Intraosseous Ganglion With Impending Fracture of the Glenoid

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Intraosseous ganglia are benign cystic and often multiloculated lesions located in the subchondral bone. Only 13 cases around the shoulder have been described in the literature. These lesions are often asymptomatic, but, in cases located close to neurovascular structures or articular surfaces, they can be symptomatic, causing pain, neurologic dysfunction, or articular fractures.

This article reports the clinical, radiographic, and pathological findings of a 34-year-old man reporting shoulder pain during heavy working activities. At physical examination, his left shoulder showed complete active and passive range of motion but was painful in external rotation and extension. Tests for the evaluation of the rotator cuff were all negative. The anterior apprehension test provoked pain. The Constant-Murley score was 59 points. Radiographs, computed tomography (CT) scan, and magnetic resonance arthrography showed an elliptical-shaped osteolytic area in the anteroinferior portion of the glenoid extending to the anteroinferior glenoid margin. Leakage of the intra-articular contrast medium showed that the cyst had eroded the articular surface and was about to cause an intra-articular fracture of the glenoid. The patient was operated on with the suspicion of an intraosseous ganglion. The cyst was curetted carefully and packed with autologous bone from the proximal tibia and artificial bone chips. At 1-year follow-up, the patient was completely asymptomatic and reported no pain during his working activities. Physical examination was negative. Radiographs and CT scan showed a cystic lesion in the anteroinferior margin of the glenoid that was partially filled by bone.

Figure 1: Preoperative radiograph showing an elliptical-shaped area of radiolucency at the inferior border of the glenoid, with well-defined margins and without sclerosis of the surrounding bone or of the periosteum.

Figure 2: Preoperative CT scan showing a cystic lesion with sclerotic margins measuring $23 \times 13 \times 20$ mm in diameter in the anteroinferior border of the glenoid, which was eroding the anterior cortex of the scapular neck.
Intraosseous ganglia are benign cystic and often multiloculated lesions composed of fibrous tissue with extensive mucoid change, located in the subchondral bone adjacent to a joint. Intraosseous ganglia are usually limited to the hip, knee, and ankle and are not as common as soft tissue ganglia. Intraosseous ganglia about the shoulder are rare; to the best of our knowledge, only 13 cases of intraosseous ganglia of the glenoid have been reported in literature. Their etiology and natural course remain unknown. Intraosseous ganglia can be diagnosed by simple radiographs and have to be differentiated from other resorptive bone lesions, such as isolated bone cyst, aneurysmal bone cyst, and giant cell tumor.

This article describes the clinical, radiographic, and pathological findings in a 34-year-old man who was operated on for intraosseous ganglion in the region of the shoulder girdle, which was about to cause a fracture of the glenoid.

**CASE REPORT**

A 34-year-old right-handed male manual laborer presented with pain in his left shoulder, which had begun 2 years prior while he was lifting a heavy weight (approximately 140 kg lifted with another man) during his work activity. His general practitioner diagnosed a muscle strain and prescribed nonsteroidal anti-inflammatory drugs and physical therapy for 3 months, without any improvement of the symptoms. During the second year, his pain worsened and was continuous; it was localized on the superior aspect of his left shoulder. At physical examination, his left shoulder showed complete active and passive range of motion (ROM), but it was painful in external rotation and extension. Tests to evaluate the rotator cuff were all negative. The bear-hug test elicited pain, but a lack of strength was not detectable. The apprehension test was negative, but the anterior apprehension test provoked pain. The Constant-Murley score for his left shoulder was 59 points (total possible score, 100 points).

Radiographs in anteroposterior (AP), true AP, axial, and outlet views showed an elliptical-shaped area of radiolucency at the inferior border of the glenoid, with well-defined margins and without sclerosis of the surrounding bone or of the periosteum (Figure 1). Computed tomography (CT) scan showed a cystic lesion with sclerotic margins measuring $23 \times 13 \times 20$ mm in diameter in the anteroinferior border of the glenoid, which was eroding the anterior cortex of the scapular neck (Figure 2). Magnetic resonance arthrography showed an elliptical-shaped osteolytic area, slightly hyperintense in T1-weighted images and markedly hyperintense in T2-weighted images; it was located in the anteroinferior portion of the glenoid and extended to the anteroinferior glenoid margin. Leakage of the intra-articular contrast medium showed that the cyst had eroded the articular surface and was about to cause an intra-articular fracture of the glenoid (Figure 3).

A ganglion of the glenoid about to cause a fracture was suspected, and the patient was recommended for surgical treatment. After general endotracheal anesthesia and interscalene block, with the patient in the beach-chair position, a deltopectoral approach to the left shoulder was taken. The deltoid and pectoralis major muscles were split with a shoulder retractor (Arthrex, Naples, Florida), and the subscapularis tendon was split horizontally with a Adson’s spreader to expose the anteroinferior margin of the glenoid neck. We did not open the shoulder articular cavity. The scapular neck was exposed using a special...
Case Report

The scapular neck retractor and cleaned. The osteolytic area was located in the inferior part of the neck under imaging intensifier control, using a needle inserted inside the cavity. Synovial fluid came out of the cavity, and the cyst was then drained. The cavity was curetted carefully and packed with autologous bone from the proximal tibia and artificial bone chips.

Postoperatively, the patient wore a sling for 2 weeks. Active and passive movements of the left shoulder began as soon as he had relief from pain, and the shoulder regained its complete range of motion without pain within 15 days. Strengthening exercises, work activities, and sports were allowed 2 months postoperatively once healing of the graft had been radiologically confirmed.

Histological examination revealed a thick layer of dense connective tissue with large collagen fibers and many fibrocytes around and among cavities filled with erythrocytes and amorphous material, part of which presented a myxoid appearance. These pathological findings were consistent with an intraosseous ganglion.

At 1-year follow-up, the patient was completely asymptomatic and reported no pain during his work activities. He had complete ROM of his left shoulder. Physical examination was completely negative; the bear-hug and anterior apprehension tests did not elicit pain. The Constant-Murley score for his left shoulder was 91 points. At 1-year follow-up, radiographs and CT scan of the left shoulder showed a cystic lesion in the anteroinferior margin of the glenoid that was partially filled by bone (Figure 4).

We continue to follow up with the patient clinically and radiologically. He is pain free and completely asymptomatic. He refused further surgery unless his shoulder were to become painful or limit his activities.

**Discussion**

Intraosseous ganglia can be classified as isolated (type 1) or invading the adjacent soft tissue (type 2). They can arise from within the bone or in the adjacent soft tissue as type 1 lesions, and then progress to type 2 lesions in either an outside-in or inside-out fashion.2,3

Infraglenoid ganglia can be close to the glenoid fossa, thereby causing an osteoarticular fracture, especially in its inferior portion, because mechanical stress and pressure are concentrated more in the infraglenoid region than in the supraglenoid region7,8; otherwise, intraosseous ganglia can be the consequence of a glenoid fracture.8 Supraglenoid ganglia can extend to the spinoglenoid notch, causing suprascapular nerve entrapment syndrome.12 Ganglia can otherwise be incidental findings revealed by magnetic resonance imaging performed for the clinical suspicion of a more common shoulder pathology, such as a rotator cuff tear. In these cases, ganglia are usually asymptomatic and do not require specific surgical treatment.5

Several treatments have been described for intraosseous ganglia, including open excision and curettage with or without bone grafting,3,5,6,8,11 arthroscopic debridement and bone grafting,8 and needleling under arthroscopic control.12 A recurrence has never been reported after surgical treatment, but Urayama et al10 reported on a recurrence following needle aspiration. Lee and Harryman8 reported on a second-look arthroscopy of a glenoid ganglion after arthroscopic debridement and bone grafting; they found the edges of the defect to be smooth, with the subchondral surface completely filled in and covered by fibrocartilage. To the best of our knowledge, the study by Lee and Harryman8 is the only one in the literature about a second look at a surgically treated intraosseous ganglion of the glenoid.

In our patient, the ganglion was close to the anteroinferior margin of the glenoid and the articular surface was almost fractured, as shown by magnetic resonance arthrography. It is unknown whether the trauma revealed a ganglion that was previously asymptomatic or if the trauma was the cause of the ganglion. The former hypothesis is more realistic because the patient had no major trauma in his history.

At 1-year follow-up, the osteolytic lesion was still not completely filled by bone, especially on the more medial side. We postulated that the patient was pain free and completely satisfied functionally because the glenoid surface and its subchondral bone had been stabilized.

The remaining bone void in the postoperative CT scan was concerning. Intraoperatively, the bone cavity was curetted and completely filled with autologous bone, and the cavity was then packed with autologous bone from the proximal tibia and artificial bone chips.
gous bone and artificial bone chips. The incomplete healing may be part of the healing process that is still in progress. In our experience, other synovial cysts treated surgically took ≥ 2 years to appear completely filled.

**CONCLUSION**

Infraglenoid ganglia can cause an osteoarticular fracture. In these cases, stabilization of the glenoid surface and its subchondral bone can relieve the patient’s symptoms and lead to complete recovery of shoulder function.

**REFERENCES**