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CASE REPORT

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Distinguishing multiple rice body formation in chronic subacromial-subdeltoid bursitis from synovial chondromatosis

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Abstract Multiple rice body formation is a complication of chronic bursitis. Although it resembles synovial chondromatosis clinically and on imaging, the literature suggests that analysis of radiographic and MR appearances should allow discrimination. We report the imaging findings in a 41-year-old man presenting with rice body formation in chronic subacromial-subdeltoid bursitis. We found that the signal intensity of the rice bodies is helpful in making the diagnosis.

Keywords Rice bodies · Bursitis · Subacromial-subdeltoid bursa · MRI

Introduction

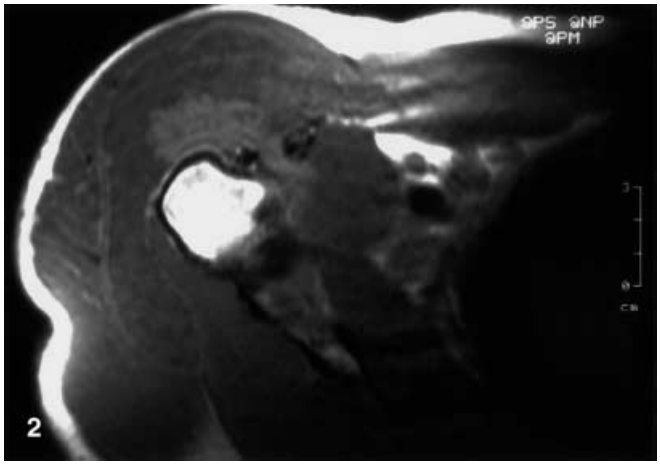
A complication of chronic bursitis is the development of multiple, white nodules resembling shiny rice grains [1, 2, 3, 4]. Although rice body formation is most commonly observed in chronic rheumatoid arthritis, it can occur in the absence of any underlying systemic disorder. We report the case of a 41-year-old man presenting with rice body formation in chronic subacromial-subdeltoid bursitis, and discuss whether a correct preoperative diagnosis can be made.

Case report

A 41-year-old Chinese man presented with a 1-year history of a right shoulder mass that had increased in size during the previous 2 months. The patient was not aware of any injury to the shoulder and did not have any arthritic symptoms. On examination, there was no associated limitation of shoulder joint movement or reduced sensation distally. Radiographs showed a soft tissue mass about the proximal humerus without evidence of calcification or bone erosion (Fig. 1).

MR imaging (0.5 T scanner) demonstrated a markedly distended subacromial-subdeltoid bursa, filled with multiple nodules of varying sizes that were isointense on T1-weighted and slightly hyperintense on T2-weighted spin-echo images relative to the hypointense skeletal muscle (Figs. 2, 3), without enhancement after intravenous gadolinium. The bursal wall was thickened with an internal septum and enhanced following intravenous gadolinium (Fig. 4). Only a small amount of bursal fluid was present. The glenohumeral and acromioclavicular articulations appeared normal.

At surgery, numerous hard shiny bodies, consistent with rice bodies, were found in the inflamed bursa. The bursa and its contents were removed in their entirety. There was neither communication with the underlying glenohumeral joint nor obvious compromise of the rotator



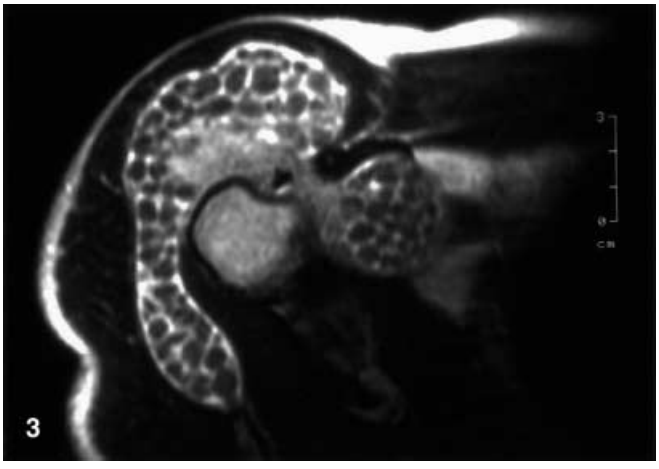


Fig. 1 Radiograph of the right shoulder demonstrates a soft tissue mass in the deltoid region without calcification or bone erosion

Fig. 2 Axial T1-weighted MR image (TR 500 ms, TE 20 ms) reveals distension of the subacromial-subdeltoid bursa without clear delineation of individual nodules

Fig. 3 Axial T2-weighted MR image (TR 2000 ms, TE 80 ms) clearly shows multiple tiny nodules in the bursal fluid. Note that the nodules have a slightly hyperintense signal compared with skeletal muscle

cuff. Pathologically, the bursal wall was lined with villous hyperplastic synovium with dense lymphoplasmocytic infiltration (Fig. 5). A few giant cells and lymphoid nodules were present. The rice bodies were noted to consist of dense fibrinous material (Fig. 6).

Discussion

Rice bodies consist of an inner amorphous core of acidophilic material surrounded by collagen and fibrin. They are frequently associated with seropositive rheumatoid arthritis, particularly of the knee joint, and appear unrelated to disease duration, severity or associated radiographic change [1]. The pathogenesis is unclear. Some authors suggest they arise from microinfarcted synovium leading to synovial shedding and subsequent encasement by fibrin derived from synovial fluid [5]. Others propose that early rice bodies are formed de novo in synovial fluid independently of synovial elements and progressively enlarge with aggregation of fibrin [1].

Previous reports of the MR appearance of rice bodies have described them as iso- or hypointense (to skeletal muscle) on T1- and T2-weighted images [2, 4, 6]. Although the rice bodies in our patient had a slightly hyperintense signal on the T2-weighted images, they were still clearly distinguishable from the surrounding bursal fluid, a finding which corresponds to other reports in the literature.

The main differential diagnosis is synovial osteochondromatosis, which may rarely involve a Synovium-lined bursa [7] and may have unmineralized metaplastic cartilage (20%) [8]. When mineralization occurs, the abnormality is apparent on radiographs. When unmineralized, the cartilage-containing masses of synovial chondromatosis are isointense or slightly hyperintense on T1-weighted and hyperintense on T2-weighted sequences relative to hypointense skeletal muscle [9]. They are reportedly difficult to separate from the surrounding fluid on all of the pulse sequences utilized [9]. In our patient, the rice bodies appeared isointense on T1-weighted

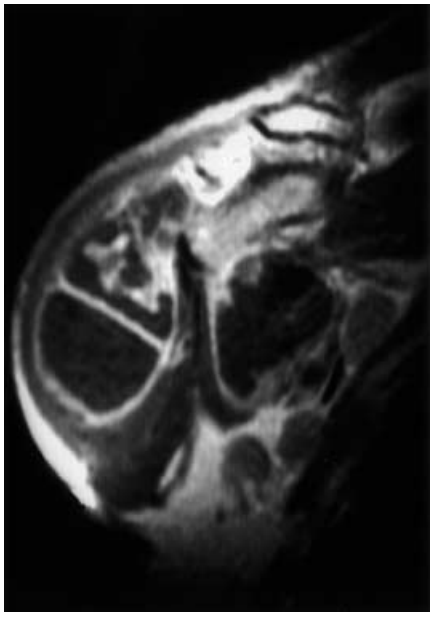


Fig. 4 After intravenous gadolinium, oblique coronal T1-weighted MR image shows marked bursal wall and septal enhancement. Note that the isointense intra-articular nodules are not enhanced

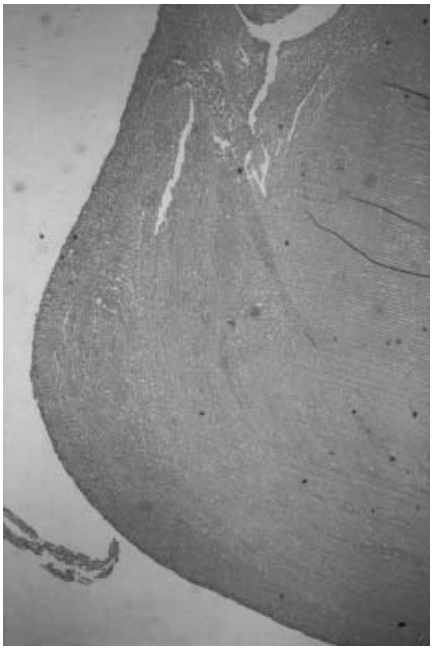


Fig. 6 Histologic specimen shows a rice body composed of dense fibrinous material without evidence of chondroid tissue. (H&E, ×40)

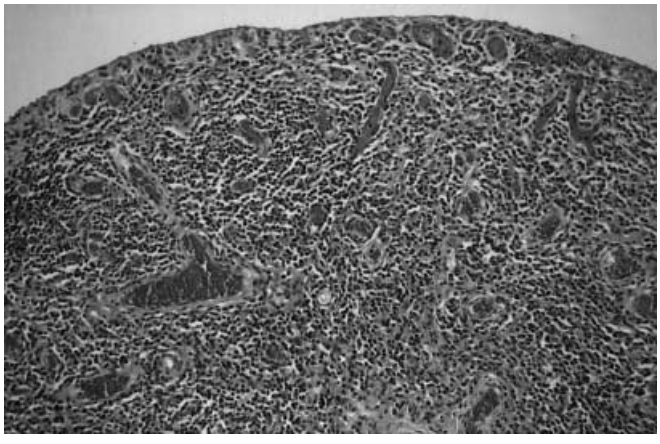


Fig. 5 Histologic specimen reveals nonspecific inflammation in the hyperplastic synovium. (H&E, ×100)

images and were virtually unrecognizable (Fig. 2) with a subtle increase in signal intensity on T2-weighted images (Fig. 3), hence our ability to distinguish them from the bursal fluid. Synovial chondromatosis usually being mildly hyperintense on T1- and T2-weighted sequences, unlike rice bodies, can be identified on T1-weighted sequences and may be indistinguishable from fluid on T2-weighted sequences.

Rice body formation is associated with rheumatoid arthritis, seronegative inflammatory arthritis and tuberculous joints [1]. As the patient did not have any arthritic symptoms, serological testing was not required. Microscopically, the thickened synovium showed chronic, nonspecific inflammation without evidence of pannus or granuloma formation. The cause of the chronic bursitis and formation of rice bodies in our patient is not known.

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