

## Lumbar gossypiboma

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### ABSTRACT

Gossypiboma is a mass formed by a retained surgical sponge and reactive tissue. The cases with gossypiboma are usually asymptomatic or with nonspecific symptoms, which delay diagnosis for months or years after surgery. We describe imaging findings in a 43-year-old woman with a symptomatic retained surgical sponge in a lumbar laminectomy site. Ultrasonography, computed tomography, magnetic resonance imaging (MRI), and diffusion-weighted MRI were performed. Gossypiboma should be considered in the differential diagnosis of a mass in a patient with a history of prior surgery. Diffusion-weighted MRI may provide important data for differential diagnosis of gossypiboma. With diffusion-weighted MRI, gossypiboma may be distinguished from an abscess by its low signal intensity and increased apparent diffusion coefficient (ADC) as compared to high signal intensity with low ADC in cases of abscess.

**Key words:** • surgical sponge • postoperative complications  
• magnetic resonance imaging • diffusion magnetic resonance imaging

A retained surgical sponge and the surrounding foreign body reaction constitute a mass called a “gossypiboma”. Textiloma, cottonoid and gauzeoma are other terms used for this condition. It is a rare, but serious, complication of surgery. Patients with a retained surgical sponge are usually asymptomatic. Even if they are symptomatic, these are nonspecific. Therefore the diagnosis may be delayed for a long time after surgery. Sometimes the retained surgical material is found incidentally during another surgery (1–5).

Although features of ultrasonography (US), computed tomography (CT) and magnetic resonance imaging (MRI) of gossypibomas have been documented in the literature, their features of diffusion-weighted imaging (DWI) have not been reported. Our aim was to present the initial DWI findings of a gossypiboma in the lumbar region after a diskectomy operation, in addition to US, CT and MRI findings. We believe that the definition of the DWI features of a mass may be important in the diagnosis of gossypiboma.

### Case report

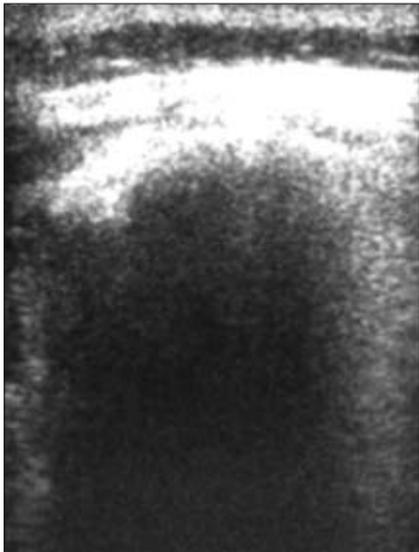
A 43-year-old woman was referred for further examination because of persistent symptoms after surgery. She had undergone surgery for lumbar disk herniation 13 days previously. Serous fluid leakage from the operation site appeared in the postoperative period. This condition was considered possible for a few days because of fat necrosis. However, persistence of symptoms required further investigation. US, CT and MRI examinations were performed. US revealed a thick, crescentic, hyperechoic material with dense posterior acoustic shadowing (Fig. 1). CT showed a well-defined heterogeneous mass measuring 4.5 x 3 cm within the posterior spinal muscles. Air bubbles in a spongiform pattern and a thick high-density capsule were detected (Fig. 2). Lumbosacral MRI was performed with a 1.5 T scanner (Gyrosan Intera Master, Philips, Best, The Netherlands). On MRI, the mass, located posteriorly at the levels of the third through fifth lumbar vertebrae, measured 7 x 5 x 3 cm. On T1-weighted MR images, the mass had homogeneous low signal intensity and on T2-weighted images it showed heterogeneous high signal intensity with encapsulation. The thin capsule was hyperintense on T1-weighted images and hypointense on T2-weighted images (Fig. 3). On post-contrast images the mass showed rim enhancement.

Additionally, DWI was done for differentiating abscess and gossypiboma. For DWI, a single-shot echo-planar pulse sequence (TR/TE, 3295/81 ms; slice thickness, 3 mm in the axial and 6 mm in the sagittal planes; interslice gap, 1 mm; FOV, 230 mm; matrix size, 128 x 256) was used with two different b-values (0 and 1000 s/mm<sup>2</sup>). The mass showed low signal intensity on b-1000 images. Apparent diffusion coefficient (ADC) maps revealed a mass with high signal intensity (Fig. 4). A reduction

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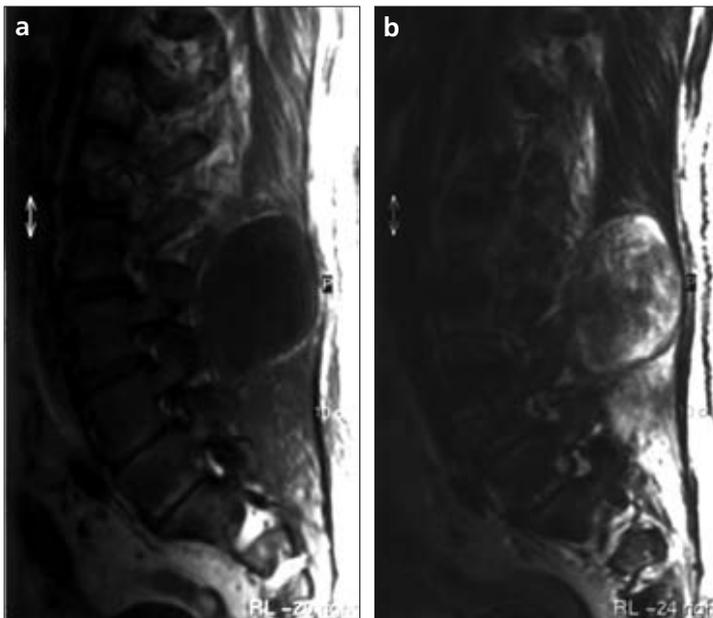
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**Figure 1.** Ultrasonography reveals hyperechoic material with dense posterior acoustic shadowing.



**Figure 2.** Axial noncontrast CT obtained with the patient in prone position shows a well-defined heterogeneous mass (arrow) with hypodense center containing air bubbles and thick hyperdense capsule.



**Figure 3. a, b.** Sagittal T1-weighted MR image (a) demonstrates a homogeneously hypointense mass with a thin hyperintense capsule. Sagittal T2-weighted MR image (b) shows the mass to have heterogeneously hyperintense signal with a hypointense capsule.

of diffusion in the mass was not observed. Therefore the mass was distinguished from an abscess and diagnosed as a gossypiboma.

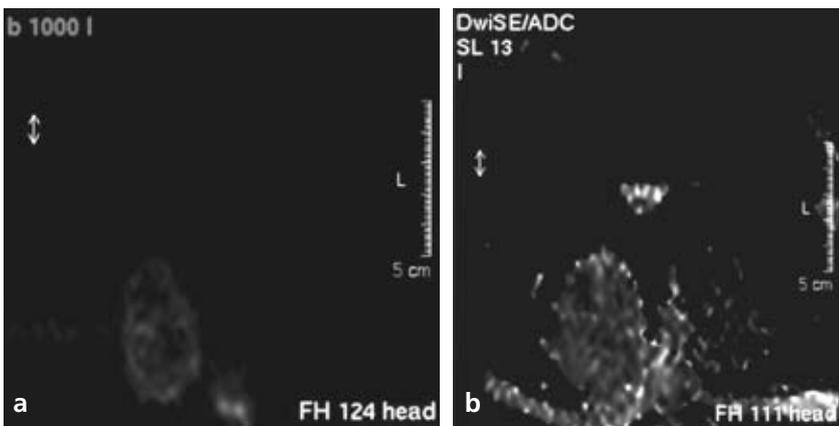
### Discussion

Gossypiboma is an uncommon complication of surgery with an estimated incidence of 1/1,500 (4). It may lead to medicolegal problems and diagnostic dilemmas, because it may necessitate invasive diagnostic procedures and operations. The symptoms of gossypiboma are usually non-specific and may appear years after surgery (1, 2, 5). Therefore, generally it is not kept in mind in the postsurgical follow-up. Because the radiologist is often the first investigator faced with this problem, he/she plays an important role in the differential diagnosis (1, 5).

Cotton surgical sponges are the most common foreign materials retained in the surgical site. The most common symptoms and complications of gossypiboma are pain, palpable mass, ileus, vomiting, weight loss, surgical site infection, sepsis, abscess, fistula formation, and migration into the lumen of urinary and gastrointestinal systems (5).

Gossypibomas are most frequently found in the abdomen. However, they have been rarely reported in the thorax, extremity, shoulder, central nervous system, paranasal sinuses and breast (6–12).

Pathologically, there are two types of foreign body reactions in gossypibomas described in the literature. One



**Figure 4. a, b.** On diffusion-weighted MR imaging (a, b) the mass shows a low signal intensity center with a hyperintense capsule on axial b-1000 image (a). ADC map (b) reveals the mass to have high signal intensity.

of them is an aseptic fibrous response resulting in adhesion, encapsulation, and granuloma. This form usually remains asymptomatic. The other is an exudative reaction leading to cyst or abscess formation (1, 2). Symptoms of the second type are more severe and it clinically presents more earlier. Fistulations to the skin or intestine followed by bowel obstruction and perforation are common (1, 2, 7, 13). While in the early postoperative period symptoms are related to the exudative response, at later times symptoms may be linked to pseudotumor formation clinically and radiologically (5). Our case had leakage from her operation site during the early postoperative period. She had undergone surgery 13 days earlier for lumbar disk herniation.

Exact count of sponges before operation field closure is important for the prevention of gossypiboma. Use of radiopaque sponges has been recommended to reduce the occurrence of gossypiboma. Because of serious complications, when a gossypiboma is diagnosed, it should be removed immediately (3, 5).

The radiologic appearances of gossypiboma are variable and depend on the type of the reaction they cause in the body and site of the sponge (6, 7). Seeing a radiopaque marker, if used, on plain radiography is the most specific imaging finding of a gossypiboma. But even with the presence of such a marker, diagnosis may not be possible. The marker may be evaluated as a calcification or surgical suture by mistake. Moreover, it may become bound or folded (1, 2, 7).

Ultrasound may be useful for the diagnosis, especially when it shows a well-defined hypoechoic mass having wavy hyperechoic foci with dense posterior shadowing (5, 13). In the early postoperative period sonographic examination may be limited due to intestinal gas distension, surgical incision and pain. CT is the best method for the detection of gossypiboma and their complications (7, 13). The appearance of a spongiform pattern with air bubbles is a typical CT sign of gossypiboma (1, 7). However, it is not present in all cases, because air bubbles within a gossypiboma do not last for years (1, 2, 13). The majority of cases demonstrate a nonspecific CT appearance such as a low- or high-density mass, or a complex mass. The mass may contain

wavy, striped, high-density areas that represent the sponge itself. A thin high-density capsule that shows prolonged enhancement after administration of contrast material may surround a low-density center. Marked rim enhancement has been considered as characteristic for gossypiboma, but it is difficult to distinguish from those in abscesses and hematomas (7, 13). The capsule thickness may be variable. Although calcification is a rare finding, it may be seen in the capsule or in the central part of mass (13). Magnetic resonance imaging usually shows a well-defined mass with a fibrous capsule that exhibits low signal intensity on T1-weighted images and high signal intensity on T2-weighted images (5).

In our case, a radiopaque marker had not been used. The operation site was examined with various imaging modalities. US showed a crescentic hyperechoic material with dense posterior shadowing. A well-defined heterogeneous mass encircled with a capsule was seen on CT. Small air densities were detected within the mass. This appearance was typical for a gossypiboma. On T1-weighted MR images the mass was homogeneously hypointense, and on T2-weighted images it was heterogeneously hyperintense with encapsulation. On postcontrast images the mass showed rim enhancement. With these imaging features, the mass could represent a gossypiboma or an abscess.

For the differential diagnosis, DWI was used. DWI allows quantitative measurement of the motion of water molecules in lesions and normal tissues. The net diffusion of water molecules is referred to as the ADC. On DWI study, we detected that the mass showed low signal intensity on b-1000 images and high signal intensity on ADC maps. The dense purulent content within an abscess restricts diffusion and is seen as high signal intensity on b-1000 images and low signal intensity on ADC maps. The reduction of diffusion in a mass which is seen with an abscess was not observed (14). Therefore the mass was diagnosed as a gossypiboma.

In conclusion, gossypiboma is an exceedingly rare mass and should be considered in the differential diagnosis in a patient with a history of previous surgery. US, CT and MRI give valuable data for radiologic diagnosis. However, none of them can definitively differ a gossypiboma from an abscess, which

has similar imaging features. DWI, however, gives the diffusion features of a mass and distinguishes it from an abscess. While the abscess is diagnosed with reduction of diffusion, diffusion increases with gossypiboma.

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