Elbow Plica: A Case of Advanced Progression

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Abstract

Symptomatic elbow plica is a considerably rare condition with an etiology and prevalence not completely understood. Misinterpretation of magnetic resonance imaging (MRI) as normal findings resulted in the progression of symptoms. In this case report, we observe and record the progression of symptoms in an untreated elbow plica. *Methods:* The medical records were retrieved from an orthopedic clinic in which a 24-year-old male presented with complaints of acute on chronic right (R) elbow pain exacerbated by forceful extension. *Results:* A secondary interpretation of the MRI and ultrasound images resulted in a reading consistent with intra-arthrodial plica with radial nerve entrapment. *Discussion:* From symptom onset, the patient experienced a drastic 18˚regression in extension from the original full range of motion (ROM). In conclusion, we utilize this situation to highlight pitfalls in the diagnosis, management, and treatment of an elbow plica.

Introduction

Symptomatic elbow plica, or synovial plica syndrome, is a normal anatomical finding, occurring in 92-98% of the general population. However, only a small fraction (7.2-8.7%) of patients experience symptoms.[1, 2] Elbow plicas are thought to be caused by repetitive motions or overuse of the elbow joint as a result of injury or trauma to the joint.[3] Diagnosis typically involves magnetic resonance imaging (MRI) or ultrasound scan (US) in addition to clinical examination. Elbow plicas are commonly misdiagnosed as lateral epicondylitis, loose bodies, or degenerative arthritis. In this case report, a misdiagnosed elbow plica is described and the consequences of the untreated condition are outlined.

Methods

A detailed analysis of a 24-year-old male patient presenting with atypical right (R) elbow pain and neurological symptoms was conducted. The patient's medical history, including past illnesses, medications, and relevant family history was thoroughly reviewed and determined non-contributory. Initial clinical assessments involved comprehensive physical examinations and neurological tests supplemented by imaging studies such as plain radiographs, ultrasonography (US), and magnetic resonance imaging (MRI). All medical records obtained from the patient's orthopedic clinic were analyzed, including patient history, physical examination findings, imaging, and radiologist reports. Ethical approval was obtained from the institutional review

board (IRB), and written informed consent was obtained from the patient. A literary search was performed across PubMed, MEDLINE and Embase with terms ((Plica[Title/Abstract]) OR (synovial plica syndrome[Title/Abstract]) OR (synovial fold syndrome[Title/Abstract]) AND (elbow[Title/Abstract])) yielding 68 results from 1988 to 2025.

Case Presentation

A healthy, active 24-year-old male presented at an orthopedic clinic with complaints of acute on chronic R elbow pain for several years exacerbated by forceful extension. The onset of pain was associated with activity. The patient had a fifteen-year history of playing baseball and did not have any documented comorbidities. The patient reported 6/10 pain approximated to the medial and lateral epicondyle with neuropathy in the finger extensors and the extensor compartment of the forearm. The patient denied previous physical therapy, corticosteroid injections, or usage of pain medication. Physical examination revealed tenderness over the medial and lateral epicondyle and pain induced by forceful extension and deep palpation of the joint. Additionally, markedly decreased elbow extension, which measured 10˚ to 130˚ using a goniometer, was observed on physical exam.

The literature outlines a flexion-extension arc of 100˚ is necessary for normal function of the elbow.[4] Flexion should lie between 130˚ and 154˚, while extension values range from -6˚ and 11˚.[5] Normative values for this patient's age range are 144˚ to 148˚ flexion and -3˚ to 0˚ extension.[5] The same study also noted a decrease in as much as 14˚ of passive range of motion (ROM) from normal in baseball pitchers' passive extension-flexion range.[5]

Diagnostic radiographs were performed upon patient presentation to the orthopedic clinic. A radiograph of the R elbow showed mild joint effusions with no evidence of dislocation, fracture, or other osseous abnormality (Figure 1). An MRI was performed to rule out ligamentous or soft tissue involvement. MRI, the preferred imaging modality, depicts normal plicae as hypointense bands on fluid-sensitive sequences, while abnormal plicae demonstrate thickening greater than 3 mm, irregular margins, and abnormal signal intensity.[6] While an MRI is a versatile imaging modality, it does have limitations including image noise, movement artifact, or misinterpretation of findings.

Figure 1. Plain radiograph of right elbow. Radiograph showing a lateral view of the right elbow with normal bony anatomy without evidence of arthritis, subluxation, fracture, or other osseous abnormalities.

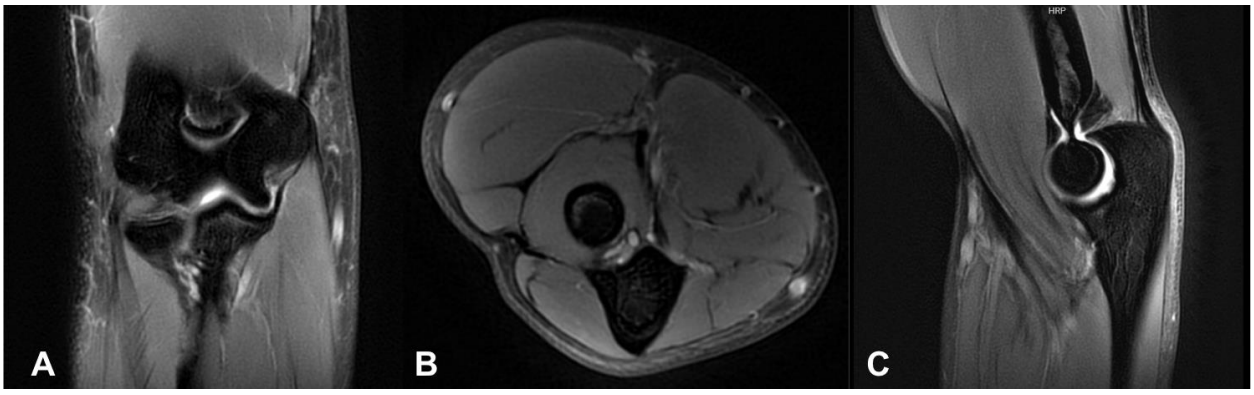

Figure 2. Magnetic resonance imaging of right elbow. Fat-suppressed (FS) magnetic resonance imaging (MRI) of the right (R) elbow. **A**, Coronal section of R elbow demonstrating anterior mass of inflamed synovial tissue within the radiohumeral joint with the ulnar collateral ligament intact. **B**, Axial section of R elbow demonstrating fluid or inflammatory infiltrate between the olecranon and humerus. **C**, Sagittal view demonstrating dark, thickening of the synovial capsule superior to the tip of the olecranon.

The original MRI reading indicated mild biceps tendinosis, negative for the following: acute osseous or chondral pathology, joint effusion, intra-articular bodies. Collateral ligaments were intact as were the muscles and tendons about the elbow (Figure 2). As a result of the radiologist's interpretation of MRI, the patient was diagnosed with R elbow pain with elbow extension deficit. This diagnosis was substantiated by correlating physical examination findings and imaging modalities. Although helpful for narrowing a differential diagnosis list, a magnetic resonance (MR) arthrogram was not performed at the time of presentation due to treating physician preference. Recommended treatment included a diagnostic corticosteroid injection and exploratory arthroscopy.

The patient declined intervention at the time of presentation and was instructed to follow up as needed should there be symptom exacerbation. Exploratory arthroscopy was determined to be of little benefit to the patient as there were no abnormalities documented in the initial diagnostic studies. Six months passed before the patient was seen at follow-up for interpretation of imaging. Upon return, the patient demonstrated elbow ROM of 28˚ to 147˚, indicating a regression in 18˚ of extension as compared to previous documentation. Overall, the flexion-extension arc only changed 1˚; however, any changes in symptoms could indicate progressive dysfunction with daily activities.

At that time, neurologic symptoms had increased in frequency and severity. The patient opted for a diagnostic corticosteroid injection into the radiohumeral joint. This in-office procedure resulted in immediate relief of pain symptoms. Cessation of pain after the administration of the corticosteroid injection is best explained by the resolution of inflammation in the joint, potentially caused by radiocapitellar synovitis. However, the ROM deficit persisted, leaving the patient with persistent lifestyle impairments. The patient was instructed to obtain serial injections as needed for symptom management.

The sustained 18˚ regression in R elbow extension prompted the patient to seek out a second opinion regarding R elbow MRI interpretation. Upon assessment by a different board-certified radiologist, an elbow plica was confirmed on MRI. It was recommended the previous MRI interpretation with normal findings be amended. While the reason for initial misinterpretation remains arbitrary, perceptual errors account for 20-40%, and cognitive errors are attributed to 60-80% of misdiagnoses.[7] Davide Blonna et. al, showed misdiagnosis of lateral elbow pain occurred as often as 11%. These new findings were augmented by ultrasound assessment of the R radiohumeral joint, which demonstrated synovitis seen in Figure 3. On ultrasound, normal synovial folds appear as hyperechoic triangular structures with a thin hypoechoic ring, while pathologic folds show thickening, irregular echogenicity, and margins (Figure 3).

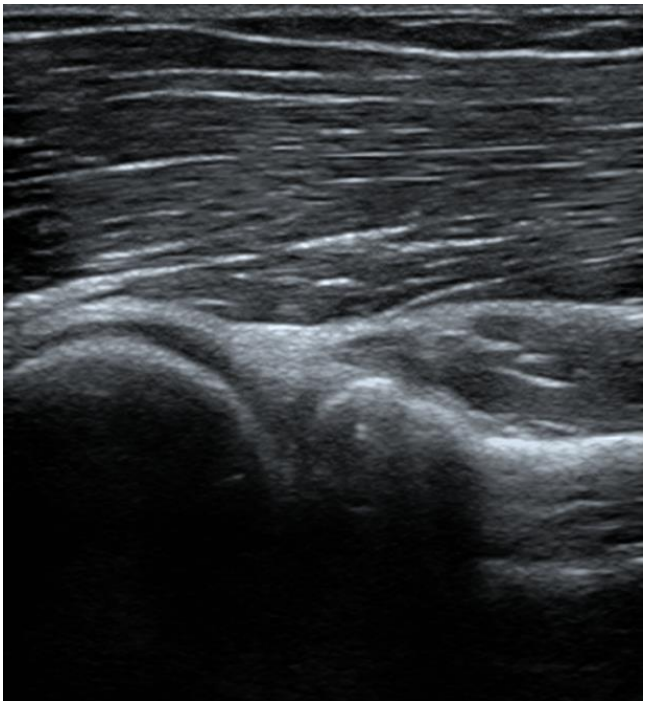

Figure 3. Ultrasonography of right elbow. Ultrasound of right elbow demonstrating hyperechoic and triangularly shaped morphological feature consistent with a posterolateral radiohumeral plica.

Discussion

Pathophysiology of elbow plicas includes thickened, inflamed, or irritated synovial lining found within the radiohumeral joint. The synovial lining is a thin layer of tissue that surrounds joints, producing synovial fluid to lubricate and nourish the joint. In an elbow plica, or synovial plica, a fold of synovial tissue may become entrapped or irritated. Four aspects of the radiohumeral are clearly differentiated and are common sites of plica infiltration. The posterolateral synovial fold is the most common site of elbow plica (86 to 100%). Additionally, anterior fold involvement is found in 67% of these elbows.[7, 9] These findings may or may not accompany symptoms; however, correctly identifying the site of an elbow plica remains a challenge in the clinical setting.

The standard of care to address symptomatic elbow plicas is to initially adhere to conservative therapy. However, there is limited data on what type of conservative therapy should be applied, or its effectiveness. Additionally, patients are advised to decrease the amount of physical activity and repetitive motions and implement guided physical therapy regimens. Non-steroidal anti-inflammatory drugs (NSAIDs) and/or corticosteroid injections are offered if pain persists. If no improvement is noted after three months of conservative treatment, surgical intervention was proposed to the patient.[6, 10, 11] It is imperative to begin physical therapy and ROM exercises early to prevent permanent deficits. Since mechanical symptoms and ROM deficits are highly variable among patients and dependent on the size and location of the plica, a low tolerance for exploring synovial plica syndrome as a differential should be considered in order to prevent permanent ROM loss.[12]

Current literature suggests symptomatic elbow plicas are a relatively rare occurrence; thus, screening examinations are often focused on pathologies unrelated to the diagnosis. According to Kholinne, E et al., the lack of evidence regarding the structure and diagnostic criteria to classify an elbow plica, or synovial fold, makes the treatment and assessment of elbow plicas grossly underdeveloped. When a search was conducted using UpToDate, appropriate epidemiology, pathophysiology, diagnostics, and treatment protocols failed to be found. Additionally, there remains inconsistency in correct terminology, prevalence, and investigation of the condition, leading to misdiagnosis and mistreatment.[13]

The authors recommend further investigation of ways to improve diagnostic criteria. One of the most important points in diagnosing radiocapitellar synovial plica pathology is obtaining an appropriate history from the patient. Additionally, diagnostic imaging studies should be carefully evaluated for inflammation, edema, and disturbance in the joint space due to penetrance of synovial or nerve tissue. Ultrasonography and MRI are the most specific for these findings.

If a plica has been definitively diagnosed as being the source of mechanical elbow pain, it can be treated correctly, and permanent ROM deficits may be avoided. Interventions should begin as soon as possible in order to prevent permanent motion deficits. Treatment should include physical therapy and arthroscopic debridement of elbow radiocapitellar plica. Unfortunately, this patient remained undiagnosed for a substantial amount of time, resulting in loss of terminal extension and impairment of activities that will remain until surgical intervention occurs. Such impairments could have been avoided if diagnostic criteria had been available upon initial interpretation of MRI findings. In light of this discrepancy in current literature, this case report serves as an example of potential consequences of an under-treated elbow plica and encourages future investigation of the condition along with improvement of current diagnostic tools, more articulate language, and overall awareness of elbow plicas.

Conclusion

The standard for elbow plica diagnosis and treatment is not clearly established, thus a high clinical suspicion based on patient symptoms correlated with history and physical examination remains the best indicator for diagnostic imaging. If diagnosis is delayed or if symptoms are left untreated, an elbow plica may progress in severity, leading to diminished ROM, nerve impingement, and neurological deficits. Patients who report pain upon repetition of elbow extension activities such as baseball, tennis, weightlifting, cheerleading, or golf, should be evaluated for an elbow plica.

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