Paralabral "Air" Cyst of the Shoulder

Santiago A. Lozano Calderón, MD, Catherine Maldjian, MD, and Richard M. Magill, MD

Cystic masses around the shoulder are an uncommon but clinically relevant finding[1-3] for two reasons. First of all, they are associated with labral tears, more commonly located in the posterior and superior aspect of the glenoid.[1,4] Secondly, they may cause suprascapular or axillary nerve impingement, the so-called quadrilateral syndrome.[1,5,6]

Diagnosis is mostly made through magnetic resonance imaging (MRI).[1,3,7,8] Characteristically, this fluid collection is best demonstrated on a T_2-weighted pulse sequence.[1,3] When evaluated in the coronal, sagittal, and transverse planes, these cystic lesions have been reported to measure an average of 2.2 cm in diameter and 2.8 mL in volume.[1] These lesions, loculated or not, are described as containing fluid.[1,5,7-9] "Air" in paralabral cysts of the shoulder has not been reported to our knowledge.

"...radiographic correlation is required to differentiate between the possibilities of gas and calcific body in a cyst."

We present the case of a female patient in her late 40s who had a posttraumatic air-containing paralabral cyst of the glenoid with prior history of shoulder trauma. Documentation of the lesion was performed with shoulder MRI, which was obtained because of persistence of symptoms after a self-standing height fall. Presence of the air was confirmed with simultaneous shoulder radiographs, which showed radiolucency in the same location. The patient had been in a motor vehicle accident in the past in which the same shoulder was injured. Radiographs from that time also showed the paralabral cyst as a smaller focus of air. The patient has given permission to publish the information and clinical material related to her case. The opportunity of looking at the manuscript before submission was given to the patient but she declined to review it.

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Case Report

A woman in her late 40s presented to the emergency department of our institution after a self–standing height fall in which she injured her left shoulder. Her chief complaint was pain and decreased range of motion secondary to pain, affecting abduction in particular.

Initial physical examination revealed no apparent shoulder deformity. Trauma signs (eg, hematoma, ecchymosis) were not evident. Pain was elicited on palpation in the subacromial area; there was no crepitation during passive or active motion or on palpation.

Initial radiographic assessment of the left shoulder demonstrated a rounded collection of air in the subglenoid region (Figure 1); no evidence of fracture or subluxation was seen. MRI was subsequently performed because of persistence of shoulder pain and motion restriction. Imaging was performed on a 1.5-T superconducting magnet (GE, Milwaukee, Wisc) in axial and oblique sagittal and oblique coronal planes. We obtained axial 3-dimensional gradient-echo (repetition time [TR] = 36 ms, echo time [TE] = 20 ms, flip angle = 8°, 2 mm thick) and fat-saturated proton density (TR = 2766 ms, TE = 10.54 ms) images and oblique coronal T_2-weighted fat-saturated fast spin-echo (FS-FSE) (TR = 3650 ms, TE = 79 ms) and oblique sagittal T_2-weighted FS-FSE (TR = 3466 ms, TE = 89 ms) images. Fluid collection in the infraglenoid region was demonstrated, as was an anterior labral tear. The fluid

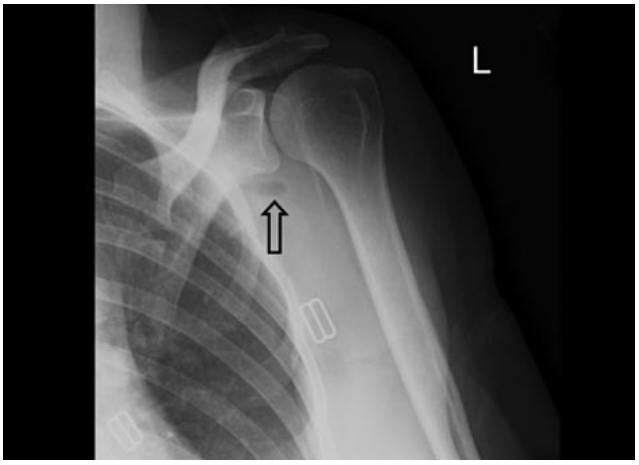

Figure 1. Frontal radiograph of the left shoulder shows an infraglenoid juxta-articular collection of air measuring 1.2 cm in transverse by 6 mm in craniocaudad dimensions.

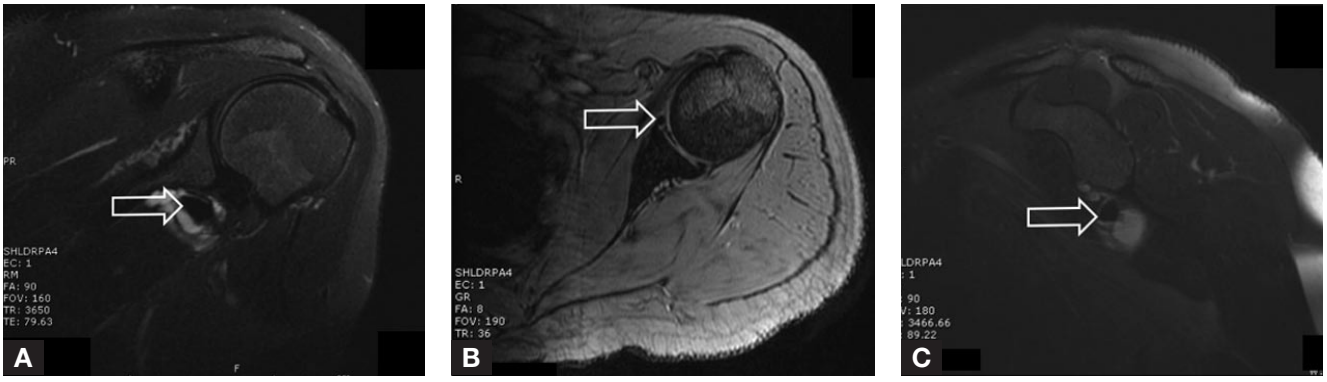

Figure 2. (A) Coronal T_2-weighted fat-saturated fast spin-echo (FS-FSE) image (repetition time [TR] = 3650 ms, echo time [TE] = 79.63 ms) shows paralabral cyst containing 1.2-cm focus of diminished signal intensity. (B) Axial 3-dimensional gradient-echo image (flip angle = 8°, TR = 30 ms, TE = 20 ms) shows increased signal through anterior labrum (suggestive of tear). (C) Sagittal T_2-weighted FS-FSE image (TR = 3466 ms, TE = 89.22 ms) shows paralabral cyst with area of internal low signal intensity.

collection contained a rounded focus of decreased signal intensity on all pulse sequences, corresponding to the location of air on the previous radiographic imaging study (Figure 2). The diagnosis, based on the combined shoulder radiographs and MRI findings, was an air-containing paralabral cyst.

To determine if the paralabral cyst was secondary to the patient's fall, we reviewed radiographic studies taken before the fall. We found shoulder images taken about 3.5 years earlier, after a motor vehicle accident (MVA). At that time, no fracture, subluxation, or acute injury was noted. These radiographs were reviewed with a musculoskeletal radiologist, and a small collection of air was seen in the same area (Figure 3). However, it was smaller and less evident than in the most recent radiograph.

Discussion

Paralabral cysts are a relatively uncommon finding.[1-3,5,6] In all prior reports, a paralabral fluid collection is described as increased T_2 signal intensity isointense to fluid on MRI, which is the primary tool for diagnosing these cysts.[1-3] In the present article, we have described the first reported case of a paralabral cyst that contains air, most likely nitrogen. The air content was confirmed by radiographic findings of radiolucency. The differential diagnosis for diminished signal intensity within a cyst on MRI also includes a calcified body. In this instance, the earlier radiograph helped to confirm that the focus of decreased signal represented air and not calcium. There are a few reports of air within a synovial cyst in the spine, but not in the shoulder.[7] These most often involved the facet joints, though they have also been described in the posterior longitudinal ligament.[8]

Previous research has documented the causal correlation or at least association between labral tears and paralabral cysts.[1-3] Published data support labrum tears as the etiologic factor in paralabral cysts.[1,3,9] The proposed mechanism is a valve effect produced by the labral tear, which facilitates accumulation of fluid and subsequent cyst formation in the paralabral location.[1-3] Our patient's case, like the majority of paralabral cysts, was associated with a labral tear (Figure 2). Therefore, it is plausible that this valve mechanism also explains the posttraumatic formation of this air collection. Air accumulated in soft tissues seldom persists for more than a few days. It is reabsorbed, unless there is a fistula or another source of gas. It can be present within joints because of trauma and both joint degeneration and stress.

Why both fluid and air had collected (and not just fluid) is unclear. The post-MVA radiograph, taken 3.5 years before the shoulder MRI, demonstrated the existence of the cyst by virtue of the collection of air, albeit a smaller amount. It is plausible that the acute nature of the injury, with high axial energy over a torn labrum, caused a valve effect that vacuumed more air than fluid because of the sudden shift between the joint and cyst pressures (the last radiograph showed more air than the initial images did). This theory requires that the labrum was torn or at least partially injured from the injury sustained in the MVA. Unfortunately, there are no shoulder MR images from that time. We postulate that the labral tear and cyst predated the

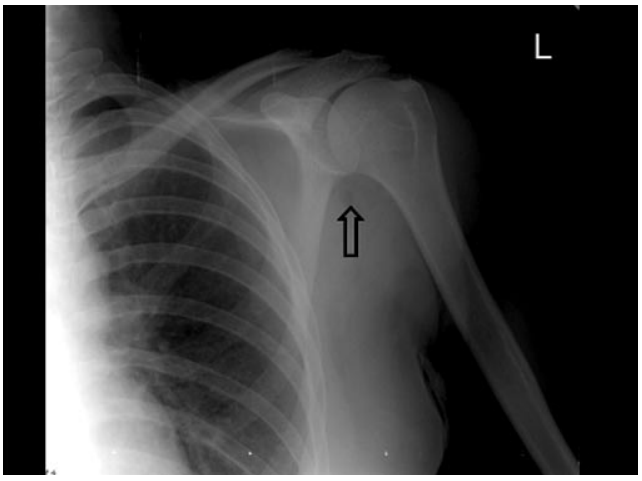

Figure 3. Three and a half years before axial computed tomography was performed (Figure 1), frontal radiograph of left shoulder after motor vehicle accident shows less evident and smaller radiolucent collection of gas (5 mm transverse, 6 mm craniocaudad) in infraglenoid area.

present trauma and may have been associated with the previous (MVA) trauma. As the tear communicates with the joint and the cyst, it is conceivable that sudden alteration in joint pressure, such as occurs in a standing height fall, may have caused more air to enter the cyst.

On MRI, low signal intensity in a labral cyst can represent a body or a gas in the cyst, and distinguishing between these possibilities may be of clinical significance. Given the patient's age and activity level, a labral tear in and of itself may not require surgery. A simple cyst with or without air can be aspirated nonsurgically, whereas a calcific body in a cyst requires arthroscopic excision. Therefore, radiographic correlation is required to differentiate between the possibilities of gas and calcific body in a cyst.

To our knowledge, this is the first reported case of gas in a paralabral cyst on MRI and the first report describing radiographic findings of air in a juxta-articular location associated with a paralabral cyst and likely labral tear. Moreover, the juxta-articular collection of air evident on radiograph may be suggestive of this diagnosis. A rounded paraglenoid collection of air on radiograph should prompt a diligent MRI search for a paralabral cyst and labral tear, particularly in the setting of trauma. Likewise, MRI signal void within a paralabral cyst should require radiographic correlation to differentiate between air and calcific body, particularly when the primary labral tear will not be repaired and the cyst might be aspirated nonsurgically, whereas the calcific body would require surgical management.

Conclusions

"Air" in a paralabral cyst of the shoulder is a previously unreported entity. A rounded paraglenoid collection of air on radiograph may be a salient radiographic sign of a paralabral cyst and should be further investigated; MRI should be used to search for a labral cyst and a tear, particularly in posttraumatic circumstances.

Authors' Disclosure Statement

The authors report no actual or potential conflict of interest in relation to this article.

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This paper will be judged for the Resident Writer's Award.