Navigating the Alphabet Soup of Labroligamentous Pathology of the Shoulder

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Abstract

Because of the widespread use of eponyms and acronyms to describe labroligamentous findings in the shoulder, interpreting shoulder magnetic resonance imaging reports can be challenging. A summary of the appearance of these lesions on shoulder magnetic resonance images can help the orthopedic surgeon to understand these entities as imaging findings and to determine the appropriate treatment for patients with shoulder injuries.

The widespread use of eponyms and acronyms to describe labroligamentous findings in the shoulder has made interpretation of shoulder magnetic resonance imaging (MRI) reports challenging. We review and discuss the appearance of these lesions on shoulder MRI to help the orthopedic surgeon understand these entities as imaging findings.

Glenolabral articular disruption (GLAD) occurs secondary to impaction of the humeral head on the glenoid articular cartilage. There is a resultant defect in the glenoid articular cartilage, which extends to the glenoid labrum. A GLAD lesion is diagnosed only if the glenohumeral ligament and scapular periosteum remain intact[1] (**Figure 1**).

Complete detachment of the anteroinferior labrum with tearing of the anterior glenoid periosteum represents a Bankart lesion. Cartilaginous Bankart lesions are caused by an anterior glenohumeral dislocation with resultant avulsion of the anteroinferior labrum and disruption of the scapular periosteum because of acute traction on the anterior band of the inferior glenohumeral ligament (**Figure 2**). Anterior instability, caused by disruption of the anterior labroligamentous complex, results. Osseous Bankart lesions occur when the anterior displaced humeral head impacts the anterior inferior glenoid rim, causing a fracture (**Figure 3**). This loss of the glenoid articular surface area can result in glenohumeral instability. Posterior shoulder dislocations can result in corresponding findings in the posterior inferior glenoid labrum (reverse Bankart lesion) and anterior

Figure 1. Axial, intermediate-weighted image shows a mildly detached tear of the chondrolabral junction of the posterior labrum with extension of the tear to the adjacent glenoid cartilage, producing a cartilage defect (arrow) consistent with a glenolabral articular disruption (GLAD).

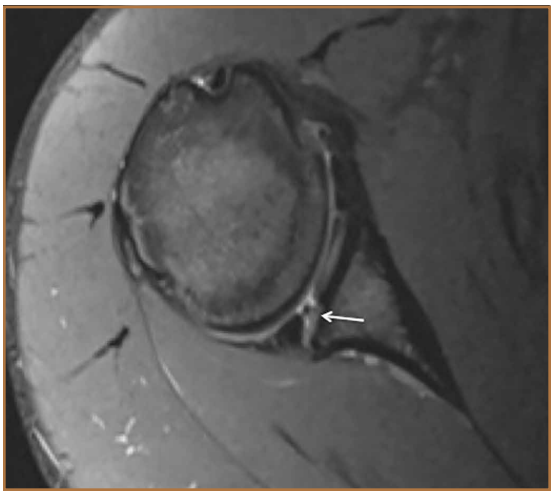
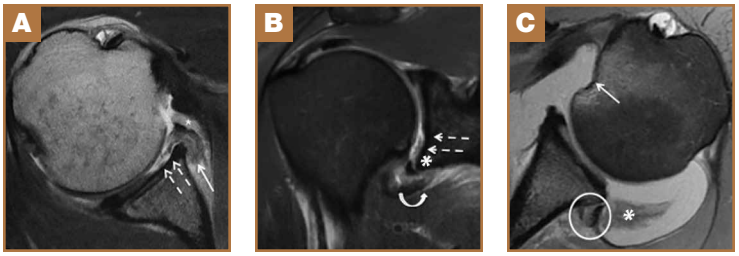


Figure 2. (A) Axial, intermediate-weighted and (B) coronal, T2-weighted, fat-saturated magnetic resonance arthrographic images show detachment and displacement of the anterior-inferior glenoid labrum (asterisk, A and B) with disruption of the scapular periosteum (arrow, A). Avulsive detachment of the anterior-inferior labrum is manifest by a thickened and partially torn anterior band of the inferior glenohumeral ligament (curved arrow, B). Also note the severe cartilage loss along the anterior-inferior glenoid rim (dashed arrows, A and B). (C) Axial, intermediate-weighted, fat-saturated image in a patient with acute trauma shows detachment and displacement of the posterior glenoid labrum with disruption of the scapular periosteum (circle). There is an anterior medial impaction fracture of the humeral head (arrow). These findings represent sequelae of a recent posterior dislocation with reverse Bankart and reverse Hill-Sachs lesions, respectively. Also note the posterior joint hematoma (asterisk) from the recent trauma. Note that the large posttraumatic effusion provides natural arthrographic contrast for detailed evaluation of the labroligamentous structures.



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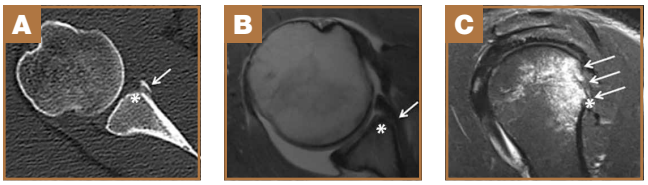

Figure 3. (A) Axial computed tomography image shows a defect of the anterior-inferior glenoid (arrow) with a medially displaced osseous fragment (asterisk), consistent with an osseous Bankart lesion. (B) Axial, intermediate-weighted magnetic resonance (MR) arthrographic image shows disruption of the anterior-inferior labrum (arrow) and anterior glenoid rim (asterisk), consistent with an osseous Bankart lesion. (C) Sagittal, fluid-sensitive MR image of the shoulder shows an impaction fracture of the posterolateral humeral head with marrow edema, consistent with a Hill-Sachs lesion/fracture. Note the depression of the cortical bone at the site of impaction (arrows).

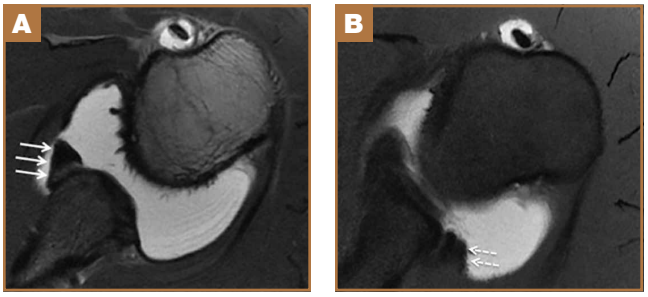

Figure 4. (A) Axial, fat-saturated, intermediate-weighted magnetic resonance arthrogram (MRA) of the shoulder shows an anteriorly and medially displaced labral fragment (arrows), which is inferiorly retracted and balled up. This is consistent with an anterior periosteal labroligamentous sleeve avulsion (ALPSA) lesion. (B) Axial, T1-weighted, fat-saturated MRA of a posteriorly and medially displaced labrum (dashed arrows), which is inferiorly displaced and has rolled up on itself, consistent with a posterior labrocapsular periosteal sleeve avulsion (POLPSA).

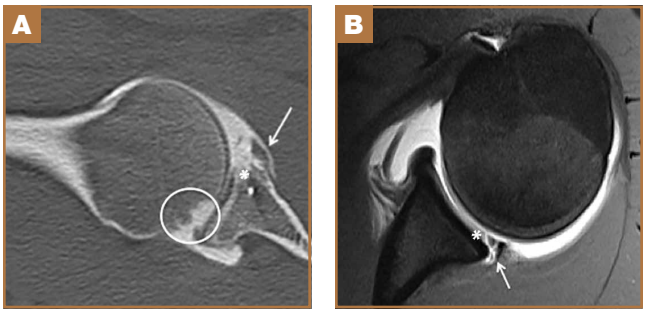

Figure 5. (A) Computed tomography arthrogram in the abducted externally rotated (ABER) position in a patient with prior Bankart repair (asterisk) shows a Perthes lesion (arrow) manifest by detachment of the anterior labrum with medial stripping of the glenoid periosteum and displacement. The ABER position exerts traction on the anterior joint capsule making these lesions more conspicuous on imaging. Note the Hill-Sachs lesion (circle). (B) Axial, T1-weighted, fat-saturated magnetic resonance arthrographic image shows detachment at the chondrolabral junction of the posterior labrum (arrow), which extends posterior and medial to the site of labral attachment, consistent with a nondisplaced, posterior labral tear with periosteal stripping—a reverse Perthes lesion. There is also disruption of the posterior rim of the adjacent glenoid cartilage, producing a small, free chondral fragment (asterisk), consistent with glenolabral articular disruption (GLAD).

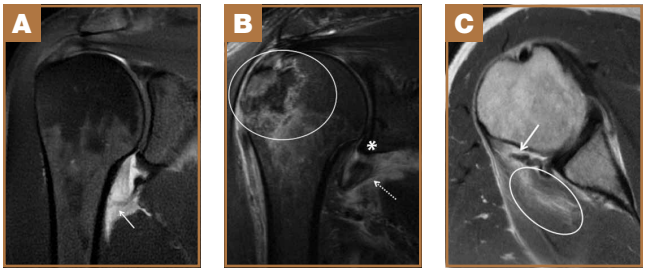

Figure 6. (A) Coronal, T1-weighted, fat-saturated magnetic resonance (MR) arthrographic image shows disruption of the anterior band of the inferior glenohumeral ligament from its humeral attachment (HAGL) with intra-articular contrast leaking through the defect into the axillary space. Notice the torn, retracted inferior glenohumeral ligament (arrow). (B) Coronal fluid–sensitive MR image in a patient with a fall and greater tuberosity fracture (circle) shows disruption of the anterior band of the inferior glenohumeral ligament from its glenoid attachment (asterisk) with a torn, inferior glenohumeral ligament (dashed arrow), consistent with a reverse HAGL. (C) Axial, intermediate-weighted image shows a torn, undulating posterior band of the inferior glenohumeral ligament (arrow), consistent with a posterior HAGL. Notice the associated strain of the infraspinatus muscle (oval).

medial humeral head (reverse Hill-Sachs lesion) (**Figure 2**).

A variant of the Bankart lesion is the anterior labroligamentous periosteal sleeve avulsion (ALPSA). This refers to a medially displaced tear of the anterior labrum with intact periosteal stripping along the medial glenoid[2] with medial rotation and inferior displacement of the anterior inferior labrum along the scapular neck. An ALPSA lesion can heal via the intact periosteal blood supply. If not repaired, anterior instability will result because of malposition of the labrum, causing a patulous anterior capsule.[3] When a corresponding lesion occurs in the posterior labrum because of a posterior dislocation, it is called a posterior labrocapsular periosteal sleeve avulsion (POLPSA) (**Figure 4**).

Another variant of the Bankart lesion is the Perthes lesion, which is a nondisplaced tear of the anteroinferior labrum with periosteal stripping. This differs from the ALPSA because the detached labrum and periosteum are held in anatomic position, possibly making the lesion difficult to detect on magnetic resonance arthrography (MRA).[3] Obtaining images in the abduction external rotation (ABER) position exerts traction on the anterior inferior joint capsule and may make the Perthes lesion more conspicuous.[4] When this occurs in the posterior labrum, it is called a reverse Perthes lesion (**Figure 5**).

In a patient with anterior glenohumeral instability without a Bankart lesion, pathology of the anterior band of the inferior glenohumeral ligament (IGHL) at its humeral attachment must be suspected. Humeral avulsion of the IGHL (HAGL) or its variants can be overlooked on arthroscopy. HAGL is diag-

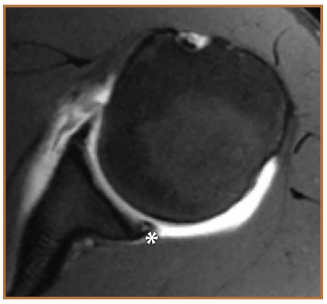

Figure 7. Axial, T1-weighted magnetic resonance arthrographic image shows faint signal abnormality within the substance of the posterior labrum (asterisk) in a patient with subjective instability but without any additional labral tear identified. This finding was believed to result from labral degeneration. Subsequent arthroscopy showed a superficial defect within the posterior labrum, consistent with a Kim lesion.

nosed on MRA when the normally U-shaped IGHL takes on a J-shape, and joint fluid extravasates across the torn humeral attachment (**Figure 6**). If there is an avulsed bony fragment from the medial humeral neck, the lesion is termed a bony HAGL (BHAGL). In addition to the findings of a HAGL, a BHAGL shows the osseous fragment and donor site on MRI. Since a BHAGL is a bony avulsion, it can even be suggested on radiography if a bony fragment is seen adjacent to the medial humeral neck.[5] These lesions are highly associated with other shoulder injuries, particularly Hill-Sachs deformities and subscapularis tendon tears, and it is imperative, therefore, to search for additional injuries if a HAGL-type injury is seen.[6]

A more uncommon type of HAGL can occur in the setting of posterior capsulolabral injury. A posterior-band IGHL avulsion from the humerus (PHAGL) has similar imaging findings to a HAGL, except that it involves the posterior band of the IGHL. PHAGLs are usually not associated with an acute injury and are thought to be related to repetitive microtrauma, perhaps since the posterior band of the IGHL is the thinnest portion of the IGHL complex.[7]

A Kim lesion is an arthroscopic finding described in patients with posterior instability as a superficial defect at the undersurface of the posterior labrum and adjacent glenoid cartilage without detachment or extension to the chondrolabral junction.[8] It is, by its nature, a concealed finding on routine MRI but can be more conspicuous in FADIR (flexed, adducted, internally rotated) positioning on MRA, which exerts traction on the posterior joint capsule, allowing intra-articular contrast to fill the tear (**Figure 7**).

This list describes several of the most commonly encountered acronyms in shoulder MRI. A review of SLAP (superior labrum anterior to posterior) lesions was described in a previous article in the journal's Imaging Series.[9] A thorough understanding of these lesions is helpful in interpreting reports and determining the appropriate treatment for patients with shoulder injuries.

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