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CASE REPORT

Articular nodular fasciitis in the glenohumeral joint

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Abstract We describe a case of multiple intra-articular masses in the glenohumeral joint of a 15-year-old patient. The patient was treated with arthroscopic excision of the masses and synovectomy. Histological and immunohistochemical studies were consistent with those of a nodular fasciitis. Follow-up examination did not reveal recurrence at 6 months. In this article we report the first case of articular nodular fasciitis in the glenohumeral joint with unusual imaging findings.

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Introduction

Nodular fasciitis is a benign fibroblastic proliferation most commonly found in patients between 20 and 40 years of age. It is the most frequent soft tissue lesion originating from fibrous tissue [1]. It is thought to be a reactive process rather than a true neoplasm. The aetiology remains unknown, although a few reports suggest a role of trauma. Nodular fasciitis arises commonly in the upper extremities of adults and in the head and neck region of infants and children. It is not widely recognized that the lesion may arise within joints, although a few cases have been reported in the knee [2–4], hand [2], ankle [2] and temporomandibular joint [5]. This uncommon intra-articular location, its rapid growth, and its rich cellularity and increased mitotic activity may cause diagnostic confusion on histological analysis. Features of articular nodular fasciitis (ANF) shown by computed tomography (CT) and magnetic resonance imaging (MRI) have been reported to be non-specific [6, 7]. We present details of a case of intra-articular synovial variant of nodular fasciitis which, to our knowledge, represents the first case that developed in the glenohumeral joint.

Case report

Clinical history

A 15-year-old adolescent boy consulted our hospital complaining of restriction in motion of his left shoulder,

along with tenderness and pain, that had been present for the past 3 months. The patient had a history of repetitive "body checks" at the time of ice hockey matches. Physical examination revealed a restricted range of motion of the glenohumeral joint in all planes. The laboratory tests did not reveal a rise in C reactive protein, sedimentation rate, or rheumatic parameters, or evidence of leukocytosis.

Plain radiography showed no abnormality, and no evidence of articular or peri-articular calcification. Further evaluation was obtained by 3 T MRI after intra-articular injection of 12 ml of diluted acidum gadotericum (0.0025 mmol Gd/ml, Artirem, Guerbet) mixed with 3 ml of iodinated contrast agent (Hexabrix 320, Guerbet). This examination revealed a 20 mm, nodular, intra-articular, proliferative mass with finger-like projections within the anterior axillary recess of the glenohumeral joint. Furthermore, several round and smooth bodies from 4 mm to 6 mm in diameter, with a target-like appearance, were found in the subscapular recess of the glenohumeral joint (Figs. 1 and 2). The glenohumeral articular cartilage appeared normal.

With a preoperative differential diagnosis of synovial chondromatosis, cartilage bodies, inflammatory arthritis or pigmented villonodular synovitis based on these imaging findings, an arthroscopic evaluation was performed. Intra-operative findings consisted of an inflammatory synovitis and multiple white masses with a smooth surface. Some were still attached to the synovium, and some were free in the joint. Hyaline cartilage and labrum appeared normal. Seventeen masses, with sizes ranging from 3 mm to 17 mm, were extirpated arthroscopically, and these, along with a portion of the synovium, were sent for pathological assessment. A synovectomy was then performed.

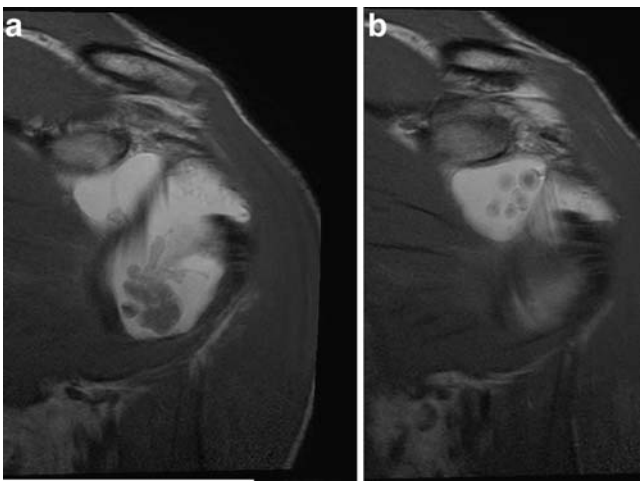

Fig. 1 **a** A 20 mm, nodular, intra-articular, proliferative mass with finger-like projections with signal isointense with that of the surrounding muscles within the axillary recess of the glenohumeral joint. Coronal proton density-weighted image (TR 1,570 ms, TE 20 ms). **b** Smooth bodies 4 mm to 6 mm and with a target-like appearance within the subscapular recess. Coronal proton density-weighted image (TR 1,570 ms, TE 20 ms)

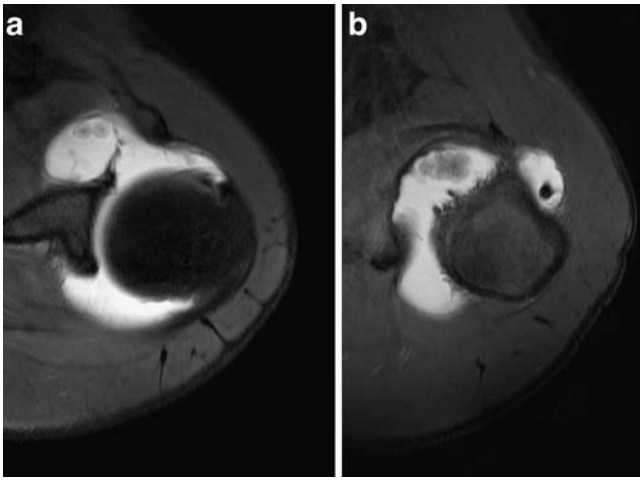

Fig. 2 **a** Visualization of two of the loose bodies within the subscapular recess, both with this target-like appearance. Axial proton density-weighted image with fat saturation (TR 2,220 ms, TE 30 ms). On pure T1-weighted images with fat saturation these bodies were hypointense and homogenous without a peripheral hyperintense ring (not shown). **b** Axial view of the intra-articular mass of the axillary recess. Proton density-weighted image with fat saturation (TR 2,220 ms, TE 30 ms)

On microscopic examination (Figs. 3 and 4), most of the masses consisted of a fibrous tissue, comprising regular fibroblastic cells with ovoid nuclei arranged in short bundles against a variably collagenous background. A few atypical mitotic figures were noted. Some areas were densely fibrous, others more loosely myxoid, and the cells in these areas had a haphazard, tissue-culture appearance. The architecture of this tissue was focally more storiform. In others areas the dense hyaline background predominated, with only a few elongated fibroblasts interspersed between thick inter-crossed collagen bundles. There were numerous histiocytes, some lymphocytic and neutrophilic infiltrate, and a few foamy macrophages. No multi-nucleated giant

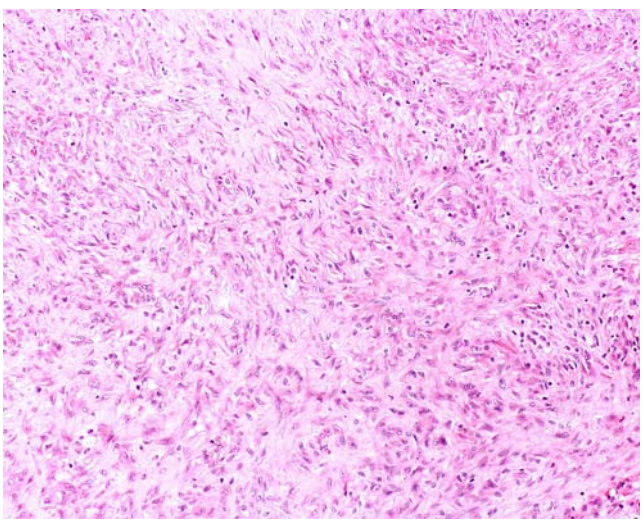

Fig. 3 Proliferation of spindled fibroblasts with plump nuclei, in a storiform pattern. Haematoxylin–eosin, ×10x

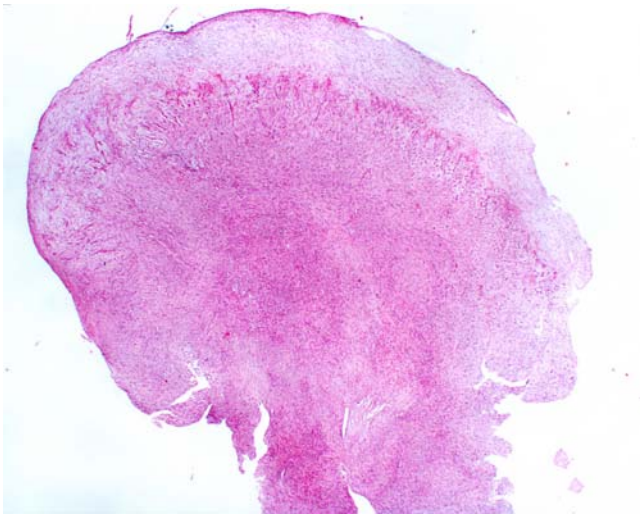

Fig. 4 At low power, the peripheral haemorrhage and oedema are visible. Haematoxylin–eosin, ×1.25

cells or haemosiderin deposits were visible. The outermost area of some of the nodules was more oedematous, with extravasated red blood cells and numerous capillaries arranged perpendicularly to the surface. Some of the nodules were partially or completely necrotic. There were no chondroid features. Immunohistochemically, the fibroblastic population stained positive for smooth muscle actin and negative for desmin and CD34; CD68 decorated the numerous macrophages. The conclusion of the pathology report indicated ANF.

Treatment consisted of immobilization in a scarf for 10 days, associated with 10 days of non-steroidal anti-inflammatory medication. The patient subsequently underwent physiotherapy, with progressive mobilization. Six months after the operation, the patient had no symptoms, with a complete range of motion of the glenohumeral joint, and had returned to ice hockey.

Discussion

Nodular fasciitis is a benign, self-limiting, proliferation of fibroblasts of uncertain aetiology that develops from fascial tissue. It is classically categorized into three forms, on the basis of its anatomic location: subcutaneous, intramuscular and fascial type, or intermuscular [1]. Various names have been used for this condition, such as inflammatory pseudotumour or pseudosarcoma, pseudosarcomatous fibromyxoid tumour, and myofibroblastic proliferation.

Nodular fasciitis rarely arises within joints. However, fibroblastic proliferative lesions can develop in synovial tissue, as shown by the 13 cases that have been previously reported [2–5]. Although the cause is unknown, a history of repetitive trauma may precede the development of these lesions, which speaks in favour of a reactive type of lesion. In the present case, soreness and limited motion and locking of the joint were present. Other non-specific symptoms, such as swelling, have also been described [3]. The differential diagnosis of multiple intra-articular masses includes localized nodular synovitis, pigmented villonodular synovitis, synovial chondromatosis, cartilage bodies, desmoid fibromatosis, juxta-articular myxoma, synovial haemangioma, inflammatory arthritis, and lipoma arborescens.

Very few descriptions of the imaging aspects of ANF are available. The lesion has been encountered most often in the knee (nine cases), with imaging data available in only two cases. In one patient, a 40 mm mass with low signal intensity on T1-weighted images, with signal that was isointense with that of the surrounding normal muscle on T2-weighted images, was located in the suprapatellar pouch with a polypoid mass on double-contrast CT [3]. In the other patient, a 45 mm mass posterior to the posterior cruciate ligament had a signal slightly hyperintense to that of the surrounding normal muscle on T1-weighted images and hyperintense to muscle on T2-weighted images. Contrast-enhanced T1-weighted images showed diffuse enhancement of the lesion in this patient [4]. There is no previous description of a mass with finger-like projections or intra-articular bodies with a target-like appearance as seen in our patient. These finding are also consistent with synovial chondromatosis, cartilage bodies or an inflammatory synovitis.

In our case, the histological features were typical of classic ANF. The target-like appearance that was evident on MR arthrography is explained by histological characteristics such as the granulation-tissue-type appearance, oedema and extravasated red blood cells prevailing toward the surface of the nodules, findings that could be related to a prior injury.

Histologically, ANF has to be differentiated from localized nodular synovitis (also called giant cell tumour, a localized and benign form of generalized pigmented villonodular synovitis). The latter condition consists mainly of small, histiocytoid cells with round or reniform nuclei with intermixed larger epithelioid cells, and varying proportions of osteoclast-like giant cells and foam cells. The nuclei in the small histiocytoid mononuclear cells and in the multi-nuclear giant cells are identical, and the mononuclear cells often contain haemosiderin deposits. In ANF, there may be foam cells and multi-nucleated giant cells as well, but there is no haemosiderin deposition, although one often finds scatterings of extravasated red blood cells. The immunohistochemical profile is also different; ANF has a fibroblastic and myofibroblastic phenotype, whereas localized nodular synovitis has a more histiocytic phenotype.

Despite the possibility of spontaneous involution in classic nodular fasciitis, there is no place for a conservative approach with the intra-articular form of the process, and arthroscopic or open resection and synovectomy are the

mainstays of treatment. This therapy generally provides relief of symptoms. Excision of the lesion is usually curative [8], and, in our patient, no recurrence has been seen to date. However, recurrences have been reported [9, 10], and, therefore, careful follow-up examinations are needed. Awareness that this type of abnormality is part of the differential diagnosis of intra-articular mass lesions, and good collaboration among surgeons, pathologists, and radiologists, will lead to the correct diagnosis.

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