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Case Report

Gossypiboma Presenting as Coloduodenal Fistula – Report of a Rare Case With Review of Literature

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The term gossypiboma is used to describe a mass of cotton matrix left behind in a body cavity intraoperatively. The most common site reported is the abdominal cavity. It can present with abscess, intestinal obstruction, malabsorption, gastrointestinal hemorrhage, and fistulas. A 37-year-old woman presented with pain in the right hypochondrium for 2 months following open cholecystectomy. As she did not improve with proton pump inhibitors, an esophagogastroduodenoscopy (EGD) was done, which showed a possible gauze piece stained with bile in the first part of the duodenum. Contrast-enhanced computed tomography (CECT) of the abdomen revealed an abnormal fistulous communication of the first part of duodenum with proximal transverse colon, with a hypodense, mottled lesion within the lumen of the proximal transverse colon plugging the fistula, suggestive of a gossypiboma. Excision of the coloduodenal fistula, primary duodenal repair, and feeding jejunostomy was done. The patient recovered well and is now tolerating normal diet. Coloduodenal fistula is usually caused by Crohn's disease, malignancy, right-sided diverticulitis, and gall stone disease. Isolated coloduodenal fistula due to gossypiboma has not been reported in the literature so far to the best of our knowledge. We report this case of coloduodenal fistula secondary to gossypiboma for its rarity and diagnostic challenge.

Key words: Surgical sponges – Intestinal fistula – Multidetector computed tomography

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The first report of a coloduodenal fistula was by Haldane in 1862, and it was malignant from the hepatic flexure.[1] Coloduodenal fistula is caused by Crohn's disease, malignancy, right-sided diverticulitis, and gall stone disease, but isolated coloduodenal fistula due to gossypiboma has not been reported in the literature to the best of our knowledge. Gossypiboma is known to present as intra-abdominal abscess, intestinal obstruction, and fistulization, but coloduodenal fistula has not been reported as a mode of presentation. We report this case of coloduodenal fistula secondary to gossypiboma for its rarity and diagnostic challenge.

Case Report

A 37-year-old woman presented with pain in the right hypochondrium for 2 months. She had undergone open cholecystectomy 5 months earlier. Clinical examination revealed no abdominal tenderness. As she did not improve with proton pump inhibitors, an esophagogastroduodenoscopy (EGD) was done. It showed a possible gauze piece stained with bile in the first part of the duodenum (Fig. 1A). Plain abdominal X-ray showed metallic, dense, wavy, radiopaque shadow in the right hypochondrium (Fig. 2). Contrast-enhanced CT (CECT) of the abdomen revealed an abnormal fistulous communication (2.4 cm caliber) of the first part of the duodenum with the proximal transverse colon. There was a hypodense, nonenhancing, gas-containing mass within the lumen of the proximal duodenum and transverse colon plugging the fistula, containing wavy linear metallic density consistent with a surgical sponge with radiopaque marker. Other than the fistula, the walls of the duodenum and colon were normal with no evidence of adjoining abscesses or fluid collections (Fig. 3). Ultrasonogram (US) of the abdomen was done retrospectively, which showed a hyperechoic mass with strong posterior acoustic shadowing, classic of gossypiboma (Fig. 4). Colonoscopy revealed a gauze piece in the proximal transverse colon (Fig. 1B). Excision of the coloduodenal fistula (Fig. 1C and 1D), primary duodenal repair, and feeding jejunostomy was done. The patient recovered well, and the contrast study done after 8 days showed no leak. The patient was then started on orals, and she tolerated normal diet.

Discussion

The term gossypiboma (textiloma, cottonoid, cottonballoma, muslinomas, or gauzeoma) is used to describe a mass of cotton matrix left behind in a body cavity intra-operatively.[2,3] It is derived from 2 words—the Latin word "gossypium" meaning cotton, and the Swahili word "boma" meaning place of concealment.[2–4] The first case of a gossypiboma was reported by Wilson in 1884.[2] The most commonly retained foreign body is the surgical sponge.[5] Retention of surgical sponges in the abdomen or pelvis has been reported to occur with a frequency of 1 in 100 to 5000 of all surgical interventions and 1 in 1000 to 1500 of intra-abdominal operations.[2,3,5]

The most common site reported is the abdominal cavity; however, virtually any cavity or surgical procedure may be involved; it can also occur in the breast, thorax, extremities, and the nervous system.[2] Gossypibomas may present in the immediate postoperative period or up to several decades after initial surgery. Gossypiboma can present as a pseudotumoral, occlusive, or septic syndrome.[2] Gossypiboma may present as an intra-abdominal mass and lead to erroneous biopsy attempts and unnecessary manipulations.[4] These retained sponges are most commonly seen in obese patients, during emergency operations involving hemorrhage, and after laparoscopic procedures.[2,3]

Cotton or gauze pads are inert substances and can cause foreign-body reactions in the form of exudative and aseptic fibrous responses.[2,4,6] The fibrous type presents with adhesions, encapsulation, and eventually granuloma formation. The exudative type occurs early in the postoperative period resulting in abscess formation and may involve secondary bacterial contamination. This results in the various fistulas seen in gossypibomas.[2,6] The longer the retention time of gauze or cotton, the higher is the risk of fistulization.[7]

Gossypibomas produce nonspecific symptoms and may appear years after surgery.[2] Gossypiboma can cause a variety of clinical presentations—from being incidentally diagnosed to being fatal. Clinical presentation may be acute or subacute. Patients present with nonspecific abdominal pain, palpable mass, nausea, vomiting, abdominal distension, and pain.[2,6] Extrusion of the gauze can occur externally through a fistulous tract or internally into the rectum, vagina, bladder, or intestinal lumen, causing intestinal obstruction, malabsorption, and gastrointestinal hemorrhage. Acute presentations result in abscess or granuloma formation. Delayed presentations present with adhesion formation and encapsulation.[2,6] Although gossypiboma is rarely seen in routine clinical practice, it should be considered in

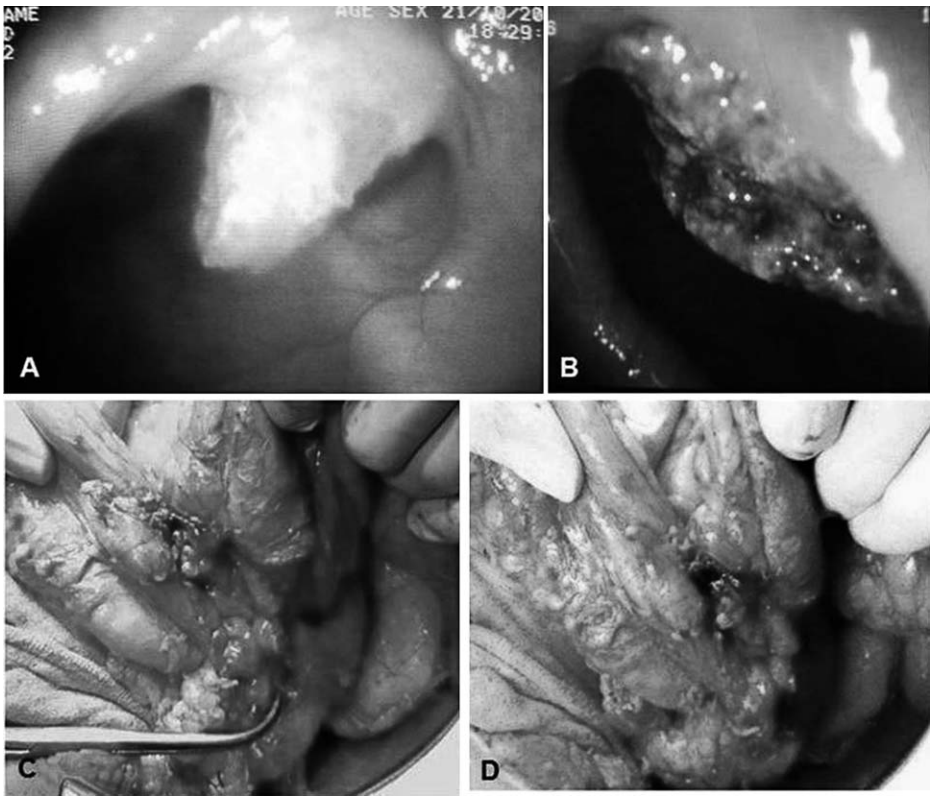

Fig. 1 A 37-year-old woman, post open-cholecystectomy, with gossypiboma and coloduodenal fistula. (A) Esophagogastroduodenoscopy showing gauze piece in the proximal duodenum. (B) Colonoscopic photograph showing gauze piece in the proximal transverse colon. (C) Intraoperative photograph showing fistula in colon. (D) Intraoperative photograph showing fistula in duodenum.

the differential diagnosis of acute mechanical intestinal obstruction in patients who have undergone laparotomy.[2] Only one case of surgical sponge migrating into the colon has been reported to be evacuated by defecation.[8]

Retained surgical sponges with radiopaque markers are readily made out on standard plain X-rays of the abdomen. The radiopaque markers are usually filaments impregnated with barium sulphate and may fold, twist, or disintegrate over periods of time. Surgical sponges without radiopaque markers are being used in some hospitals, and though X-rays cannot give a straightforward diagnosis, they may show a characteristic whorl-like pattern owing to gas trapped within the cotton fabric.[2,6] Gossypibomas complicated by fistula formation benefit from X-ray contrast studies to define the anatomy and extent of the abnormality.[2]

Gossypiboma on ultrasound (US) appears as a well-delineated mass containing a wavy internal echo, with a hypoechoic ring and strong posterior acoustic shadowing.[2,9] Sonographic findings of abdominal gossypiboma can be broadly grouped into 3 types: (1) linear or arc-like echogenic area with intense posterior acoustic shadowing obscuring internal characteristics of the mass as was seen in our case; (2) a hypoechoic or cystic mass representing foreign-body inflammatory tissue response with central wavy hyperechogenicity and posterior acoustic shadowing owing to the gauze piece; and (3) nonspecific pattern with a hypoechoic or complex mass that may be difficult to differentiate from tumor.[10,11] Posterior acoustic shadowing observed in all cases is due to the reflection of the ultrasound beam from the surface of the mass by the foreign body as well as the gas trapped within the cotton fibers or to calcification.[10–13]

CT is the imaging modality of choice for detecting gossypibomas and its possible complications.[2,9] A CT finding of a low-density heterogeneous mass with an external high-density wall (with contrast enhancement) is considered to be specific for

Fig. 2 A 37-year-old woman, post open-cholecystectomy, with gossypiboma and coloduodenal fistula. Plain X-ray of the abdomen, Antero-posterior view (supine) showing metallic, dense, wavy radiopaque shadow in the right hypochondrium (*arrow*).

gossypiboma by several authors. The internal whirl-like or spongiform pattern containing air bubbles is the most characteristic sign.[2,9] The radiopaque marker strip if present is seen as a thin, wavy, or crumpled metallic density in the mass, as in our case.[2,4] Calcification of the wall of the mass may also be observed on CT.[2] CT findings of gossypiboma may sometimes be indistinguishable from those of an intra-abdominal abscess.[2] Likewise, CT findings of gossypiboma may sometimes be indistinguishable from those of fecaloma, hematoma, abscess, and tumor. Fecalomas on CT are seen as intraluminal colonic masses, with a spotted appearance, lacking a definite capsule. The differentiation of intraluminal gossypiboma (as in our case) from fecaloma could have been difficult in the absence of the radiopaque marker and the fistula. Early postoperative hematomas are slightly hyperdense, with attenuation values of 50 to 80 HU, owing to proteinaceous blood products and are seen to resolve on follow-up studies. Intra-abdominal abscess is seen as a hypodense area of fluid attenuation with a thick, well-defined, enhancing wall. If gas is present within an abscess, it produces an air–fluid level rather than the spongiform or whirl-like pattern characteristic of gossypiboma. However, abscess can also result as a complication of gossypiboma. Gossypiboma can also present as a palpable abdominal mass in patients with a past history of laparotomy, thus mimicking an abdominal tumor. The observation of a mass with strong acoustic shadowing on ultrasound and classic, central whorled pattern of gas within the mass, with a thick, enhancing capsule and central non-enhancing areas on CT will help in the differentiation of gossypiboma from abdominal tumor.

A retained sponge typically appears as a soft-tissue-density mass with a thick, well-defined capsule with a whorled internal configuration on T2-weighted imaging on magnetic resonance imaging (MRI).[2,4] Gossypiboma is seen as a well-circumscribed mass with a hyperintense center and a peripheral hypointense rim on T2-weighted images, showing strong peripheral-rim enhancement on contrast-enhanced T1-weighted images. The radiopaque markers seen on X-rays and CT scans are usually not made out on MRI since the impregnated barium sulphate filaments do not have any magnetic property.[14]

In our case, it may be inferred that the surgical sponge retained during the previous surgery for cholecystectomy could have gradually eroded the adjoining walls of the proximal duodenum and transverse colon creating a fistulous tract and thus migrated intraluminally. The high pressure in the colon may push the colonic contents into the duodenum where the pressure is low, resulting in feculent vomiting. However, in our case, there was no feculent vomiting as the surgical sponge was plugging the fistula tract tightly.

Retained surgical foreign bodies (RSFB) can lead to significant medical and legal problems between the patient and the doctor and have an estimated incidence of approximately 0.3 to 1.0 per 1000 cases. RSFB can result in the surgeon facing charges of medical negligence, thereby increasing the hospital costs for unnecessary legal tangles and compensation. Also, it affects the reputation of the surgeon and contributes to unnecessary morbidity to the patient, which is potentially avoidable.[15]

The best way to avoid RSFB is to prevent its occurrence. The different ways to avoid such events are to accurately count all the pieces of surgical gauze and surgical instruments used during an operation, repeat the count in case of any doubt to a member of the operating team, inspect the operative

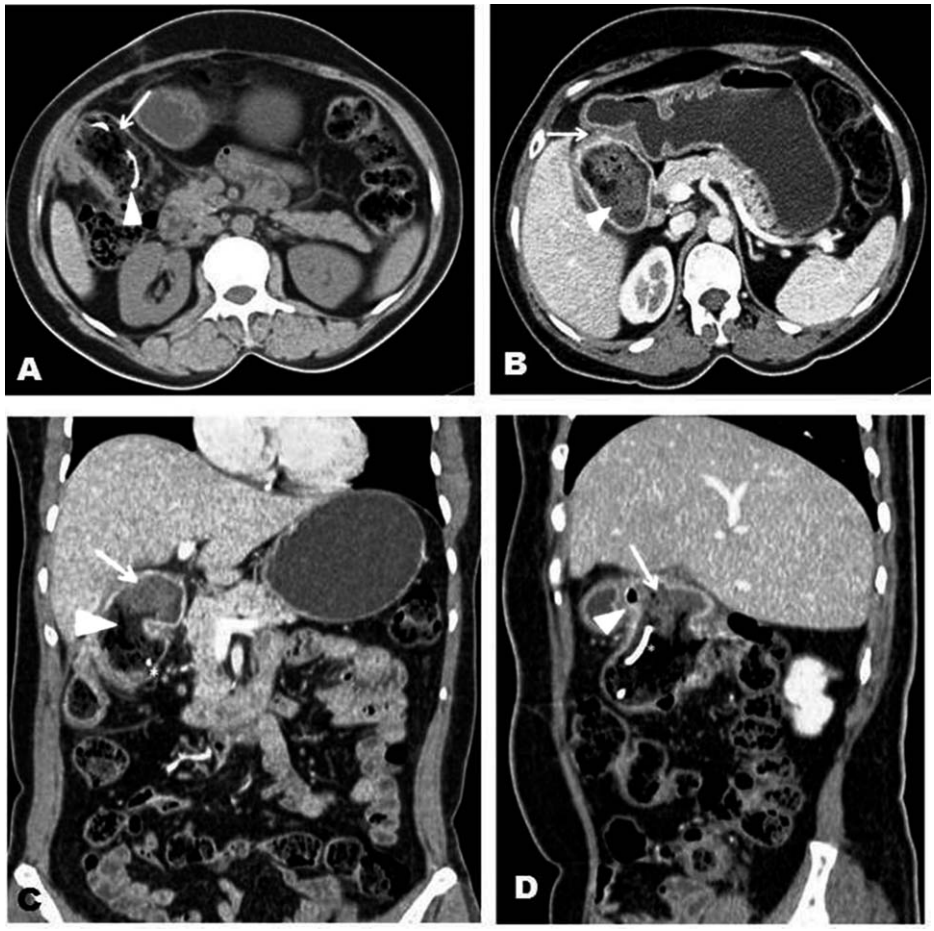

Fig. 3 A 37-year-old woman, post open-cholecystectomy, with gossypiboma and coloduodenal fistula. (A) Nonenhanced axial CT scan of the abdomen showing intraluminal hypodense gas-containing mass (*arrow*) in the proximal transverse colon, with metallic density (*arrowhead*) in the mass consistent with surgical sponge having radiopaque marker strip. (B) Contrast-enhanced (venous phase) axial CT scan of the abdomen showing intraluminal hypodense gas-containing mass (*arrow*) in the proximal duodenum and the fistulous tract (*arrowhead*). (C) Contrast-enhanced (venous phase) coronal reformatted CT image of the abdomen showing an intraluminal hypodense gas-containing mass (*arrow*) in the proximal transverse colon with metallic density (*). A 2.5-cm fistulous tract (*arrowhead*) is seen between the proximal duodenum and the proximal transverse colon. (D) Contrast-enhanced (venous phase) sagittal reformatted CT image of the abdomen showing an intraluminal hypodense gas-containing mass (*arrow*) in the proximal duodenum and proximal transverse colon with metallic density (*). A 2.5-cm fistulous tract (*arrowhead*) is seen between the proximal duodenum and the proximal transverse colon. [Siemens Sensation 64 Multislice CT, 250 mAs, 120 kV, 2-mm slices: oral contrast—30 mL meglumine diatrizoate (Urograffin) 60% diluted in 1 L water; intravenous contrast: meglumine diatrizoate (Urograffin, Erlangen, Germany) 60%, 50-mL bolus.]

field thoroughly before closure, use radiopaque markers, and X-ray the operative region before and after fascial closure while the patient is still on the operating room table. All these assume particular importance and significance in difficult surgeries, which span many hours and where a lapse in concentration is expected on the part of the operating team members. Meticulous attention should be paid to surgery until its completion to avoid such events.[16]

Conclusion

Diagnosis of gossypiboma is not straightforward, and delayed diagnosis can be a surgical problem. Inadvertently retained sponges are not usually suspected clinically and are subsequently recognized on imaging. Coloduodenal fistula is a rare presentation of gossypiboma, which can be successfully managed with excision of the fistula with primary duodenal repair.

Fig. 4 A 37-year-old woman post open-cholecystectomy with gossypiboma and coloduodenal fistula. B-mode US of the right upper abdomen showing a hyperechoic mass (*arrow*) with strong posterior acoustic shadowing (*arrowhead*)—classic US appearance of gossypiboma; liver and kidney are shown (Siemens CH6-2 2D US, 4.44 MHz, Erlangen, Germany).

References

1. Haldane DR. Case of cancer of the caecum, accompanied by with caecoduodenal and caecocolic fistulae. *Edinburgh Med J* 1862;**7**:624–629
2. Manzella A, Filho PB, Albuquerque E, Farias F, Kaercher J. Imaging of gossypibomas: pictorial review. *AJR Am J Roentgenol* 2009;**193**(suppl 6):S94–101
3. Dakubo J, Clegg-Lamptey J, Hodasi W, Obaka H, Toboh H, Asempa W. An intra-abdominal gossypiboma. *Ghana Med J* 2009;**43**(1):43–45
4. Sun HS, Chen SL, Kuo CC, Wang SC, Kao YL. Gossypiboma—retained surgical sponge. *J Chin Med Assoc* 2007;**70**(11):511–513
5. Taçyildiz I, Aldemir M. The mistakes of surgeons: "gossypiboma." *Acta Chir Belg* 2004;**104**(1):71–75
6. Arpit N, Abhijit RA, Ranjeet NS, Govind C, Hira P, Bhatgadde VL. Gauze pad in the abdomen: can you give the diagnosis without knowing the history? Available at: http://www.jradiology.com/arts/50.pdf. Accessed July 4, 2013
7. Gencosmanoglu R, Inceoglu R. An unusual cause of small bowel obstruction: gossypiboma-case report. *BMC Surg* 2003;**3**:6
8. Manikyam SR, Gupta V, Gupta R, Gupta NM. Retained surgical sponge presenting as a gastric outlet obstruction and duodeno-ileo-colic fistula: report of a case. *Surg Today* 2002; **32**(5):426–428
9. Ersoy H, Saygili OB, Yildirim T. Abdominal gossypiboma: ultrasonography and computerized tomography findings. *Turk J Gastroenterol* 2004;**15**(1):65–66
10. Yamato M, Ido K, Izutsu M, Narimatsu Y, Hiramatsu K. CT and ultrasound findings of surgically retained sponges and towels. *J Comput Assist Tomogr* 1987;**11**(6):1003–1006
11. Sugano S, Suzuki T, Iinuma M, Mizugami H, Kagesawa M, Ozawa K *et al*. Gossypiboma: diagnosis with ultrasonography. *J Clin Ultrasound* 1993;**21**(4):289–292
12. Choi BI, Kim SH, Yu ES, Chung HS, Han MC, Kim CW. Retained surgical sponge: diagnosis with CT and sonography. *AJR Am J Roentgenol* 1988;**150**(5):1047–1050
13. Kokubo T, Itai Y, Ohtomo K, Yoshikawa K, Iio M, Atomi Y. Retained surgical sponges: CT and US appearance. *Radiology* 1987;**165**(2):415–418
14. Van Goethem JW, Parizel PM, Perdieus D, Hermans P, de Moor J. MR and CT imaging of paraspinal textiloma (gossypiboma). *J Comput Assist Tomogr* 1991;**15**(6):1000–1003
15. Stawicki SP, Evans DC, Cipolla J, Seamon MJ, Lukaszczyk JJ, Prosciak MP *et al*. Retained surgical foreign bodies: a synopsis. *OPUS 12 Scientist* 2008;**2**(2):1–6
16. Stawicki SP, Evans DC, Cipolla J, Seamon MJ, Lukaszczyk JJ, Prosciak MP *et al*. Retained surgical foreign bodies: a comprehensive review of risks and preventive strategies. *Scand J Surg* 2009;**98**(1):8–17