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Short Report

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Faecolith migrating from the appendix to produce liver abscess after subhepatic laparoscopic appendectomy

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Abstract

The subhepatic position of an appendix may lead to difficulty in diagnosis of appendicitis, its surgical management as well as bizarre complications. A 'lost' appendicular faecolith is not an uncommon complication due to spillage during the removal of the appendix or due to perforation. Here we report a case of such a faecolith migrating into the liver parenchyma following intraoperative hepatic injury, and producing a liver abscess. The calcified lesion seen in the liver corresponded to a free-lying faecolith on a preoperative computed tomography scan. Liver abscess was presumed to arise from implantation of this foreign object into the liver parenchyma. Pigtail drainage of abscess was performed with good result.

Keywords

Appendicular faecolith, subhepatic appendicitis, liver abscess, laparoscopic appendectomy, hepatic injury

Introduction

Inflammation of a subhepatic appendix is a relatively rare presentation due to this uncommon position, probably the result of abnormal embryonic bowel rotation.[1] In this context, a laparoscopic approach may result in inadvertent complications. We report the development of a liver abscess associated with a neglected appendicular faecolith after laparoscopic appendectomy. This unique presentation differs from other causes of liver abscess associated with appendicitis, whether subhepatic[2,3] or elsewhere.

Case report

A 55-year-old man presented to our emergency facility with right upper quadrant pain and fever for the previous 5 days. On examination he was febrile and mildly dehydrated with rebound tenderness in the right upper quadrant. On admission, his pulse rate was 90 beats/min and his arterial blood pressure 110/70 mmHg. Laboratory tests revealed a neutrophilic leukocytosis (22.1×10^3 µL, neutrophils = 81.3%), C-reactive protein = 157 mg/L and mildly deranged hepatic function.

The patient had undergone laparoscopic appendectomy 3 weeks earlier in our surgical division. A review of the intraoperative record described a difficult laparoscopy with a severely inflamed appendix in a subhepatic location. There was no documentation of a faecolith. The gross surgical specimen showed perforation at its tip with severe inflammatory changes but no intraluminal faecolith.

Emergency ultrasound scan on the second admission showed a well-defined hypoechoic area in the subcapsular region of the right lobe of the liver, suggestive of a liver abscess. A computed tomography (CT) abdominal scan with intravenous contrast confirmed the diagnosis, with a calcified focus being noted within the abscess cavity. Review of the initial preoperative CT scan prior to appendectomy, clearly showed a perforated acute appendicitis with a faecolith in the subhepatic region (Figure 1). The liver had no other prior abnormality. The calcified focus seen in the abscess cavity on

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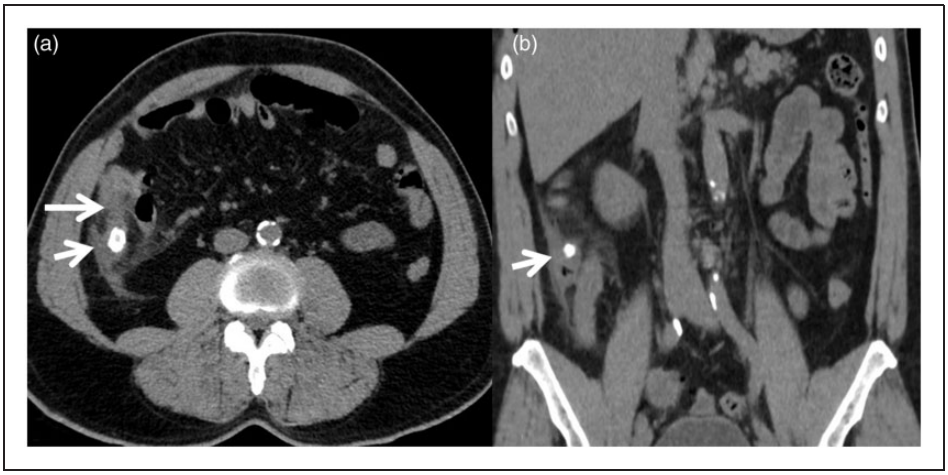

Figure 1. Non-contrast preoperative CT abdomen axial (a) and coronal (b) images show inflammatory changes of acute perforated appendicitis (long arrow) with appendicolith (short arrows) in subhepatic location.

Figure 2. Contrast CT abdomen axial (a) and coronal (b) images performed 3 weeks after laparoscopic appendectomy. Interval development of abscess formation in right lobe of liver (long arrows) with chunky calcification (short arrow) and subhepatic inflammatory changes from previous appendicitis (asterisk). Chunky calcification inside the liver abscess is corresponding to appendicolith.

the second CT scan corresponded exactly to the free-lying faecolith on the first CT scan in both shape and size (Figure 2).

The patient was subsequently managed by pigtail drainage of the abscess under ultrasound guidance, together with intravenous antibiotics (amoxicillin clavulanate 500/125 tab every 8 h for 5 days). Foul smelling pus was aspirated. A mixed growth of *Bacteroides species*, *E. coli* and *Streptococcus milleri* was obtained. Stain and culture was negative for mycobacterium. The pigtail catheter was removed after 2 weeks when ultrasound scan showed almost complete resolution of the abscess.

Discussion

Liver abscesses can be classified according to aetiology of the infecting agent as viral, bacterial or parasitic. In biliary sepsis and portal pyaemia, the organisms are enteric and usually polymicrobial. Staphylococcal liver abscess is the most common in most of the world and is evident in 20% of cases.[4] Infections arising from the biliary tract are the most common causes and result in 30–50% of all cases. Other causes of cholangitis include endoscopic retrograde cholangiopancreatography (ERCP) or percutaneous transhepatic procedures.

Conditions such as complicated diverticulitis, appendicitis, peritonitis and pancreatitis may cause portal vein pyaemia and resultant pyogenic liver abscesses.[3] Apart from gastrointestinal causes, other causes may be septicaemia, secondary to hydatid disease, amoebiasis, trauma and malignancy.[5]

Iatrogenic liver abscess from direct injury during laparoscopy or surgery is known, although implantation of appendicolith causing liver abscess related to the surgical procedure has not been documented in the literature the same way it occurred in our index case. Pyogenic liver abscess is not uncommon after open appendectomy, which occurs secondary to generalised bacteraemia from intestinal tract and pyelephlebitis (portal vein inflammation).[2] Depending on abscess size (>3 cm), location (subcapsular and impending rapture) and patient's clinical condition, combination of antibiotics and percutaneous drainage procedure should be planned on an urgent basis to reduce morbidity and prevent mortality.[5]

Laparoscopic appendectomy has become a safe, commonly performed procedure worldwide in the emergency setting, and has now replaced open appendectomy in many settings. It is associated with a shorter hospital stay and fewer chances of wound infection. However, like any other surgical procedure, it is not free from complications (overall complication rate 8.1% versus 10.6 % in open appendectomy), especially in complicated appendicitis.[6] The laparoscopic approach has technical limitation of limited field of visualisation, inadequate lavage, risk of trocar injuries causing bleeding and long learning curve. Open appendectomy is associated with various complications like increased tissue damage, longer hospital stay and postoperative recovery, and also difficulty of access using conventional right iliac fossa approach for abnormal anatomical sites. Irrespective of the technique, common complications are intra- and postoperative infection, intestinal obstruction, incomplete removal of inflamed appendix, visceral injury and haemorrhage. Less common complications are related to the technique of procedure itself, anaesthesia and port site defects. Direct visceral injury to small and large bowel, ureter and urinary bladder has been reported in the literature, which depends on the location of appendix. The laparsocopic approach has demonstrated its superiority over the convention appendectomy in last decade and it is now preferred choice irrespective of the severity.[6,7]

Treatment of complicated subhepatic appendicitis by a laparoscopic approach is still debatable; however recent trend is advocating its use.[1] Direct hepatic injury during subhepatic appendectomy is rare and often goes unnoticed due to spontaneous healing. Laparoscopic appendectomy has the advantages of less tissue damage, shorter hospital stay, faster recovery and lesser chance of postoperative infection in uncomplicated appendicitis. However, due to its inherent limited field of view, its role in complicated appendicitis is controversial. The revised Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) guidelines concluded that laparoscopic appendectomy can be performed safely in complicated appendicitis.[8] In our case, the presence of an appendicolith in the liver abscess was conclusive evidence of hepatic injury. Secondary implantation of this foreign body during surgery is presumed, as preoperative imaging showed no previous focal calcified lesion in the liver. The appearances of an extraluminal faecolith are of a small high density outside the bowel with associated inflammation and abscess usually in the pericaecal region and hepatorenal pouch.[9–11] Other possibilities of calcification developing in a liver abscess are unlikely in a short duration of 3 weeks. Since the preoperative CT showed perforated appendicitis with free extra luminal appendicolith, there are high chances that it could have been lost during the difficult subhepatic laparoscopy and displaced towards the liver surface which in turn acted as a nidus for infection. Retained or dropped appendicolith is not a rare complication occurring due to stone expulsion during or before appendectomy. Dropped appendicoliths like dropped gallstones acts as a nidus for infection and later formation of intra-abdominal abscess. A patient may present with an intra-abdominal abscess, fistula or non-healing surgical wound.[9,12] The duration between appendectomy and symptoms from appendicolith can vary from days to years.

Conclusion

Liver abscess due to migration of an appendicular faecolith into the liver parenchyma following direct hepatic injury during a laparoscopic excision of a subhepatic appendix is sufficiently bizarre and is added to the long list of possible complications of appendicectomy. This complication could, however, easily have been avoided if the first surgeon had paid attention to the free-lying faecolith visible on the initial CT scan and had made an attempt to locate and remove it. In fact, wherever a perforated appendix is found, a faecolith should always be sought for. This begs the question whether a laparoscopic approach should be converted to an open one if the faecolith is not found, or whether insertion of a drain is adequate to allow evacuation of purulent fluid likely to collect as a result of a neglected faecolith. There is no specific recommendation on this aspect and in our experience, as long as faecolith is within the appendix, laparoscopic appendectomy in expert hands is the preferred approach and in cases of dropped faecolith, it would

be better to opt for open appendectomy if it is known preoperatively.

Competing interests

All the authors have seen the manuscript and approve it for submission. The authors have no competing interest in the publication of the manuscript to declare.

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