

## Retained Surgical Gauze Swab Migration in a Paraplegic Patient: A Case Report and Literature Review

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### Abstract

**Introduction:** Gossypiboma is a serious but uncommon complication of surgical interventions. Most case reports and reviews refer to abdominal or thoracic surgery. Retained postoperative foreign bodies in limb or spine surgery are less commonly encountered. We present a case of gossypiboma in a paraplegic patient originating from pararectal surgery and detected 15 years after index surgery for infectious migration to the left thigh.

**Case Presentation:** A 56-year-old paraplegic patient with complete sensory deficit in both legs presented with signs of an infected haematoma at the left thigh. At the time of surgical evacuation cotton tissue originating from a surgical gauze swab was retrieved. After a thorough investigation of the patient's medical history, polytrauma treatment consisting of emergent laparotomy with abdominal gauze packing in 1986 and surgical treatment of a fistulating pararectal abscess in 2001 were stated possible origins of the intraoperative findings. Further surgical interventions with a more extended approach were necessary. Another gauze tissue conglomerate was found next to the ischial tuberosity, revealing the surgical treatment of a pararectal abscess (developed from sacral decubiti) as the origin of the retained gauze swabs.

**Conclusion:** Retained surgical gauze (RSG) swab is a serious and, due to medicolegal reasons, underreported complication of surgical intervention. Diagnosis can be challenging because patients may present with only vague symptoms. In the presented case, the patient remained asymptomatic for 15 years, mainly due to his paraplegia. Prevention of RSG is far more important than cure. Awareness of the problem, staff training and the use of preventive measures as radiopaque labelled gauze swabs or monitored counting should be mandatory in every surgical intervention.

**Keywords:** Gossypiboma; Retained surgical gauze; Foreign body; Septic migration; Paraplegic; Asymptomatic; Pararectal abscess

### Introduction

Retained postoperative foreign bodies are a known but infrequent complication after surgical interventions [1]. The most common type of retained foreign bodies is surgical gauze swabs, also referred as gossypibomas [2]. The reported incidence in the literature varies from 1/1000 to 1/5000 [1,3-5]. Gossypiboma appear most commonly in the abdomen, followed by pelvis and thorax [2]. Retained surgical gauze (RSG) swabs following limb or spine surgery is rarely reported [3-6]. Accordingly, while quite a few case reports and systematic reviews have been published referring to abdominal surgery, no report of migrated gossypiboma in the limbs could be found in our literature review. We report a case of gossypiboma in a paraplegic patient originating from pararectal surgery and detected 15 years after index surgery for infectious migration to the left thigh.

### Case Report

A 56-year-old male patient was referred to our emergency department for evaluation and treatment of a suspected infectious process at the left thigh. The patient remained paraplegic after a motorbike accident in 1986, with spasticity and complete sensory deficit in both legs. Two weeks earlier, he was treated for erysipelas on the left thigh and calf. At the same time, a contusion of the medial supracondylar region of the left knee occurred during transfer from bed to wheelchair. Because of the paraplegia there was no complaint of pain, but an enlarging mass forming at the site of contusion could be noticed the following days. At presentation the patient showed with local and laboratory signs of infection together with fever. Plain radiographs of the affected region showed no particularities except for an inhomogeneous bone structure at the inferior pubic ramus. Sonography revealed a large (200 × 100 × 80 mm) fluid collection at the medial dorsal thigh extending to the inguinal region proximally,

suspected to be a haematoma. An additional MRI of the left thigh showed an even greater dimension with the mass extending around the greater trochanter to the gluteal region laterally and the inferior pubic ramus following the adductor muscle group to their origin proximally (longitudinal diameter 450 mm). No evidence for foreign bodies was seen. The diagnosis of an infected haematoma was postulated and the patient was taken to the operation theatre for evacuation of the infected haematoma the same day.

A longitudinal skin incision at the medial thigh starting from the supracondylar region was chosen for approaching the mass, as the closest surface contact was shown in that region. Diagnosis of an infected haematoma could be confirmed after opening the fascia of the thigh, with immediate discharge of haematoma and pus. A thorough debridement of the wound was performed. During evacuation, a fibre like debris that resembled cotton tissue was extracted from the wound (Figures 1 and 2). Samples were taken, both for microbiological and histological workup and the wound was closed leaving two drainages. We began the administration of intravenous antibiotics directly after the primary intervention with appropriate adjustment after receiving the microbiological results. Histological workup confirmed the debris to be tissue of a gauze swab. Since there was no report of prior surgery on the left leg as well as no scars corresponding to such an intervention

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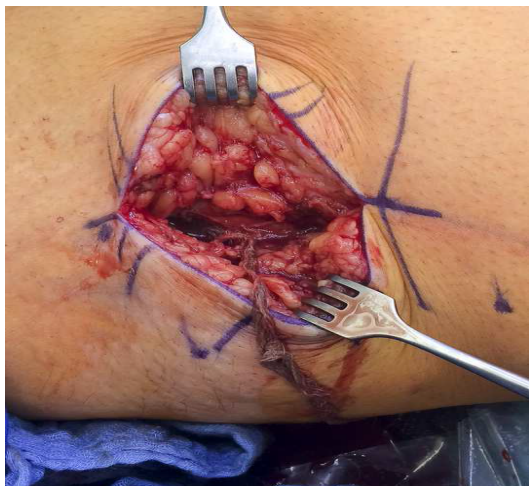


Figure 1: Intraoperative situs.



Figure 2: Retrieved gauze tissue.

we performed a thorough investigation of the patient's medical history to find the origin of the retrieved gauze (Figures 3-6).

The patient's medical history began in 1986 in the course of a polytrauma after a motorbike accident (the trauma that also caused paraplegia). That time, emergent laparotomy together with abdominal gauze packing had to be performed for hepatic and splenic lacerations. After second- and third look revisions, wound closure was performed and the patient recovered but remained wheel chair bound with spasticity and complete sensory deficit in both legs. During the following years, several treatments for sacral decubiti were documented in our medical history, culminating in the diagnosis of a fistulating gluteal abscess on the left side in 2001. Surgical treatment of the abscess contained several interventions. The surgical report of one of the procedures described (after complete fistula excision) a wound cavity of a man's fist size reaching down to the left tuber ischiadicum. The report also stated that a tamponade of the wound with gauze swabs was necessary in order to achieve sufficient haemostasis, revealing an additional possible origin of the gauzes swabs found during evacuation of the infected haematoma.

A second look at the preoperative MRI was done to find out if the gauze swab could be detected retrospectively, but neither the

intraoperative removed gauze swab nor other additional gauze swabs could be identified on the MRI. Due to persistent elevated infection parameters and continued wound discharge, revision surgery was necessary one week after haematoma evacuation. Before revision, a CT scan of the abdomen and thigh was performed for accurate determination of size and origin of the remaining infectious process, and in order to rule out intraabdominal foci maintaining infection. The CT scan showed persistently extensive and branched abscess formation on the dorsal thigh with involvement of the gluteal region with some affection of the gluteus medius muscle. No intraabdominal abscess was seen, and there was no evidence of radiopaque foreign bodies within the abdomen and thigh.

For revision surgery, the initial incision was extended proximally ending approximately 10 cm distal to the groin. A second surgical approach dorsolaterally, analogue the Kocher Langenbeck approach, was performed to expose the abscess formation to the gluteal region that was not accessible through the medial incision. Another conglomerate of gauze tissue was found between gluteus medius and maximus muscle together with an abscess cavity extending to the ischial tuberosity. This region corresponds to the former pararectal abscess location that was surgically treated in 2001, confirming the assumed origin of the process within that surgical intervention. After thorough debridement and drainage, the wounds were closed. The



Figure 3: Radiograph of Hip and Femur AP.



Figure 4: Axial CT slice of the peritrochanteric region.

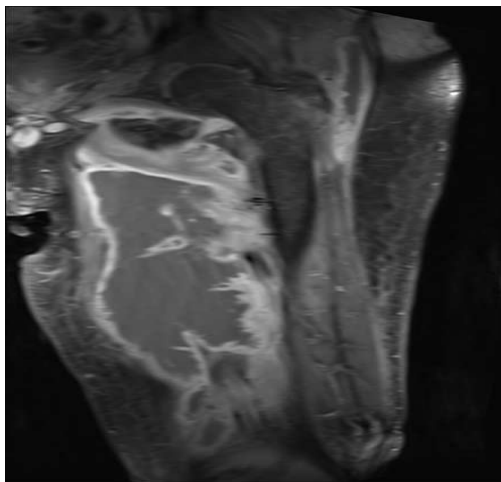


Figure 5: Coronary MRI slice of the femur.

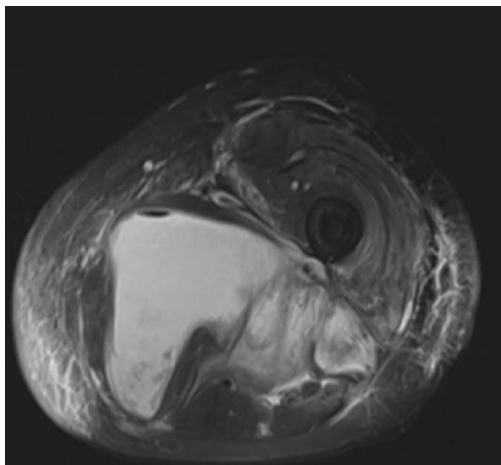


Figure 6: Axial MRI slice of the femur.

further postoperative period was uneventful with rapid regression of infection parameters and favourable wound healing. The patient left hospital in good general conditions and did not show any problems in the postoperative clinical course.

## Discussion

Gossypiboma is a well-known low frequency but clinically significant complication after surgical procedure [1,7]. The reported incidence among case reports and review articles varies from 1/1000 to 1/5000 [2-5] interventions. However, the reluctance of medical institutions to publish such matters, maybe for medicolegal implications, might lead to underreporting of diagnosed cases. Furthermore, gossypibomas may never be found in cases where patients remain asymptomatic. Gossypiboma appear most commonly after surgical interventions in the abdominal cavity, followed by pelvic and thoracic surgery [2,7,8]. Retained surgical gauze swabs following limb or spine surgery is rarely reported [6]. No report of migrated RSG in orthopaedic or trauma surgery of the limbs was detected in our literature review. This might be due to the smaller wound cavities and different tissue structure. In addition, it can be assumed that a foreign body in the extremities would become symptomatic a lot earlier than it would become in the viscera

innervated abdominal cavity. The patient's paraplegia might present a key factor for the unusual clinical course and the long asymptomatic period till the diagnosis of gossypiboma could be made.

Normally, two types of foreign body reaction can be seen in the clinical course following gossypiboma [8]. The first type is an aseptic fibrous response to the foreign material leading to adhesion and encapsulation and resulting in a foreign body granuloma. This type of reaction may take a silent clinical course. The second type triggers an exudative inflammatory reaction and abscess formation, attempting to extrude the foreign material. It is this type of reaction that might produce postsurgical complications such as fistula formation or migration of the retained material, and therefore lead to erosion and perforation into adjacent viscera [7-9]. The exudative type of response can cause symptoms in the early postoperative period, but the extrusion process can take years and clinical symptoms are often unspecific [7]. Rajkovi, et al. described a case of gossypiboma discovered 40 years after index surgery as the cause for chronic lumbar back pain [6]. As a consequence of the inflammatory process introduced by retained surgical bodies, sarcomas developing from chronic inflammatory tissue have been reported throughout the literature [10-12]. In the presented case, the exudative process led to migration of surgical gauze to the distal medial thigh over a period of 15 years. This long time interval must be considered in the light of the patient's paraplegia. We suppose that symptoms would have led to an earlier detection in a patient with normal sensomotoric function.

The literature reveals many risk factors for gossypiboma. According to Gawande, et al. the three major risk factors for retained gauze are emergency surgery, unplanned changes of the surgical procedure and high body mass index [13]. Bani-Hani, et al. stated that in his case series RSG were nine times more likely after emergency surgery compared to randomly selected controls, and four times more likely when an unexpected change in the surgical procedure was undertaken [1]. Other risk factors shown in the literature are lengthy procedures, multicavity cases and shift changes [8,13,14]. Since those case-related risk factors are specific to the needs of each patient at the time of surgery, standardization and procedure regulation is more difficult to establish in order to reduce the incidence of RSG. Comparing to this, risk factors concerning operating room environment such as poor communication, incomplete count or absence of a standardized count policy, the use of non-radiopaque sponges or change in operating room teams are more adjustable [2,15]. Emphasis should be made to eliminate those risk factors whenever possible. In the presented case, treatment of a fistulating gluteal abscess with intraoperative wound tamponade was the cause of RSG, as not all gauze swabs used for tamponade were removed during revision surgery. The intervention was not performed on an emergency base, and no unplanned changes during revision surgery occurred. Revision was performed by the same surgeon as prior surgery when tamponade was left in place. However, the number of gauzes left in the wound for tamponade was not noted on the surgical report. Once soaked in blood, gauze swabs change in size and shape and can be difficult to distinguish from surrounding tissue [16]. Poor visibility within the big sized wound cavity in the obese patient together with limited accessibility of this particular anatomical region might also have contributed.

The use of radiopaque labelled surgical gauze swabs for surgical interventions has been widely adopted [1,13,15,17]. In our institution, they are used as a standard in abdominal as well as in orthopaedic surgery. However, this obligation was not in place in 2001, when surgery on the gluteal abscess was performed in the presented case.

Additionally, procedural standards like a strict discipline in gauzes swabs counting (once before surgery initiation, twice before wound closure) as we do it in our clinic today was not routinely performed by that time.

Radiopaque labelling of surgical gauze swabs can facilitate their detection in suspicious cases [2,18]. Still, the diagnosis of gossypiboma can be challenging, as markers may be distorted by folding, twisting or disintegration over time. Even in the presence of radio-opaque markers, RSG may be overlooked. Bani-Hani, et al. stated in his case series that (although using exclusively radiopaque labelled gauzes swabs) diagnosis was possible using plain x-ray in only two out of eleven patients [1]. While a simple X-ray may give the decisive hint in presence of radiopaque labelling, the preoperative diagnosis for gauze swabs without such tags is much more challenging. Sponges without radiopaque markers may be identified by ultrasound visualization [19]. CT scan can be considered the most commonly used and effective method for gossypiboma detection overall [2,18,20] and therefore seems to be the diagnostic modality of choice in this setting. The most specific pattern for a retained gauze is a spongiform object with air bubbles [20]. With radiopaque markers, a curvilinear structure within a possibly undistinguishable mass can be detected [18]. MRI may be helpful in problematic cases, although illustration of specific gauze tissue within a collection of putrid fluid might be impossible, nor is it capable of visualizing radiopaque markers [1,2,15].

Egorova, et al. [21] quantitatively evaluated the sensitivity and specificity of counting. Although retained sponges and instruments were one hundred times more likely to occur in case of a discrepant count, the sensitivity of counting was calculated 77% [21]. Larger studies have reported similar sensitivities from 62% to 88% [4,13,17] accounting for the large number of cases of a retained sponge with falsely correct counts.

RSG should be removed as soon as diagnosed [1,8]. In case of suspected retained gauze without radiological proof surgical exploration should be performed in a timely manner.

## Conclusion

Retained surgical gauze swab is a rare but serious complication of surgical intervention. Affected patients can present with various and sometimes very vague symptoms. Diagnosis of gossypiboma can be challenging and high suspicion must be present. Therefore, prevention of RSG is far more important than cure. As human errors cannot be completely abolished, emphasis should be made to reduce the incidence to a minimum. Awareness of the problem, continuous training of the involved staff and strict adherence to regulations can help reduce this low frequency but clinically significant event. The use of radiopaque labelled gauze swabs and sponges, a thorough monitored counting at the beginning and the end of surgery and a methodical examination of the wound cavity before closure, especially in obese patients and during emergency surgery should be mandatory in every operation theatre.

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