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CASE REPORTS

Gossypiboma Mimicking an Intra-Abdominal Tumor: A Post-Cesarean Case Report and Review of the Literature.

Labeat Haxhirexha[1,3], Aferdita Ademi[1,2,4], Ferizat Dika – Haxhirexha[2], Agron Dogjani[3], Kastriot Haxhirexha[1,2]*

[1] Department of Surgery, Tetovo Clinical Hospital, North Macedonia
[2] Faculty of Medical Sciences – University of Tetovo, North Macedonia
[3] Department of Surgery, Faculty of Medicine, University of Medicine, Tirana, Albania
[4] South East European University, Tetovo, North Macedonia

Corresponding author: Prof. Kastriot Haxhirexha MD, PhD
Clinical Hospital of Tetovo, Republic of North Macedonia
Email: dr.kastriot@gmail.com
ORCID: https://orcid.org/0000-0001-6607-5871

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ABSTRACT

Background: Gossypiboma, the retention of a surgical sponge or gauze within a body cavity following an operative procedure, is a rare but clinically significant complication. It may manifest acutely or after a prolonged latent period, presenting diagnostic difficulties even with advanced imaging modalities.
Case Summary: We report the case of a 26-year-old woman who presented with a two-week history of abdominal pain and distension, eight months after an uneventful cesarean section. Abdominal computed tomography (CT) with contrast identified a peri-umbilical mass (92 × 69 mm) with heterogeneous density and characteristics compatible with gossypiboma. Laparotomy was undertaken on the basis of this radiological suspicion; however, no retained surgical material was found. Instead, the operative finding was an inflammatory pseudotumor of the greater omentum, confirmed histopathologically as a chronic fibro-inflammatory process. The patient made an uneventful recovery and was discharged on postoperative day three.
Conclusion: This case illustrates the considerable diagnostic overlap between gossypiboma and other intra-abdominal masses, particularly omental inflammatory pseudotumors. It underscores the critical need for interdisciplinary caution, rigorous intra-operative documentation, and strict surgical sponge-counting protocols to mitigate both clinical and medicolegal risks.
Keywords: gossypiboma; inflammatory pseudotumour; foreign body reaction

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INTRODUCTION

The inadvertent retention of surgical foreign bodies represents one of the most preventable and consequential complications in modern operative medicine. Among retained surgical items, textile materials — gauze swabs, surgical sponges, and laparotomy packs — are by far the most commonly implicated. (1)

The term "gossypiboma" (from the Latin gossypium, meaning cotton, and the Swahili boma, meaning place of concealment) was coined to describe the clinical and pathological entity arising from such retained cotton materials. (2) The condition is also referred to in the literature as textiloma, cottonoid, or muslinoma. (3)

Although the precise incidence of gossypiboma is difficult to ascertain owing to significant underreporting, estimates from large multicentre studies suggest that retained surgical items occur in approximately 1 per 1,000 to 1 per 18,000 operative procedures (4,5).

Abdominal and pelvic cavities account for the overwhelming majority of cases, with obstetric and gynecological procedures — particularly cesarean deliveries — representing a disproportionately high-risk operative context. (6) Predisposing factors include emergency surgery, unplanned changes in operative procedure, prolonged operative duration, high intra-operative blood loss, obesity, and inadequate surgical sponge-counting protocols. (7)

The pathophysiological response to a retained textile body is fundamentally determined by the host tissue's immunological reaction. Two principal patterns have been described. In the acute or exudative form, the cotton fibers incite an intense inflammatory response mediated by polymorphonuclear leucocytes and macrophages, ultimately leading to abscess formation and, in some cases, systemic sepsis. (8)

This reaction typically becomes symptomatic within weeks of the index procedure, facilitating earlier radiological detection and diagnosis. In contrast, the chronic or aseptic form is characterized by a fibroblastic and granulomatous reaction to the foreign material. The omentum and adjacent bowel loops sequentially encapsulate the swab, and over months to years, a well-defined fibrous pseudocapsule forms around it, creating a mass lesion that may be indistinguishable, both clinically and radiologically, from a neoplasm. (9,10)

Clinically, gossypiboma may remain entirely asymptomatic for years, only becoming apparent incidentally on imaging performed for an unrelated indication. (11)

When symptomatic, the presentation is protean and may include abdominal pain, distension, nausea, vomiting, anorexia, weight loss, and a palpable abdominal mass. More serious sequelae, including intestinal obstruction, enteric fistula formation, bowel perforation, and peritonitis, occur when the retained material erodes progressively through the bowel wall. (12,13)

Radiological investigation is the cornerstone of pre-operative diagnosis. Plain abdominal radiography may demonstrate a radio-opaque marker if a detectable marker thread is incorporated into the swab (14). Abdominal ultrasonography typically reveals a hyperechoic mass with posterior acoustic shadowing and a surrounding hypoechoic halo. (15)

Computed tomography (CT) with intravenous contrast remains the modality of choice, offering the highest sensitivity and enabling characterization of the mass density, relationship to adjacent structures, and assessment of vascular enhancement. (16)

Magnetic resonance imaging (MRI) may provide additional information in selected cases, particularly for delineating tissue planes and assessing bowel-wall involvement. (17)

Nevertheless, despite the superiority of modern cross-sectional imaging, false-positive and false-negative diagnoses continue to be reported, reflecting the morphological heterogeneity of gossypiboma and its mimicry of other intra-abdominal pathologies. (18)

Beyond its immediate clinical implications, gossypiboma carries far-reaching medicolegal consequences. It is widely regarded as a "never event", a wholly preventable adverse outcome, and often results in successful litigation against the surgical team, the operating institution, and the healthcare system. (19)

The financial burden encompasses the direct costs of remedial surgery and extended hospitalization, as well as indirect costs attributable to litigation and reputational damage. (20)

The present report describes a case in which CT imaging was highly suggestive of gossypiboma in a patient who had undergone cesarean section eight months previously, yet surgical exploration revealed an inflammatory pseudotumor of the omentum rather than a retained sponge. This case affords the opportunity to review the current literature on gossypiboma, to discuss the entities with which it may be confused, and to highlight the broader implications for surgical practice, radiological reporting, and patient safety.

Aims of the Study

The principal aims of this report are threefold. First, to describe a rare and instructive case in which CT-confirmed suspicion of gossypiboma was refuted by operative exploration, thereby highlighting the inherent limitations of radiological diagnosis for this condition. Second, to provide a comprehensive literature review of the epidemiology, pathophysiology, clinical manifestations, diagnostic strategies, and management of retained surgical textiles. Third, to discuss the differential diagnosis of intra-abdominal gossypiboma, with particular emphasis on omental inflammatory pseudotumor, and to advocate for the implementation of robust intra-operative safety measures that may prevent

the occurrence of this serious complication.

Case Report

A 26-year-old female patient presented to our emergency department reporting a two-week history of progressive abdominal pain and distension. Her surgical history was notable for a cesarean section performed at an external institution approximately eight months prior to presentation. The postoperative course following her delivery had been uneventful, and she had been asymptomatic until the onset of the current complaint. She denied fever, rigors, change in bowel habit, rectal bleeding, and urinary symptoms. There was no personal or family history of malignancy.

On general examination, the patient was hemodynamically stable with a temperature of 36.8 °C, a heart rate of 82 beats per minute, and a blood pressure of 118/74 mmHg. Abdominal examination revealed moderate generalized distension with mild diffuse tenderness on deep palpation, most pronounced in the peri-umbilical region. No peritoneal signs were elicited. Bowel sounds were present and of normal character. Digital rectal examination revealed normal sphincter tone and fecal material, with no blood on the examining glove.

Laboratory investigations revealed a mildly elevated C-reactive protein (CRP) at 18 mg/L (reference range < 5 mg/L) and a white blood cell count of 9.4×10^9/L, with a mild left shift on differential. Hemoglobin, renal function, liver enzymes, and tumor markers (CEA, CA 19-9, CA 125) were all within normal limits.

Abdominal ultrasonography demonstrated multiple dilated, fluid- and gas-filled bowel loops consistent with a partial small-bowel obstruction. (Fig. 1)

The examination was technically limited by bowel gas obscuring the peri-umbilical region. Subsequent contrast-enhanced abdominal CT revealed a well-defined heterogeneous peri-umbilical mass measuring 92 × 69 mm. The lesion exhibited variable internal densities, with areas of fatty attenuation interspersed with denser soft-tissue components.

An adjacent segment of the transverse colon demonstrated mural thickening and marked hypo-enhancement of the colonic wall on contrast-enhanced images. Distal to the mass, contact was observed between the lesion and several ileal loops. No free intra-abdominal fluid, ascites, or retroperitoneal lymphadenopathy was identified.

The overall CT appearances were considered by the reporting radiologist to be compatible with a postoperative gossypiboma, and an urgent surgical consultation was recommended. (fig. 2).

Following appropriate resuscitation, hematological optimization, and informed consent — which encompassed a detailed discussion of the radiological findings, the differential diagnosis, and the operative risks — the patient was taken to the operating theatre for exploratory laparotomy.

A superior midline incision above the umbilicus was performed. On entering the abdominal cavity, a systematic exploration was conducted. No retained surgical material, swab, or gauze was identified at

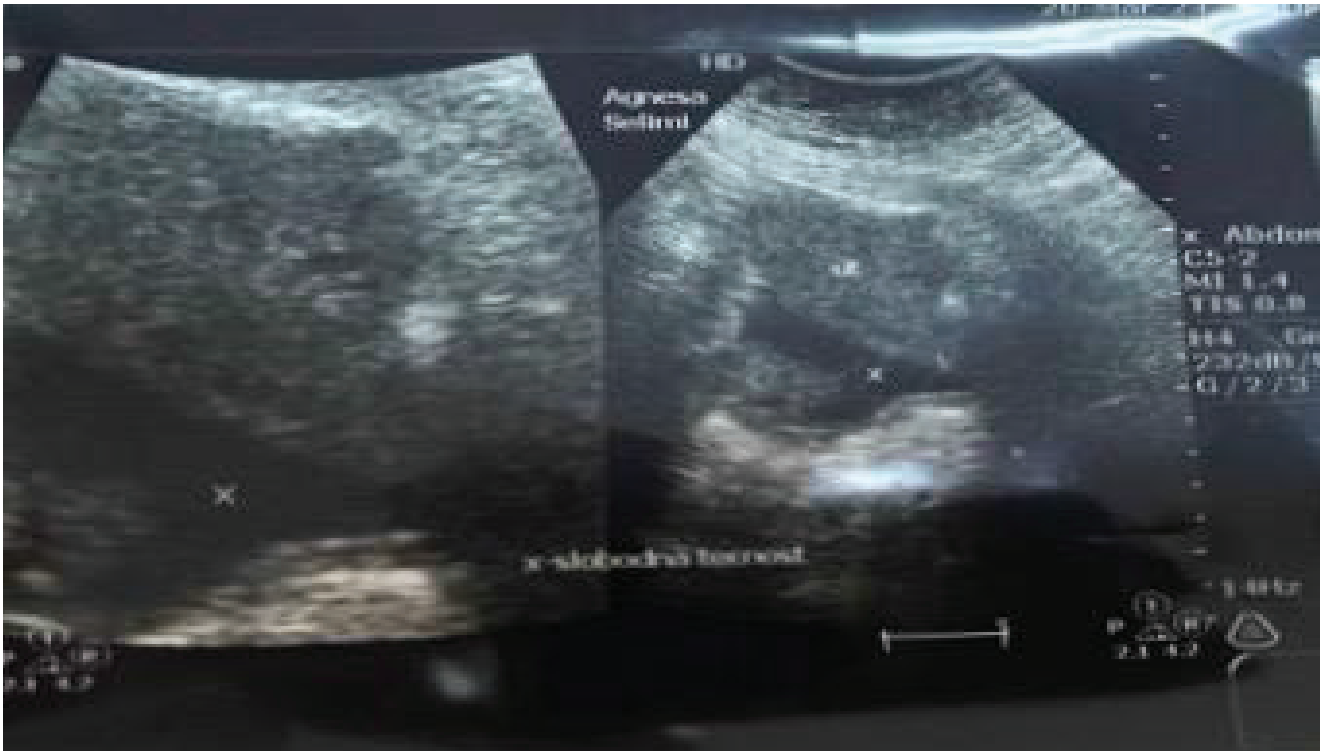

Figure 1. Suspicious periumbilical mass for Gossypiboma

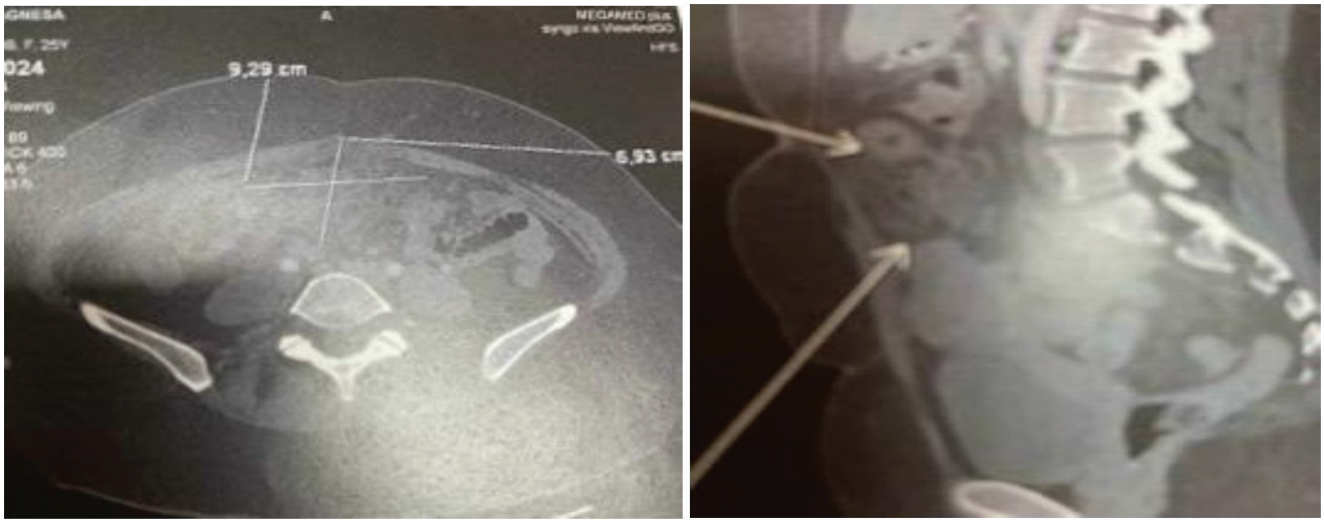

Figure 2. CT images of peri-umbilical mass suspected of Gossypiboma

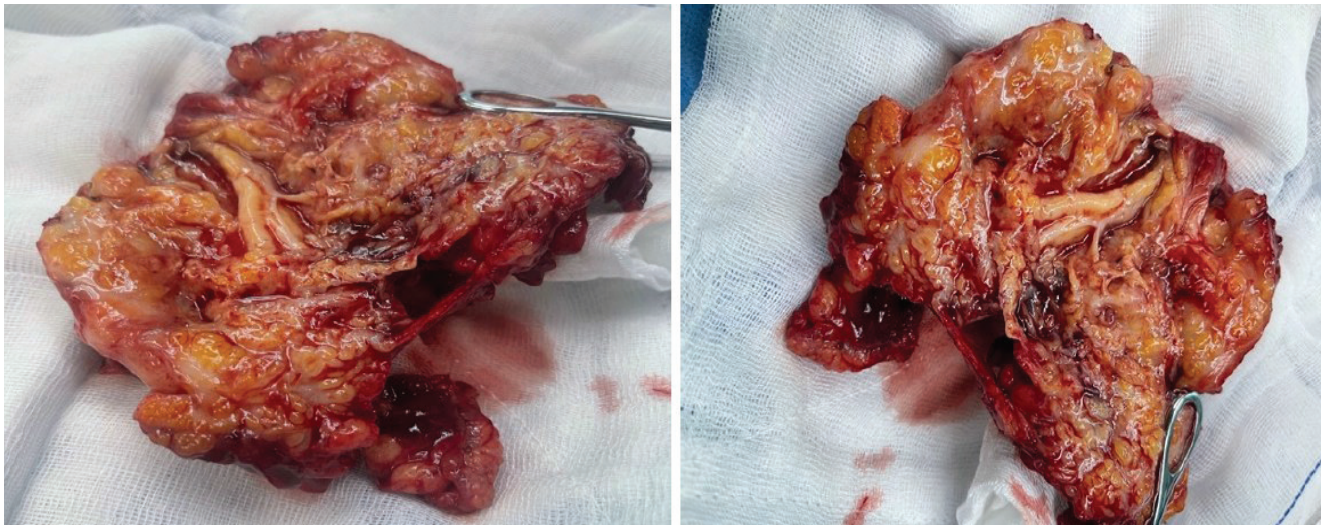

Figure 3. Inflammatory pseudotumor of the greater omentum

any site within the peritoneal cavity. However, in the infraumbilical region of the greater omentum, a firm tumor-like mass of dimensions corresponding to those described on CT was encountered. The mass was noted to be adherent to the transverse mesocolon, the anterior wall of the transverse colon, and several adjacent ileal loops.

Sequential dissection was undertaken to separate the mass from its points of adhesion.

The transverse colon and ileal loops were mobilized without requiring enterotomy or colotomy. (fig. 3)

The mass along with a cuff of surrounding omentum was then excised en bloc within macroscopically healthy margins. Hemostasis was secured, the abdominal cavity irrigated, and the incision closed in layers. The estimated intraoperative blood loss was 80 mL, and the operative duration was 95 minutes.

The patient's postoperative course was uncomplicated. She was commenced on clear fluids on postoperative day one, progressed to a light diet on day two, and was discharged in a clinically stable condition on postoperative day three. She was reviewed in the outpatient clinic at two weeks without complaint.

Macroscopic examination of the resected specimen revealed a firm, lobulated, yellowish-grey mass measuring 95 × 72 × 58 mm, with a fibrous pseudocapsule and no areas of necrosis or hemorrhage. No textile fibers or foreign material were identified on gross inspection.

Histopathological analysis demonstrated dense chronic inflammatory infiltrates comprising lymphocytes, plasma cells, and scattered eosinophils, embedded within a background of storiform fibrosis. Immunohistochemical staining was negative for malignant markers. No epithelioid granulomata, neoplastic cells, or foreign body material were detected. The overall histopathological diagnosis was consistent with an inflammatory pseudotumor (inflammatory myofibroblastic tumor) of the omentum with no evidence of retained surgical material.

DISCUSSION

The present case is instructive on several levels. It illustrates, firstly, the inherent diagnostic difficulty that surrounds gossypiboma — a condition that remains clinically underappreciated and radiologically challenging — and secondly, the potential for false-positive radiological diagnoses to lead to interventions that may ultimately prove unnecessary. Even though an experienced radiologist used advanced CT technology, an incorrect conclusion was made. This highlights the importance of combining imaging results with a thorough clinical evaluation before deciding on surgery.

Gossypiboma is considered a rare complication of surgical procedures, though its true incidence almost certainly exceeds that reported in the peer-reviewed literature, owing to widespread underreporting driven by medicolegal concerns. (1,4) Studies from high-income countries suggest an incidence of 1 in 3,000 to 1 in 5,000 abdominal operations, (5) whereas data from resource-limited settings suggest substantially higher rates, attributable to inadequate surgical counting protocols and the absence of radio-opaque marker threads in surgical sponges. (21)

Obstetric procedures, and cesarean delivery in particular, have been consistently identified as a high-risk context, with one large systematic review attributing up to 22% of all abdominal gossypiboma cases to obstetric surgery. (6) Risk factors identified in multivariate analyses include emergency procedures, complex or prolonged operative duration, intraoperative hemodynamic instability, and changes to the originally planned surgical procedure. (7)

The pathophysiological basis of the two principal clinical phenotypes of gossypiboma — the acute suppurative form and the chronic fibrous form — is now well characterized at the cellular and molecular level. The acute form is driven by early activation of the innate immune system, with complement deposition, macrophage recruitment, and cytokine release (predominantly interleukin-1β, tumor necrosis factor-α, and interleukin-6) orchestrating an exudative inflammatory response. (8)

This typically leads to abscess formation, with clinical manifestations including fever, localized tenderness, leukocytosis, and elevated inflammatory markers. In contrast, the chronic form which applies to the present case is characterized by the transition from acute inflammation to a reparative fibroplastic process, driven by transforming growth factor-β (TGF-β) and platelet-derived growth factor (PDGF), culminating in the formation of a fibrous pseudocapsule. (9)

The omentum plays a central role in this encapsulation process and is almost invariably implicated as the primary barrier structure. (22)

The resulting mass, devoid of viable inflammatory cells and rich in collagen, may lack the imaging hallmarks of infection and can convincingly mimic primary neoplastic or other inflammatory intra-abdominal masses. (10) From a radiological standpoint, diagnosing gossypiboma is challenging due to the morphological heterogeneity of the lesion across different stages of evolution and the variable density of different textile materials. (16)

On plain radiography, detection depends on the presence of a radio-opaque marker thread, a feature now mandated for all surgical swabs in most high-income countries but not universally implemented. (14) Ultrasonography offers an important first-line assessment but is limited by operator dependence, body habitus, and bowel gas obscuration. (15)

CT with intravenous contrast provides the most comprehensive evaluation, allowing characterization of the mass dimensions, internal structure, relationship to adjacent viscera, and vascular enhancement pattern. (16,23) The classical CT appearance of gossypiboma is that of a heterogeneous mass with spongiform or whorled internal architecture, containing areas of air-like density interspersed with higher-density soft-tissue components, surrounded by a rim-enhancing fibrous capsule. (17)

However, as the present case and several others in the literature attest (18,24), these features are not pathognomonic, and a broad differential diagnosis must be maintained.

The differential diagnosis of an intra-abdominal mass with the CT characteristics described above includes, in addition to gossypiboma: omental infarction, epiploic appendagitis, mesenteric panniculitis, desmoid tumor, gastrointestinal stromal tumor (GIST), liposarcoma, metastatic deposit, retroperitoneal fibrosis, and — as illustrated by the present case — inflammatory pseudotumor of the omentum. (25,26) Inflammatory pseudotumor (also known as inflammatory myofibroblastic tumor) is a rare, locally aggressive but usually benign entity characterized histopathologically by a myofibroblastic spindle-cell proliferation within a background of chronic inflammatory infiltrate. (27)

It may occur at virtually any anatomical site but has a predilection for the lung and abdominal viscera. Its etiology remains incompletely understood, though prior inflammation, surgical trauma, and occult infection have been proposed as inciting factors. (28)

On CT, omental inflammatory pseudotumor presents as a soft-tissue mass of variable density, occasionally with calcification and rim enhancement, features that overlap substantially with those of gossypiboma. (29)

Several imaging features have been proposed to aid in differentiating gossypiboma from other intra-abdominal masses. The presence of a gas-containing, spongiform internal architecture has been reported to have a specificity of up to 91% for gossypiboma on CT. (16)

Radio-opaque marker threads on plain radiography, when present, are virtually pathognomonic. (14)

F-18 fluorodeoxyglucose positron emission tomography / CT (FDG-PET/CT) has been explored as an adjunct modality and may demonstrate avid tracer uptake in the acute inflammatory phase, but is less discriminatory in the chronic fibrotic stage. (30)

MRI with dedicated sequences, including T2-weighted imaging and diffusion-weighted imaging (DWI), may provide additional tissue characterization; gossypiboma typically demonstrates a distinctive T2-hypointense periphery with heterogeneous central signal, whereas inflammatory pseudotumors tend to exhibit more homogeneous enhancement. (17,31)

Despite these advances, the diagnostic uncertainty inherent in many cases justifies a multidisciplinary team approach involving surgery, radiology, and pathology, before definitive management decisions are made.

The management of confirmed or strongly suspected gossypiboma is primarily surgical, though the operative approach varies according to the lesion's anatomical location, the degree of adhesion to surrounding structures, and the patient's overall clinical condition. (32)

Minimally invasive techniques, including laparoscopic and robotic-assisted approaches, have been reported to be successful in selected cases with limited adhesion burden. (33)

When bowel involvement is present, segmental resection with primary anastomosis may be required. In the present case, surgical dissection without bowel resection was sufficient, reflecting the relatively early encapsulation of the mass without full mural penetration of the adjacent colon or ileum.

The medicolegal implications of gossypiboma are profound and constitute an important additional dimension of this condition. Retained surgical items are among the most common categories of surgical "never events" in most national patient-safety reporting frameworks. (34)

Successful litigation is reported in the majority of cases that reach adjudication, and settlement awards are frequently substantial. (19)

Legal liability may extend to the entire operative team, including surgeons, scrub nurses, and anesthetists, as well as to the employing institution, and, in some jurisdictions, to accreditation bodies. (20)

Crucially, however, the present case illustrates an equally important and underappreciated medicolegal risk: the risk of false-positive diagnosis. An erroneous attribution of a mass lesion to retained surgical material may lead to unnecessary surgery, expose the patient to operative risk, and result in unjustified litigation against a surgical team that did not, in fact, leave a swab behind. This dual medicolegal hazard reinforces the need for diagnostic rigor and transparent, evidence-based communication with the patient at every stage of the clinical pathway. (35)

From a preventive standpoint, a multimodal approach to the elimination of retained surgical items has been advocated (36). The cornerstone remains a robust, standardized sponge- and instrument-counting protocol, performed at defined intervals during surgery — notably before incision, at the time of closure of any body cavity, and at skin closure — with discrepancies triggering mandatory radiological screening before wound closure (40).

Supplementary technologies, including radio-frequency identification (RFID) sponge-tagging systems and barcode-based counting, have demonstrated the ability to reduce retained-item rates to near zero in institutions that have adopted them. (37,38,39)

Electronic surgical-count documentation systems, which create an auditable real-time record of all items in the operative field, offer an additional layer of accountability. (39) Organizational factors, including a zero-tolerance institutional culture for procedural shortcuts, structured team communication, and simulation-based surgical safety training, are increasingly recognized as essential complements to technological safeguards. (40,41)

CONCLUSION

Gossypiboma following abdominal surgery constitutes a rare but clinically and medicolegally significant complication, whose diagnosis is complicated by a protean clinical presentation and by the limitations of current imaging modalities. The present case demonstrates that even state-of-the-art contrast-enhanced CT may yield a false-positive diagnosis of gossypiboma when the actual pathology is an omental inflammatory pseudotumor of the omentum —a distinct entity that can closely simulate retained surgical material in both radiological and clinical terms. This observation carries important practical implications: surgeons and radiologists must approach the diagnosis of gossypiboma with a high degree of circumspection, maintaining a broad differential diagnosis and integrating imaging findings with a thorough clinical and operative history before embarking on operative intervention.

Equally, this case serves as a reminder that the prevention of retained surgical items demands a systemic response encompassing meticulous intra-operative counting protocols, the adoption of adjunct identification technologies such as RFID, rigorous documentation practices, and a strong institutional safety culture. Only through the concurrent pursuit of diagnostic accuracy and preventive excellence can the burden of this entirely preventable complication, and its attendant human, institutional, and medicolegal consequences be meaningfully reduced.

Editorial Statements

Ethics Approval and Consent to Participate
This study involved the analysis of data from human participants. The research protocol was reviewed and approved by the Institutional Ethics Committee and was conducted in accordance with institutional regulations, the principles of the Declaration of Helsinki, and internationally accepted standards for biomedical research ethics.

Data Availability Statement
The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Author Contributions (CRediT): Conceptualization & Methodology: LH, AA; Data Curation, Investigation and Writing – Original Draft: AD, KH: Formal Analysis: FDH: Writing – Review & Editing: KH,AD: Supervision: KH. All authors have read and approved the final version of the manuscript.

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The authors used a generative artificial intelligence tool solely for language editing and grammar improvement. All scientific content, data analysis, interpretation, and conclusions were independently developed, verified, and approved by the authors.

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