



New face and...tail of gossypiboma

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ABSTRACT. BACKGROUND: Gossypiboma (retained surgical sponge) is a rare but a severe surgical case. It can cause variable and often serious complications requiring repeated and risky surgical interventions in order to remove them, and may lead to high morbidity and mortality. **CASE PRESENTATION:** We present a case of a gauze pad unintentionally left in the abdominal cavity of a 61-year-old patient after a sigmoidectomy with a Hartmann's procedure. Although the textile sponge was recognized and removed during the same hospitalization, the patient was subsequently diagnosed with a large abdominal fat-containing mass, requiring repeated surgery. Microscopic examination revealed fibrous-adipose and granulation tissue, and thread granulomas of a foreign body type. **CONCLUSIONS:** Even relatively short-term retention of a gauze object in the abdominal cavity associated by unusual host response may result in the growth of a large abdominal granuloma, which has all radiological signs of a tumor. To prevent the incidence of gossypiboma, it is necessary to strictly follow the rules of the operating room and apply all the available measures.

KEY WORDS: gossypiboma, retained surgical sponge, iatrogenic complication, computed tomography, fat-containing mass, foreign body granuloma, redo surgery.

INTRODUCTION

The term gossypiboma is derived from the Latin word “gossypium” meaning cotton wool, and the suffix –“oma” meaning mass [1, 2]. Gossypiboma refers to a mass consisting of accidentally forgotten cotton materials such as gauze or compress during surgery inside the body. The most often gossypibomas occur in the abdominal cavity. They can be asymptomatic for a long time and detected accidentally while simulating abdominal tumors or causing various complications [3]. The most common acute complications of abdominal gossypiboma include abscess formation, peritonitis, chronic purulent cutaneous fistula, erosion of the intestinal wall with partial or complete migration of the foreign body into the gastrointestinal tract, manifested as small bowel obstructions [4, 5]. The delay in diagnosis of this iatrogenic condition, combined with the severity of possible complications, can have negative effects including high patients' morbidity.

The exact occurrence of gossypiboma is unknown because many incidents are either not discovered or not reported, due to possible

forensic medico-legal consequences or likely widespread critical press coverage with both surgeon's and hospital's lost reputation [6]. According to the most reliable assessments, the complication occurs 1 in 1,000 to 1,500 of abdominal surgeries [4].

Here we present a clinical case of a gauze sponge forgotten in the abdominal cavity after an emergency sigmoidectomy and Hartmann procedure for acute neoplastic ileus. Although the foreign body was discovered and retrieved during the same hospitalization, a follow-up radiological examination 16 months later revealed a fat-

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containing tumor-like mass of considerable size in the abdominal cavity. Removal of the tumor required a second surgical intervention. Postoperative histological examination of the tumor mass revealed the fibrous-adipose and granulation tissue, with diffuse and focal lympho-histo-plasmacytic infiltration, and thread granulomas of a foreign body type. To our knowledge, this is the first report of a late huge abdominal granuloma simulating fat-containing tumor as a consequence of an excessive proliferative host response to a relatively short-term retention of a gauze sponge in the abdominal cavity.

CASE REPORT

A 61-year-old man was admitted for closure of colostomy. From the history of disease: 16 months ago, he had an emergent surgery in the same hospital for acute large bowel obstruction due to an occlusive tumor of the sigmoid colon. The patient underwent Hartmann's procedure – resection of sigmoid colon and terminal colostomy. It is noteworthy that the surgery was performed in the late evening, “afterhours” (i.e., between 6 PM and 9 PM), and was accompanied by a change of a scrub nurse. The following histopathology report described moderate-differentiated adenocarcinoma (G2) with serosal invasion and involvement of 4 of 14 sampled lymph nodes (TNM stage pT3 pN2a L0 V0 Pn1 R0). The early postoperative period is unfavorable, with diffuse abdominal pain, intestinal paresis, fever up to 38°C, and an elevation of inflammatory parameters in laboratory tests. Abdominal sonography was inconclusive although suggested an intra-abdominal abscess. The patient underwent computed tomography (CT) of the abdominal cavity. In the left upper abdomen, the slightly encapsulated mass of a spongiform pattern and multiple gas bubbles inside, measuring 109x85x125mm in size, and with infiltrative changes of adjacent tissues is visualized (Fig.1). With these radiological findings the provisional diagnosis of gossypiboma was established.

Finally, 15 days after the primary intervention and during the same hospitalization, the patient underwent an urgent exploratory laparotomy with easy retrieval of a gauze sponge

measuring 15x15x10 cm in size. No lesions of surrounding organs and structures were found. There was a rapid disappearance of the pathological symptoms, and after 4 days he was discharged in good condition. The patient had been referred for postoperative adjuvant therapy, Hence, he underwent 4 courses of chemotherapy with a combination of folinic acid, fluorouracil and oxaliplatin (FOLFOX).



Figure 1. CT scan appearance of a textile foreign body, accidentally left in the abdominal cavity (gossypiboma) as a slightly encapsulated mass of spongiform pattern with entrapped air bubbles (arrows).

A year and 4 months after the primary surgery, being fully asymptomatic, the patient had been addressed to the same hospital for the closure of colostomy. However, on the preliminary CT scan on the left abdominal flank a well-circumscribed mass of 16x8x4 cm in size with adipose tissue content (average density: -81 Hounsfield units), with thick walls and an irregular outline, and infiltration of adjacent tissues is visualized (Fig.2). The mass was described by radiologist as a fat-containing abdominal tumor, suggestive of lipogranuloma or

mesenteric panniculitis, while there were no signs of local recurrence or dissemination of the previous colonic adenocarcinoma (distant metastases, lymphadenopathy). At the same time, the hypotheses of new neoplastic process such as liposarcoma was also considered in the differential diagnosis. In addition, taking into account the patient's past surgical history, we did not rule out an inflammatory pseudotumor, as a consequence of the second sponge left behind. Subsequently, the patient was scheduled for a laparotomy to establish the origin of the new tumor, as well as to close the colostomy.



Figure 2. A well-circumscribed fat-containing mass (with density range from -54 to -105 Hounsfield units) on the left abdominal flank, diagnosed on contrast-enhanced CT scan (arrows).

Exploration of the abdominal cavity revealed a tumor mass of 15x8x6 cm in size, in the left lateral flank with an extension toward left iliac fossa and into the mesogastric area and retroperitoneal space, well delimited, of an irregular shape, with a hard-elastic consistency, closely attached to the left lateral abdominal wall, mesentery and jejunal loops. Removal of the

tumor within the limits of macroscopically unchanged tissues with enforced resection of a 50 cm long jejunal loop (2 segments of jejunum were adhered to the tumor with suspicion of serosal invasion) was performed, and an end-to-end jejuno-jejunal anastomosis was created. Hand-sewn end-to-end colorectal anastomosis was done with closure of the colostomy and restoration of the digestive tract integrity. Macroscopic examination of gross pathologic specimen shows homogeneously yellow adipose tissue covered with a thick capsule, with a yellow cut surface on section (Fig.3). However, the presence of a foreign body inside the tumoral mass or anywhere in the peritoneal cavity was not evident.



Figure 3. Photograph of gross pathologic specimen demonstrates the removed abdominal tumor, 15x8x6 cm in size, separated from the intestinal loop. The tumor is completely encapsulated, and shows a homogeneously yellow cut surface characteristic of adipose tissue, without any gross foreign body inside.

Subsequent histological examination of the removed surgical specimen revealed the composition of tumor from fibrous-adipose and granulation tissue, with diffuse and focal lympho-

histo-plasmacytic infiltration, and thread granulomas of a foreign body type (Fig.4). Atypical cells with mitotic activity in the studied material are not determined.

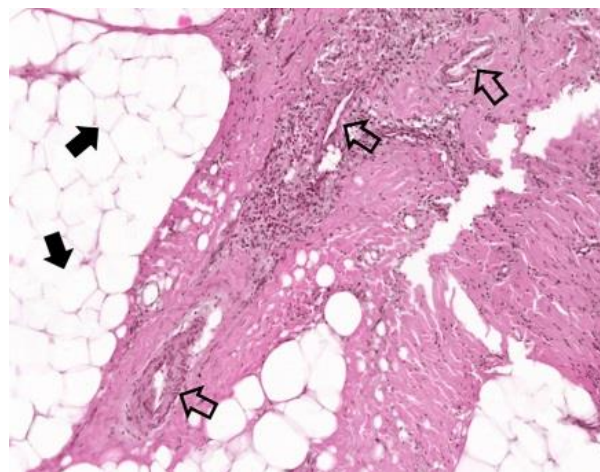


Figure 4. The microscopic findings (Hematoxylin & Eosin staining, x200) demonstrate mature adipocytes (arrows), fibrous septa with chronic venous congestion, diffuse and focal lympho-histo-plasmacytic infiltration and "thread" granulomas of a foreign body type (open arrows).

The patient has been symptom-free in one year of follow-up. Abdominal CT screening performed 12 months after surgery, having been apparently free of disease, both for fat-containing abdominal lesions recurrence and colon adenocarcinoma dissemination.

DISCUSSION

Gossypiboma is mentioned in the medical literature as one of those rare surgical complications that should never happen. Their actual incidence is unknown because some patients remain asymptomatic or present with nonspecific symptoms, and due to underreporting of cases, given the potential serious reputational and medico-legal repercussions for surgeons and hospitals. The reported incidence of the retained textile surgical items varies widely and ranges from 0.01% to 1% of abdominal operations, or according to the most realistic estimates from 1 in 1,000 to 1,500 surgeries [4, 6].

Unintentional forgetting of the textile matrix in surgical field is most often described in

emergency and long-term surgical interventions, accompanied by significant bleeding. However, the main risk factor is recognized as human error in the current and final counting and surveillance of surgical objects used during surgery [1, 7]. The risk of such errors increases significantly with appearance of sudden unplanned situations, the late "afterhours" time of intervention and change in surgical team [4, 6]. Regrettably, such unfortunate combination of circumstances: an urgent surgery after the end of scheduled working hours, a change in scrub nurse, could explain (but not excuse) the erroneous leaving of a gauze sponge in the abdominal cavity in our case.

The clinical presentation of gossypiboma is widely variable and depends on the location of sponge, duration of its retention and the type of reaction [2]. It is well known that gossypiboma leads to two leading types of foreign body reaction [6]. The first is a chronic aseptic fibrinous reaction leading to the formation of a foreign body granuloma and the development of a mass (this reaction may be clinically asymptomatic for many years and is only discovered incidentally which is often mistaken for a tumor). The second type of reaction, called exudative, includes persistent inflammation leading to intra-abdominal abscess and other septic complications that are likely to appear in the early post-operative period. In any case, the clinical signs are nonspecific, since the possibility of leaving a foreign body is rarely taken into account when assessing the complicated course of the early postoperative period in an individual patient. Therefore, imaging studies play a decisive role in establishing a timely diagnosis. A simple abdominal x-ray may be sufficient to detect a radiopaque marker if it is present on a left gauze sponge [1, 6], which was not the case in our situation. Ultrasound imaging might reveal a heterogeneous mass and strong posterior acoustic shadowing, caused by a crumpled and fluid-soaked sponge [3]. However, ultrasound has some limitations, especially when examining the early postoperative abdomen, and may not identify foreign bodies at great depths or located behind gas-containing hollow organs [3]. In addition, gossypiboma can mimic infected

hematomas or abscesses, which was stated in the present case. Abdominal CT scanning is the best imaging modality for diagnosis and precise localization of gossypiboma. The spongiform pattern of a well-circumscribed mass with entrapped gas bubbles is the most characteristic CT sign for gossypibomas [6], supplemented with a thin high-density capsule showing marked enhancement in postcontrast studies [1]. Once an abdominal gossypiboma is recognized, it must be removed immediately, which is supposed to stop the pathological symptoms, as well as prevent a variety of often severe further complications [2, 7]. Despite anecdotal reports of laparoscopic or endoscopic extraction of gossypibomas, redo open surgery remains the most reliable method for removing foreign bodies unintentionally left in the abdominal cavity [6].

There are a variety of fat-containing lesions that can arise in the intraperitoneal cavity and retroperitoneal space. Their common feature on CT is the identification of the fat component with low attenuation with a range of -10 to -100 Hounsfield units [8]. In some cases, the origin and localization of the tumor on imaging exams is quite clear, when they certainly come from the corresponding organ (ie, kidney, liver, adrenal gland, ovary). A significantly greater diagnostic dilemma is presented by intra-abdominal and retroperitoneal uncommon fat-containing masses with no evident connection with surrounding organs. At the same time, an extremely important task from a clinical standpoint is to establish the origin and malignant potential of the mentioned tumors. In fact, some of them need to be removed under any circumstances (ie, liposarcoma, retroperitoneal teratoma, renal cell carcinoma), others – only when they reach a large size or become symptomatic (ie, lipoma, myelolipoma, angiomyolipoma, adrenal adenoma, mesenteric panniculitis) [8]. However, the problem is that reliable preoperative histological evaluation to determine the only correct treatment approach is not easy and requires adequate sampling of the tumor [9]. Otherwise, complete surgical excision with negative margins remains the standard of care for unclassified histologically and potentially malignant abdominal or retroperitoneal masses. Initially, in our case,

liposarcoma, an inflammatory pseudotumor, and mesenteric panniculitis were considered the most likely based on interpreting radiological findings of fat-containing lesion on the left abdominal flank. However, the more apparent hypothetical diagnoses were not histologically confirmed ultimately. On the contrary, macroscopic and microscopic examinations strongly indicated the inflammatory origin of the abdominal mass.

In this regard should be mentioned that any foreign object elicits a reaction in the human body [1]. Manifestations of this reaction, as well as the natural evolution of foreign textile items unintentionally left in the human body after surgery is variable, and depends on its location, composition, grade of microbial contamination, and individual response. Even if the textile matrix is removed from patient after 3-4 days, the induction of an inflammatory reaction with or without elements of infection can already be observed [2]. Host reactions following implantation of biomaterials include injury, blood-material interactions, provisional matrix formation, acute inflammation, chronic inflammation, granulation tissue development, foreign body reaction, with evolution to a mature fibrous capsule [10, 11]. Chronic inflammation is less uniform histologically than acute inflammation and this term has been used to identify a wide range of cellular responses, including granuloma formation with foreign body giant cells [10]. The formation of a fibrous capsule appears to be the most critical aspect in subsequent histogenesis. Within this capsule, however, there remains an ongoing “remodeling” of the reaction, with histologic evidence of focal fibroblastic and/or vascular proliferation [11]. At least two cases of angiosarcomas arising in the fibrous capsule of a retained in the abdomen sponge have been published [11, 12]. The authors of these rare reports conclude that in case of unusual host response, the implanted foreign material should be considered capable of inducing virtually any form of sarcoma in humans. Other, at first glance seem less dramatic, manifestations of a reaction to a foreign body, implanted or inadvertently left in the abdominal cavity, include granulomas. Numerous cases of postoperative abdominal granulomas of large

sizes are described in the medical literature [13, 14, 15, 16]. Granuloma is formed more commonly due to non-absorbable suture material, such as silk and polyfilament threads [13, 14], but also surgical sponges [16]. The clinical importance of their differentiation especially increases in patients who have undergone surgery for neoplasms, because they create imaging findings that may be confused with a malignant lesion recurrence at a previous operative site [15], as occurred in our case. However, its definite diagnosis is only made after the surgical excision of the lesion followed by histological examination [14]. Therefore, if recurrence cannot be completely ruled out, diagnostic surgery is required [16].

Based on retrospective assessment of the history and evolution of disease, radiological data, surgical discoveries and histological findings, we are entitled to propose the following hypothesis. In our view, the appearance of a completely benign fat-containing large abdominal tumor mass, with microscopic signs of an inflammatory granuloma, is most likely due to the temporary presence of a gauze matrix in the abdominal cavity in combination with an unusually strong and extent proliferative host response to a foreign body. In support of this, several arguments should be put forward: First, the histological structure of the pseudotumor mass is determined by chronic inflammation with thread granulomas of a foreign body type, which can be either a persistent proliferative reaction to a two-week retention of gossypiboma in the abdominal cavity, or to residual single gauze fibers after removal of the foreign body bulk; Second, macroscopic examination of the removed surgical specimen did not reveal the gross foreign bodies; Third, the location of the new fat-containing tumor mass generally matches the previous site of gossypiboma; Fourth, repeated CT scan along with intraoperative findings confirm the absence of pseudotumor at the time of primary surgery; Fifth, the rapid development of tumor to its actual large size within a relatively short period of sixteen months elapsed between two surgical interventions is characteristic of the inflammatory origin of mass,

which tend to occur two years post-operatively [13, 14].

To our knowledge, this is the first case report in the medical literature of a late large abdominal granuloma simulating a fat-containing tumor as a result of an excessive proliferative response to a relatively short-term retention of a gauze sponge in the abdominal cavity. Future analyses and documentation of similar cases, as well as expert opinions regarding the nature and the extent of host reaction to foreign material, are needed to confirm our presumption and explain the pathophysiological mechanisms and histological characteristics of this unusual complication.

Although inadvertently leaving sponges and other surgical items inside patients may cause clinically dangerous consequences, they are entirely preventable, being called by clinicians as “never events” for this reason [7]. Nowadays, there are many guidelines and protocols developed at the global and national levels to enable the prevention of these events in the form of patient safety measures [1, 5]. A correct surgical checklist and accurate counts for sponges and instruments are highly advisable. This is the responsibility of the whole surgical team including surgeons and their assistants, scrub and circulating nurses, and even support staff. Careful sponges counting at four stages of any surgical procedure is necessary: at the beginning, while closing any hollow viscus, peritoneum, and skin [5]. If any discrepancy is found, it is the responsibility of the entire surgical team to find the missing object with every effort by all possible means.

CONCLUSIONS

Despite increased attention to patient safety, gossypiboma is still encountered in daily surgical practice. The possibility of the abdominal gossypiboma should be considered in differential diagnosis of any postoperative patient who presents with pain, infection, or a palpable mass, and highly sensitive diagnostic modalities such as CT should be applied immediately.

In addition to more common complications, even a relatively short-term retained gauze matrix in the abdominal cavity under certain conditions can lead to an unusually

strong proliferative response of the host organism to a foreign body and, as a result, lead to formation of a large-size abdominal granuloma, radiologically indistinguishable from tumor.

Prevention of abdominal gossypiboma can be achieved with increased vigilance and strict adherence to preventive measures and strategies in the operating room, aimed at careful counts for sponges and instruments, thorough cavity exploration, as well as the use of other available methods of control.

DISCLOSURES

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