A 22-year-old collegiate football player fell on his right elbow while playing football. He felt his shoulder dislocate posteriorly, with immediate, spontaneous relocation. He continued to play but began experiencing shoulder instability and pain that was most pronounced with his arm outstretched and adducted. On physical examination 1 week later, after no interim treatment, the patient had a positive posterior apprehension test and a positive dynamic labral shear test with mild pain to palpation over the rotator cuff. Range of motion and strengthening exercises were prescribed. Re-examination showed persistent posterior instability and pain. Direct magnetic resonance arthrograms were obtained (Figure 1). Your diagnosis?
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DIAGNOSIS: Reverse Bankart lesion with posterior labral tear. Initial radiographs were normal (Figure 2). T1-weighted, fat-suppressed oblique coronal magnetic resonance imaging (MRI) of the shoulder with intra-articular gadolinium shows a tear of the posterior glenoid labrum with a tiny bony avulsion consistent with a reverse Bankart lesion (Figure 1). Although bone marrow edema was found in the anterior humeral head, no reverse Hill-Sachs lesion was present (Figure 3).

ETIOLOGY
Posterior dislocation of the shoulder is unusual, comprising approximately 3% of all shoulder dislocations. Posterior shoulder dislocations are classically associated with seizure disorders and electroconvulsive therapy but also can occur subsequent to a fall with axial loading on the shoulder or arm positioned in adduction and internal rotation. Posterior glenohumeral instability may be caused by posterior dislocation or by repeated microtrauma occurring during activities such as throwing, punching, or swimming.1 Associated findings include posterior labral tears, posterior capsular stripping, fractures, contusions or erosions of the postero-inferior glenoid rim, and vertical impaction fractures of the anterior humeral head.1-4

The reverse Bankart lesion consists of fraying or tear of the posterior labrum after trauma.1 A small avulsion fracture of the glenoid rim also may be present. If the impact is severe enough, a “tough” fracture of the anterior humeral head may be seen, commonly referred to as a “reverse Hill-Sachs lesion.” Up to 60% of posterior locations are missed at the time of presentation with subsequent delayed complications such as osteolysis, muscle contractures, and myositis ossificans.5

IMAGING
Our patient experienced immediate, spontaneous relocation of his posteriorly dislocated shoulder. Radiographs obtained 1 week later were negative, as is common in the evaluation of shoulder instability. Computed tomography (CT) may be helpful in detecting bony avulsions but is less sensitive for intra-articular pathology without double-contrast arthrography and overall has poor soft-tissue contrast when compared with MRI.

Conventional MRI will show bone contusions and impaction fractures but may be less sensitive in evaluating labral abnormalities in the nondistended joint.6 The combination of the superior soft-tissue contrast and the ability to distend the glenohumeral joint makes direct MR arthrography the procedure of choice for both suspected labral abnormalities and shoulder instability. Direct MR arthrography may be performed using either saline or dilute gadolinium as the contrast agent.1,7,8

A 22-g spinal needle was used on the shoulder joint under fluoroscopic guidance and a small amount of iodinated contrast was injected to confirm the intra-articular location of the needle. Dilute gadolinium was injected into the joint; typically, a 1:200 dilution of gadolinium in normal saline is used. The joint was then gently injected to resistance, approximately 12-15 cc.

The patient immediately underwent MRI. T1-weighted images with fat-suppression were obtained in the axial and oblique coronal and sagittal planes using a surface coil and small field of view. Additional imaging with the patient in the abducted and externally rotated position may be obtained to better evaluate the capsule.1,7 A fat-suppressed T2-weighted sequence, usually in the coronal plane, helps identify any bone marrow edema or extra-articular fluid.

In reverse Bankart lesions, MR arthrography shows the tear or fraying of the posterior labrum as well as any associated capsular abnormalities.9

Figure 1: Oblique coronal (A) and axial (B) fat-saturated T1-weighted images obtained after gadolinium arthrogram.
Bone marrow edema, as seen in anterior or humeral head contusions, bony reverse Bankart, or reverse Hill-Sachs lesions, are best demonstrated on the T2-weighted fat suppressed images. The labral tears are typically best seen in the oblique coronal plane, with evaluation complemented by the axial and oblique sagittal planes (Figure 1).

TREATMENT

The patient was examined under anesthesia prior to arthroscopic repair and found to have 1+ laxity anteriorly and posteriorly, improved with external and internal rotation, respectively. At arthroscopy, the humeral head was normal with no reverse Hill-Sachs deformity detected. The glenoid articular surface showed a focal area of type 2 degenerative change located inferiorly and centrally. A tear of the posterior superior labrum, which was unstable to probing, was found. There was no significant posterior capsular laxity. The labrum was repaired with absorbable suture anchors placed at 9 o’clock and 11 o’clock on the bony glenoid.

Three months postoperatively, the patient was doing well with no instability and improving range of motion.

PROGNOSIS

While surgery for posterior shoulder instability has traditionally been less successful than that for anterior instability in generalized ligamentous laxity, recent studies have shown arthroscopic surgery to be an excellent tool in the management of posterior glenohumeral instability associated with reverse Bankart lesions, capsular tears, or both. In this patient, there is increased risk of recurrent injury to his posterior capsule and labrum due to his position as an offensive lineman, which requires him to use his body and shoulder for blocking while playing football.

SUMMARY

Posterior labral tears and capsular abnormalities are common complications of posterior shoulder dislocation. Direct MR arthrography is the best imaging modality for evaluating these challenging clinical problems.

REFERENCES


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