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ROTATOR INTERVAL LESION

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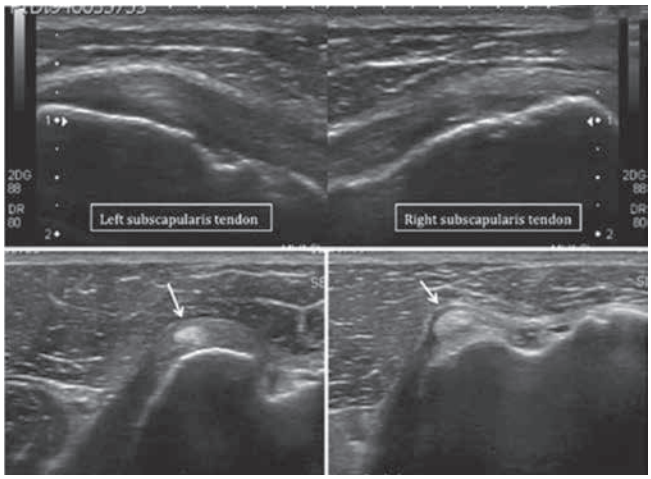
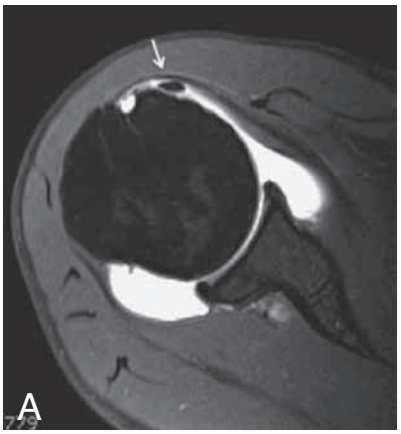
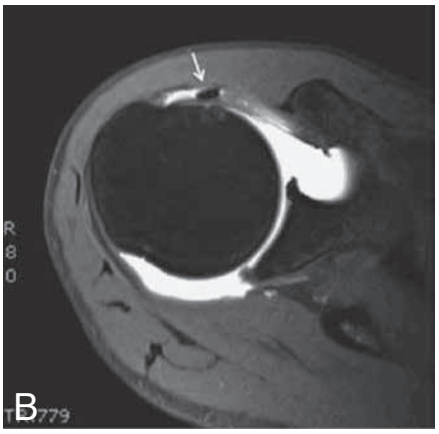
Key-word: Shoulder

Background: A 58-year-old male patient felt right anterior shoulder pain of sudden onset during work. The patient is a painter. The patient presented at the emergency department with persistent right shoulder pain. He mentioned a sensation of a 'snap' in the shoulder.







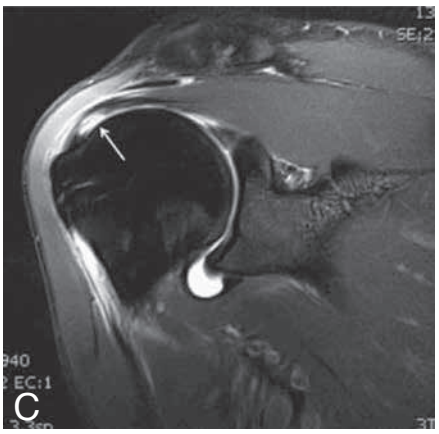


Fig. 1 | 2
3A | 3B | 3C

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Work-up

Ultrasonography of the right and left shoulder (Fig. 1) shows normal left subscapularis tendon in comparison with an abnormal right subscapularis tendon. There is a luxation of the biceps tendon (arrows) out of the bicipital groove.

Arthrography of the right shoulder with the arm in endorotation (Fig. 2) reports normal findings.

Direct MR arthrography of the right shoulder after intra-articular injection of diluted gadolinium contrast medium (Fig. 3, A, B: Axial T1-weighted images with fat saturation) shows marked luxation of the biceps tendon (arrows) out of the bicipital groove. There is a partial subscapularis tendon rupture with the biceps tendon lying between the subscapularis tendon fibers. Coronal T1-weighted image with fat saturation (C) demonsrates partial rupture of the supraspinatus tendon at the articular side (arrow) with filling of the defect with contrast medium.

Radiological diagnosis

The imaging findings are diagnostic for *rotator interval lesion (biceps-pulley lesion), type 5* according to the Bennett classification.

Discussion

The rotator interval (RI) is the portion of the shoulder joint reinforced by the coracohumeral ligament (CHL) and internally by the superior glenohumeral ligament (SGHL) and transversed by the intra-articular portion of the biceps tendon. The rotator interval is a triangular anatomic area defined superiorly by the anterior edge of the supraspinatus tendon and inferiorly by the superior edge of the subscapularis tendon. The base of this triangle is at the base of the coracoid process, and its apex is at the transverse ligament over the bicipital groove. The CHL and SGHL form a slinglike band surrounding the biceps brachii tendon proximal to the bicipital groove. The medial portion of the CHL, the SGHL and the superior fibers of the subscapularis tendon are believed to act as a pulley, which is critical in preventing the biceps tendon from subluxation or dislocation. Diagnosis of abnormality of the RI is often difficult because of its complex anatomy and the difficulty in visualizing the structures within it both on imaging studies and arthroscopy. Therefore it is called the «hidden lesion».

Bennett was the first to classify biceps subluxation-instability in 2001 and has since modified his classification on the basis of subsequent experience with arthroscopic diagnosis and treatment.

The classification summarizes the possible injury patterns of the RI:

Type 1 lesions are isolated tears of superior fibers of subscapularis tendon, resulting in medial subluxation of the biceps tendon within the groove.

Type 2 represents tear of the medial sheath (CHL–SGHL complex), allowing medial subluxation of biceps tendon.

Type 3 represents lesions of both medial sheath and subscapularis tendon, allowing medial dislocation of biceps tendon from out of the bicipital groove.

Type 4 involves tears CHL and most-anterior fibers of supraspinatus tendon, allowing biceps tendon to dislocate anteriorly to the subscapularis and coracohumeral ligament.

Type 5 combines lesions of all structures (subscapularis tendon, medial sheath, CHL, and supraspinatus tendon), which allows the biceps tendon to dislocate either anteriorly or medially.

The typical clinical presentation of a rotator interval lesion is persistent anterior shoulder pain. It can have an acute onset after trauma or a more chronic onset with underlying chronic anterior shoulder impingement. Imaging is mandatory for further differentiation and to exclude chronic shoulder disease or rotator cuff tears which need surgery. The first step in evaluating the rotator cuff is an ultrasound examination.

Imaging the components of the rotator interval is challenging. The small size of the structures requires high spatial resolution imaging. The imaging modality of choice however is direct MR arthrography. Intraarticular contrast material separates the folds of tissue in the RI and allows better structure delineation.

(Sub)luxation of the biceps tendon out of the bicipital groove is an important clue to the diagnosis since it will always be associated with a RI injury. Therapy of rotator interval lesions with biceps luxation is controversial and consists of biceps tenodesis or biceps tenotomy.

Bibliography

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