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DECLARATION

I Chang-han Liu declare that the work on which this dissertation is based on my original work except where it is indicated otherwise and that this dissertation is not being submitted for another degree in any other university. I empower the University of Cape Town to reproduce the work done in this dissertation for research purposes.

Signature: Signed by candidate

Date: 25 April 2005

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ABSTRACT

BACKGROUND

Cancer of the oesophagus, one of the most common cancers amongst the black population in South Africa with "cure" in this condition often considered as a "fortunate accident" by many experts in the field of oncology due to its late presentation and common occurrence of metastasis at presentation. The palliative care team focused their attention on measures to solve the cardinal symptom of this disease, which in most cases was dysphagia. This was also the main determinant of quality of life for these patients. Therefore, the primary objective of the study was to determine the effectiveness of the palliative measures in improving the cardinal symptom of oesophageal carcinoma – dysphagia.

Accurate staging in most, if not all of the cancers is paramount, as it determines which options and sequences of treatment are appropriate. Oesophageal carcinoma is no exception. For patients staged I/II, surgical resection of the tumour was attempted if possible. For advanced stage oesophageal carcinoma, that is stage III/IV, surgical resection with curative intent was not performed. The cardinal symptom of oesophageal carcinoma was then treated mainly with palliative radiotherapy, dilatation of the oesophagus with flexible bougie and oesophageal intubations.

AIMS AND OBJECTIVES

AIM :

The aim of the study was to establish the effectiveness of three palliative measures in patients with advanced thoracic oesophageal carcinoma in the Oncology Department at the University of Cape Town.

OBJECTIVES:

1. To determine the incidence of improved ability to swallow after the Proctor-Livingstone intubation and bougienage were performed.
2. To determine the incidence of procedure related mortality, failed insertion, ruptured oesophagus and length of hospital stay for pulsion intubation with the Proctor-Livingstone tube.
3. To determine incidence of procedure related mortality, failed dilatation, ruptured oesophagus and length of hospital stay for dilatation of oesophagus with flexible

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bougie.

4. To determine the incidence of worsening of dysphagia during radiation therapy that was severe enough to warrant steroid therapy.

METHODS

A retrospective study was conducted at Groote Schuur Hospital. This comprised of all patients diagnosed with advanced cancer of the oesophagus from 01.01.2003 to 31.12.2003. Suitable folders were selected and three palliative measures – intubation, dilatation and radiotherapy were audited for rupture, procedure failure, failure to improve dysphagia, length of hospital stay and worsening of dysphasia as a result of radiotherapy.

RESULTS

In the study, when dilatation was compared to the Proctor-Livingstone intubation of the oesophagus, the following were found:

1. Rupture: 9% for dilatation, 0% for Proctor-Livingstone intubation.
2. Length of hospital stay: 6.4 dyas for dilatation, 7 days for Proctor-Livingstone intubation.
3. Failed procedure: 9% in dilatation and 22% for Proctor-Livingstone intubation.
4. Dysphagia improvement: 90% in dilatation and 77% for Proctor-Livingstone intubation.
5. Failure to improve dysphagia: 2% in dilatation and 22% for Proctor- Livingstone intubation

For radiotherapy, worsening of dysphagia as a result of radiotherapy was 8.6%.

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CONCLUSION

In the study, dilatation had fewer incidences of failure to improve dysphagia and failed procedure; this supported Groote Schuur Hospital's approach of dilatation before intubation. However, patients that received intubation were more advanced in their malignant condition which may have contributed to the higher incidence of failed procedure and failure to improve dysphagia. Therefore, further prospective studies where randomization of patients between dilatation and intubation and minimal patients lost to follow-up is recommended.

CHAPTER 1: INTRODUCTION

Oesophageal carcinoma, one of the most common cancers that occurred amongst the black populations in South Africa with "cure" in this condition being regarded as a "fortunate accident" by many experts in the field of oncology because of its late presentation and the common occurrence of metastasis. With "cure" for this malignancy being the exception rather than the rule, the palliative care team focused their attention on solving the cardinal symptom of oesophageal carcinoma which occurred commonly throughout the history of this condition – dysphagia, this being the main determinant of quality of life for these patients. Therefore, the primary objective of the study was to determine the effectiveness of the palliative measures commonly employed to alleviate dysphagia in the Radiation Oncology Department at Groote Schuur Hospital.

Only two government oncology unit served Cape Town and its vicinity. Groote Schuur Hospital drained two secondary hospitals, Somerset and Jooste Hospital; the drainage areas included Mitchelles Plain, Observatory, Rondebosch, Cape Town and its coastal areas as well as the entire West coast.

Patients that presented with oesophageal carcinoma usually complained of dysphagia, initially to solids but eventually, patients would not be able to even swallow liquids. This progressive dysphagia was a result of the cancerous mass which grew within the lumen of the oesophagus, or less commonly, due to malignant stricture which narrowed the lumen of the oesophagus. It was not uncommon to find patients progressing from mild obstruction of the oesophagus to a complete obstruction where saliva could not be swallowed.

The other important feature in the disease progression of oesophageal carcinoma was the formation of tracheo-oesophageal fistulae, which occured naturally as the result of malignant invasion of the trachea, or induced by radiation treatment, especially where the trachea and mediastinum were already invaded by the tumour which was common to grossly advanced disease, for example, stage IV carcinoma of oesophagus. In such cases, radiation exposure to the chest was best avoided to minimize the risk of tracheo-broncho-oesophageal fistula development.

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Palliative treatment may sound like measures reserved for terminally ill patients, however, the opposite is true – palliation should start at the time of diagnosis for every oncology patient. Oesophageal carcinoma could be broadly classified according to their site of occurrence, that is, cervical and thoracic oesophagus and the oesphageal-gastric junction. Carcinoma of the cervical oesophagus was a challenge to surgeons and oncologist alike. This was because in order to excise the tumour adequately, laryngectomy was often needed, especially for malignancies that had already invaded the surrounding structures of the cervical oesophagus, example, the trachea, intrinsic/extrinsic muscles of the larynx.

In the case of carcinoma of the cervical oesophagus, the best therapeutic approach was probably chemotherapy combined with radiation therapy. When the lesion is so high up, intubation of the oesophagus to alleviate dysphagia would be poorly tolerated, therefore, for the purpose of the study; cervical oesophageal carcinoma would not be included. Adeno-carcinoma of the oesophago-gastric junction, due to its close relation to the stomach, the treatment approach differed to that of the thoracic oesophagus; hence it is also excluded in the study.

Patients diagnosed with advanced carcinoma of the oesophagus may present in numerous ways. For example, pain, aspiration pneumonia, brain metastasis as well as psychosocial issues. However, the most common presenting complaint was dysphagia which was the focus of the study.

The study looked at the three main palliative measures used to relieve the cardinal symptom of carcinoma of thoracic oesophagus (used in Groote Schuur Hospital), namely: oesophageal dilatation, oesophageal intubation, and external beam radiation to the marked area of the oesophagus. As the tumour grows larger, it obstruct lumen of oesophagus causing dyphagia, which can be very distressing to patients suffering from cancer of the oesophagus. Dilatation forces the obstructed lumen open and provide rapid relief to dyphagia. Intubation relieves dysphagia in the similar way, except a tube is placed across the tumour which potentially provides a longer dysphagia free period. External beam radiation does not provide immediate relief for dyaphagia, instead it changes tumour physiology, slowing tumour growth which may alleviate chest pain related to tumour growth.

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Dilatation of the oesophagus (bougienage) and intubation of the oesophagus mentioned above were done endoscopically. Ruptured oesophagus was one complication that occured with both intubation and dilatation and was fatal if left untreated. This resulted in subsequent mediastinitis, pending the position of the tube the rupture may be sealed and bridged by the tube. If the rupture was not sealed and mediastinitis or empyema ensued, the outcome was often poor, especially in cases of advanced oesophageal carcinoma where the patient's general state of health was already poor. Provided there were no complications from these procedures, the post-operative recovery period was generally short. External beam radiation could be performed on an outpatient basis and the there was no need for patients to be admitted to hospitals.

Patients that faced an incurable condition encounter psychological, social and spiritual issues which were just as important as the physical treatments. Some examples of emotions experienced by the terminally ill patients were denial, anger, fear, guilt, sadness, and depression. These emotions were ongoing and progressive, even if the patients had accepted their condition. In addition to the emotional issues, they also faced various social and spiritual challenges. Therefore, ongoing psychological and spiritual counseling and support were necessary for patients as well as their carers.

Even in a resource scarce setting of Groote Schuur Hospital, professional psychological counseling were still provided in both wards and clinics, social workers were available to talk to the patients, they provided guidance and empathy, and organized solutions to patients social and spiritual problems. Patients were also referred to appropriate local facilities such as hospice for further support. Although the study looked mainly at the medical part of palliation treatment, the non-medical part of the palliative plan was just as important.

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CHAPTER 2: BACKGROUND

2.1 ANATOMY

The oesophagus is a muscular organ forming a hollow tube extending from the crycopharyngeus muscle to the oesophago-gastric junction. The entire length of the oesophagus is divided into 3 areas:

(1) Cervical oesophagus: this extended from the crycopharyngeus muscle to the thoracic inlet
(2) Thoracic oesophagus: this extended from the thoracic inlet to the border of the oesophago-gastric junction
(3) Oesophago-gastric junction: this formed part of the oesophagus bordering the stomach where the columnar epithelium took over from the squamous epithelium.

Squamous cell lined almost the entire length of the lumen of oesophagus and only the last few centimeters of the oesophagus (bordering the gastric cardia) is lined by columnar epithelium. The oesophagus itself is muscular conduit made of both smooth and striated muscles, predominated by smooth musclesg. Like any other organ, it contained several other tissue and cell types: granular cells, lymph tissues etc., therefore, many types of malignancy arose from the oesophagus, example malignant lymphomas, melanomas, rhabdomyosarcoma, carcinomas etc. For the purpose of the study, only squamous cell carcinomas and adenocarcinomas of the thoracic oesophagus were studied.

In the study, only carcinoma of the thoracic oesophagus was studied as it was the commonest site of occurrence of cancer of the oesophagus as well as for treatment uniformity.

2.2 DIAGNOSIS AND STAGING

Patients with obstructive lesions of the oesophagus usually complained of dysphagia and oesophageal carcinoma was no exception. Barium swallow formed the next investigation as it obtained a better assessment of the cause of obstruction when

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oesophageal carcinoma was suspected, before a Barium swallow was done. Gastrograffin was preferred to Barium in such cases because it caused fewer problems in the case of extravasations as a result of tracheo-broncho-oesophageal fistulae, which almost inevitably lead to varying degrees of aspiration pneumonia.

Oesophagoscopy, bronchoscopy and lymph node fine needle aspiration were used to stage the patients initially. At Groote Schuur Hospital, the TMN system was used to stage patients with oesophageal carcinoma. TMN system staged the tumour according to clinical information based on non-invasive tests and pathological findings based on histological and cytological results, which included the results of invasive staging procedures or surgical resection of the tumour. The prognosis of the patients with oesophageal carcinoma correlated well with the TMN staging and prognosis depended on the degree of tumour penetration of the oesophagus, regional or distant lymph node involvement and evidence of distant metastasis.

Management of oesophageal carcinoma depended on staging and the anatomical site of the tumour. Bougienage and intubation of the oesophagus were palliative measures more commonly used in treating dysphagia that resulted from carcinoma of the thoracic oesophagus. Management of carcinoma of the cervical oesophagus mainly revolved chemo-radiation due to the fact that the tumour was high up and in order to achieve an adequate margin of resection of the tumour, laryngectomy was often necessary. Even when laryngectomy and oesophagectomy were used in combination, the prognosis was still generally poor. Also, intubation was not well tolerated at all in the cervical oesophagus.

In the case of carcinoma of the oesophago-gastric junction, due to its close relations to the stomach were managed differently to the cervical and thoracic oesophagus. In the study, only the palliative treatment of the thoracic oesophageal carcinomas was reviewed.

Early lesions of carcinoma of the thoracic oesophagus (stage I and II), i.e. lesions that were 5cm or less without evidence of extra-oesophageal spread, were considered for surgical resection, i.e. oesophagectomy. If the patient failed to fulfill the criteria for surgery, then radical treatment of either radiotherapy alone or in combination with

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chemotherapy was used. Currently, ongoing studies were performed and these determined if there were any advantages in combining chemotherapy and radiotherapy over radiotherapy alone as radical treatment for patients that were staged I and II disease and who were unsuitable for surgical resection.

Advanced lesions of the thoracic oesophagus (stage III and IV), this meant that lesions with evidence of extra-oesophageal spread, received palliative (not radical) radiotherapy. Palliative radiotherapy only comprised of 4 to 10 fractions of radiation as compared to 24 to 30 fractions for radical radiotherapy. This was the protocol adopted by the Oncology Department at Groote Schuur Hospital. The effects of palliative radiotherapy were often short-lived and not all tumours responded to radiation. Patients with advanced lesions eventually obstructed again. Such patients were then considered for bougienage and/or intubation of the oesophagus for dysphagia palliation.

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2.3 TREATMENT OPTIONS

2.3.1 Palliative Radiotherapy

The policy that was adopted at Groote Schuur Hospital for usage of palliative radiotherapy was that it suited patients with:

(1) Advanced T3 tumours (and was still able to swallow)
(2) > 10% body weight loss
(3) Generally had poor physical health[1]

Following the initial diagnostic oesophagoscopy, biopsy and dilation bougienage of the oesophagus, patients who were suitable for palliative radiotherapy were booked into the oesophagus clinic as soon as possible for the mark-up for radiotherapy. Mark-up simply meant: to map out a field of treatment by radiation. Palliative radiation was usually performed on an outpatient basis.

External beam radiation exposed the patient to a source of radiation outside of the body, while intracavitatory radiation exposed the patient to a source of radiation placed within a body cavity, example, within the lumen of the oesophagus. External

beam radiation remained the mainstay of radiation treatment for most carcinomas and oesophageal carcinoma was no exception. Unlike surgical treatments such as intubation and dilation of the oesophagus, radiation therapy does not provide immediate relief from dysphagia. Radiation slowed the tumour growth rate and increased dysphagia-free period.

2.3.2 Bougienage (dilatation) of the oesophagus

All patients diagnosed with cancer of the oesophagus were considered for bougienage when they complained of dysphagia. The policy at Groote Schuur Hospital was not to exceed three dilatations before intubation of the oesophagus, since the risk of rupture of the oesophagus increased significantly after the third bougienage.

Bougienage is essentially dilatation of the oesophagus with a flexible, inflatable bougie under oesophagoscopic vision. After the biopsy and brush cytology is performed, dilatation followed and this allowed the patients to resume satisfactory swallowing. Subsequent dilatations were performed as the patients became obstructed again. Dilatation was suitable for most patients that complained of dysphagia of a malignant aetiology. This was true even for those who had a poor performance status.

Bougienage was also used to alleviate dysphagia related to radiotherapy due to secondary tumour oedema, which had not responded to intra-venous steroids. It was generally regarded as a safe procedure with the rate of rupture less than 8% and the morality rate of about 2% according to Unruh's series. The policy at Groote Schuur Hospital was not to exceed three dilatations before intubation of the oesophagus was performed, as this minimized the risk of rupture of the oesophagus as a result of dilatation (refer to Appendix Figure 5).

2.3.3 Intubation of the oesophagus

The method reviewed in the study was the Proctor-Livingstone tube (a type of pulsion tube). The following were indicated for the Proctor-Livingstone tube at Groote Schuur Hospital:

(1) Tracheo-Broncho-oesophageal fisula
(2) Grossly advanced malignancy and performance status IV patients

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(3) Mediastinal sinus
(4) More than 2 to 3 bougienage performed[15]

Most experts in the field of oncology accepted that the single modality palliation failed to provide optimal treatment of dysphagia. This meant that in order to palliate dysphagia optimally, the combinations of bougienage, intubation and radiotherapy of the oesophagus were required throughout the disease progression.

Intubation of the oesophagus, as the name suggested, was the passing of a conduit that bypassed the tumour which allowed the passage of food. It provided a more permanent solution to dysphagia than dilatation since the tumour could not grow into the stent.

Stents used to intubate the oesophagus was basically divided into two-types according to the method of insertion:

(1) Pulsion tubes e.g. Proctor-Livingstone tube (see Appendix figure 4-6)
(2) Traction tubes e.g. Celestin tube (see Appendix figure 1-3)

Both tubes were inserted with the aid of an oesophagoscopy. At Groote Schuur Hospital, the Proctor-Livingstone tube was attempted first. If this failed, insertion of the Celestin tube was then used. Pulsion tube, in the case of the study was under review and not the traction tube. The type of pulsion tube reviewed was the Proctor-Livingstone tube.

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CHAPTER 3: LITERATURE REVIEW

Literatures in this study were obtained from Medline and PubMed search engins. In South Africa, carcinoma of the oesophagus had reached epidemic proportions in certain parts of the rural country, for example Eastern Cape. In these parts of South Africa, incidence of oesophageal carcinoma in the black population reached 100 per 100 000. In the Eastern Cape, 41% in men and 36% in woman that presented with malignant diseases were carcinoma of the oesophagus[2]. This was a disease of poverty where social factors dominated in the development of this particular cancer. Heavy alcohol consumption over a prolonged period of time raised the risk of developing carcinoma of the oesophagus by 10-25 times[3]. Cigarette smoking was also linked to the development of oesophageal carcinoma[4,5].

Other factors that predisposed an individual to oesophageal carcinoma, the majority of which were associated with a low socio-economic status, for example food contaminated with fungi which resulted in nitrites production, nutritional deficits such as folic acid, vitamin C, vitamin A, and riboflavin[6]. A high concentration of nitrosamines found in the food groups ingested daily also predisposed an individual to oesophageal carcinoma[7]. Other less common factors known to be associated with this malignant condition, for example chronic acid reflux of the oesophagus may cause the pre-malignant condition of Barret's oesophagus was also known to significantly raise the risk of developing the malignant condition[8].

Carcinoma of the oesophagus causes obstruction of the lumen of the oesophagus, and it usually presents late. Despite advances in the field of medical technology, surgical removal of the tumour with wide clear margin, hopefully free of cancer, remained the mainstay of curative treatment and this had not changed since the 1940s[9].

Treatment of dysphagia caused by advanced cancer of the oesophagus (stage III and IV) usually bore no curative intent and Groote Schuur Hospital was no exception. The aim of the study was to determine the incidence of failed procedure, dysphagia improvement, procedure related mortality, ruptured oesophagus and length of hospital stay for both dilatation or intubation as well as to determine the incidence of

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worsening of dysphagia during radiotherapy that was severe enough to warrant steroid treatment.

Accurate staging was important in most, if not all, cancers as it determined the treatment options that was appropriate at the particular point in time. Oesophageal carcinoma was no exception. TMN staging was used to stage patients with carcinoma of the oesophagus at Groote Schuur Hospital. However, there were other guidelines with modified TMN staging, for example, the Japanese Guidelines for oesophageal carcinoma, which may correlate better with survival rates, but more research was necessary before this approach would be commonly accepted[10, 11]. For early lesions (stage I or II) surgical resection of the tumour would be considered where possible. For advanced lesions (stage III or IV) surgical resection was considered unsuitable due to the poor prognosis of the disease and a long recovery period would be expected post-operatively. For such patients, dysphagia was treated with palliative radiotherapy, bougienage (dilatation) and/or intubation of the oesophagus.

Percutaneous gastrostomy was also used to palliate patients with advanced oesophageal carcinoma, it does not treat dysphagia, but it allowed patients to continue to feed through the gastrostomy. Due to the lack of resources at Groote Schuur hospital, this option of treatment was not commonly available to patients. It was only offered when dilatation and intubation became impossible. Literature had shown that PEG may not be suitable since it was indefinite in the prolongation of life nor improved the quality or life in such patients[12, 13].

Patients with advanced oesophageal carcinoma were first dilated to treat dysphagia, the first dilatation usually occurs during the initial diagnostic oesophagoscopy and biopsy. The policy at Groote Schuur Hospital was to dilate patients up to three times before intubation was considered. Pulsion intubation would be attempted first, if that fails, traction tube insertion can then be considered. Most of the patients passed away before their third dilatation and could not reach the stage of oesophageal intubations. Therefore, stenting was not a common occurrence and traction tube insertion was even more rarely done.

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More modern self expandable metal stents were used. These outperformed the conventional plastic stents such as the Proctor-Livingstone tube in terms of insertion ease, fewer complications and better long term patency[14]. However, it costed up to ten times more to place one of the self-expandable wire mesh stents than the Proctor-Livingstone tube in South Africa[15].

Doses of radiation given to a pre-planned area over a period of time were shown to benefit dysphagia of malignant aetiology. The use of radiation therapy began in the 1920's, but only in the 1950's was radiation therapy for oesophageal carcinoma used with any frequency[16]. It was previously used as a single modality of treatment for curative and palliative intent for the management of cancer of the oesophagus, however, the 5 year survival rate was poor and the local tumour recurrence rate was reported to be as high as 50%[17]. Radiotherapy as a single modality treatment in cases where care may be possible yielded a 0 - 20% 5 year survival rate and the risk of local recurrence was high[17]. For those with early stage disease where curative surgery could be considered, surgical resection, i.e. oesophagectomy and lymph node clearance yielded a significantly higher 5-year survival rate than radiotherapy as a single modality treatment[18]. However, surgical resection failed to show a clear advantage over radiotherapy when it came to improving the dysphagia.

In advanced cases, the effects of the radiotherapy on the tumour was short lived, ranging from two to six months and not all dysphagia responded. Approximately 50% had a positive response in alleviating the dysphagia when it came to external beam radiation[19]. When oesophageal carcinoma involved the aorta or atrium, radiotherapy caused haemorrhagic episodes. When the trachea or bronchus were involved by the tumour, radiation induced fistulae and was therefore, best avoided in such cases. The other complication to note of radiotherapy was a worsening dysphagia as the result of radiation. This was mainly due to tumour oedema secondary to radiation exposure. Steroids, intravenous or oral were necessary to decrease the oedema. At Groote Schuur Hospital, the Oncology Department made use of Decadron 40mg intravenous injections stat followed by Decadron 20mg intravenous injections per day for two more days which alleviated the dysphagia[15]. If trial of steroids failed, then bougienage or intubation would be considered.

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More recent studies showed brachytherapy to be the most superior option to treat dysphagia in advanced carcinoma of the oesophagus [20, 21]. However, more evidence from more studies was needed before this view can be commonly accepted. Even though studies were carried out to evaluate and compare efficacies of various palliative measures, it was important to bear in mind that the different treatments of dysphagia more likely complemented each other rather than competed with one another[19].

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CHAPTER 4: AIMS AND OBJECTIVES

AIM :

The aim of the study was to establish the effectiveness of three palliative measures in patients with advanced thoracic oesophageal carcinoma in the Oncology Department at the University of Cape Town.

OBJECTIVES:

1. To determine the incidence of improved ability to swallow after the Proctor-Livingstone intubation and bougienage were performed.
2. To determine the incidence of procedure related mortality, failed insertion, ruptured oesophagus and length of hospital stay for pulsion intubation with the Proctor-Livingstone tube.
3. To determine incidence of procedure related mortality, failed dilatation, ruptured oesophagus and length of hospital stay for dilatation of oesophagus with flexible bougie.
4. To determine the incidence of worsening of dysphagia during radiation therapy that was severe enough to warrant steroid therapy.

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CHAPTER 5: METHODS

5.1 POPULATION AND SAMPLING

A retrospective study was done at Groote Schuur Hospital on all patients diagnosed with carcinoma of the thoracic oesophagus that underwent palliative radiotherapy and/or dilatation of the oesophagus and/or Proctor-Livingstone intubation of the oesophagus from 01.01.2003 to 30.12.2003.

The patient's names were identified from the Gastro-Intestinal Cancer register of 2003 at the Department of Oncology, Groote Schuur Hospital. This register contained names of all the patients treated for cancer of the oesophagus at the Department of Oncology, Groote Schuur Hospital during the year 2003. A total of 105 patients were treated for carcinoma of the oesophagus at Groote Schuur Hospital in 2003 and their corresponding names and hospital number were recorded from the register. Permission was obtained from the head of Oncology Department for use of the folders for research purposes.

After several sessions of careful reviewing of 105 patients' folders and their contents at Groote Schuur Hospital, 52 patients' folders were non-thoracic carcinoma of oesophagus or they were not available at the time or research (circulating within the hospital for use in various wards which made tracking them very difficult). The exact number of non-thoracic carcinoma of the oesophagus was unclear, the ratio was probably one third to that of two thirds in the case of folders circulating in the hospital. Ten patients' folders were unsuitable (the patient either died before receiving treatment or the folder contents were too scanty to be used). This left 53 patients with carcinoma of the thoracic oesophagus with adequate folder contents for the purpose of the study. Of the 53 patients, 44 received dilatation without intubation, 9 underwent intubation and 23 received palliative radiotherapy. The results of the procedure were discussed and shown in the results section.

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5.2 OUTCOME

Each patient's folder were studied and reviewed; each one of the 52 patients received at least one of the three palliative treatments under examination in the study. For every palliative treatment that the patients received, the following were recorded:

(1) Outcome of each treatment – Whether or not the treatment improved the dysphagia for all three palliative treatment. Progress of dysphagia while receiving treatment was monitored by the nursing staff and attending doctors and recorded in the chart and the nursing observations. These observations were used to determine the effectiveness of palliative measures.
(2) Procedure related mortality of all three palliative treatments.
(3) Procedure failure – For Proctor Livingstone intubation and dilatation of the oesophagus only. This occurred when the procedure was abandoned in theater due to inability to dilate the oesophagus or insertion of the Proctor-Livingstone tube.
(4) Rupture of the oesophagus – For Proctor-Livingstone intubation and dilatation of oesophagus only.
(5) Lengths of hospital stay – For Proctor-Livingstone intubation and dilatation of the oesophagus only.
(6) Development of obstruction during a course of radiotherapy – For radiotherapy only. This occurred when the patients developed worsening of dysphagia while they received radiotherapy and the worsened dysphagia was confirmed on barium swallow.

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The length of time the patients remained dysphagia free was not included as an outcome measure as this was difficult to determine since many patients failed to return for follow-up and no information was gathered on the progress of dysphagia after their discharge from the hospital.

A graph was drawn up comparing the two palliative procedures, namely the Proctor-Livingstone intubation and dilatation of the oesophagus. A comparison of the following parameters was conducted:

(1) Symptomatic improvement of the dysphagia after completion of the procedure, i.e. the ability to tolerate soft diet after surgical treatment.

(2) Procedure related mortality.

(3) Failure of procedure.

(4) Rupture of the oesophagus.

(5) Length of hospital stay.

For radiotherapy, incidence of patients that developed a worsening of dysphagia while on radiotherapy that warranted treatment with steroids was determined.

5.3 DATA ANALYSIS

The method of data analysis was to determine the frequency of a number of variables in regards to three palliative treatments in the study. For intubation and dilatation, variables under examination were: failure to improve dysphagia, oesophageal rupture, failed procedure and procedure related mortality. For radiotherapy, the variable was development of obstruction of the oesophagus as a result of radiotherapy. Length of hospital stay was also determined for intubation and dilatation. Length of time for which dysphagia was relieved by a particular treatment was difficult to determine. This was due to the fact that patients were frequently lost to follow-up. Patients seen at Groote Schuur oncology clinics came from all over the Western Cape and even extended to the Eastern Cape. Therefore, to be able to attend the clinic at a particular date often posed as a difficulty. Some patients had passed away before the follow-up date, while others had returned to the Eastern Cape oncology clinic for follow-up also created difficulties in determining the length of time.

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5.3.1 Radiation therapy

Of the patients that received palliative radiotherapy, the incidence of worsening of dysphagia as a result of receiving radiation as well as treatment associated mortality was determined.

5.3.2 Pulsion intubation in comparison with dilatation of the oesophagus

Pulsion intubation with Proctor-Livingstone tube was compared to bougienage in terms of improvement of dysphagia after the procedure, failure of procedure, complication of procedure, and length of hospital stay.

For Proctor-Livingstone intubation, patients who had the tube inserted the percentage of dysphagia improvement, complication and failed procedure was determined. The average length of hospital stay was also worked out.

5.4 ETHICAL CONSIDERATIONS

The study was a retrospective study and data collection was achieved by reading through the patients' folders only. No questionnaires were made for the patients to complete, no patients were interviewed, no interaction with the patients was carried out and only the folders were examined. The patients' name, addresses, identity number, date of birth or any other personal details which lead to a compromise in the individual patient's rights of confidentiality were not stated in the study.

The parameters reviewed and investigations consisted of the rates of symptom relief and complication of the palliative procedures performed from 01.01.2003 to 30.06.2003. As mentioned above, no name, hospital folder number, identity number, date of birth was mentioned. Individual patients' details, which lead to a compromise in the confidentiality, were all omitted in the study.

Permission from the acting head of Department of Oncology at Groote Schuur Hospital, Professor Abratt was consulted and permission was granted for the study. Approval from the research and ethics committee was also obtained to conduct the study-REC REF: 369 /2004. If contents in the Literature Review or Data Analysis indicated a palliative care intervention which improvde the quality of life for the patients with advanced caner of the oesophagus, attention would be brought to the Oncology Department at Groote Schuur Hospital.

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5.5 RESULTS

Of the 53 patients, dilatation of the oesophagus was performed 44 times, for each dilatation dysphagia improvement, complication and failed procedure and length of hospital stay were all recorded in the folders.

Proctor-Livingstone intubation, of the 53 patients, only 9 tubes were inserted. Out of the 9 intubations, percentage of dysphagia improvement, complication and failed procedure was determined. The average length of hospital stay was worked out from the 9 intubations.

5.5.1 Dilatation of the oesophagus

A total of 44 dilatations of the oesophagus with flexible bougie were performed after reviewing 53 suitable patient folders. The following were found:

(1) A total of 40 out of 44 dilatations were reported to have had symptomatic improvement of the dysphagia after completion of uncomplicated dilatation. The improvement of the dysphagia was observed by the treating surgeons and the attending nurses, both of whom recorded their observation in the patient's hospital folder.
(2) A total of 4 out of 44 dilatations failed and the procedure was abandoned. All 4 failed dilatations were recorded by the attending surgeon, as well as the reason for abandonment of the procedure.
(3) All 4 failed dilatations were as a result of rupture of the oesophagus during dilatation.
(4) Only one patient died after failed dilatation as a result of ruptured oesophagus.
(5) Only one out of 44 dilatations reported no improvement of dysphagia after dilatation.
(6) A total of 40 out of 44 dilatations experienced no complication.
(7) The average length of hospital stay was 6.4 days.

TABLE 1: Dilatation of oesophagus

(1) Total number of dilatation of the oesophagus reviewed	44

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(2) Number of dilatations that resulted in symptomatic improvement	40
(3) Number of dilatations that did not result in symptomatic improvement of the dysphagia	4
(4) Number of dilatation associated mortality	1
(5) Number of dilatation that failed during the procedure	4
(6) Number of dilatations complicated by rupture of the oesophagus	5
(7) Average length of hospital stay	6.4 days

5.5.2 Proctor-Livingstone intubation of the oesophagus

Of the 53 patient folders reviewed, the following were established:

(1) A total of 9 Proctor-Livingstone tubes were inserted.

(2) There was no procedure related mortality recorded.

(3) Two of the 9 Proctor-Livingstone intubations failed.

(4) No reported rupture of the oesophagus was made from the 9 insertions with the Proctor-Livingstone tube.

(5) Seven out of 9 Proctor-Livingstone intubation experienced symptomatic improvement of the dysphagia. The improvement of the dysphagia was noted and recorded by the attending surgeons and nurses.

(6) Only one out of the 9 Proctor-Livingstone intubation experienced no relief of dysphagia after the procedure.

(7) The average length of hospital stay was 7.0 days

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TABLE 2: Intubation of oesophagus

(1) Total number of Proctor-Livingstone tubes inserted	9
(2) Number of intubations that resulted in symptomatic improvement of the dysphagia	7
(3) Number of intubations that failed to resulte in symptomatic improvement of the dysphagia	2
(4) Number of intubation associated mortality	0
(5) Number of intubations that failed during the procedure	2
(6) Number of intubation complicated by rupture of the oesophagus	0
(7) Average length hospital stay	7.0 days

5.5.3 Palliative radiotherapy

Of the 53 patient folders reviewed, the following were found:

(1) A number of 23 patients received radiotherapy.

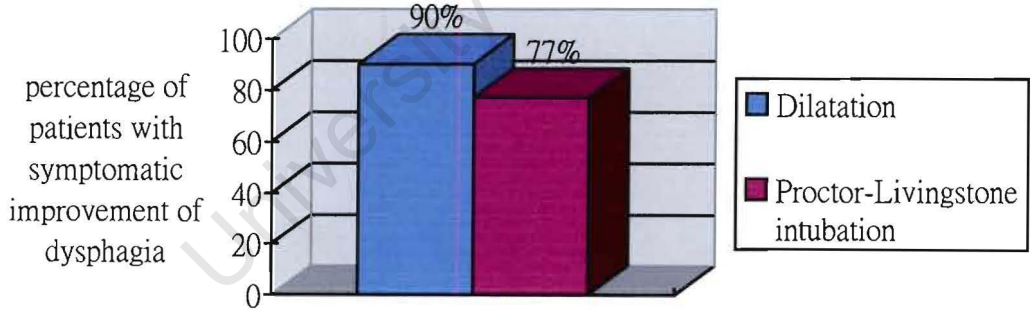
(2) A total of 2 out of 23 developed obstructions during the course of radiotherapy (i.e. worsening of dysphagia while on radiotherapy), one of which responded to steroid therapy, the others were to be dilated in order to relieve the dysphagia.

(3) A total of 21 out of 23 patients received radiotherapy and tolerated soft diets during the treatment without a worsening of the dysphagia.

(4) There were no treatment-associated mortalities.

Bar graphs comparing dilatation and intubation

Graph 1: Symptomatic improvement of dysphagia



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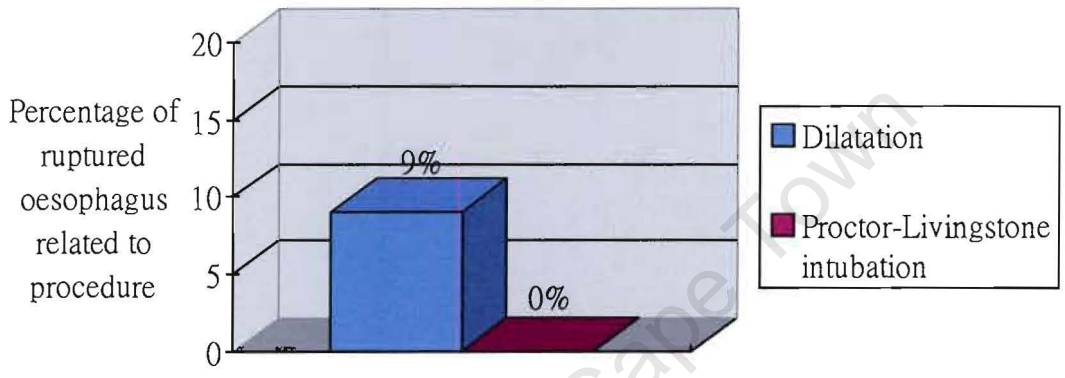
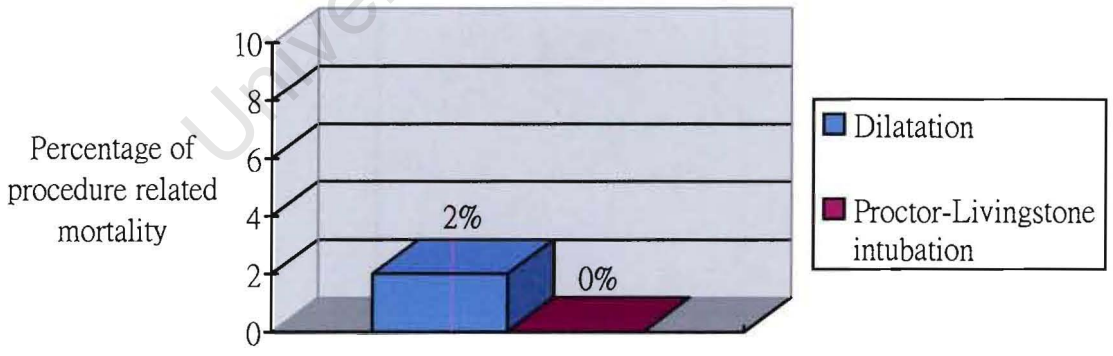
Graph 2: Ruptured oesophagus related to procedure



Graph 3: Procedure related mortality



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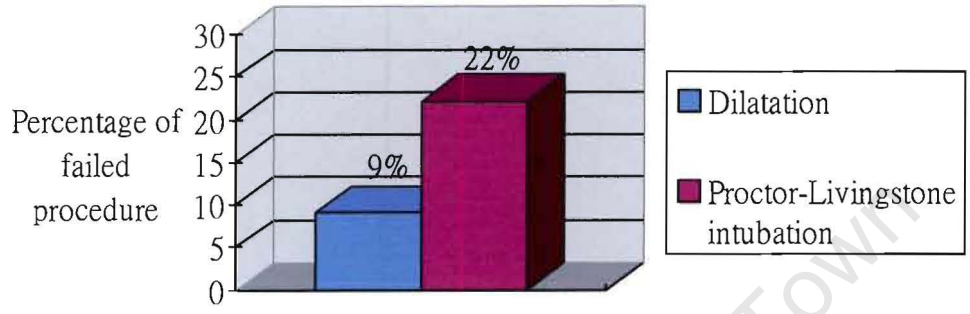
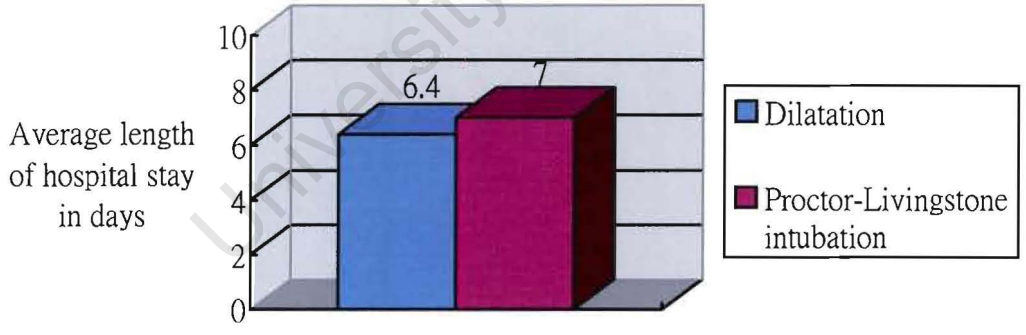
Graph 4: Failed procedure



Graph 5: Average length of hospital stay



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Radiation related tumour oedema that resulted in complete obstruction of the oesophagus was 8.6%, this meant that 2 out of 23 patients that had received radiotherapy developed complete obstruction, both of which were successfully treated with steroids or intubation. Radiotherapy does not provide immediate relief of dysphagia; therefore its results could not be directly compared to dilatation and intubation.

CHAPTER 6: DISCUSSION

In advanced carcinoma of the oesophagus, the continued growth of the tumour caused complete obstruction of the oesophagus which resulted in tremendous amount of distress to the patient. In order to treat dysphagia, the oesophagus was dilated or intubated and these were the methods of treatment used at Groote Schuur hospital.

In the South African public health setting, patients usually presented with advanced disease at the time of diagnosis of carcinoma of the oesophagus. Therefore, curative surgery was not performed and patients in most cases received palliative surgery at least once since diagnosed. Palliative surgery, such as dilatation and intubation offered rapid relief of dysphagia and intubation offered a more enduring improvement. With the introduction of modern self-expandable metal stents, it provided a more simplified stent placement, longer patency period and lower complication rate than the conventional plastic stents such as the Proctor-Livingstone tube[11].

In the study, patterns emerged when the various palliative measures treating dysphagia in carcinoma of the thoracic oesophagus were compared. In the case of the Proctor-Livingstone tube insertion, only nine patients' folders were available for review, which was a rather small sample size and the subsequent statistical result may not be representative of the procedure. When interpreting the data collected on intubation and dilatation, it must be born in mind that patients that had undergone intubation were generally more advanced in their malignant condition with a poorer state of health which caused more difficulties during intubation. Not many patients were intubated because of the policy of repeated dilatation before intubation.

With the introduction of self-expandable metallic stents, there seemed to be mounting evidence of its superiority to plastic stents in terms of ease of placement, fewer complications and a better long term patency period. In 1999, Sanyika C. et al conducted a prospective study over a twelve months period where they compared Wallstent and Proctor-Livingstone tube and found that Wallstent was effective in sealing all three fistulae, compared to one that was non-sealing in Proctor-Livingstone

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tube. The initial stent placement of Wallstents where only two patients needed two stents for adequate tumour coverage compared to 15 patients for those that received the Proctor-Livingstone tube. For the Wallstent, 90% remained patent at 1 and 3 months compared to 66% and 50% in Proctor-Livingstone tube[14].

6.1 EFFECTIVENESS OF DILATATION AND PROCTOR-LIVINGSTONE INTUBATION IN RELIEVING DYSPHAGIA

As previously mentioned, "effectiveness" was determined by a review of the nurses' and doctors' records, whereby the patients' progress of dysphagia was recorded at least once a day. The records occurred while the patients remained in the ward and included patients ability to tolerate various forms of diet, or example solids, liquids and soft diet.

It appeared that dilatation of the oesophagus with the flexible bougie out performed the Proctor-Livingstone intubation in the relief of dysphagia in cancer of the oesophagus. Dilatation achieved dysphagia relief for 90% of the patients dilated in the study and the Proctor-Livingstone intubation only achieved 77%. However, the policy at Groote Schuur Hospital was to perform the Proctor-Livingstone intubation after repeated attempts at dilatation, this lead to a higher rate of failed procedure and complications, such as rupture of the oesophagus during the intubation.

In addition, of the 9 patients who received the Proctor-Livingstone intubation, there were other concurrent pathologies of the oesophagus, which served as an additional indication for the Proctor-Livingstone intubation, namely: two patients were intubated because of a failed dilatation which resulted in ruptured oesophagus and hence the need for intubation in order to seal off the rupture. Concurrent oesophageal pathology also negatively impacted on the success rate of the Proctor-Livingstone intubation.

6.2 COMPARISON BETWEEN DILATATION AND THE PROCTOR-LIVINGSTONE INTUBATION IN TERMS OF FAILURE TO ALLEVIATE DYSPHAGIA

Dilatation out performed the Proctor-Livingstone intubation in this regard. Dilatation only failed to relieve dysphagia in 2% of the patients that received the procedure and

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intubation had a failure rate of 22% in dysphagia relief. Patients who were intubated at Groote Schuur Hospital often had concurrent pathology of the oesophagus and thus received repeated dilatation prior to intubation. This increased the risk of rupture of the oesophagus during intubation. Concurrent pathology of the oesophagus resulted in an increase in the procedure complication rate and possibly also increased the failure rate. Out of the nine patients intubated with the Proctor-Livingstone tube, two patients had concurrent tracheo-oesophageal fistulae; the other two patients had concurrent rupture of the oesophagus.

6.3 PROCEDURE RELATED MORTALITY FOR THE PROCTOR-LIVINGSTONE INTUBATION AND DILATATION

No patients died from the Proctor-Livingstone intubation in the study and only one patient died from ruptured oesophagus during the dilatation. The patient's general health condition, concurrent medical disease, the state of disease progression in cancer of the oesophagus and the age of the patient all affected the mortality related to any surgical procedure. The patient population in the study was not screened according to these factors as there was not enough information and the prospective study would be better suited to such rigorous screening process than the retrospective study.

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However, if the population size for the Proctor- Livingstone intubation group was larger than 9 patients, the mortality probably would had been higher than that of dilatation since the patients who were intubated at Groote Schuur Hospital generally had a more advanced disease process due to the policy to dilate patients up to three times before the Proctor-Livingstone intubation was considered. With a more advanced disease at the time of intubation, patients generally had a poorer performance status and this increased the mortality rate. The frequent presence of concurrent oesophageal pathology also played a role in an increase in the risk of mortality associated with the Proctor-Livingstone intubation.

6.4 COMPARISON OF RISKS OF FAILED PROCEDURE BETWEEN THE PROCTOR-LIVINGSTONE INTUBATION AND DILATATION

Dilatation of the oesophagus with the flexible bougie in the study revealed a 9% rate of failed procedure. Of the 44 dilatations, four failed intra-operatively and all were due to rupture of the oesophagus during the attempt to dilate with the flexible bougie. Proctor-Livingstone intubation in the study had a 22% rate of failure intra-operatively – two of the nine intubations failed. Pulsion intubation of the oesophagus with the Proctor-Livingstone intubation was a more complicated procedure than the dilatation. It involved dilating the oesophagus to accommodate the Proctor-Livingstone tube and the tube would then be pushed past the tumour under fiber-optic vision.

Bougienage or dilatation, on the other hand was a much simpler procedure as once the flexible bougie passes the tumour, it could be inflated and this widened the obstructed lumen of the oesophagus. The Proctor-Livingstone intubation was a much more complex procedure since it involved dilating the lumen of the oesophagus while at the same time the pulsion tube would be inserted and required the maneuvering of the tube past the tumour into its appropriate position. Therefore, a higher failure was expected. Furthermore, the policy at Groote Schuur Hospital was to treat dysphagia of carcinomatous origin with dilatation before pulsion intubation was considered. Consequently, when the patients were considered for the Proctor- Livingstone intubation, the disease was often more advanced, the tumour more extensive, which increased the level of difficulty and raised the rate of procedure failure.

The other factor that contributed to a higher failure rate was the frequent presence of concurrent oesophageal pathology, example, tracheo-oesophageal fistula and ruptured oesophagus, which on their own were indications for pulsion intubation. This increased the level of difficulty and thus contributed to the high intra-operative failure rate.

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6.5 COMPARISON BETWEEN DILATATION AND PROCTOR-LIVINGSTONE INTUBATIN IN TERMS OF CAUSING RUPTURE OF THE OESOPHAGUS

A total of four out of 44 dilatations (9%) of the dilatations ended in ruptured oesophagus and none of the Proctor-Livingstone intubation resulted in a perforated oesophagus. Generally at Groote Schuur Hospital, by the time the patients were considered for pulsion intubation they were often more advanced in the progression of malignant disease, both locally in the oesophagus and systemically. These patients often had concurrent local oesophageal pathology such as tracheo-oesophageal fistulae, which increased the risk of rupture.

In the study, dilatation carried a much higher risk of rupture of the oesophagus and it sits at 9%. This may be due to the sample size of the patient in the dilatation group, which was much larger and more representative of the target population than the Proctor-Livingstone intubation patient group. Furthermore, two of the nine intubations were performed in an attempt to seal off the oesophageal rupture. Therefore, further rupture caused by the Proctor-Livingstone intubation would not be noted by the attending surgeon, thereby giving a falsely low figure of zero percent.

6.6 COMPARISON OF THE LENGTH OF HOSPITAL STAY BETWEEN THE PROCTOR-LIVINGSTONE INTUBATION AND DILATATION

The average length of hospital admission for dilatation of the oesophagus in the study was 6.4 days as opposed to 7.0 days for the Proctor-Livingstone intubation. There was no significant advantage of dilatation over pulsion intubation in this regard. This was expected since both procedures were minimally invasive and no laparotomy or gastrostomy incisions were made. The two procedures may vary in the degree of complexity; their degree of invasiveness was about the same. Therefore, post-operative recovery period and pre-operative work-up were similar to each other.

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6.7 PALLIATIVE RADIOTHERAPY (EXTERNAL BEAM RADIATION)

External beam palliative radiotherapy at the Department of Oncology, Groote Schuur Hospital was usually done on an outpatient basis over a short period of time. The doses of the radiation was given either at 4.6 gray per day and for four days (i.e. 4 fractions of radiation at 4.6 gray per fraction) or 3.0 gray per day, four days per week, for a total of ten days (i.e. 10 fractions of radiation at 3.0 gray per fraction).

In the study, two of the 23 patients that received the external beam palliative radiotherapy experienced a worsening of the dysphagia. One of the patients responded to steroid therapy and the other had to be dilated to overcome dysphagia. This yielded a rate of 8.6% who developed radiation related obstruction of the oesophagus. Patients who received the palliative external beam radiation were selected according to their general health condition, the stage of the malignancy and their ability to swallow. The criterion used was as follows:

(1) Stage III disease
(2) Suffered from dysphagia but still able to swallow.
(3) Poor physical health (general performance status II-III)

For grossly advanced disease, namely stage IV, mediastinal invasion by carcinoma of the oesophagus, gross tracheal involvement by the tumour, and for those who were in extremely poor physical health, were not candidates for palliative external beam radiation since the complication rate were higher for those patients to receive external beam radiation, example development of a tracheo- oesophageal fistula, complete obstruction of the oesophagus secondary to radiation associated tumour oedema. For such patients, pulsion intubation with the Proctor-Livingstone tube was the treatment of choice for dysphagia.

Patients chosen to receive radiotherapy must still be able to swallow or else dilatation would be considered prior to receiving radiation. The purpose of radiotherapy was to prolong dysphagia free interval and does not relieve acute worsening of dysphagia. For patients that had received radiation on a daily basis for four to ten days, the tumour could in response to the radiation become oedematous and resulted in

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complete obstruction of the oesophagus. When the patient suddenly became totally unable to swallow while undergoing the course of radiotherapy or immediately after completion of the course, then intravenous steroids were given to treat the tumour oedema. If intravenous steroid were unable to produce relief of dysphagia, dilatation was then considered.

Radiation related tumour oedema resulting in a complete obstruction of the oesophagus in the study had a rate of 8.6%, this meant that two of the 23 patients developed obstruction and both were successfully treated with steroids or pulsion intubation without further complication and mortality. The complication rate (which is 8.6%) was lower than the rupture rate of the oesophagus in the dilatation group (which was 9%).

6.8 RECOMMENDATIONS

One of the limitations in this retrospective study, was that patients were often lost to follow-up. This may be the result of Groote Schuur Hospital receiving and treating patients from outside designated drainage areas, for example, some of the patients were from Eastern Cape, a few even came from Gauteng. This made determination of dysphagia-free intevals between treatment very difficult. Other limitations such as inter-observer bias resulted from various treating doctors and nurses who recorded the patients daily progress may influence measurement of outcome. Therefore, further prospective studies were recommended where patients lost to follow-up as well as inter-observer bias could be minimised in order to compare the three measures more effectively and arrive at a more significant conclusion.

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CHAPTER 7: CONCLUSION

The quality of life in a terminally ill patient was determined by many factors, for example, psychosocial issues, pain control, cachexia etc. Although all the relevant issues must be considered when forming a palliative plan for these patients, the most common presenting complaint for patients with advanced carcinoma of the oesophagus was dysphagia.

Therefore, the quality of life in patients with advanced carcinoma of the oesophagus depended mainly on the palliative physician and the surgeon's ability to improve the dysphagia, which was the cardinal symptom in patients suffering from carcinoma of the oesophagus. The other important factor, which also determined the quality of life in these patients, was the amount of time they spent in hospitals away from their family in order to be treated for their dysphagia.

The main purpose of the study was to compare the two most commonly used surgical procedures to palliate dysphagia in patients with advanced carcinoma of the thoracic oesophagus at Groote Schuur Hospital. The procedures were: dilatation (Bougienage) of the oesophagus and pulsion intubation of the oesophagus with the Proctor-Livingstone tube. The comparison between the procedures may empower palliative physician to choose better between the palliative procedures, keeping the failure and complication rate in mind when treating patients that presented with dysphagia.

In the case of external beam radiotherapy, even with careful selection, there still existed a risk of complete obstruction of the oesophagus for which the patient would need to be admitted to hospital for treatment. Once again, time away from their family and this negatively impacted on the patient's quality of life.

The objectives of the study were to compare frequencies of a number of variables of dilatation and intubation, such as rupture of oesophagus, failed procedure, length of hospital stay, as well as to determine the frequency of worsening of dysphagia as a result of radiotherapy. When dilatation (Bougienage) of the oesophagus was

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compared to the Proctor- Livingstone intubation in the study, it seemed that dilatation out performed the Proctor-Livingstone intubation in terms of:

(1) Failed procedure rate: 9% in dilation vs. 22% in Proctor-Livingstone intubation.
(2) Dysphagia improvement rate: 90% in dilatation vs. 77% in Proctor-Livingstone intubation
(3) Rate of failure to improve dysphagia: 2% in dilatation vs. 22% in Proctor-Livingstone intubation
(4) Length of hospital stay: 6.4 days for dilatation vs. 7.0 days in Proctor-Livingstone intubation.

The study was limited in describing simple patterns that emerged out of the data collected, the patient population in both dilatation group and intubation group varied greatly in terms of age, health condition and progression of the disease, all of which impacted on reliability of the results. The other limitations were the population size for intubation was too small and the lack of use of inferential statistics which disallowed significant conclusion.

It was also worthwhile to note that the policy at Groote Schuur Hospital was to treat dysphagia with dilatation first, which was repeated on subsequent presentation of dysphagia before the Proctor-Livingstone intubation was considered. Therefore, by the time the patients were intubated, they were often more advanced in the disease progression, which meant that they were more than likely to have deteriorated in the general physical health as well as a higher risk of developing concurrent oesophageal pathology, such as fistulas. This meant that dilatation of the oesophagus as a palliative procedure for advanced carcinoma of the oesophagus was likely to yield superior results in terms of the success rate and the complication rate than the Proctor-Livingstone intubation, and it does so in the study.

However, the Proctor-Livingstone intubation in the study failed to record ruptured oesophagus as a complication, this was probably because that one of the indication for pulsion intubation was ruptured oesophagus in order to seal off existing perforation. Indeed, two of the nine patients in the Proctor-Livingstone intubation group were intubated because of ruptured oesophagus. This meant that even during intubation, if

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the oesophagus ruptured further, it would not be easily noticed and hence would not be recorded as a complication since there was already a rupture in the instance. In the external radiation group, 8.6% of the patients experienced a worsening of the dysphagia while receiving radiotherapy. One of the two patients responded well to steroid therapy while the other patient responded well to dilatation of the oesophagus.

A set protocol was followed as the patient with known oesophageal carcinoma presented to Groote Schuur Hospital with dysphagia – repeated dilatation up to three presentations was used to treat dysphagia unless otherwise indicated. This meant that patients would not be able to choose the Proctor-Livingstone tube to be inserted earlier than currently indicated.

The study showed that the Proctor-Livingstone tube insertion had a lower rupture rate than dilatations and the length of hospital stay was about the same. The Proctor-Livingstone intubation carried a higher procedure failure rate and a lower dysphagia improvement rate than dilatations of the oesophagus. This was most likely due to the current policy to repeat dilatations before the eventual intubation and the patients' malignant condition at the time of intubation were generally more advanced, for example, the tumour was larger and more extensive and the patient's health deteriorated. Therefore, the failure rate was expected to be higher and the dysphagia improvement rate lower than dilatations.

From the data collected in the study, dilatation was more effective in improving dysphagia and had a lower incidence of procedure failure than intubation, which supported Groote Schuur Hospital's protocol to repeatedly dilate before intubation. However, the intubation population generally had a more advanced malignant condition and a poorer health condition which may contribute to the higher incidence of procedure failure and failure to improve dysphagia. Therefore, future prospective studies where patients could be randomized between intubation, dilatation and minimal patient population lost to follow-up is recommended in order to draw more significant conclusion.

Although there was a protocol to guide the treatment of dysphagia in patients diagnosed with advanced carcinoma of the oesophagus, it was merely a guide and

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patients were assessed on an individual basis. The tendency was to repeatedly dilate the patients to alleviate dysphagia followed by intubation at Groote Schuur Hospital. If patients requested intubation earlier than indicated in accordance with the protocol, after careful counseling the request was accommodated provided there were no contra-indications. Generally, patients accepted treatments without questioning. However, patients sometimes declined treatment on offer, if patients continued to refuse treatment after careful counseling, their rights were respected and the treatment stopped. Patients that refused treatment were clearly informed that the current refusal would in no way jeopardize the quality of their future treatment. All three measures palliated dysphagia of malignant aetiology and the success of such palliation depended on the clinician's ability to individualise and combine the palliative measures when necessary.

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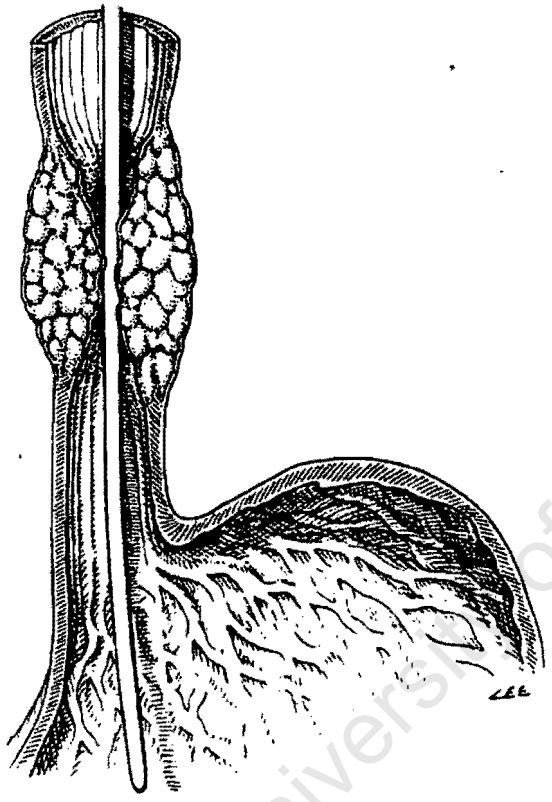
APPENDIX

Pictures of the pulsion and traction intubation are shown in the following figures (these pictures are extracted from K.M Pagliero, Palliative treatments for carcinoma of oesophagus, pages 830-833):



Appendix: Figure 1
Traction intubation – retrieval of the pilot bougie through a gastrotomy

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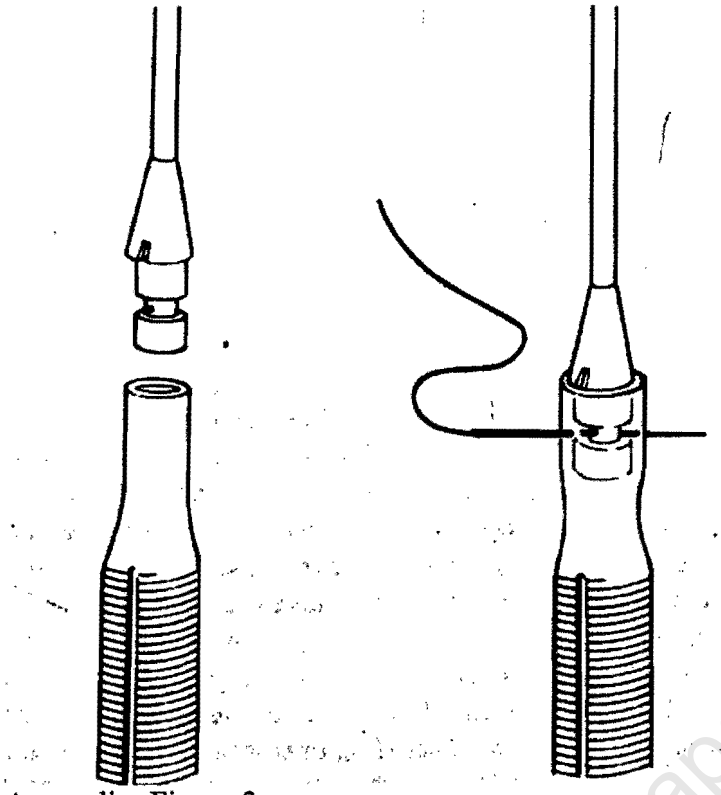
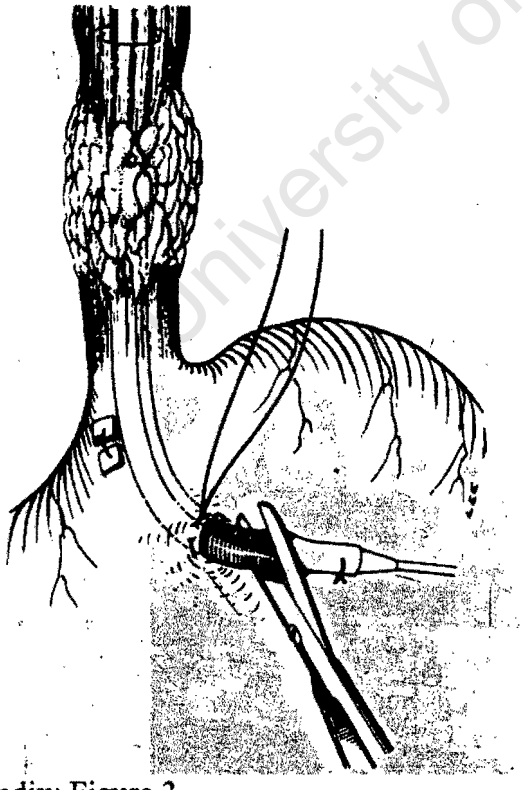


Appendix: Figure 2
Traction intubation – the Celestin tube is sutured to the pilot bougie



Appendix: Figure 3
Traction intubation – the tube is anchored to the curve of the stomach and excess tube is cut off

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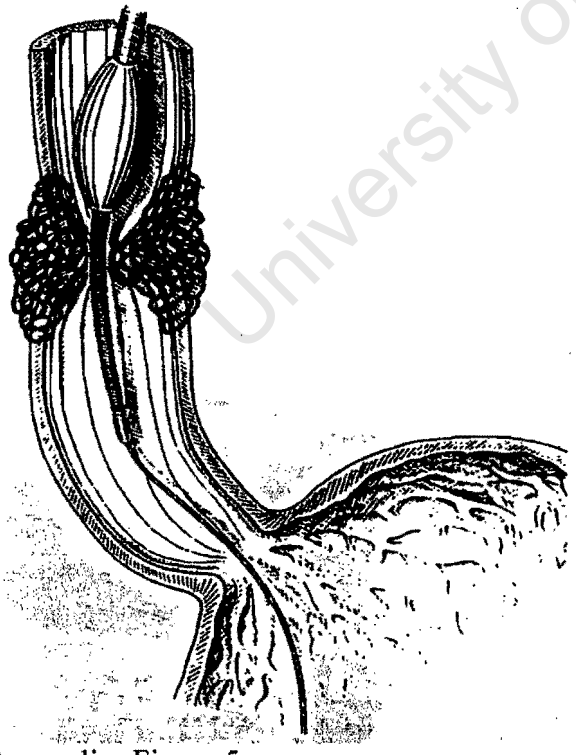
Appendix: Figure 4

Pulsion intubation – the Atkinson pulsion tube



Appendix: Figure 5

Pulsion intubation – the tumour is dilated to 45 FG

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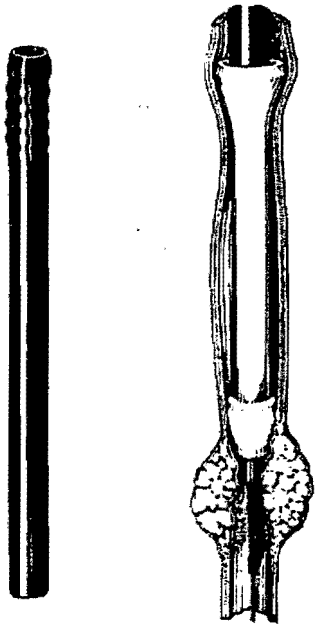

Appendix: Figure 6
Pulsion intubation – insertion of the tube

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DATA SHEET

This is an example of the data collection. The patients' details are not to be shown for confidentiality.

	Length of hospital stay	Complications	Failed procedure	Improved dysphagia	Worsening dysphagia
Dilatations					
Intubations					
Radiation therapy					

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