



CLINICAL IMAGES

Simultaneous ultrasound identification of acute appendicitis, septic thrombophlebitis of the portal vein and pyogenic liver abscess

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A 17-year-old youth from a rural background presented to a secondary hospital with a 3-week history of epigastric pain, constipation and weight loss. He had a temperature of 40°C, marked right upper quadrant tenderness and a white cell count of $21.1 \times 10^9/l$. The chest and abdominal radiographs were normal, but an abdominal ultrasound scan showed two small areas of low echogenicity in the left lobe of the liver consistent with abscesses (Fig. 1). The main portal vein was distended, measuring 16 mm in diameter, and contained echogenic material indicative of thrombus (Fig. 2). In the right iliac fossa there were features of an inflamed appendix, as demonstrated by an 8 mm diameter tubular, non-compressible, fluid-filled viscus, with a distal blind end and an echogenic focus filling the lumen proximally (Fig. 3). A diagnosis was made of acute appendicitis, complicated by septic thrombophlebitis of the portal vein (pylephlebitis) and pyogenic liver abscesses. Appendicectomy was performed later that day, revealing an inflamed appendix, confirmed histologically. The patient was treated with perioperative intravenous triple antibiotics and commenced on anticoagulants following surgery. Discharge was on the 10th postoperative day. Regular out-patient follow-up documented progressive decrease in the size of the portal vein thrombus and the liver abscesses. The abdominal ultrasound scan 4 months post surgery demonstrated a completely normal upper abdomen.

Discussion

Historical and clinical perspectives

In the 18th-century Western world, inflammation of the appendix was regarded as an uncommon, newly described curiosity. By midway through the 20th century, appendicitis had become the commonest cause of acute abdomen in children in developed countries.¹ This change in incidence has

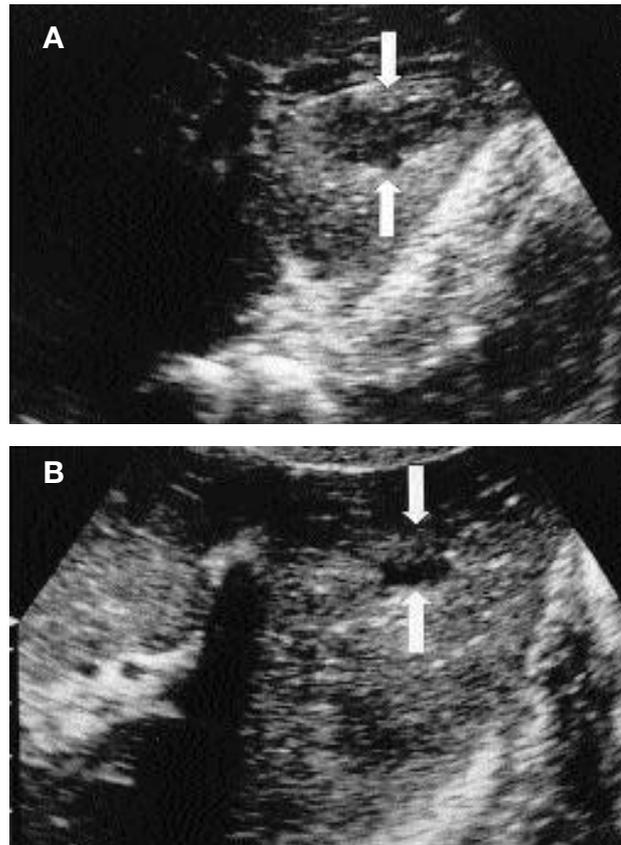


Fig. 1. Longitudinal (A) and transverse (B) scans through the left lobe of liver showing poorly defined foci of low parenchymal echogenicity, in keeping with abscesses (arrows).

been attributed to dietary and other lifestyle factors. The emergence of appendicitis in the peri-urban black African population has been noted over the past 30 years² and reports in the last decade cite it as the commonest non-traumatic cause of an acute abdomen in hospitals serving peri-urban black populations.³ It remains a rare condition in rural populations in developing countries. With ready access to antibiotics and modern surgical techniques, uncomplicated appendicitis has a low morbidity and mortality.⁴ However, complications occur frequently in children and in developing countries, with peritonitis and perforation occurring in up to

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Fig. 2. Longitudinal scan through the porta hepatis, demonstrating a distended portal vein filled with echogenic thrombus (arrow) (sv = splenic vein; L = left lobe of liver).



Fig. 3. Oblique scan through right iliac fossa, demonstrating a blind-ending viscus (a), with an echogenic focus filling the lumen proximally (arrow) (ia = common iliac artery; iv = common iliac vein).

58% of cases and contributing to significant morbidity and mortality.⁵ It is in this clinical setting that the possibility of liver abscess and pylephlebitis has to be considered.

Before the antibiotic era, pylephlebitis was considered universally fatal. As recently as 30 years ago it had a reported 50% mortality rate, while more recent reports document 11 - 32% mortality.^{6,7}

The signs and symptoms of pylephlebitis and hepatic abscess can be minimal, but almost always include fever, chills, peritoneal symptoms, abdominal distension and striking leucocytosis. Nausea, vomiting and liver tenderness may also be present. Liver function tests are often normal and blood cultures may be negative.⁸

Early diagnosis, appendicectomy and appropriate antibiotic therapy form the basis of successful modern management. The

ideal duration of antibiotic therapy is not clear, although a minimum of 4 - 6 weeks is recommended empirically. The role of anticoagulation is controversial and it is not without risk, with complication rates of up to 20% documented.

Ultrasound imaging in appendicitis

Ian Donald's watershed paper in the *Lancet* of 1958 heralded the era of diagnostic ultrasound. Within 20 years, the real-time, grey scale scanners that form the basis of modern imaging had evolved and ultrasound was established as a first-line non-invasive investigation for focal hepatic pathology. It is currently accepted as providing an accuracy of 94% for liver abscesses.

The first ultrasound diagnosis of acute appendicitis was reported by Deutsch and Leopold in 1981 and was followed in 1986 by Puylaert's description of graded compression sonography using a high-resolution linear probe. This is now accepted as yielding high sensitivity, specificity and accuracy in the diagnosis of acute appendicitis. However, the precise role of ultrasound in the management of acute appendicitis has still to be defined, with uncomplicated appendicitis remaining a clinical diagnosis.

Normal ultrasound anatomy of the portal vein and the features of its thrombosis were defined by Webb in 1977, while the earliest sonographic diagnosis of thrombosis of the portal vein, as a complication of appendicitis, was made by Babcock in 1979.

To the best of our knowledge, this is the first case documenting simultaneous ultrasound demonstration of the triad of acute appendicitis, pylephlebitis and liver abscess on an initial examination, thus facilitating early diagnosis and successful management.

Conclusion

Septic thrombophlebitis of the portal vein and pyogenic liver abscess are rare but potentially fatal complications of acute appendicitis. As rural Africa becomes progressively more urbanised, appendicitis is becoming an important cause of the acute abdomen in adults and children. Many factors in Africa contribute to delayed access to medical care and therefore a relatively higher proportion of complicated appendicitis. In this clinical setting, the possibility of pylephlebitis or liver abscess should be considered. Modern ultrasound technology allows diagnosis of these conditions, provided training in the modality is adequate and clinicians maintain a high index of suspicion. Deliberate evaluation of the portal system and liver is obligatory when performing ultrasound for suspected appendicitis. With the burgeoning spectrum of medical personnel performing diagnostic ultrasound in Africa, its role as an appropriate, cost-effective, accessible and accurate imaging modality in this clinical setting is stressed.





1. Berry J, Malt RA. Appendicitis near its centenary. *Ann Surg* 1984; **20**: 567-575.
2. Walker ARP. Is appendicitis increasing in South African Blacks? (Opinion). *S Afr Med J* 1979; **56**: 503-504.
3. Fulton J, Lazarus C. Acute appendicitis among black South Africans. *S Afr J Surg* 1995; **33**: 165-166.
4. Slovis TL, Haller JO, Cohen HL, Berdon WE, Watts FB. Complicated appendiceal inflammatory disease in children: pylephlebitis and liver abscess. *Radiology* 1989; **171**: 823-825.
5. Madiba TE, Haffajee AA, Mbete DL, Chaitram H, John J. Appendicitis among African patients at King Edward V111 Hospital, Durban, South Africa: a review. *East Afr Med J* 1998; **75**(2): 81-84.
6. Plemmons RM, Dooley DP, Longfield RN. Septic thrombophlebitis of the portal vein (pylephlebitis): Diagnosis and management in the modern era. *Clin Infect Dis* 1995; **21**: 1114-1120.
7. Baril N, Wren S, Radin R, Ralls P, Stain S. The role of anticoagulation in pylephlebitis. *Am J Surg* 1996; **172**: 449-452.
8. Chang TN, Tang L, Keller K, Harrison MR, Farmer DL, Albanese C. Pylephlebitis, portal-mesenteric thrombosis and multiple liver abscesses owing to perforated appendicitis. *J Pediatr Surg* 2001; **36**: E19-E21.

LETTER FROM THE UK

Plumbing the depths

Dear Aunt Ethel

The bastions of self-esteem are threatened when one is accused of lifelong antisocial behaviour. Along with using a butter-knife even when dining alone, and walking on the outside of the pavement when accompanying the fairer sex, I was taught that a gentleman always leaves the lavatory seat and its lid in the upright position. Decades later, sources close to me pronounce that this is wrong, uncivilised, user-unfriendly. Batten down the hatches; leave seat and lid horizontal.

I confessed immediately to male chauvinism, and now endeavour to leave the seat in unisex mode. As for the lid: I invoke science and political correctness — ventilation principles and transparency — to justify an open-door policy. Do books of etiquette address this delicate matter? What does the Royal Family do? I recall the only redeeming moment in an American comedy war movie: when the hapless private rigs up a pulley-system for the inspection of the latrines by a five-star General. As the GI snaps to attention and salutes, so do all the toilet seats, leaping simultaneously into erect posture.

To develop a theme: I am able to conjure up people out of nowhere in the back of beyond, be it a volcanic crater or a forest in New Zealand, a billabong in the Red Desert, behind a maroela in the Marico, or deep in a dingle in the Peak District. Obey a call of nature with not a soul in sight, and before one can say 'Zip it', a party of hikers will crest the brow, or the land-owner will screech to a halt in his Toyota bakkie. The population density in Hong Kong renders the ruse unnecessary. I must admit that in the Middle East I have been

'Doc' has been in specialist physician practice in Pietermaritzburg for almost a quarter-century. As Robert-Ian Caldwell he performs musical revues and writes an 'Aunt Ethel' column for the local SAMAnewsletter. He and his wife (doctorate in plant pathology) and three children are all past UCT students.

scared to try it: mindful of the harsh fact that in some regions hands get chopped off for the merest peccadillo.

The quaint South African custom of admiring the hydrangeas does not meet with universal approval. A visting Englishman was quite taken aback and asked 'Is this compulsory?' when we stepped into the garden after supper. My wife swears that large tracts of lawn and several valuable shrubs have shrivelled because of this practice: our dogs proudly shoulder some of the blame. Nor is the habit without its perils. My uncle had to spend the rest of the night up a tree to avoid the Big Five, when he strayed too far from the bushveld camp and got lost. During a black-tie dinner a night-blind companion descended a terrace very suddenly and vertically when he took a step too far. Juggling one's stream between courses is as ill-advised as changing horses in mid-stream.

Presumably private hospitals carry heavy public liability insurance. I wonder if a Maritzburg one has had to increase its premiums since introducing its 'cox on the rox' promotion? Every morning the gents' urinals are re-charged with a shovel-load of ice cubes: aesthetically pleasing but with the potential for frosty medico-legal retribution.

For the record, 'spending a penny' at London railway stations now costs 20P — about R2.70. UK tour-bus destinations have finally agreed to accept Euros from their EU clients rather than face the ire of popping passengers. Nevertheless, my co-consultant advises that men over the age of 55 should pop a catheter into their suitcases when they head for that exotic island — this could save them (or a friend) enormous discomfort and inconvenience. The prostate is an ancient adversary. In Victorian times, gentlemen carried flexible silver catheters in the brim of their collapsible top-hats when attending the opera.

Go with the flow, Aunt Ethel.

Yours affectionately,

Robert-Ian