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## A 40-year-old gossypiboma (foreign body granuloma) mimicking a malignant femoral surface tumor

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The patient was treated by Dr. Kenshi Sakayama at Ehime University Hospital, Ehime, Japan

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### Introduction

Cotton-induced pseudotumor is a kind of foreign body granuloma, and has been called cottonballoma or gauzeoma [8, 9, 10, 13, 16]. Foreign body granuloma due to retained surgical sponge is also called gossypiboma or textiloma [1, 3, 6, 11, 14, 15, 17, 21]. These terms are basically synonyms, and the condition is not that infrequent in the field of thoracic or abdominal surgery [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 21, 22]. However, gossypiboma in the extremity developing to the size of a 10 cm mass or greater and accompanied by bone destruction is extremely rare. It is reported to be difficult to differentiate these lesions from malignant musculoskeletal tumors [8, 9, 11, 15]. We encountered a gossypiboma in

**Abstract** The patient was a 61-year-old man who developed gossypiboma of the left thigh and femur resulting in the imaging appearances of a malignant surface tumor. He had a past history of surgery on the left femur for open fracture 40 years previously. Radiographs and CT showed a soft tissue mass with osteolysis and periosteal thickening of the left femur. On MRI, the mass showed heterogeneous signal intensity with contrast enhancement at the periphery, suggesting a malignancy. <sup>99m</sup>Tc-HMDP bone scintigraphy showed a faint ring-like uptake, but thallium -201 scintigraphy did not show any uptake in the tumor. An extensive intralesional excision was performed. Post-operative histopathological examination showed a fibrous foreign body

with reactive changes. There were neither viable cells nor atypical giant cells around the foreign body. No malignant change was evident. Based on surgical and histopathological examinations, the tumor was finally diagnosed as gossypiboma related to a retained surgical sponge.

**Keywords** Femur · Surface tumor · Gossypiboma · Foreign body granuloma · Imaging

the thigh of a patient which, on imaging, had the appearances of a destructive aggressive surface tumor mimicking a chondrosarcoma.

### Case report

The patient was a 61-year-old man who had sustained an open fracture after a traffic accident 40 years previously (at the age of 20 years), successfully treated by external skeletal fixation surgery. About 35 years after surgery, he noticed a swelling in the left thigh that gradually enlarged. On physical examination, an elastic hard mass was palpated, but there was no local heat, pain on pressure or spontaneous pain.

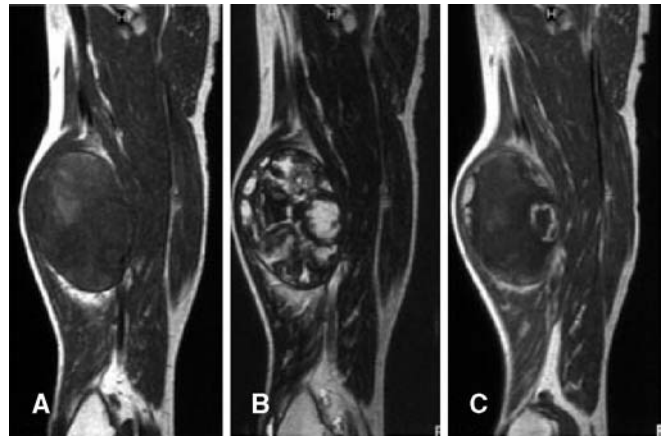
Radiograph of the left thigh showed a soft tissue mass adjacent to the shaft of the femur with periosteal thickening and osteolysis (Fig. 1). CT demonstrated an expansive mass located deep in



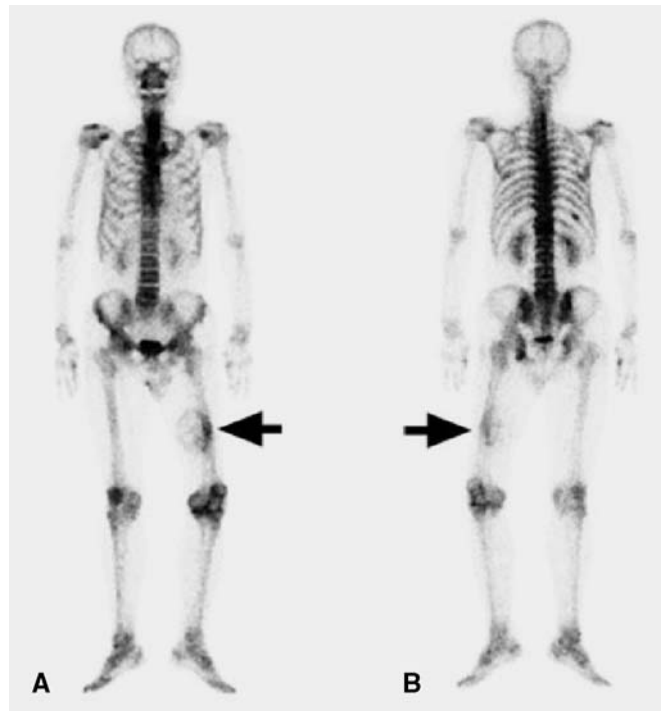
**Fig. 1** Radiographs at the initial consultation: **A** frontal view, **B** lateral view. Destruction, osteolysis, spicula, and calcification were observed



**Fig. 2** Contrast-enhanced CT scan at the initial consultation. A mass was observed contacting the medial side of the diaphysis of the left femur. The lesion demonstrated coarse calcification, but there was no fatty component observed. The boundary with muscle was clear and the mass showed heterogeneous contrast at its periphery

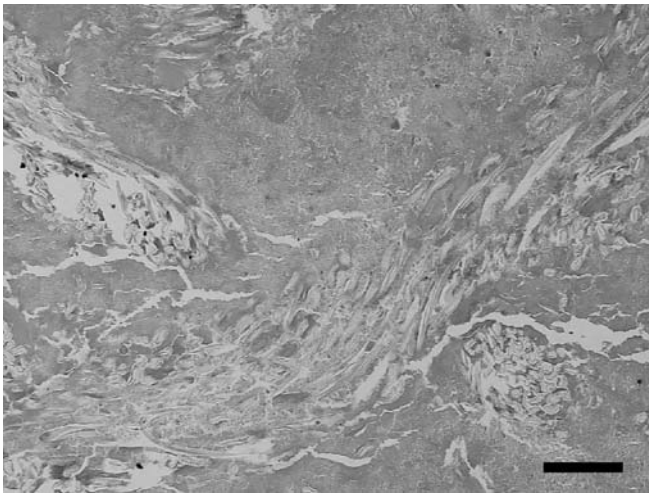
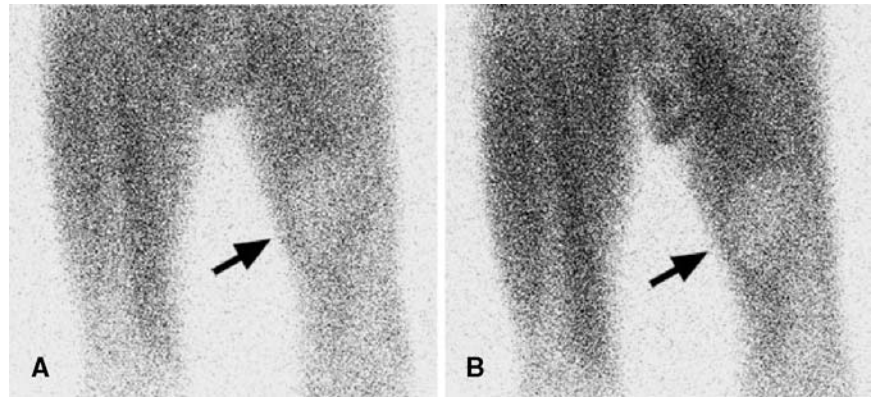


**Fig. 3A—C** Coronal MR images at the initial consultation. Parenchymatous lesion measuring 7×9×12 cm in the center of the left thigh suggests that it may have originated from the surface of bone. **A** T1-weighted image (TR=350 ms, TE=14 ms). A portion of the lesion was isointense to muscle and other parts showed slightly high signal intensity, which was assumed to indicate hemorrhage. **B** T2-weighted image (TR=3000 ms, TE=105 ms). The center was heterogeneous and signals ranged from very high signal intensity to low signal intensity. **C** Gadolinium-enhanced T1-weighted image, focusing on the margin, and the interior showed heterogeneous contrast enhancement



**Fig. 4**  $^{99m}\text{Tc}$ -HMDP bone scintigraphy: **A** anteroposterior view, **B** posteroanterior view. A slightly round ring-like mass is seen with very slight accumulation consistent with previous findings (*arrow*). Accumulation was observed in the left ischial bone, and metastasis from sarcoma was suspected. Accumulations on the right 10th rib, low and middle thoracic vertebrae, and knee joint were considered traumatic change, or degenerative change

**Fig. 5**  $^{201}\text{Tl}$  scintigraphy: **A** early phase (15 min), **B** delayed phase (90 min). Reduced elliptical accumulation was observed compared with physiological accumulation in the surrounding muscles (*arrow*)



**Fig. 6** Histopathological findings. Fibrous foreign body and reactive findings were observed. There were neither viable cells nor atypical giant cells around the foreign body. At the center, calcified corpuscles were found and calcification was observed in part of the surrounding tissue. There were no malignant findings. Scale bar represents 100  $\mu\text{m}$

the thigh confluent with the left femur and producing periosteal thickening (Fig. 2). Coarse calcification at the center and heterogeneous contrast enhancement at the periphery was observed. A destructive aggressive surface tumor such as chondrosarcoma was initially considered. MRI showed a well-marginated soft tissue mass measuring 7×9×12 cm in diameter in the medial aspect of the left thigh. On T1-weighted images (TR=350 ms, TE=14 ms) the mass was isointense to muscle and showed a slightly high signal intensity suggesting focal hemorrhage (Fig. 3A). On T2-weighted images (TR=3000 ms, TE=105 ms) the mass was heterogeneous with signals from very high to low intensity (Fig. 3B). Gd-DTPA enhanced T1-weighted images showed nonhomogeneous contrast enhancement in the periphery (Fig. 3C). Thus, a malignant tumor originating from the soft tissue was highly suspected.  $^{99\text{m}}\text{Tc}$ -HMDP bone scintigraphy showed a faint, ring-like uptake in the tumor with intense uptake at the site of the left femur (Fig. 4; arrow).  $^{201}\text{Tl}$  scintigraphy showed reduced uptake in the tumor compared with physiological accumulation in the surrounding muscles (Fig. 5).

Based on the above findings, malignant neoplasms such as chondrosarcoma, osteosarcoma and chronic expanding hematoma

were suspected and a preoperative needle biopsy was performed. On pathological examination, tumor was not observed. There was a space covered by a fibrin mass and vascular endothelium had formed (angiogenesis), but there were no malignant findings. Since the diagnosis remained unclear and malignancy could not be completely excluded, an operation was performed. Macroscopically, the margin was comparatively regular, the resected mass was elastic and hard and its surface was rich in vessels. At the center of the mass, serum liquid and a retained surgical sponge were observed. The boundary with the femur was irregular. Extensive intralesional excision was performed. For reconstruction, beta-tricalcium phosphate was used. On postoperative histopathological examination, fibrous foreign body with reactive findings were observed. There were neither viable cells nor atypical giant cells around the foreign body. Calcified corpuscles were found at the center and calcification was observed in part of the surrounding tissue. There were no malignant findings (Fig. 6). Thus, based on the surgical and histopathological examinations, the mass was finally diagnosed as gossypiboma due to retained surgical sponge. Two years after surgery, the postoperative course has been uneventful without infectious symptoms.

## Discussion

Foreign body granuloma due to retained surgical sponge is synonymously described as gossypiboma, cottonballoma, textiloma or gauzeoma [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 21, 22]. This condition is not that infrequent in the field of thoracic or abdominal surgery. Imaging findings specific to gossypiboma on radiographs and CT scans include a whirl-like appearance, or gas produced by bacteria captured in the gauze fiber may cause the mass to be visualized as a sponge-like phenomenon [14]. It is reported that MRI has demonstrated the folded fabric structure of gauze on T2-weighted images in some cases [10, 12, 13]. However, the frequency of these findings is low. It is reported that various images have been observed depending on the period of retention of the sponge and the surgical site [3, 18]. In particular, a whirl-like appearance has frequently been reported in the fields of digestive surgery or obstetrics and gynecology, and involvement of fine gas produced by intestinal bacteria has been pointed out.

However, gossypiboma in the field of orthopaedic surgery (extremities or vertebrae) has few specific findings and definitive diagnosis on imaging studies is difficult [8, 9, 11, 15, 21]. Bone scintigraphy did not provide additional helpful information for differentiation. There have been no reports regarding  $^{201}\text{Tl}$  scintigraphy in cases of gossypiboma. Thus, as previously reported, the high negative predictive value of  $^{201}\text{Tl}$  scintigraphy with negative uptake of  $^{201}\text{Tl}$  is helpful to exclude malignant

tumors in some cases that show equivocal findings on CT and MRI [19, 20]. This was so in our patient.

Some reports indicate that sarcoma may arise in gossypiboma [4, 5, 7]. In these cases, the period of retention in the body was 20 years or longer [4, 5, 7]. Thus, it is always necessary to exclude coincidental sarcoma through pathological investigation of the whole cut surface of the resected specimen after its total removal.

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