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Images in Medicine

MR Geyser Sign in chronic rotator cuff tears

Col R.S. Negi^{a,*}, Lt Col B. Gogoi^b, Maj A.S. Randhawa^c^a Senior Advisor (Radiology), 151 Base Hospital, C/O 99 APO, India^b Classified Specialist (Orthopaedics), 151 Base Hospital, C/O 99 APO, India^c Graded Specialist (Orthopaedics), 151 Base Hospital, C/O 99 APO, India

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ABSTRACT

Acromio-clavicular (AC) joint cysts are rare presentation of chronic shoulder pathology. These cysts may be observed secondary to either degenerative changes in the AC joint with an intact rotator cuff (type 1 cyst) or following a chronic rotator cuff tear (type 2 cyst). The latter phenomenon is known as Geyser Sign and is described by ultrasound, conventional arthrogram and magnetic resonance imaging (MRI). We present a case of chronic rotator cuff tear presenting with a large type 2 cyst and Geyser Sign on MRI.

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Introduction

Although the rotator cuff tears and acromio-clavicular (AC) joint degeneration are common in medical practice, their presentation with a cystic swelling over the AC joint is a relatively rarer manifestation.¹ Till date, less than 50 cases have been described in literature. Most of these cases were secondary to a chronic rotator cuff tear, leading to glenohumeral joint fluid tracking through a communicating AC joint into the subcutaneous planes (type 2 cysts). This leakage when seen on a conventional arthrogram was seen “erupting” as a “Geyser” and hence was called the Geyser Sign. Fewer cases of type 1 cyst, which occur secondary to the AC joint degeneration with an intact rotator cuff, have been described.²

Craig in 1984 initially described the Geyser Sign as leakage of contrast from the glenohumeral joint into the subdeltoid bursa during a conventional arthrogram.¹ However, with

increased use of magnetic resonance imaging (MRI) and musculoskeletal ultrasound in the evaluation of shoulder pathologies, this sign has increasingly been described in association with chronic rotator cuff tears.³

Clinical and imaging findings

A 68-year-old male presented to the orthopedics department with a gradually progressive swelling over his right shoulder for the last six months. The mass was a fluctuant swelling located over the AC joint and was associated with pain and limitation of movements during the flexion and abduction. Marked wasting of supraspinatus and infraspinatus muscles was noted.

With a clinical suspicion of tubercular arthritis of the acromio-clavicular (AC) joint and a cold abscess in the subcutaneous plane, MRI evaluation of the shoulder was

* Corresponding author.

E-mail address: raj.negi9@gmail.com (R.S. Negi).

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Fig. 1 – Coronal T1SE and FSPD images demonstrate a large lobulated cystic lesion (star) overlying the acromio-clavicular joint.

performed on a 1.5 T MR scanner. It revealed a large cystic lesion with lobulated contours overlying the AC joint (Fig. 1). There was complete tear of the supraspinatus and the conjoint tendon with retraction of the ends and superior migration of the humeral head abutting against the acromion process. Degenerative changes were observed in the humeral head as well as the AC joint. Moderate effusion was noted in the glenohumeral joint, which was freely communicating with the subacromion bursa through the large defect in the rotator cuff. There was further communication of this fluid through the AC joint to the large subcutaneous cyst – the “Geyser Sign” (Fig. 2).

A diagnosis of a large chronic rotator cuff tear with type 2 cyst of the AC joint was made and the patient was referred back to the orthopedics department for further management.

Discussion

Acromio-clavicular cysts are broadly classified into type 1 and type 2 cysts. The type 1 cysts are formed as a result of degenerative AC joint changes secondary to trauma, infection, metabolic disease, or overuse. These cysts are limited to the joint and are not associated with any rotator cuff pathology. Long-term degenerative changes in the joint cause inflammation of the synovium leading to their formation.⁴

Type 2 AC joint cysts on the other hand are secondary to chronic rotator cuff tears. The superior migration of the humeral head in these cases impinges on the inferior aspect of the AC joint, which over a period of time leads to degeneration. The synovial fluid within the inflamed glenohumeral joint thus finds a way through a freely communicating subacromion

Fig. 2 – Coronal FSPD and sagittal T2W images reveal complete tear of the supraspinatus and conjoint tendons with cranial migration of the humeral head (arrow). Degenerative changes in the form of subarticular cysts of the humeral head and synovitis involving the AC joint. Geyser Sign is indicated by the curved arrow.

bursa into the AC joint space and further into the subcutaneous plane above leading to the cyst formation. This phenomenon is called the Geyser Sign.² Some authors believe that the deteriorated capsule of the AC joint acts as a valve allowing one-way flow of the fluid from the sub-acromion bursa to the cyst.^{4,5}

If these cysts are aspirated or excised surgically without removing the underlying pathology, there is a high incidence of recurrence. The surgical management is aimed at rotator cuff repair along with distal clavicular resection, if possible. Owing to chronic tear, a satisfactory repair cannot be achieved in most of the cases. In such cases, either distal clavicular resection alone or with shoulder hemiarthroplasty is performed. Arthroscopic debridement is reserved for high-risk patients with comorbid medical conditions. Shoulder arthrodesis is reserved for cases with significant anterior deltoid deficiency or multiple previous surgeries.^{3,6}

Radiological differentials to be considered include ganglion cyst, lipoma, juxta-articular cysts, synovial cyst, tumor, or an infectious process.^{4,7}

The acromion-clavicular joint cysts represent benign processes with different pathophysiologies representing the type 1 and 2 cysts. Presence of Geyser phenomenon in a type 2 cyst is amply demonstrated on MRI without the need for a conventional shoulder arthrogram. Their differentiation from other shoulder pathologies could help achieve a definitive surgical management as highlighted.

Conflicts of interest

The authors have none to declare.

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