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Ossifying chondrolipoma of the thigh: radiographic pathologic correlation

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INTRODUCTION

Lipomas are the most common benign soft-tissue tumors occurring in the subcutis or muscular regions. Histologically, lipoma consists of mature adipose cells, similar to normal adipose cells. Lipomas can occasionally have areas of bone or cartilage formation and are classified as osteolipomas or chondrolipomas, respectively.[1,2] However, there have been few reported cases of lipoma with both ossification and cartilage formation.[3,4]

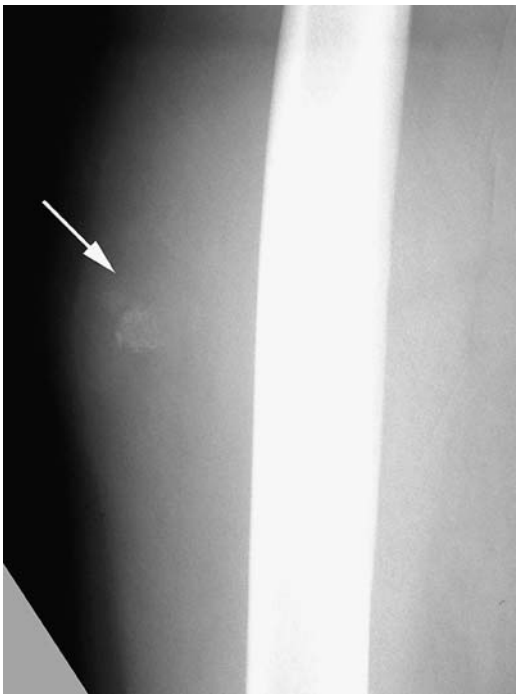

FIGURE 1. Plain lateral radiograph shows irregular mineralization in the anterior thigh (arrow).

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Here, we report an extremely rare case of ossifying intramuscular chondrolipoma in the thigh and review its radiographic and pathologic correlation. According to the guidance of the local institutional review board, the patient and her guardian provided informed written consent.

CASE REPORT

A 58-year-old woman presented with a painless mass in the left thigh of 3 yr' duration. There was no history of trauma. On physical examination, a firm mass, 3×4 cm in size, was palpated on the anterior thigh. A lateral plain radiograph showed irregular mineralization in the soft tissue (Figure 1). Axial MRI demonstrated that the tumor, located within the rectus femoris muscle, had predominantly high-signal intensity on both T1-weighted and T2-weighted images. The medial border was poorly defined (Figure 2). Enhancement after Gd-DTPA administration was not seen. Sagittal MRI demonstrated the tumor, with irregular intermediate-signal intensity within the high-signal intensity area on the T1-weighted image (Figure 3A). On the T2-weighted image, the

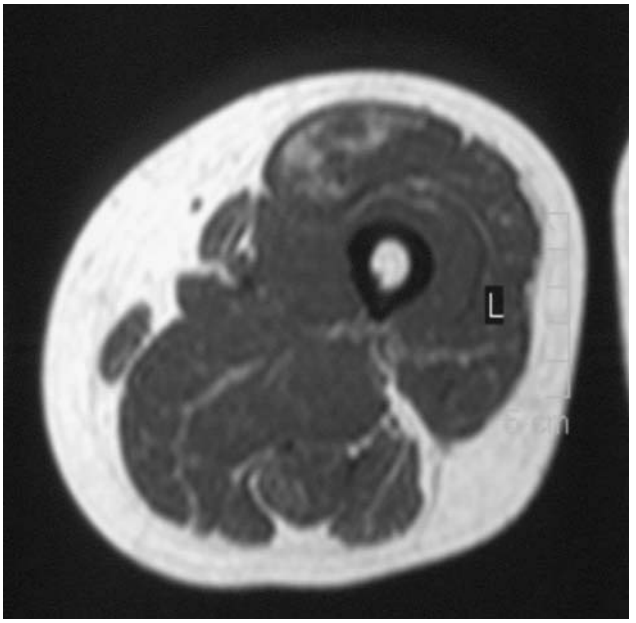

FIGURE 2. Axial T1-weighted MRI (TR/TE = 550/17). The tumor within the rectus femoris muscle is predominantly of high-signal intensity including intermediate signal foci corresponding to cartilage formation with ossification. The medial border is poorly defined.

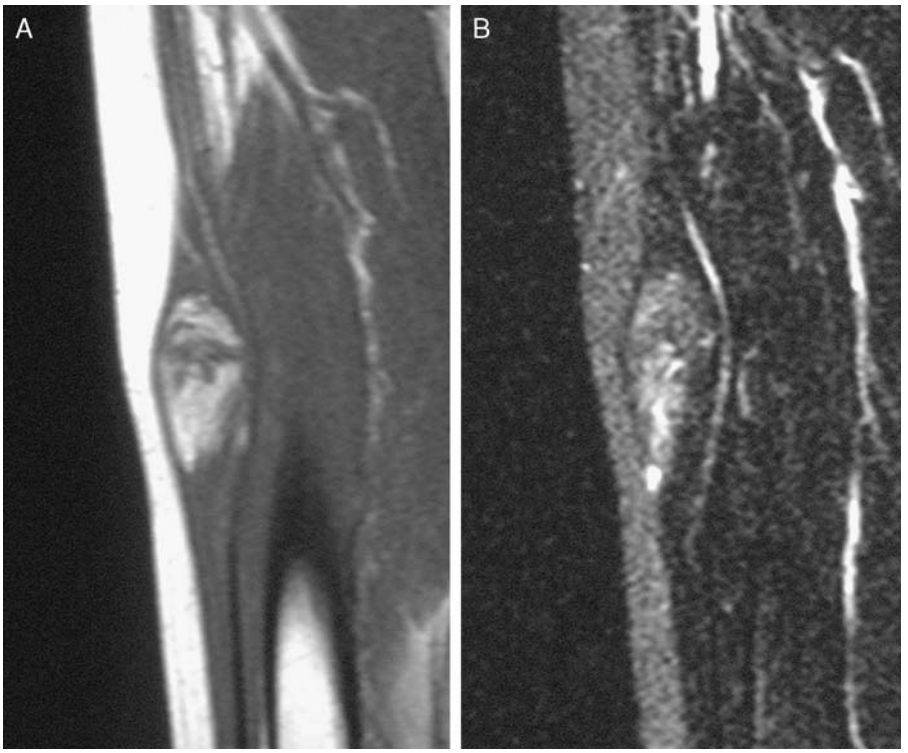

FIGURE 3. Sagittal T1-weighted MRI (TR/TE = 550/16). The lesion shows irregular intermediate-signal intensity surrounding high-intensity area. The distal border of tumor is poorly defined (A). Sagittal T2-weighted MRI (TR/TE = 5146/100). The tumor appears heterogeneous, from iso-signal intensity to high-signal intensity with fat. Bright signal area corresponds to cartilaginous area (B).

lesion had inhomogeneous high-signal intensity and partial intermediate-signal intensity (Figure 3B).

The tumor was completely removed under general anesthesia. The axial cut surface of the tumor was predominantly yellowish and partially glistening white (Figure 4). Each lesion was measured on the maximal cut surface: the lipomatous area was 56 × 21 mm in size, and the cartilaginous area was 35 × 20 mm. Histologically, the tumor was composed of mature adipocyte-like cells (lipoma cells) in the peripheral area, with ossification in the cartilaginous matrix in the central area (Figure 5). The cartilaginous cells were similar to hyaline cartilage cells and did not have nuclear atypism. From these findings, definitive diagnosis was ossifying chondrolipoma. There was no recurrence at 8 yr after surgery.

DISCUSSION

Lipomas occasionally can have other mesenchymal components, such as bone, cartilage, and vessels, and are classified as osteolipoma, chondrolipoma, and angiolipoma, respectively.[1,2] Histologically, these are metaplasias from lipoma and not neoplastic changes.[1,2] According to previous case reports, chondrolipomas and osteolipomas arise mostly from the breast[5,6] or from the oral, nasopharyngeal, or pharyngeal regions.[7–10] The occurrence in extremities is extremely rare: only five case reports of chondrolipoma are available.[3,11–14]

Radiographic features of conventional lipoma are well known.[15] However, there have been few radiographic reports on the above subtypes of lipomas.[15] Furtheremore, there is limited information available on the radiographic findings of chondrolipomas.[3,4,13] Characteristic features of the MRI findings in our patient were the central area of tumor, intermediate signal intensity on T1-weighted images, and hererogeneous high-intensity on T2-weighted images, differing from adipose tissue. The heterogeneous signal intensity was similar to that in previously reported cases.[3,13,14] The nonlipomatous lesion proved to be a cartilaginous area with ossification, as assessed by macroscopic and pathologic examinations. Usually, T2-weighted images of benign chondromatous lesions, such as soft-tissue chondromas or enchondromas, consist of lobulated bright signal intensity with partial low intensity, reflecting variable calcification.[16,17] However, these typical findings were not seen in our patient. Another differential diagnosis is hemangioma, which often includes adipose tissue and occasional mineralization with poorly defined margins. Our radiographic findings mimicked this; however, central ossification in the tumor by radiograph ruled out phlebolith in hemangioma.

The gross appearance of the excised tumor consisted of a cartilaginous area with ossification in the lipomatous area (Figure 5). Histologically, the cartilaginous area contained mature chondrocytes and matrix, differing from chondroid lipoma.

Despite seeing central ossification in the cartilage component of the tumor, we could not establish whether the ossification developed from enchondral ossification in the cartilaginous area or from differentiation of lipomatous

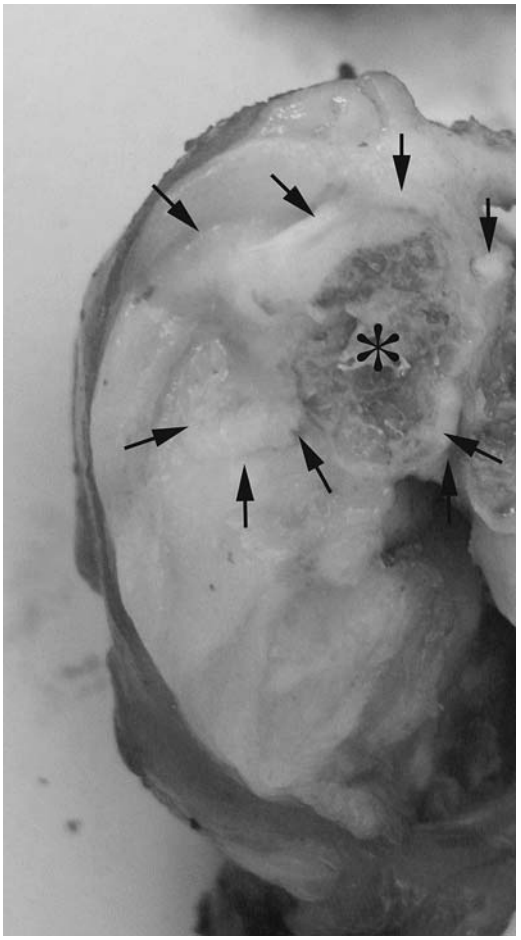

FIGURE 4. Grossly cut surface of the tumor appears as a yellowish lipomatous area and focal ossification (*) in glistening carlilaginous area (arrows).

tissue. Cartilaginous tumors, such as synovial chondromatosis, enchondromas, soft-tissue chondromas, occasionally occur with ossification in chondroid matrix. On the other hand, they can arise from two different metaplasias such as ossification together with cartilage formation from lipoma. Recently, multipotent adult stem cells, the adipose-derived stem cells (ASCs), obtained from liposuction waste have the potential for chondrogenesis, osteogenesis, and myogenesis.[18,19] Lipoma cells might have the potential to differentiate into other mesenchymal tissues. In our patient, the ossification area was focal and central surrounding the cartilage area. Moreover, the ossification pattern was similar to that in soft-tissue chondroma.[20] Thus, we believe that ossification in chondrolipoma by enchondral ossification occurred over a long period of time. We finally diagnosed this from radiographs and pathological examinations as an ossifying chondrolipoma, not osteochondrolipoma.

In summary, we present a case of ossifying chondrolipoma of the thigh with radiographic and pathologic findings.

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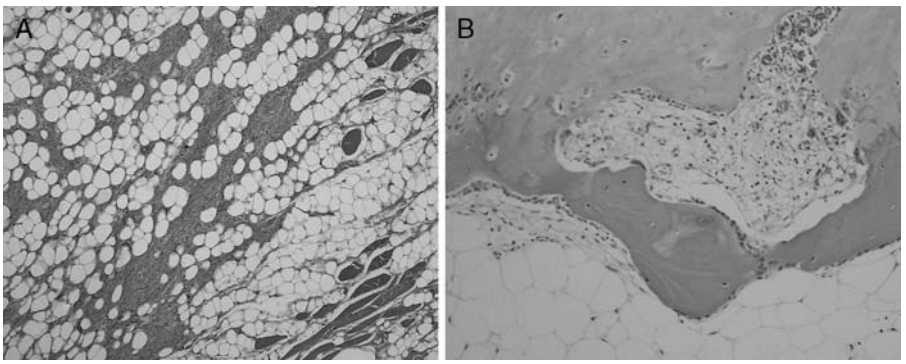

FIGURE 5. Photomicrograph shows that the tumor consists of three parts: Approximately 60% of the tumor is mature adipose tissue (lipoma) including a little bit of muscle fibers (A). Bone formation surrounding cartilaginous area (B) (hematoxylin and eosin).

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