

Gossypiboma of the Leg: MR Imaging Characteristics. A Case Report

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We report a 22-year-old man with a solid mass in the right proximal leg, which was found out to be a gossypiboma. MR imaging revealed a well-defined mass lesion that showed intermediate signal intensity at T1-weighted imaging (T1WI) and slightly high signal intensity at T2-weighted imaging (T2WI). Wavy, low-signal-intensity stripes were visible within the fluid-filled central cavity. At surgical exploration, a sponge, retained after previous knee surgery, was discovered, and it was found that a granuloma had developed. Pathologic examination revealed granulomatous inflammation, with lymphocyte and giant cell infiltration. The presence of wavy, low-signal-intensity gauze fibers at T2WI may be a characteristic MR appearance of gossypiboma.

Gossypiboma is a rare tumor caused by gauze fibers retained during surgery. It often mimics other neoplasms and may cause diagnostic difficulty and serious complications (1–3). For a soft-tissue tumor, MRI, as used in this case, is usually the imaging modality of choice. To our knowledge, a gossypiboma of the extremities has not been previously reported in the literature in English (1–6); we describe the MR imaging findings of a gossypiboma of the leg, detailing its pathologic correlation.

Index terms:

Knee
Magnetic resonance (MR)
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CASE REPORT

A 22-year-old man presented with a painful mass in the right proximal leg, explaining that during the previous year, progressive enlargement had occurred. Five years earlier, he had been involved in a traffic accident, resulting in avulsion fracture of the right anterior cruciate ligament. Treatment at a local clinic involved pull-out suturing and internal fixation with screws, and the screws were removed one year later.

Physical examination revealed a solid mass about 7 × 5 × 3 cm in size, and anterolaterally, there was mild tenderness of the right proximal leg. The findings of laboratory examinations were unremarkable, with a normal cell count and normal biochemistry.

Conventional radiography of the right knee showed that laterally, the soft-tissue density of the proximal leg had increased, that bony structures were intact, and there was no abnormal calcification. Because the mass was thought to be a soft-tissue tumor, MRI was performed; spin-echo T1-weighted (TR/TE: 419/17.8) and fast spin-echo T2-weighted (TR/TE: 1876/90) images revealed an elliptical, well-circumscribed mass in the anterolateral aspect of the right proximal leg, abutting the crural fascia (Figs. 1A, B). Compared to skeletal muscle, its signal intensity was intermediate at T1WI and slightly high at T2WI; additionally, a central fusiform region showed low signal intensity at T1WI and high signal intensity at T2WI, and this was thought to indicate fluid

content.

Peculiarly, wavy, low-signal-intensity structures within the central fusiform region were seen at T2WI, and because we had not observed this imaging appearance previously, sonography was also performed, revealing a well-defined hypoechoic tumor with strong acoustic shadowing. In light of the imaging findings and the clinical course of a rapidly growing mass in the deep subcutis of the lower extremity, the pre-surgical differential diagnosis was a fibrous, neurogenic, or sarcomatous tumor with an unusual imaging appearance.

At surgery, a well-encapsulated, brownish soft-tissue tumor containing serous fluid was discovered in the central cavity; examination of a cross-sectional specimen revealed

the presence of fiber-like material, shown at histological investigation to be gauze fibers (Fig. 2). Microscopically, the tumor showed granulomatous inflammation, with fibrosis, lymphocyte infiltration, and giant cell reaction (Fig. 3). Sparse gauze fibers were found within the tumor; some had been phagocytosed by giant cells, leading to gossypiboma. The patient was discharged ten days later, and his recovery was uneventful.

DISCUSSION

In surgical practice, a gossypiboma is an uncommon complication. Other complications which have arisen because of a retained surgical sponge, and which could be life

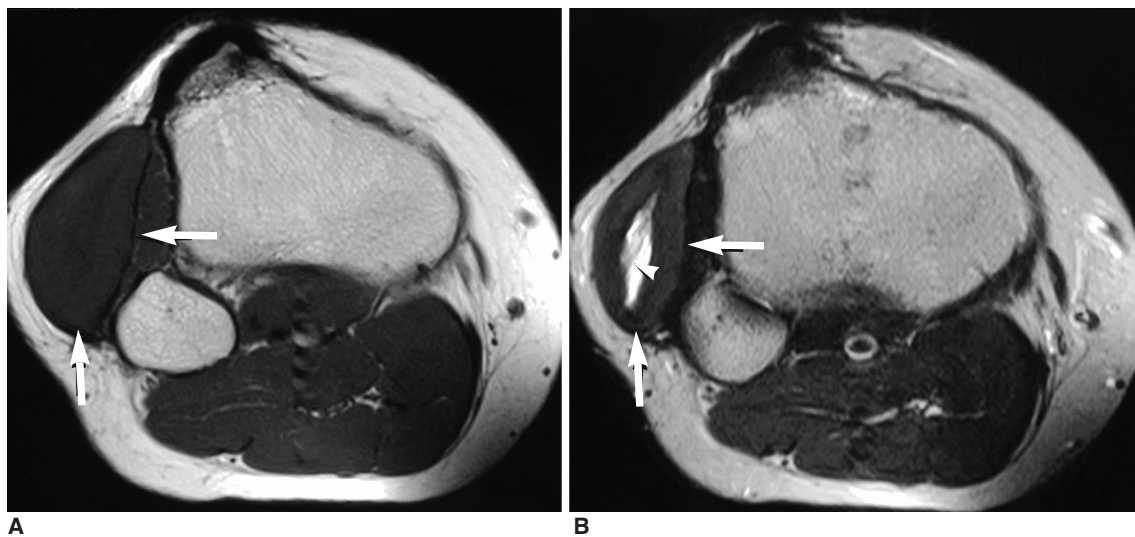


Fig. 1. MR imaging of the right proximal leg. Axial T1-weighted (A) and T2-weighted (B) MR images depict a well-circumscribed, elliptical mass (arrows) with a central, fusiform, fluid-filled cavity in the deep subcutaneous layer of the right proximal leg. Note the wavy, low-signal-intensity structures (arrowhead) in the central cavity, representing the gauze fibers.

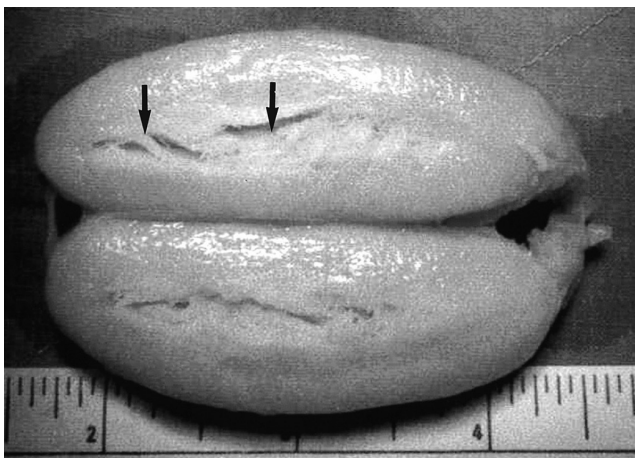


Fig. 2. Gross pathologic specimen shows a well-encapsulated mass with a fusiform central cavity. The gauze fibers (arrows) are clearly depicted.

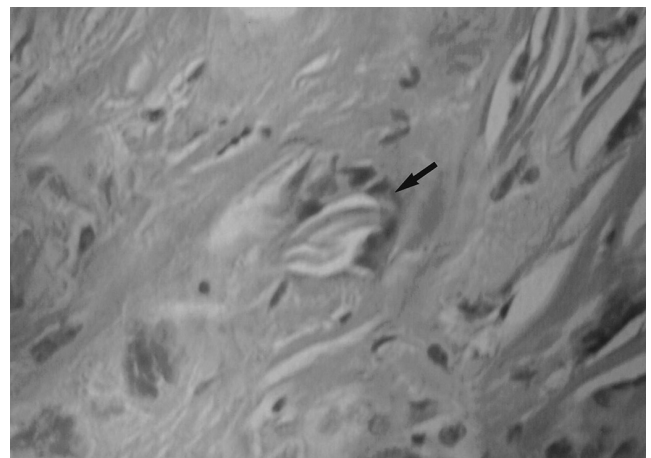


Fig. 3. Microscopic examination of the tumor revealed fibrosis, and lymphocyte and giant cell infiltration had occurred. Note the presence of giant cells, which phagocytosed the gauze fibers (arrow).

threatening and cause legal problems, include abscess formation, a chronically infected sinus tract (fistula), neighboring bone erosion, vessel occlusion, and gastrointestinal tract perforation (1–3). The number of relevant published reports are few; because a surgical sponge is more easily left in a deep body cavity, those that do exist are usually encountered in the fields of abdominal, chest, or neurosurgery (1–6). Routine gauze counting in the operating theater can reduce the incidence of occurrence. Olnick et al. (7) reported that gossypiboma can be subdivided into two types: exudative and aseptic fibrinous; histologic examination suggested that our case may be the latter.

Nowadays, many operating theaters utilize sponges containing radiopaque barium sulfate markers and inert plastic materials that can be identified at conventional radiography and CT (7), though in our case, the examination of plain film revealed no such markers. Sonography may, in some cases, detect gauze fibers as curvilinear, hyperechoic stripes with intense acoustic shadowing (2–4); we observed strong acoustic shadowing but no echogenic gauze fibers.

At MR imaging, the signal intensity of a granuloma varies: both high and low signal intensity have been reported at T1WI and at T2WI, low signal intensity at T1WI, and high signal intensity at T2WI (3, 4). Signal intensity may vary according to histologic composition, stage, and fluid content of the tumor (3), and as a result, that of a tumor is nonspecific for the purpose of differential diagnosis. In our case, the wavy, low-signal-intensity stripes observed at T2WI were found to represent gauze fibers in the granuloma's central cavity; the high-signal-intensity fluid we used provided good contrast with the low-signal-intensity gauze fibers. Similar findings were described by Kuwashima et al. (3) and Sugimura et al. (4).

The location and morphology encountered in our case indicated that the differential diagnosis should include fibromatosis (desmoid tumor), schwannoma (neurilemoma), malignant fibrous histiocytoma (MFH) and other sarcomatous tumors such as fibrosarcoma, rhabdomyosarcoma, and leiomyosarcoma. At MR imaging, desmoid tumors often show inhomogeneous signal intensity, poor margination

and possible neurovascular and bone involvement (8). Most schwannomas, on the other hand, show relatively low signal intensity at T1-weighted spin-echo MR imaging and high signal intensity at T2-weighted imaging; at T1WI, a peripheral rim, the split fat sign, has been noted, and at T2WI, the fascicular sign, consisting of small ring-like structures with peripheral high signal intensity has been described (8). For other soft-tissue tumors, such as MFH and sarcomatous tumors, MR imaging is non-specific (8).

In conclusion, gossypiboma is a rare tumor but is of critical clinical importance. Its diagnosis is often difficult, but delayed diagnosis can be disastrous. MRI is currently widely used for the evaluation of soft-tissue tumors, and an awareness of the imaging appearance of a gossypiboma is thus assuming greater importance. The wavy, low-signal-intensity stripes seen at T2WI, which represent gauze fibers and are not apparent in other soft-tissue tumors, may be characteristic of gossypibomas. Recognition of this imaging feature, in combination with a patient's clinical history, facilitates successful diagnosis and helps surgeons formulate more effective surgical plans.

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