Chondrolipoma of the Shoulder: A Case Report

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Chondrolipoma is rare and is mainly encountered in large-sized, long-standing lipomas. Chondrolipoma can be found at almost any site of the body, particularly in the connecting tissue of the skeletal system, breast, pharynx, and nasopharynx. A small number of chondrolipomas have been reported in the literature with rare magnetic resonance examples available. Here, we report a rare case of chondrolipoma in the shoulder and review its radiographic and pathologic correlation. This paper aims to report plain radiograph, computed tomography, and magnetic resonance examples of chondrolipoma.

Keywords: Shoulder; Soft tissue neoplasms; Benign tumors; Subcutaneous fat; Lipoma; Cartilage; Case report

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]. However, there have been few reported cases of lipoma with both ossification and cartilage formation [2]. Cartilaginous or osseous metaplasia (chondrolipoma, osteolipoma) is rare and is mainly encountered in large-sized, long-standing lipomas [2]. Chondrolipomas can be found at almost any site of the body, particularly in the connecting tissue of the skeletal system, breast, pharynx, and nasopharynx. A small number of chondrolipomas have been reported in the literature with few magnetic resonance (MR) examples available [3]. Here, we report a rare case of chondrolipoma in the shoulder and review its radiographic and pathologic correlation. The purpose of this paper is to report plain radiograph, computed tomography (CT), and MR examples of chondrolipoma.

CASE REPORT

A 46-year-old man presented with a painless mass in the right shoulder. There was no history of trauma. When he used the right arm for a long time, he was getting tired quicker than the opposite. These symptoms gradually progressed for several years and recently also continued to occur. The plain radiograph showed a radiopaque mass in the subscapular region of the right shoulder (Fig. 1). CT showed a $10 \times 11 \times 5.8$ cm well-defined oval soft tissue mass at the right axilla. Heavy calcification in the mass containing low-density fat components was seen. The mass was located subcutaneous fat layer, just the anterior aspect of the right scapula body, and compressed the muscle (Fig. 2). Magnetic resonance imaging (MRI) revealed an oval calcified soft tissue mass in the right axilla. Axial MRI demonstrated that the tumor was located in the medial aspect of the body of the scapula, the anterolateral area of the right brachial plexus. There was predominantly high signal intensity on both T1 weighted and T2 weighted images. The tumor within the right axillar was predominantly of high signal intensity including mixed intermediate signal foci corresponding to cartilage formation with ossification. Other signal intensities of fluid and fat were also seen. The tumor appeared heterogeneous, from iso-signal intensity to high signal intensity with fat. The bright signal area corresponded to the cartilaginous area (Fig. 3). Enhancement after Gd-DTPA administration was not seen. The tumor was completely removed under general anesthesia. The tumor was resected. It was a well-circumscribed, hard mass with surrounding adipose tissue. The axial cut surface of the tu

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mor was predominantly yellowish lipomatous areas, partially whitish glistening cartilaginous areas, and a well-demarcated hard bony component (Fig. 4). Histologically, the tumor was composed of mature adipocytes within the hyalinized stroma and mature osseous components in the cartilaginous matrix (Fig. 5). The patient provided written informed consent for the publication of clinical details and images.

**DISCUSSION**

Lipoma is by far the most common soft tissue tumor and occurs in the elderly, without any predilection for a certain sex or race. The common lipoma is subcutaneous and most commonly located on the back, shoulder, neck, abdomen, or proximal extremities [1]. According to previous case reports, chondrolipomas and osteolipomas arise mostly from the breast [3] or from the oral, nasopharyngeal, or pharyngeal regions [4,5]. The occurrence in extremities is extremely rare. Chondrolipoma is benign cartilage containing mesenchymoma of the soft tissues and is a rare lesion that should be treated by surgical excision. Clinically, it may present as a firm, fixed mass.

Histologically, these are metaplasias from lipoma and not neoplastic changes [1]. Normally, the histopathologic examination of lipomas is easy to perform, even if these tumors contain uncommon or rare components. An increased number of capillary blood vessels characterize angiolipomas; an increase in myxoid ground substance points to a myxoid lipoma or liposarcoma, whereas spindle cell metaplasias sometimes may completely or partly mask the matrix of these tumors. On the other hand, mesenchymal metaplasias with the formation of cartilage and bone are very rare findings.

The tumor can be classified as benign or malignant. Fibrous elements are found in all mesenchymal tumors and are not counted as one of the elements [6]. These tumors tend to recur and infiltrate locally making them true neoplasms. Two possible explanations for the development of a cartilage component in benign mesenchymoma have been presented. The first is that cartilage arises from chondro-osseous metaplasia of the adipose tissue. Al-

![Fig. 1. Chondrolipoma in the shoulder of a 46-year-old man. Plain radiograph shows radiopaque mass in the subscapular region of the right shoulder.](image)

![Fig. 2. Noncontrast enhanced axial (A) and coronal (B) view computed tomography shows a 10×5×4.5 cm well-defined oval soft tissue mass at the right axilla. Heavy calcifications in the mass, containing a low-density fat component (black arrow), are seen. The mass is located subcutaneous fat layer, just the anterior aspect of the right scapula body, and compressed the muscle.](image)
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Fig. 3. (A) Axial view. (B) Coronal view. T1 weighted magnetic resonance imaging (MRI). The tumor within the right axillar is predominantly of high signal intensity including mixed intermediate signal foci corresponding to cartilage formation (white arrow) with ossification (arrowhead). Other signal intensities of fluid and fat (black arrow) are also seen. (C) Axial view. (D) Coronal view. Fat suppression T2 weighted MRI. The tumor appears heterogeneous, from iso signal intensity to high signal intensity with fat. The bright signal area corresponds to the cartilaginous area.

Fig. 4. (A) Macroscopic appearance of the resected tumor. (B) The grossly cut surface of the tumor. Grossly, there are yellowish lipomatous areas (black arrow), whitish glistening cartilaginous areas (white arrow), and a well-demarcated hard bony component (arrowhead).

Alternatively, cartilage may originate from multipotential cells in the mesenchymoma [7]. Close proximity or contact with bones, joints, tendons or the periosteum might induce a specific tendency of the mesenchyme to produce chondroid ground substance, which
would then lead to chondro-osseous metaplasia of a lipoma that developed in the same region. Metaplastic transformation may occur in response to mechanical stress caused by frequent contact with the periosteum and joints [8].

Radiographic features of conventional lipoma are well known [9]. However, there have been few radiographic reports on the above subtypes of lipomas [9]. The chondrolipoma presented the above-displayed MR features that were consistent with a fat-containing tumor and suggestive of cartilage. The presence of fat was confirmed by high signal regions on T1 weighted images corresponding with low signal on fat suppression T2 weighted images. While a large portion of the chondrolipoma was fat, several nonlipomatous areas could be identified, which were of intermediate signal on T1 weighted images and fat suppression T2 weighted images corresponding to fibrous septa.

The gross appearance of the excised tumor consisted of a cartilaginous area with ossification in the lipomatous area. 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 endochondral ossification in the cartilaginous area or from differentiation of lipomatous tissue. Cartilaginous tumors, such as synovial chondromatosis, enchondromas, and soft-tissue chondromas, occasionally occur with ossification in the chondroid matrix. On the other hand, they can arise from two different metaplasias such as ossification together with cartilage formation from lipoma.

We believe that the chondromatous transformations are real metaplasias, the causes of which are still to be elucidated. The described metaplasias do not have any influence on prognosis. Cartilage does not show any atypical cells. Complete surgical excision is the gold-standard therapy. Treatment of benign mesenchymomas is by local excision with a 20% recurrence noted in one series [8]. Recurrence may represent previously incomplete removal [8].

In conclusion, this is a rare report of chondrolipoma arising from connecting tissue of the skeletal system; this tumor should be kept in mind as a potential cause of lesions affecting the distal extremities.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES