Polymyalgia rheumatica and giant-cell arteritis.

CASE 81

Miss G.W., aged 81, had always enjoyed excellent health until the death of her sister. Following this, in September 1962, both knees became painful and swollen. At the same time, she began to feel ill, tired and lacking in energy. Some months later, she developed lumbar backache and then remained unchanged. In January 1964, she developed bilateral shoulder girdle pain and limitation with morning stiffness lasting 1 hour. In August 1964, she developed increased shoulder girdle pain and pain in the neck, and noticed swelling over the sterno-clavicular joints. She also had slight pain over the temporomandibular joints, which was only present for a few minutes in the mornings. She had never had severe headache or tenderness.

She was admitted to the Devonshire Royal Hospital in September 1964.

Examination

An area ½" long of the anterior branch of the left superficial temporal artery was slightly thickened and tender. There was marked synovial thickening and instability of both sterno-clavicular joints and slight limitation of shoulder girdle range. There was an effusion of the left knee.

Investigations

E.S.R. 20 mm. in one hour
Haemoglobin 98%
W.B.C. 8,800
S.C.A.T. negative
Blood urea 52 mg./100 ml.
Serum albumin 4.5 gm.%
Serum globulin 3.0 gm.% with normal electrophoresis.

A biopsy of the sterno-clavicular joint showed histological changes of active synovitis.

A biopsy of the left superficial temporal artery at the site of thickening showed histological changes of active giant-cell arteritis.

Course

Following treatment with Prednisolone, 10 mg. daily, she rapidly improved.

Diagnosis

Polymyalgia rheumatica and giant-cell arteritis.