

A case of missed gossypiboma

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ABSTRACT

Gossypiboma refers to a retained surgical cotton matrix. It is a rare but preventable complication of surgery. A 54-year-old man presented with a non-healing wound with pus discharge following open cholecystectomy and common bile duct exploration. Computed tomography revealed a sub-hepatic well-encapsulated mass, characteristic of a gossypiboma. Intraoperative finding revealed a retained abdominal pack with pus confirming the radiological findings of a gossypiboma. Retrospectively, the radio-opaque markers were seen in the initial radiograph during t-tube cholangiogram, which was not picked up initially. The present case highlighted the importance of being familiar with imaging features of a gossypiboma to prevent delayed appropriate management.

Keywords: Abdominal cavity, foreign body, imaging, surgical sponges

INTRODUCTION

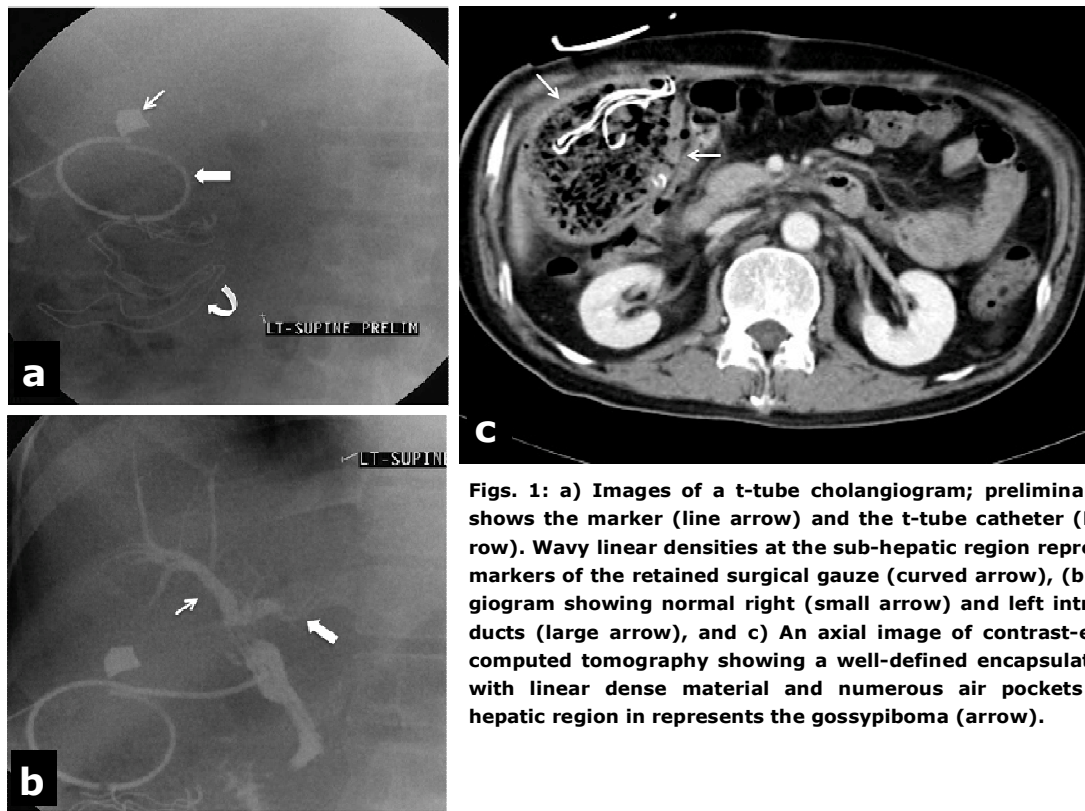
Gossypiboma refers to retained surgical cotton matrix accidentally left behind during surgery. The word gossypiboma was derived from the combination of a Latin word 'gossypium' (cotton) and Kiswahili word 'boma' (place of concealment). The incidence of retained foreign materials following surgery varies from 0.01% to 0.001%, and the commonest retained material is gossypiboma.^{1, 2} The clinical presentations are non-specific, which make clinical diagnosis difficult. Radiograph and computed tomography should readily detect gossypiboma because of incorporation of radiopaque filaments into the sur-

gical sponges. However, this can be overlooked owing to lack of familiarity with the imaging features. We present a case of a gossypiboma that was missed on the initial radiographic image and discuss the overall imaging findings as learning purposes.

CASE REPORT

A 54-year-old man presented with intermittent right upper quadrant pain, pale stool and tea-coloured urine. Ultrasonography of the hepatobiliary system revealed multiple cholelithiasis with dilatation of the biliary system. He underwent endoscopic retrograde cholangiopancreatogram (ERCP) but failed to completely clear the stones. Unfortunately stent insertion also failed. The patient proceeded to a cholecystectomy and bile duct exploration with complete clearance. A t-tube

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Figs. 1: a) Images of a t-tube cholangiogram; preliminary image shows the marker (line arrow) and the t-tube catheter (Block arrow). Wavy linear densities at the sub-hepatic region represent the markers of the retained surgical gauze (curved arrow), (b) cholangiogram showing normal right (small arrow) and left intrahepatic ducts (large arrow), and c) An axial image of contrast-enhanced computed tomography showing a well-defined encapsulated mass with linear dense material and numerous air pockets at sub-hepatic region in represents the gossypiboma (arrow).

inserted intra-operatively (Figure 1a). He recovered well and was discharged home. At day 10 post-operation, a routine t-tube cholangiogram was performed, which showed no evidence of residual calculus, contrast leak or biliary duct dilatations as shown in Figure 1b. There is wavy linear density seen at the right sub-hepatic region, which was initially thought to be an overlying artefact. In addition minimal pus discharge was noted oozing from the wound site. On further enquiry, he claimed that he had an intermittent fever for a few days prior. The pus was sent for culture and he was discharged home with oral antibiotic and to be reviewed back at the clinic. The culture came back as positive for *Proteus* species.

Upon review two weeks later, he was

unwell with complaint of pain at the right upper quadrant of the abdomen. On examination, more pus was seen discharged from the operative wound associated with tenderness. He was slightly tachycardic (pulse rate 104 beats/min). Otherwise, the blood pressure, respiratory rate and temperature were all within normal limits. An abdominal computed tomography was performed and this demonstrated a sub-hepatic well-encapsulated mass-like lesion measuring 7.3cm x 7.1cm x 7.7cm (width x thickness x height) with multiple air pockets and linear dense material representing a gossypiboma (Figure 1c).

Open surgery was performed and the intraoperative findings demonstrated a retained surgical gauze containing pus. There

was no associated damage to the surrounding structure or viscera. Retrospectively, the wavy linear densities seen at initial t-tube cholangiogram was the retained gauze, which had been mistaken as overlying artefacts. The gossypiboma was removed. He recovered well post-operatively and was discharged home with oral antibiotic. He was well upon review a week later.

DISCUSSION

Gossypiboma is a rare iatrogenic complication of surgery secondary to a retained sponge or gauze. The non-absorbable retained surgical materials may induce either exudative or aseptic fibrinous responses.¹ In exudative response an abscess may be formed with or without secondary bacterial infection. On the other hand, in fibrinous response, adhesion and encapsulation develop resulting in the formation of a foreign body granuloma and inflammatory mass. The exudative type tends to present earlier than the fibrinous type. In approximately one third of cases, the patients are usually asymptomatic with the diagnosis are made unexpectedly based on plain radiographs taken various reasons.² Other usual clinical presentations include non-specific abdominal pain, fever, abdominal distension, palpable mass, intestinal obstruction, non-healing surgical wound and external fistula.² Owing to the non-specific presentation and unawareness of clinicians, arriving at correct diagnosis of gossypiboma can be challenging. In the present case, the clinical presentation was non-healing and discharging wound that was associated with abdominal pain. Despite the low occurrence of this complication, the diagnosis should be considered in all patients who present with unexplained symptoms of pain, fever, mass, non-healing wound and

wound and fistula with prior history of surgery and, hence, the imaging should be reviewed for the possibility of retained foreign bodies.

Gossypiboma has inconsistent radiologic appearance and this depends on the type of the material, the duration of the foreign body in situ and the anatomical location. Radiologically, it may be confused with post-operative collection, haematoma, tumour or even bezoar. Plain radiograph is the commonly used method to identify retained sponge or gauze. The use of surgical gauze impregnated with radio-opaque markers was first introduced in the 1920s.² These markers appear as wavy linear opacities and the overall shape depends on the orientation of the gauze. The markers may be distorted owing to folding or twisting. The role of plain radiograph is limited if there is no radio-opaque marker or if the markers have disintegrated over time. In the present case, these linear markers were clearly seen in the t-tube cholangiogram. However, it was initially mistaken as overlying artefact. This serves as an important lesson that familiarity with this linear appearance can avoid missing a diagnosis of accidentally retained gauze. A whirl like soft tissue density with no markers associated with peripheral calcifications may be seen occasionally.³ It is important to scrutinize the whole field of view of the radiograph and avoid missing a partially imaged sponge at the periphery.

On CT scan, gossypiboma is typically seen as a soft-tissue density mass containing gas bubbles, and may show a spongiform pattern or whorled texture. Spongiform pattern with entrapped gas bubbles have been reported to be the most characteristic features of gossypiboma with the incidence of 54%.⁴

Similar to plain radiography, curved or banded radiopaque lines may be seen. However, the markers may disintegrate over time or masked by calcification depositions. Older surgical sponge or gauze may not have the radiopaque markers. In the present study, the linear radiopaque marker is seen associated with surrounding multiple air pockets. Another described appearance of gossypiboma in CT imaging is the 'calcified reticulate rind sign', which is probably formed by gradual deposition of calcifications along the fiber network of the surgical gauze.⁴ However, this is a less commonly seen and was not seen in the present case. On ultrasonography, gossypiboma may present as echogenic areas with acoustic shadowing, anechoic cystic mass with wavy stripped internal echo, or non-specific hypoechoic mass or complex mass.²

The risk factors for accidental retention of surgical gauze or materials include emergency operations, unexpected change in surgical procedure, shift changes of nursing staff during procedure, involvement of more than one surgical team and high body mass index.^{2,6} However, in all operations meticulous counting of sponges or instruments should always be practised. More recently, electronic counting based on barcode has been reported.⁵ In cases of inconsistency of counts, thorough exploration of the abdomen at the termination of surgery or in patients presenting with nonspecific symptoms as described, routine post-operative x-ray can be

carried out.⁵ The mainstay treatment is surgical removal of the mass itself and secondary bacterial infection can be treated with antibiotics.

In conclusion, inadvertently retained sponges are often clinically not suspected and may be first recognised by imaging. Hence, awareness of the typical radiologic appearances of the retained surgical gauze is imperative to avoid missing a diagnosis of a gossypiboma and subsequent delay of the appropriate management.

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