Case Resolution

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DIAGNOSIS: Elbow Synovial Fold Syndrome.

DISCUSSION

The radiohumeral synovial fold is an anatomic structure formed by capsular tissue and is located on the proximal edge of the annular ligament. It has four portions clearly differentiated by location: anterior, lateral, posterolateral, and lateral olecranon. The most common synovial plica of the elbow is the posterolateral radiohumeral synovial fold.

Normal synovial folds are shaped as meniscoid (triangular) structures, composed mainly of fibroadipose tissue with moderate vascularization and abundant nerve endings in the periphery, suggesting that abnormalities may be associated with pain.

The function of the synovial elbow folds remains unknown. They might act as stabilizers to prevent excessive movement. Although their role during pronation and supination may be considered of a protective nature, these folds are not directly compressed between the capitellum and the fovea radialis.

The pathophysiological characteristics of Synovial Fold Syndrome are not clearly defined. This syndrome arises from an injury, such as a direct blow, repetitive microtrauma or overloading (e. g., sports requiring repetitive flexion-extension movements, such as throwing athletes and golfers), a twisting force that stretches the fold, precipitating an inflammatory reaction. Repetitive injury causes inflammatory thickening of the synovial fold and chronic localized synovitis. As the thickening increases, the fold can interpose and be compressed between the articular surfaces during certain movements, producing snapping of the joint.

The symptoms for Elbow Synovial Fold Syndrome are nonspecific and require careful evaluation in order to reach the proper diagnosis as the clinical findings mimic epicondylitis (tennis elbow). On physical examination, pain is commonly located posterolaterally, and not along the lateral epicondyle or in the extensor tendon origin. Folds can cause lateral elbow pain even before the development of locking or catching symptoms.

Thickened synovial fold clinical manifestations include snapping pain as the main complaint and elbow locking during elbow flexion and extension. Diagnosis of Elbow Synovial Fold Syndrome, or posterolateral impingement, should be considered in patients with painful snapping, particularly if they have symptoms on the elbow lateral aspect. Reproduction of symptoms during flexion-extension in a pronated forearm (flexion-pronation test) should lead to consider the possibility of a pathologic synovial fold in the radiocapitellar joint.

Elbow Synovial Fold Syndrome occurs usually as an isolated condition. There are only a few reported cases of Elbow Synovial Fold Syndrome associated with other abnormalities, including posterolateral instability, medial collateral ligament lesion, lateral epicondylitis (Figure 4), ulnar neuropathy, and intra-articular loose bodies (Figure 5).

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Imaging

Ultrasound: Ultrasound is a useful tool in the evaluation of patients with elbow pain and snapping, allowing accurate diagnosis of Elbow Synovial Fold Syndrome and differential diagnosis with other more common elbow conditions, such as lateral epicondylitis. Ultrasound imaging provides multiple advantages: the ability to perform contralateral comparative studies, clinical correlation, and dynamic studies. Dynamic exploration in flexion and extension is a simple and reliable method for elbow evaluation.

The elbow synovial folds can be easily evaluated using ultrasound imaging because of their superficial location at the periphery of the radiohumeral compartment. Ultrasound image of a normal synovial fold shows a hyperechoic triangular shape surrounded by a thin hypoechoic ring. Pathologic synovial folds appear thickened on ultrasound, with irregular echogenicity and margins. Color Doppler ultrasound allows for easy identification of focal synovitis in some of this syndrome cases.

Magnetic resonance imaging (MRI): MRI is the imaging method of choice to evaluate most of the elbow pathologic processes as it guarantees an accurate assessment of elbow folds with pathologic component, the articular cartilage, and associated injuries, thus facilitating an appropriate treatment planning. However, MRI usefulness is limited in cases with small amounts of fluid or absence of focal synovitis. Most of the cases of Elbow Synovial Fold Syndrome diagnosed through MRI occur in patients diagnosed with lateral epicondylitis after the failure of long-term conservative treatments.

Normal synovial folds appear as hypointense bands surrounded by synovial fluid and are best assessed on fluid-sensitive sequences (T2-weighted sequences). MRI of a pathologic fold commonly shows thickening, abnormal signal intensity, and irregular margins. There is significant size overlapping between symptoms and asymptomatic folds. The literature review suggests a cutoff value of 3 mm for thickened elbow folds. Synovial fold thickening (>3 mm) is usually symptomatic.

MRI can be used in the evaluation of significant secondary signs of Elbow Synovial Fold Syndrome, including the existence of focal posterolateral synovitis and chondromalacia in the anterolateral aspect of the radial head or, less frequently, on the capitellum. Chondromalacia is secondary to chronic mechanical rupture of the synovial folds over the surface.

Gadolinium MRI improves the identification of focal synovitis. Focal synovitis in the elbow posterolateral aspect is an important secondary sign of Elbow Synovial Fold Syndrome but may not occur in some cases, especially in patients with chronic symptoms.

CT arthrography or MR arthrography: Some symptomatic folds may not be found on non-arthrographic MRIs in patients without joint fluid. The intraarticular contrast used in CT or MRI arthrographies highlights joint surfaces and distends the capsule, thus providing excellent fold visualization. Fold morphologic changes and cartilaginous lesions associated with the radial head and capitellum are identified more accurately on CT or MRI arthrography than on CT or MRI without intraarticular contrast.

MRI arthrography of the elbow may also provide data for the evaluation of collateral ligament tears occurring under the surface, cartilaginous lesions, osteochondritis dissecans, and intraarticular loose bodies in patients without joint effusion. CT arthrography is, in general, slightly better than MIR arthrography in revealing morphologic abnormalities of the articular cartilage, but both techniques are useful for showing articular cartilage defects in the elbow. CT arthrography can provide useful information in cases where MRI is contraindicated.

Differential diagnosis

Pathologic elbow synovial folds can cause lateral elbow pain even without joint locking or catching during the initial phase of the syndrome. The differential diagnosis for causes of lateral elbow pain includes lateral epicondylitis (Figure 4). When a patient complains of elbow painful locking or snapping, several entities must be ruled out, of which the most common causes are: loose bodies (Figure 5), instability, annular ligament lesion, and snapping of the medial head of the triceps over the epicondyle.

Treatment

Initial treatment should include rest from all physical activities, physiotherapy, and nonsteroidal anti-inflammatory agents. In case of unsatisfactory course, an arthroscopic procedure, involving excision of the pathologic fold and focal fibrosis, should be considered, which may also include the assessment and repair of cartilaginous lesions.

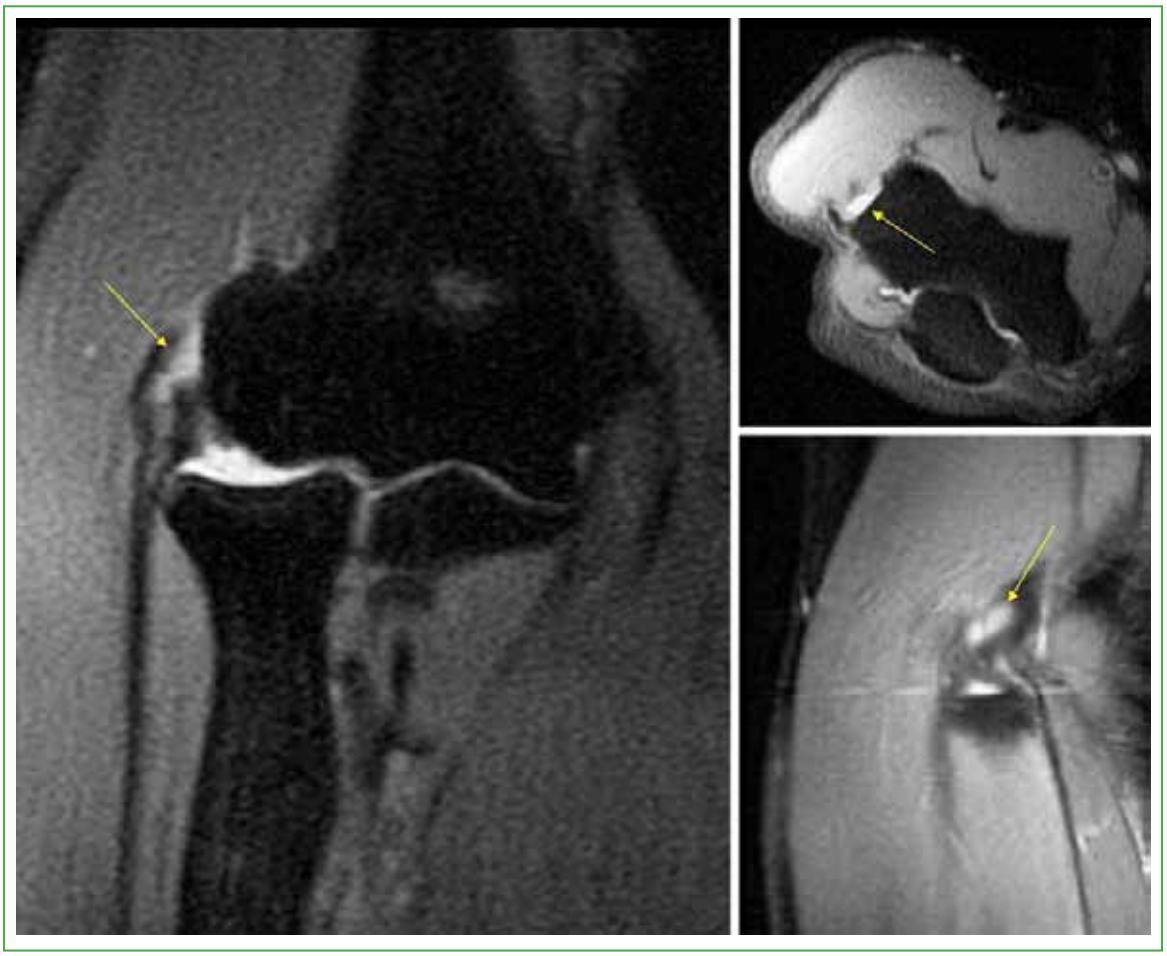

Figure 4. Fat-suppressed T2-weighted MRI sequence. Partial tear of the short radial extensor tendon, at its proximal insertion level, associated with lateral epicondylitis.

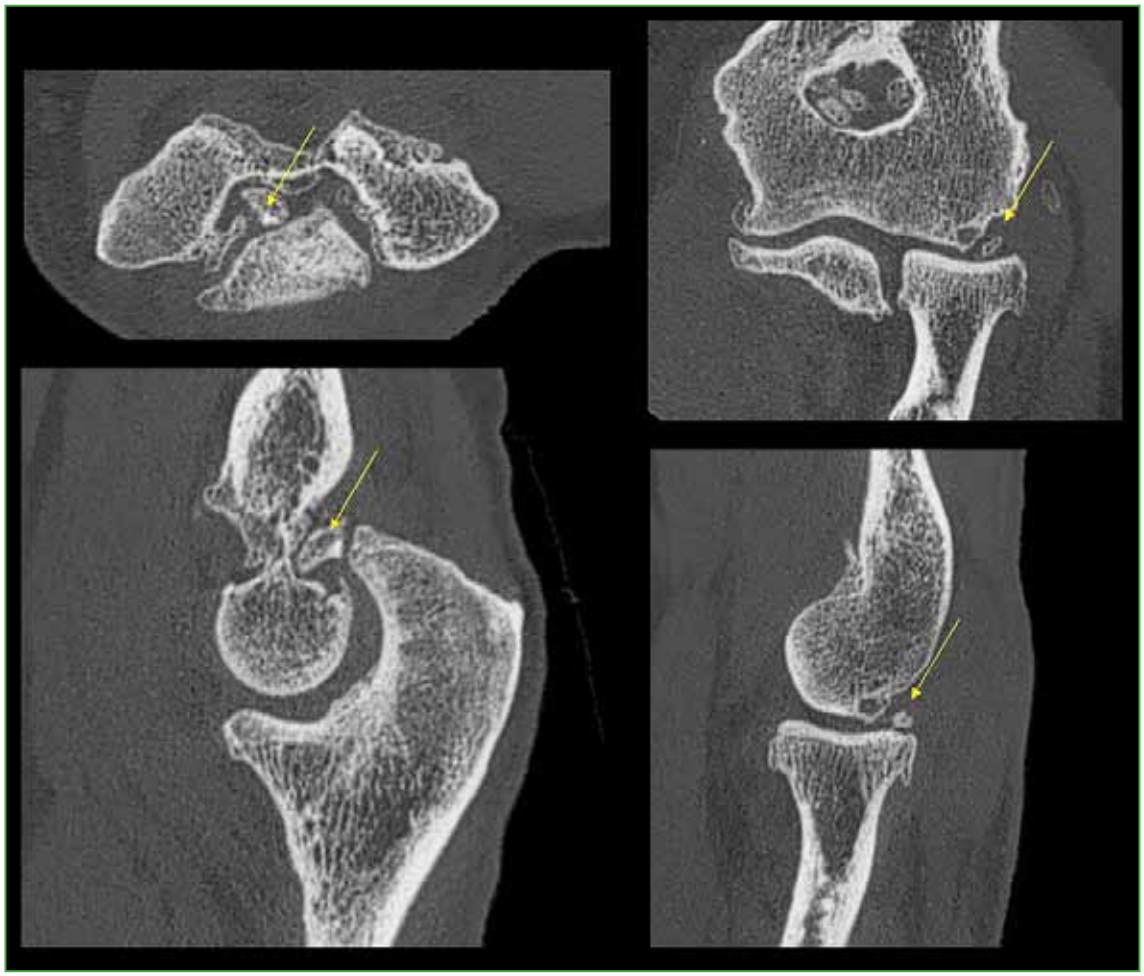

Figure 5. Cone beam 3D CT scan showing a reduced intraarticular space, marginal exostosis formation and intraarticular loose bodies.