Skeletal Radiol (1999) 28:283–285

CASE REPORT

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Subacromial-subdeltoid lipoma arborescens associated with a rotator cuff tear

Received: 13 October 1998
Revision requested: 10 November 1998
Revision received: 22 January 1999
Accepted: 31 January 1999

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Abstract A 44-year-old man presented with lipoma arborescens of the right shoulder, associated with a rotator cuff tear. MRI revealed villous proliferations with signal intensity of fat on all pulse sequences. At surgery, this bursa was found to contain moderately yellow cloudy fluid without fat globules. Histological examination of the lesion showed subsynovial accumulation of mature fat cells.

Key words Lipoma arborescens · Synovial membrane · MRI · Shoulder · Bursitis

Introduction

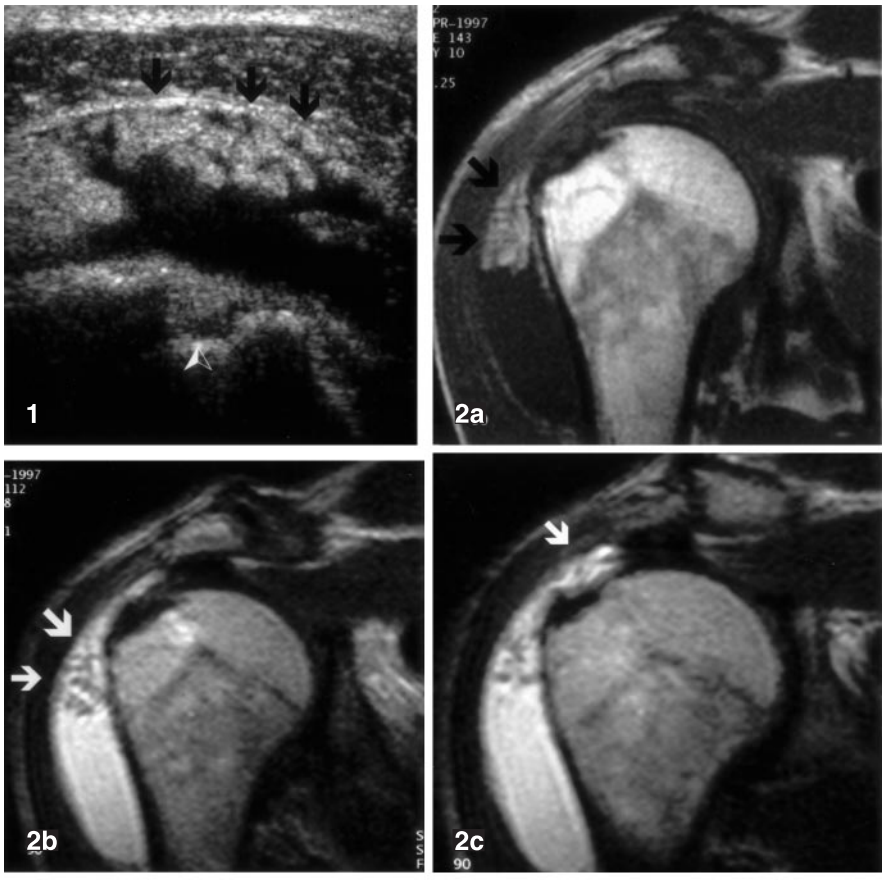
Soft-tissue swelling in the shoulder region may reflect a tumoral, traumatic or arthritic disorder. Lipoma arborescens is a rare synovial disorder which rarely involves the shoulder region [1–3]. As a rule, the condition presents itself as a non-specific monosynovitis, without any abnormal laboratory findings or specific features on radiography [1–17]. Both MRI and ultrasound permit diagnosis. MRI is an effective and non-invasive means to diagnose this distinct entity [7–9, 15, 16], for which surgical [1, 2, 4–6, 8–14, 18] or arthroscopic synovectomy [17] is the usual recommended treatment.

Case report

A 44-year-old man was referred to our hospital because of pain and swelling of the right shoulder region that had persisted for a few months. His past medical history was unremarkable. On clinical examination, a tender swelling covered the anterolateral aspect of the right shoulder. Abduction and external rotation were limited both actively and passively. All other joints were normal. No relevant laboratory abnormalities were found. In particular, acute phase reactants were normal and rheumatoid factor was absent.

Radiographs disclosed soft-tissue swelling, but no other abnormalities. Ultrasonography disclosed a sonolucent effusion in this bursa containing hyperechoic villous proliferations suggestive of fat (Fig. 1). MRI revealed a full-thickness tear of the supraspinatus tendon and a large effusion within the bursa containing numerous frond-like projections (Fig. 2). On all pulse sequences, these villous and synovial proliferations had a signal intensity of fat. In addition, a chemical-shift artifact was observed at the interface with fluid, confirming the fatty nature of the lesion.

The patient underwent surgery. The subacromial subdeltoid bursa contained lipomatous-like villous proliferations projecting into the abundant surrounding fluid. The entire bursa was resected and the rotator cuff repaired.



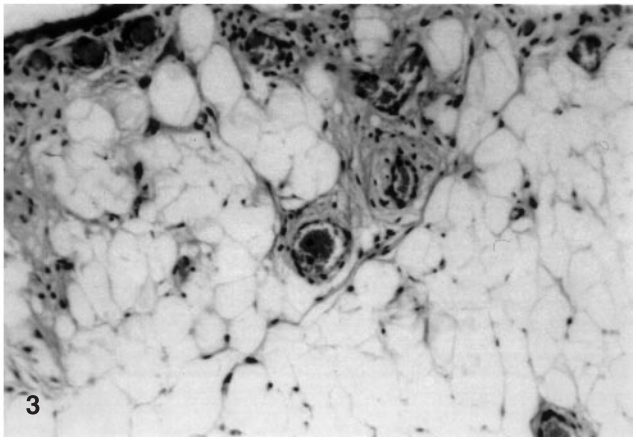


Fig. 1 Ultrasound of the right shoulder shows a sonolucent effusion in the subacromial subdeltoid bursa containing hyperechoic villous proliferations suggestive of fat (*black arrows*). The long head of biceps tendon (*arrowheads*) is seen in the intertubercular sulcus

Fig. 2 Coronal MR image of the right shoulder discloses a subacromial subdeltoid effusion containing villous proliferations presenting with signal intensity similar to that of fat on **A** T1-weighted images (*black arrows*) and **B** on T2-weighted images (*white arrows*). Chemical-shift artifacts along the frequency encoded direction are present on T2-weighted images. The rotator cuff tear is indicated by a *white arrow* on a more anterior coronal T2-weighted MR image (**C**)

Fig. 3 Photomicrograph shows large subsynovial accumulation of fat. No granuloma or inflammatory cells are seen (haematoxylin and eosin ×130)

Histological examination of the proliferative synovial tissue showed extensive replacement of the subsynovial connective tissue by mature adipose cells and swollen villous projections over the synovial surface (Fig. 3). These typical features of lipoma arborescens were in accordance with the MRI diagnosis. The bursal synovial fluid was mildly inflammatory, with 5600 WBC/mm^3 (neutrophils 19%, lymphocytes 81%), and cultures remained sterile.

After 1 year, the patient is asymptomatic with normal shoulder function.

Discussion

Lipoma arborescens is characterized by marked villous proliferation of the synovial membrane and hyperplasia of the subsynovial fat. This condition is rare with only 49 reported cases. Typically, a slowly increasing, painless synovial thickening and effusion with intermittent exacerbations develop over a few years [1–17]. Laboratory findings are unremarkable [1–17]. Microscopic characteristics are a subsynovial accumulation of mature fat cells normally present in small areas [1–17] and a chronically inflamed synovium in some cases [10, 13, 14]. Moderate infiltration of mononuclear inflammatory cells [6, 12, 13] and fibroblasts may be present [6]. These findings are quite distinct from synovial fat necrosis associated with ischemic pancreatic disease [19]; from aggregates of foamy macrophages filled with lipids sometimes associated with pigmented villonodular synovitis [20] and also from the histological features of intra-articular lipoma [21]. Other localized lipomatous synovial lesions have been reported in the context of traumatic conditions for which the term lipoma arborescens has erroneously been employed [11, 12].

The cause of lipoma arborescens is not known [1–17]. Several possibilities have been suggested including a neoplastic process, a synovial

reaction to inflammatory or traumatic stimuli. Because the condition has occasionally been described with rheumatoid arthritis [3] or psoriasis [13], one could hypothesize that the development of lipoma arborescens is a reactive process.

The knee is by far the most frequently affected joint with a predilection for the suprapatellar pouch [4–18]. The subdeltoid bursa location is a rare location, with only three cases thus far described in the literature. All of them were associated with rotator cuff tears [1–3].

Synovitis or effusion of the subacromial subdeltoid bursa may occur in association with partial or full-thickness cuff tears. Massive subacromial subdeltoid bursitis, sometimes containing fibrinous "rice bodies", is typical in rheumatoid disease [22]. A similar picture, either isolated or associated with glenohumeral joint involvement, is also observed in crystal deposition diseases, infection, amyloidosis, pigmented villonodular synovitis, and idiopathic synovial (osteo)-chondromatosis. Our patient had none of these conditions and only had the usual features of synovial lipoma arborescens.

MRI of lipoma arborescens has been reported by several authors [2, 8, 9, 15, 16]. The diffuse villous proliferations presenting a signal intensity of fat on all pulse sequences together with a chemical-shift artifact at the interface with fluid are diagnostic. A simple synovial lipoma can be distinguished by the presence of a solitary round or oval intra-articular mass. In synovial chondromatosis, ossified nodules may develop fatty marrow, but radiologic findings are diagnostic. On MRI, they appear as nodules presenting signal voids surrounding central areas of fat.

Lipoma arborescens being uncommon, precise treatment guidelines are not available. Most authors recommend partial synovectomy. Recurrence has been reported only in one case [4].

This fourth case of lipoma arborescens involving the subacromial subdeltoid bursa was associated with a rotator cuff tear, as were the previous three cases. MRI permitted accurate preoperative diagnosis of both abnormalities.

References

1. Dawson JS, Dowling F, Preston BJ, Neumann L. Case report: lipoma arborescens of the sub-deltoid bursa. Br J Radiol 1995; 68:197–199.
2. Lipoma arborescens of the shoulder: magnetic resonance imaging findings. Can Assoc Radiol J 1995; 46:311–313.
3. Weston J. The intra-synovial fatty masses in chronic rheumatoid arthritis. Br J Radiol 1973; 46:213–216.
4. Armstrong SJ, Watt I. Lipoma arborescens of the knee. Br J Radiol 1989; 62:178–180.
5. Blais RE, LaPrade RF, Chaljub G, Adesokan A. The arthroscopic appearance of lipoma arborescens of the knee. Arthroscopy 1995; 11:623–627.
6. Burgan DW. Lipoma arborescens of the knee: another cause of filling defects on a knee arthrogram. Radiology 1971; 101:583–584.
7. Chaljub G, Johnson PR. In vivo MRI characteristics of lipoma arborescens utilizing fat suppression and contrast administration. J Comput Assist Tomogr 1994; 20:85–87.
8. Donnelly LF, Bisset GS III, Passo MH. MRI findings of lipoma arborescens of the knee in a child: case report. Pediatr Radiol 1994; 24:258–259.
9. Feller JF, Rishi M, Hughes EC. Lipoma arborescens of the knee: MR demonstration. Am J Roentgenol 1994;163:162–164.
10. Grieten M, Buckwalter K, Cardinal E, Rougraff B. Case report 873: lipoma arborescens (villous lipomatous proliferation of the synovial membrane). Skeletal Radiol 1994; 23:652–655.
11. Hallel T, Lew S, Saba K, Bansal M. Villous lipomatous proliferation of the synovial membrane (lipoma arborescens). J Bone Joint Surg Am 1988; 70:264–270.
12. Hubscher O, Costanza E, Elsner B. Chronic monoarthritis due to lipoma arborescens. J Rheumatol 1990; 17:861–862.
13. Kloen P, Keel SB, Chandler HP, Geiger RH, Zarins B, Rosenberg AE. Lipoma arborescens of the knee. J Bone Joint Surg Br 1998; 80:298–301.
14. Martinez D, Millner PA, Coral A, et al. Case report 745: synovial lipoma arborescens. Skeletal Radiol 1992; 21:393–395.
15. Ryu KN, Jaovisidha S, Schweitzer M, Motta AO, Resnick D. MR imaging of lipoma arborescens of the knee joint. AJR 1996; 167:1229–1232.
16. Martin S, Hernandez L, Romero J, et al. Diagnostic imaging of lipoma arborescens. Skeletal Radiol 1998; 27:325–329.
17. Sola JB, Wright RW. Arthroscopic treatment for lipoma arborescens of the knee : a case report. J Bone Joint Surg Am 1998; 80:99–103.
18. Arzimanoglu A. Bilateral arborescent lipoma of the knee. J Bone Joint Surg Am 1957; 39:976–979.
19. Smukler NM, Schumacher HR, Pascual E, Brown S, Ryan WE, Sadeghian MR. Synovial fat necrosis associated with ischemic pancreatic disease. Arthritis Rheum 1979; 22:547–553.
20. Byers PD, Cotton RE, Deacon OW, et al. The diagnosis and treatment of pigmented villonodular synovitis. J Bone Joint Surg Br 1968; 50:290–305.
21. Pudlowski RM, Gilula LA, Kyriakos M. Intraarticular lipoma with osseous metaplasia: radiographic-pathologic correlation. AJR 1979; 132:471–473.
22. Steinfeld R, Rock MG, Younge DA, Cofield RH. Massive subacromial bursitis with rice bodies: report of three cases, one of which was bilateral. Clin Orthop 1994; 301:185–190.