16 year old baseball pitcher presenting with gradual worsening of posterolateral right elbow pain and negative MRI findings

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Introduction

Elbow pain is a common presenting symptom in repetitive motion performing athletes. Due to the popular use of prolonged conservative therapy initially and the importance of early surgical intervention in Elbow Synovial Fold Syndrome, proper and prompt diagnosis is essential. As ESFS is an uncommon diagnosis, this case report analyzes the common presenting symptoms, how best to correctly narrow the differential diagnosis and how to proceed with effective treatment.

Elbow synovial fold syndrome (ESFS) or Elbow Plica Syndrome is thought to result from repetitive impingement of redundant synovial folds, causing inflammation secondary to the cytokine-mediated factors [1]. Plicae are folds of synovial membrane that are thought to be remnants of embryonic connective tissue that failed to fully resorb during fetal development[2]. They are present in 80% of the population, but are usually asymptomatic. Function of plicae:

1. Stabilizers to prevent excessive movement.
2. Distribute synovial fluid throughout the joint.
3. The rich innervation in the plica helps play a role in nociception, proprioception and coordination of movement[2].

In the elbow joint, a synovial humeral plica is a physiologic condition. It only becomes pathologic in cases where the plica hypertrophies and dilates into the radiohumeral articulation, causing pain [3].

Embryology, Anatomy, Histology

In embryonic development, the elbow joint forms by mesenchymal cavitation sequentially at the radiohumeral site, ulnohumeral region, and ending at the radiolunar site. Thereafter, all three cavities merge. The plicae are septal remnants of this process [2].

The radiohumeral synovial plica occur on the medial side of the annular ligament (Al) (Figure 1). Although they are contiguous with the radiocapitellar joint capsule, they are still distinct from the annular ligament. The elbow synovial plica are located at the radiohumeral joint and encompass the peripheral margins of the radial dome (2).

There are 4 aspects of the radio-humeral synovial fold clearly differentiated by location (Figures 2 and 3):

- The posterolateral (PL) synovial fold is the most common (86%–100%), located between the lower sigmoid cavity (SC) of the ulna, radial head (RH), and the transverse sulcus of the major sigmoid cavity (2A). The anterior fold (AF) (67% of cases) is a thin anterior part of the radio-humeral fold.
- The lateral olecranon fold (OF) originates from the posterolateral fold and travels proximally along the olecranon’s lateral periphery, with its rounded apex located at the peak of the lateral non-articular portion of the trochlear notch.

Mechanism of Damage

Inflammation secondary to repeated impingement usually results from repetitive hyperextension of the joint, blunt trauma, fat pad irritation, internal elbow derangements, and overloading. As the plica enlarges due to inflammation, it can be compressed between the articular surfaces during elbow flexion and extension, resulting in a "snapping” sensation at the joint at around 80-100 degrees of elbow flexion

MR arthography showing a thickened posterolateral plica and focal irregular asymmetry-Figure 4 [2]