A Relook at Gossypibomas with a Focus on Imaging Findings: A Case Report

Case Report

ABSTRACT

Background: Retained surgical sponges, also known as gossypibomas or textilomas are seldom reported due to medico-legal implications, especially for the surgical team. Some are discovered in the early post-operative period, while others are discovered many years later with varied manifestations and complications as well as non-specific imaging findings.
Presentation of Case: We report a case of a 79-year-old lady with colon carcinoma who had a colostomy and multiple previous surgeries. A retained sponge was incidentally found on CT scan done for radiological evaluation prior to stoma reversal, confirmed on conventional radiography and MRI. The sponge was removed with small bowel resection and anastomosis during the stoma reversal surgery. Unfortunately, she had a stormy post-surgical period and succumbed 3 months later.
Discussion: Imaging findings depend on the time of presentation, presence of radiopaque marker, type of reaction elicited by the retained foreign body as well as its complications. In the early post-operative period, they may mimic hemostatic agents, hematoma and abscesses while in chronic cases, may mimic tumours, both malignant and benign.
Conclusion: Awareness of the varied imaging findings and early detection of retained foreign bodies are essential, requiring a high index of suspicion in patients who have a history of previous surgery.

Keywords: Gossypiboma; textiloma; retained surgical sponge; retained surgical items; foreign objects.

1. INTRODUCTION

Gossypiboma and textiloma are terms used to described mass-like reaction caused by gauze fibres, cotton or woven fabrics, left behind after surgery. The term gossypiboma is derived from the Latin word Gossypium (cotton) and the Swahili word boma (concealment) [1,2]. Although they are most commonly found in the abdominal cavity, they may also be found anywhere in the body, with reports of gossypibomas found in the pleural and pericardial cavity, extremities, central nervous system as well as in the breasts, with the first report dating back as far back as 1884 [1,3–6]. They are seldom reported due to medico-legal implications, especially for the surgical team. They sometimes cause diagnostic confusion due to their varied manifestations and complications as well as non-specific imaging findings, especially if non-radiopaque materials were used. Here we present a case of a retained surgical sponge in the abdomen with a focus on the distinguishing imaging findings.

2. PRESENTATION OF CASE

A 79-year-old woman who had colon carcinoma diagnosed 20 years ago and currently on colostomy was referred for radiological evaluation prior to a reversal of Hartmann's procedure. She had a history of three previous surgeries, the last of which was done 3 years ago.

An unenhanced Computer Tomography (CT) scan with bowel contrast was performed, which showed no evidence of stricture, filling defects or extravasation of contrast from the bowel loops and rectal stump. Incidentally, a well-circumscribed thick-walled complex mass with central spongiform pattern and curvilinear

hyperdensities within was seen in the left iliac fossa in close proximity with a small bowel loop, with no evidence of bowel obstruction (Fig. 1). The abdominal radiograph taken showed a radiopaque irregular serpiginous linear opacity in the left lower quadrant (Fig. 2). Magnetic Resonance Imaging (MRI) of the abdomen with limited sequences demonstrated a well-defined mass with spongiform low signal intensity within on T1- and T2- weighted images. A low peripheral rim was seen on T2 weighted images, suggestive of a capsule (Fig. 3).

A diagnosis of a retained surgical foreign body was made and the patient was scheduled for surgery. Reversal of Hartmann's procedure was done and the retained surgical sponge was found and removed with bowel resection with end-to-end anastomosis as it was adherent to the adjacent jejunal loop (Fig. 4). Unfortunately, the patient had a stormy post-operative period and passed away 3 months later due to a chest infection.

3. DISCUSSION

Retained surgical foreign bodies may be divided into those that are textile-based, such as gauze fibres, cotton or woven fabrics or those that are non-textile based, such as needles, surgical instruments, catheters and other devices. The true incidence of retained surgical foreign bodies is hard to determine as not all cases are reported due to medicolegal implications. The reported incidence of retained sponges range from 1 in 100-5000 in all surgeries and 1 in 1000-1500 in intraabdominal surgeries, as well as accounting for 50% of malpractice claims for retained foreign bodies [1,6]. Various risk factors for retained surgical sponges have been suggested, amongst which are incorrect swab count, high body mass index, female sex, emergency surgery, sudden deviations in surgical plan, more than two surgical teams involved, change of surgical or nursing staff during the surgery as well as intraoperative haemorrhage [6,7].

Some are discovered in the early post-operative period, while others are discovered many years later. Clinical symptoms in these patients, especially those with delayed presentation are often non-specific, with symptoms such as fever, nausea, vomiting, anorexia, weight loss, palpable mass, gastrointestinal bleeding or altered bowel habits. Very rarely, long term retainment of surgical gauzes may even induce cancer or mimic cancer [1,8]. Two types of reactions are usually described with retained surgical items, which are the early (exudative) reaction and the delayed (fibrinous) reaction [2]. The exudative forms present early due to inflammatory reaction, superimposed infections, abscess formation, fistulas and sepsis. The fibrinous forms tend to present later due to fibroblastic reactions, adhesions, granuloma formation and encapsulation, sometimes causing a palpable mass, or even remaining asymptomatic for years. These foreign bodies may also cause erosion into an adjacent hollow viscus, and may even be expelled through the rectum in some cases [6,9,10]. In our patient, the retained sponge was discovered incidentally and she was asymptomatic in keeping with a delayed fibrinous reaction towards the retained surgical sponge.

Imaging findings depend on the time of presentation, presence of radiopaque marker, type of reaction elicited by the retained foreign body as well as its complications. Conventional radiography is often the first line of imaging in the postoperative period for detection of misplaced sponges or swabs due to it being easily available at most centre and having a high sensitivity rate in detecting sponges with incorporated radiopaque markers, despite a false negative rate of 10-25% [11]. The most common findings are of a radiopaque irregular linear serpiginous opacity, with or without increased volume and density of the adjacent soft tissues, as seen in our case (Fig. 2). In cases without radiopaque markers, amorphous radiolucencies may be seen due to trapped gas or gas forming infective agents [1,2,12].

CT is useful when radiographs are negative or to further characterize the findings suspected on the radiograph. It is also good for locating the gossypiboma and assessing its complications, if present. Retained sponges are usually seen on CT as a soft tissue density or low density heterogenous mass with whorl-like or spongiform pattern, corresponding to entrapped air bubbles. They also have thick peripheral rim, with or without calcifications, which may enhance in the post-contrast phase, even in the absence of infection. Thin curvilinear metallic densities representing the radiodense marker may also be seen, helping to clinch the diagnosis [1,2,6,12,13]. In our patient, the retained sponge was first detected and suspected on CT with classical findings of a well-defined thick-walled mass with central spongiform pattern in the left iliac fossa. The presence of a curvilinear radiodense opacity within the mass, best seen on the three dimensional (3D) reformatted images, further confirmed the diagnosis of a retained surgical sponge (Fig. 1D).

In the early post-operative period, gossypiboma, hemostatic agents, hematoma and abscesses may appear similar on CT. Air-fluid levels with well-defined rim enhancement are usually seen in abscesses, however a gossypiboma may be complicated with a superimposed abscess, causing diagnostic confusion [6]. As for hemostatic agents, the air bubbles within may be seen to be more tightly packed, linear in appearance and unchanged on serial examinations as compared to gossypibomas and abscesses, however rim enhancement may also be seen due to foreign body reaction and inflammatory response [6,14]. Hematomas should show progressive resorption in serial examinations, differentiating them from gossypibomas. Due to these overlapping imaging findings, close communication with the primary surgical team as well as correlation with the clinical and biochemical findings are necessary for proper interpretation of CT findings.

In chronic cases, the gas bubbles within the gossypibomas may be absorbed, especially in the pleural cavity and may mimic tumour, both malignant and benign [2,3,6]. In oncological patients with previous surgery, differentiation between tumour recurrence, residual tumour and gossypiboma may be challenging. Fecaloma and intestinal obstruction may also be confused with gossypibomas with their mottled appearance on CT, however they should have a recognizable bowel wall with no well-defined capsule or rim enhancement [6].

Ultrasonography can be useful in the assessment of superficial masses, as it does not rely on ionizing radiation, as well as being able to assess for other post-operative complications or collections. Nevertheless, it is user dependent and may be challenging in larger size patients or deep-seated foreign bodies. The sonographic findings of retained sponges are varied, appearing either cystic with zigzag echogenicity within or solid and heterogeneous, with the most consistent finding of posterior acoustic shadowing due to a combination of gauze material, air bubbles and calcifications [1,2,6] Ultrasound was not performed for our patient.

MRI is rarely used in the detection of gossypibomas, with few reports found in literature. However, they can be helpful in cases where other imaging modalities were inconclusive or when the foreign body was incidentally discovered during MRI scans done for other purposes. The appearance on MRI may be varied depending on the histological composition, stage and fluid content of the lesion, however are typically seen as a heterogenous soft tissue mass, with whorled internal configuration and thick well-defined capsule on T2 weighted images. The capsule is low signal intensity on all pre-contrast sequences and may or may not enhance post contrast, sometimes demonstrating a serrated appearance [1,2,6,12,13]. The radiopaque markers on surgical gauzes are usually not seen on MRI as they are neither magnetic nor paramagnetic [6]. A limited non-contrast MRI was done for our patient in which T2-weighted images showed a well-defined mass with spongiform pattern within and a low signal intensity capsule (Fig. 3).

Surgical removal of the gauze is the standard treatment, usually done via the previous operative site, although they may also be removed via laparoscopic or endoscopic procedures [15,16]. Surgery may be difficult and complicated in chronic cases where dense adhesions have formed around the gossypiboma or when there has been fistulous communication with the gastrointestinal tract, necessitating bowel resection. In some cases, due to the patient's co-morbidities, the risks versus benefits of surgical removal may need to be considered. In our patient, the retained sponge was found and removed during the stomal reversal surgery, with jejunal resection due to bowel adherence. Unfortunately, she succumbed due to a chest infection in the post-operative period.

The manual counting of sponges by two persons before surgery, during surgery and before closure has been the primary preventive method for years with thorough search of the missing item inside or outside the body cavity when there are any discrepancies in the final counts. If still not found, imaging such as conventional radiograph or CT scan may be done to locate the misplaced sponge to facilitate early retrieval of the sponge, preferably before closure of the surgical field. Despite everything, correct counts are not always reliable as 62-88% of reported cases had correct counts [7]. Newer methods of sponge counting have therefore been developed to reduce human error which include using computer assisted counting systems involving bar-coded or data-matrix-coded sponges as well as using radiofrequency (RF) detectors with RF identification chips sewn into sponges [7,11].

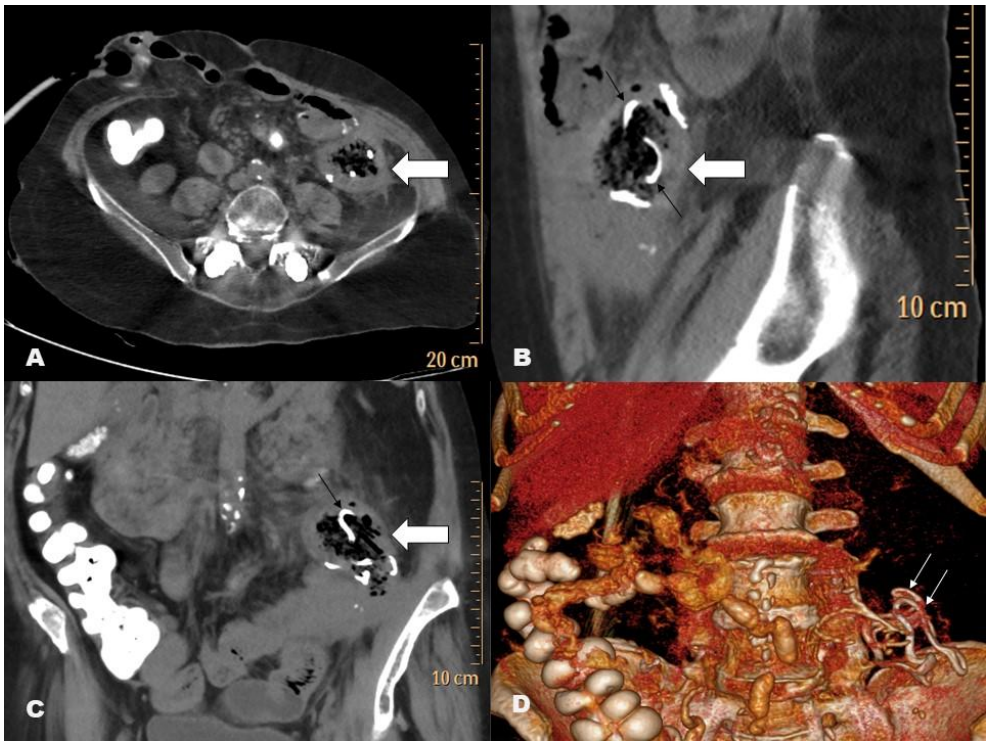

Fig. 1. CT of the abdomen in (A) axial, (B) sagittal and (C) coronal views showing a well-defined thick-walled complex mass in the left iliac fossa (large white arrow) with central spongiform pattern suggestive of trapped air bubbles. The curvilinear hyperdensities within (thin black arrows) represented the radiodense marker. The whorled coil of radiodense marker (thin white arrows) is more clearly seen on the (D) 3D reformatted image

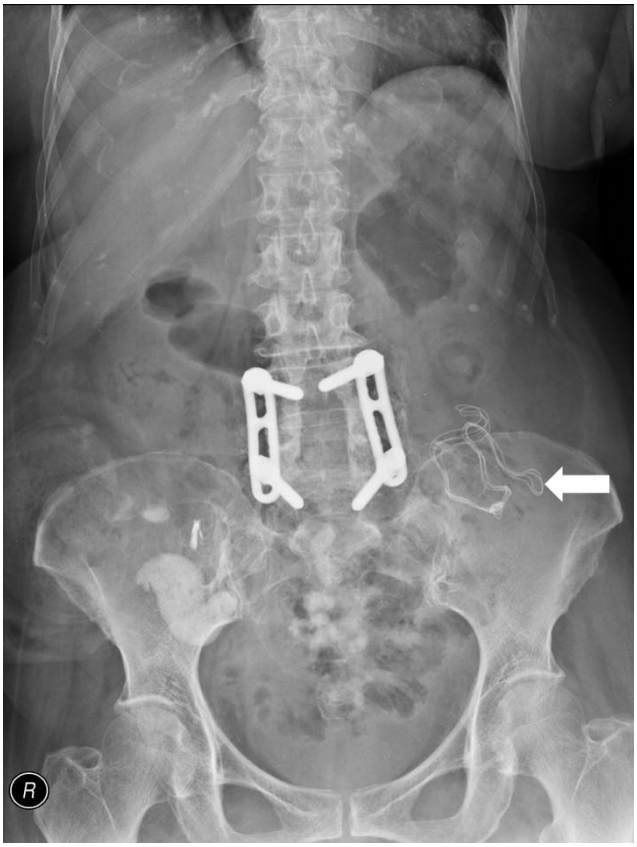

Fig. 2. Plain abdominal radiograph showed a radiodense irregular serpinginious linear opacity (white arrow) in the left lower quadrant. Right-sided colostomy bag with residual bowel contrast seen in the right iliac fossa and pelvis. Surgical plate and screws in the lower lumbar spine are suggestive of previous spinal surgery

Fig. 3. T2-weighted MRI image showed a well-encapsulated mass with low signal intensity capsule (white arrow) and spongiform low signal intensity within

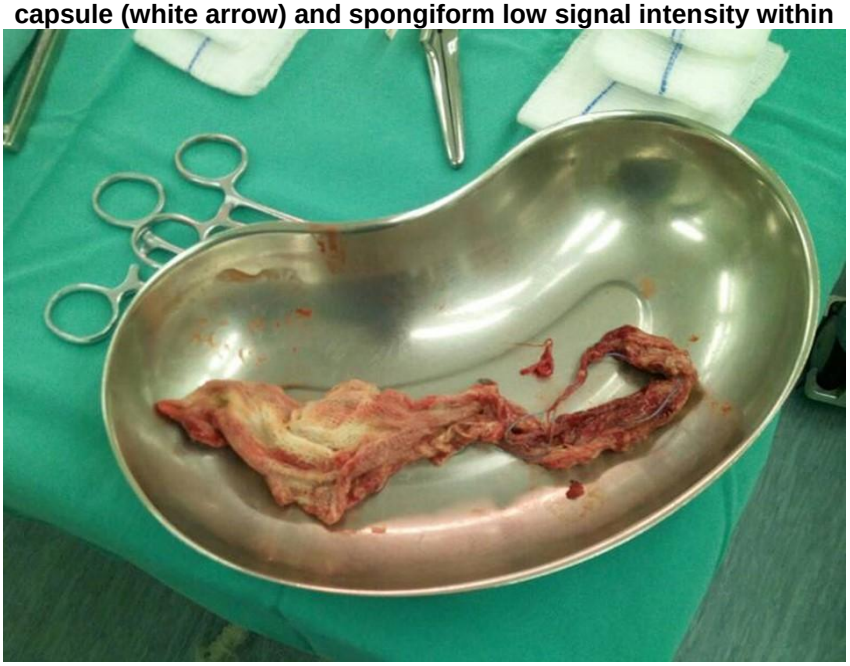

Fig. 4. The retained surgical sponge with blue radiodense marker embedded within

4. CONCLUSION

Awareness and knowledge of the risk factors, presentation, complications and imaging features of retained surgical sponges are vital for early detection of this serious problem. A differential diagnosis of retained sponges should always be considered on imaging in patients with a history of previous surgery, as not all retained sponges

have radiopaque markers causing diagnostic confusion.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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