83. Glenohumeral Instability I

The glenohumeral joint is the most mobile joint in the body. Instability may result from traumatic dislocation which can cause tearing of the joint capsule and glenoid labrum. The ovoid glenoid labrum attaches to the osseous glenoid rim, providing attachment for the glenohumeral ligaments. The intact labrum is uniformly hypointense on MR. Capsular joint structures may be seen to better advantage with MR arthrography, performed with the intraarticular injection of approximately 12 mL of dilute (0.1 mL of gadolinium chelate in 20 mL saline) gadolinium chelate. Direct arthrography may need not be performed in the presence of a joint effusion in which case thin section T2WI may suffice. In arthrography, FS T1WI are obtained following contrast injection in adduction, and optionally with the shoulder abducted and externally rotated (ABER). Indirect (intravenous) arthrography may be performed following the intravenous injection of gadolinium based contrast material at the time when joint fluid enhancement occurs, which may be promoted by post-injection exercise of the shoulder. Indirect techniques do not afford the joint distention associated with direct arthrography. Instability may be considered atraumatic or traumatic. AMBRI refers to atraumatic, multidirectional, often bilateral instability, for which rehabilitation is the first line therapy followed by capsular shift surgery. This is often manifest as recurrent subluxations or dislocations of the humeral head. Anterior glenohumeral instability is the most common post-traumatic instability and arises following anterior dislocations. The anteroinferior glenoid together with the inferior glenohumeral ligament and labrum constitutes the major resistance to anterior dislocation. Structural injuries at this site constitute osseous and soft tissue Bankart lesions and Bankart variants. In a typical anteriorly dislocated shoulder, the humeral head is displaced anteroinferiorly, contacting the anteroinferior glenoid rim, and resulting in a posterolateral humeral head osteochondral impaction fracture—a Hill-Sachs lesion. Such a lesion is illustrated on the FS T1WI images from an MR arthrogram in Fig. 83.1A. This large Hill-Sachs lesion consists of a prominent impaction deformity of the posterolateral humeral head. Marrow edema at this site was better visualized on the FS T2WI (not shown). The bare area of the posterior humeral head should not be confused with a Hill-Sachs defect, the latter which typically occurs at the level of above the coracoid process rather than below it. This patient also had a Bankart lesion (Fig. 83.1B) consisting of avulsion of the anteroinferior labrum, which remains attached to the anterior glenohumeral ligament. Periosteal disruption of the anterior scapula surface is also present, constituting a soft-tissue Bankart lesion. Complete labral avulsion is not essential for Bankart-type lesions. In so-called double lesions, avulsion of the labrum from the scapular rim and of the glenohumeral ligament from the avulsed labrum is present.

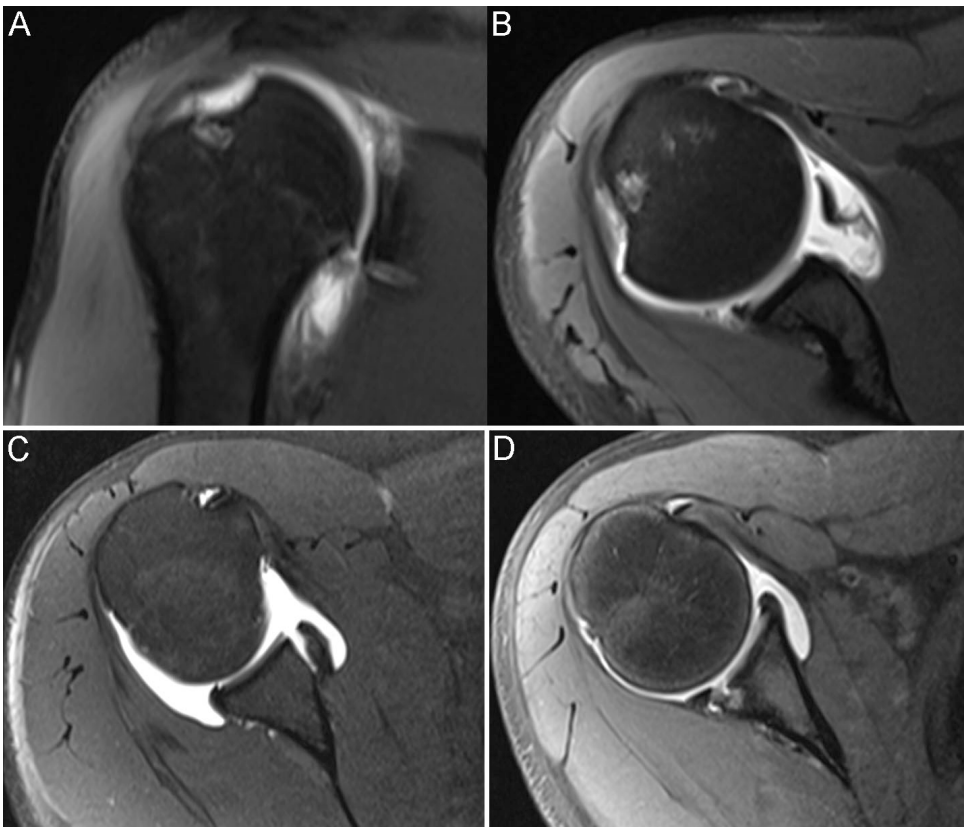

Fig. 83.1

The addition of scapular periosteal disruption to a double lesion is termed a triple lesion. An osseous Bankart (i.e. Bankart fracture) may also occur as illustrated in the MR arthrogram images (FS T1WI) of Fig. 83.1C. Here the hypointensity of the anterior labrum is interrupted by a large, linear focus of high SI, correlating to contrast within this tear (with the avulsed component including both labrum and underlying bone). Chronic osseous Bankart lesions tend to heal with osseous hypertrophy resulting in inferiorly convex glenoid curvature, while acute Bankart lesions are more characteristically associated with hyperintensity within the underlying glenoid on fluid sensitive images. Operative repair of a Bankart lesion consists of reattachment of the labrum to the glenoid rim with poorer outcome resulting from hypertrophic glenoid convexity as described above. Identification of suture anchors and tacks, which may demonstrate susceptibility artifact, is aided with MR as is the detection of recurrent Bankart tears. Since normal postoperative findings after Bankart repair include hyperintensity on T2WI, correlating with granulation tissue (often appearing near sutures), evaluation for recurrent tears with direct MR arthrography is preferred.

Posterior instability of the shoulder is less common and is associated with glenoid dysplasia. The relevant anatomy and abnormalities in posterior instability and dislocations

is analogous to that of anterior instability described above. Dislocations result in wedge-type impaction deformities on the anteromedial humeral head (i.e. a reverse Hill-Sachs lesion) as well as posterior labral tears (i.e. reverse Bankart) with possible osseous involvement. Figure 83.1D demonstrates on a FS T1WI following intraarticular contrast administration, a fracture extending through the articular cartilage of the posterior glenoid and exiting the posterior glenoid cortex, consistent with a reverse Bankart. Contrast is also seen undermining the posterior labrum in this region along with a paralabral cyst.