Spectrum of CECT Findings of Retained And Migrated Surgical Items In Abdomen – A Series of Seven Cases.

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Research Article

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Abstract

Background: Various retained surgical items often present a diagnostic dilemma to the interpreting radiologist. These items include retained surgical sponge (gossypiboma), misplaced, migrated catheters, broken instruments, irrigation sets, and a variety of surgical paraphernalia. Such foreign bodies present with varying imaging findings and can often mimic other diseases radiologically.

Case presentations: We present a series of seven interesting cases of retained surgical mops (case 1, 2 and 3), broken and retained surgical instrument (case 4), migrated plastic biliary stent (case 5), migrated contraceptive device (case 6) and surgically placed hemostatic agent (case 7)

Conclusions: Familiarity with the variable imaging findings and communication with the clinician can facilitate timely management for these patients.

Background

Gossypiboma is a term used to describe a mass of cotton matrix that is left behind in a body cavity during operation (1). Gossypibomas have become a dreaded problem in modern medicine because they provoke many non-anticipated, potentially fatal complications to the patient, besides mitigating serious medico-legal implications. Recent literature favors the use of the term ‘retained surgical items (RSI)’ to encompass all the surgery or procedure-related needles, broken instruments, irrigation sets, and rubber materials placed or misplaced in the patient’s body (2). Radiologists often encounter unfamiliar surgical structures when asked to evaluate postoperative scans where interpretation becomes very challenging. The diagnosis of RSI and distinction from mimickers is important but difficult to make and mandates interaction between the surgical team and the radiologists about the utilized surgical techniques. We describe a series of seven abdominal retained surgical items diagnosed on CECT.

Case Presentations

Case 1

A 39-year-old female with the chief presenting complaint of on and off bleeding and serous discharge per vaginam for 1 year. The patient gave a history of total abdominal hysterectomy done for uterine fibroid at another medical facility 2 years back. USG examination revealed a complex heterogeneous mass in the pelvis. CECT abdomen revealed, a defined heterogeneous mass located posterior to the UB in the cul de sac. The lesion showed heterogeneous enhancement with multiple tiny non enhancing fluid density components. There was no mottled air within the lesion (Fig. 1a). The possibility of an inflammatory pseudo mass was suggested. Exploratory laparotomy done revealed a globular inflammatory mass bulging posterior to the bladder, 12x 12 cm in size filled with a surgical mop of approx 16 x17 cm and purulent material (Fig. 1b, c).

Case 2
A 72-year-old male who presented with heaviness and discomfort in the right upper abdomen for the last 4 years. The patient gave a history of open cholecystectomy done 10 years ago at another medical facility. Physical examination revealed a firm 6x6 cm non-tender lump in right hypochondrium per abdominal examination. USG examination suggested the possibility of intraperitoneal hydatid cyst in the right hypochondrium. CECT abdomen showed an intraperitoneal complex cystic lesion in the right hypochondrium with an internal lamellated membrane and a diagnosis of hydatid Cyst was suggested (Fig. 2a). However, IgG and IgM were negative for Echinococcus granulosus. Intraoperatively a capsulated gauze of 9 x 8 cm was present in the peritoneal cavity in right subhepatic region densely adherent to the inferior surface of the right lobe of the liver, omentum and adjacent bowel with purulent material inside the capsule (Fig. 2b,c).

Case 3

A 26-year-old female presented with pain and purulent discharge from the incision site for 3 months following total abdominal hysterectomy performed in another hospital 4 months back. Physical examination showed a sinus tract was noted in the lower part of the incision with an underlying, irreducible, mobile lump of 10x 8 cm. USG abdomen suggested a complex inflammatory mass in the supravesical region. CECT showed a well defined thick-walled heterogenous intra-peritoneal collection measuring 6x9x 10 cm in supravesical region in midline suggestive of an abscess. The lesion showed mottled air loculi in the center indicating a possibility of retained sponge (Fig. 3a). Exploratory laparotomy revealed a 10x 8 cm surgical gauze present adherent to the posterior surface of the bladder and adjacent bowel with foul-smelling purulent material (Fig. 3b).

Case 4

A 35-year-old female presented with diffuse abdominal pain for 4 years. The patient had undergone open appendicectomy 10 years back and revealed no other history of other surgical intervention or abdominal trauma. On examination, the abdomen was distended with diffuse tenderness, tachycardia and blood pressure of 100/50 mm Hg. CECT revealed a large tubular structure of metallic attenuation extending from ileal loop to sigmoid colon lumen, with adjacent clumped and adhered small bowel loops (Fig. 4). A possibility of iatrogenic foreign body (likely broken surgical instrument) with suspicious fistulous communication between the sigmoid colon and small bowel (ileocolic fistula) was kept. The patient developed sepsis and was shifted to the ICU for hemodynamic and ventilator support. The patient expired before surgery could be performed. The family denied the autopsy.

Case 5

A 62-year-old man underwent laparoscopic cholecystectomy and 1 week after discharge developed intense pain in the right upper abdomen. Ultrasound showed moderate free fluid in GB fossa and perihepatic regions. The patient underwent ERCP which revealed biliary leak through the cystic duct. A double pigtail plastic stent was placed. The patient was lost to follow up for the next 2 months. Two and
half months later the patient presented with colicky abdominal pain, vomiting, and distension of bowel. CECT of the abdomen was performed with oral and intravenous contrast administration. A few dilated ileal loops were seen in the umbilical region with abrupt narrowing of the lumen suggestive of intestinal obstruction (Fig. 5a). On adjusting window settings, a coiled tubular structure was observed at the site of abrupt narrowing (Fig. 5b). The plastic biliary stent was not seen in CBD. A diagnosis of the migrated biliary stent causing intestinal obstruction was made and the patient was taken up for laparotomy and surgical removal of the stent.

Case 6

A 30-year-old P2 L2 female presented with a history of lower abdominal pain for 1 week. She had undergone intracaesarean placement of intrauterine contraceptive device (Cu-T) that was placed 6 months ago. 3 months after the placement, she passed the IUD thread through the vagina. She presented to our hospital with cyclical pain abdomen and amenorrhea to our hospital for the last three months. Ultrasound and CECT abdomen revealed showed the presence of collection within the endometrial cavity suggestive of hematometra. Also, a hyperdense linear structure consistent with IUCD was seen in the right parametrium (Fig. 6). A diagnosis of post-surgical hematometra with misplaced IUCD was made and evacuation of hematometra and laparotomy was planned to remove the migrated IUCD. However, eventually, hysterectomy was performed with the retrieval of CU-T.

Case 7

A fifty-eight-year-old lady was referred for CECT abdomen for evaluation of postoperative sepsis. She underwent vaginal hysterectomy a day ago for uterine prolapse at an outside institute. Within hours after surgery, the patient became hypotensive and tachycardic.

Hemoglobin was 7 g/dl (from preoperative 11 g/dl)). Laparotomy was performed to arrest the bleeding. Subsequently, a day later, the patient was referred to our institute with sepsis. The patient was febrile and TLC was markedly raised (21000/ mm3). CT showed a large heterogeneous hematoma measuring approximately 14x 7x 4 cm in the pelvis and lower abdomen, posterior to the urinary bladder. A well hypodense structure was seen superior and anterior to the hematoma with multiple closely packed gas pockets within (Fig. 7a,b). A diagnostic suspicion of gossypiboma was made and the presumptive diagnosis was offered to the referring gynecology team.

However, after interacting with the operating surgeon, the re-evaluation of the scan was requested as the surgical sponge count was confirmed during and after surgery. The operating surgeon informed us that gelatine sponge (gel foam, Pharmacia) was used against the bleeding surface to produce hemostasis. To evaluate the imaging pattern of gelfoam, a scan of gelfoam soaked with blood, stuffed in surgical glove was obtained (Fig. 7c). Comparison with the scan and scrutiny of the pattern and morphology of the structure convinced us of the initial fallacy. The decision was made to conservatively manage the patient with i.v. antibiotic therapy. The patient gradually improved and was discharged after 7 days.
Discussion

Gossypiboma and other retained surgical items can be seen in cases of emergency surgery, the unexpected change in the surgical procedure, disorganization (e.g., poor communication), change in the surgical team or scrub nurses, hurried sponge counts, long operations, unstable patient, inexperienced staff, inadequate staff numbers, and obesity. Imaging features of gossypiboma are variable and depend on the time since surgery, secondary infection, communication with bowel, and other organs. (3) CT is the imaging modality of choice for diagnosis and identification of possible complications. The typical imaging appearance of gossypiboma on CECT are divided into three types (i) spongiform mottled air densities with or without surrounding fluid collection (case 3) (ii) a well-defined cystic mass containing distinct internal hyperechoic wavy, striped structures similar to hydatid cyst (case 2); and (iii) non-specific pattern with a complex mass (case 1) (3–5). Mottled air loculi adjoining the gossypiboma can be seen up to six months after surgery (6).

The presence of mottled gas densities in the surgical field, often alerts the radiologist and the surgeons to the possibility of gossypibomas, especially when accompanied by clinically evident sepsis. However, bioabsorbable hemostatic agents used at the time of surgery contain coalescent gas trapped within their interstices and hence mimic gossypibomas, as seen in case 7 (7). In chronic cases, the calcified reticulate rind has been reported as a useful sign to diagnosed gossypiboma where the gas bubbles within are gradually absorbed (8). In complicated cases, the gauze can be seen extending into the bowel, vagina, or urinary bladder or can cause intestinal obstruction (4).

The fourth case of our series most likely represented a retained surgical instrument that showed transmural migration to bowel lumen and subsequent ileocolic fistula. Besides surgical sponge, various other instruments such as clamps, retractors, drains, electrodes can be left behind after abdominal surgeries (9). Similar to sponges they can also manifest as an abscess or inflammatory mass. Also, they can show catastrophic complications such as massive gastrointestinal bleed, perforation of the bowel, bowel fistula, or intestinal obstruction. (9)

Distal migration of plastic biliary stent occurs in 8–10% cases and mostly are evacuated spontaneously. Uncommonly they migrate and embed in the duodenal diverticula. Rare case reports of bowel perforation have been described in the literature with perforation of duodenal diverticula, duodenum, caecum, or ascending colon (10). A case of duodenocolic fistula due to migrated stent has been reported (11). Verma et al reported a case of a mentally sound teenage male having eaten plastic wires leading to plastic bezoar causing an intestinal obstruction (12). However, obstruction caused by migrated plastic stent has not been reported.

The migration of intrauterine contraceptive devices from fundus is a common complication. The migration can vary from intrauterine displacement, expulsion through the vaginal canal, embedment into myometrium to complete uterine perforation into the parametrium or peritoneum (13). Perforation of IUCD into parametrium and hematometra, both are likely results of improper surgical technique of closure.
of uterine incision of cesarean section has been reported previously as an isolated case report (14). CT scan can effectively demonstrate the location of migrated IUCD and guide the surgical retrieval.

**Conclusions**

Our series describes the spectrum of CT findings of retained and migrated surgical items. CT is the most useful modality for diagnosis, localization, evaluation of adjacent anatomy, and recognition of complications of abdominal retained surgical items. Due to its variable and confusing clinical presentations, the radiologist is often the first to recognize the diagnostic possibility of RSI. Timely communication with the referring clinician is most urgent for those patients. Familiarity with imaging findings and communication with the clinician can facilitate timely management for these patients.

**Abbreviations**

CECT: Contrast enhanced CT, USG: ultrasonography, IUCD: Intrauterine contraceptive device, TLC: Total leukocyte count.

**Declarations**

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Figures

Figure 1

CECT image showing heterogeneously enhancing lesion (arrow) with multiple tiny non enhancing fluid density components (curved arrow) posterior to urinary bladder. (figure 1a). Exploratory laparotomy done revealed a a globular inflammatory mass bulging posterior to bladder, filled with surgical mop and and purulent material (fig 1b, c).
Figure 2

CECT image showing an intraperitoneal complex cystic lesion (arrow) in right hypochondrium with internal lamellated membrane (fig 2a). Intraoperatively a capsulated gauze was seen in right subhepatic region(fig 2b,c).

Figure 3

CECT image showing a well defined thick walled heterogenous intra-peritoneal collection (black arrow) in supravesical region with mottled air loculi in center ( white arrow) indicating a possibility of retained sponge (Fig 3a). Exploratory laprotomy revealed a surgical gauze present adherent to the posterior surface of bladder (fig 3b).
Figure 4

CECT coronal (a) and axial (b) images showing a large tubular structure of metallic attenuation (arrow) extending from ileal loop to sigmoid colon lumen, with adjacent clumped and adhered small bowel loops suggestive of ileocolic fistula.

Figure 5
A few dilated ileal loops were seen in the umbilical region with abrupt narrowing of the lumen (white arrow) suggestive of intestinal obstruction (fig 5a). On adjusting window settings, a coiled tubular structure (black arrow) is observed at the site of abrupt narrowing (fig 5b) suggestive of migrated biliary stent.

![Image of ileal loops and biliary stent](image1)

**Figure 6**

CECT (a) and ultrasound (b) images showing a hyperdense linear structure in right parametrium (arrow) consistent with migrated IUCD as well as hematometra (HM).

![CECT and ultrasound images](image2)

**Figure 7**

CECT image shows a large pelvic hematoma and a hypodense structure seen superior and anterior to the hematoma with multiple closely packed gas pockets (arrow) within (figure 7 a,b). To evaluate the imaging pattern of gelfoam, a scan of gelfoam soaked with blood, stuffed in surgical glove was obtained (figure 7c) which showed similar appearance.

**Supplementary Files**
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- CAREchecklistEnglish2013.pdf