Loose Body in Elbow of a Baseball Player: Arthroscopic/Radiologic Correlation

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We present the case of a 21 year old male college varsity baseball player who presented with sudden non-traumatic right elbow pain and limited range of motion. Plain radiographs suggested a calcified intra-articular body. Magnetic Resonance (MR) was performed to better characterize the location, consistency and mobility of this body. Multiple intra-articular bodies were found at subsequent arthroscopy. This case emphasizes the close correlation among the clinical, radiographic, MR and arthroscopic findings.

Introduction

The elbow of a baseball player undergoes significant stress. The repetitive forces of throwing can be significant in young athletes with skeletally immature bones, particularly in pitchers. This may result in a variety of injuries, such as medial epicondylitis, ulnar collateral ligament injury, and osteochondral defects. Baseball throwing injuries are becoming better understood with increasing use of magnetic resonance imaging (MRI) and elbow arthroscopy. Accurate recognition of normal variants and abnormal MRI findings in the elbow is imperative for prompt diagnosis and treatment.

Case Report

We present the case of a 21 year old male college division IA outfielder who presented with sudden non-traumatic right elbow pain and limited range of motion. He was initially seen by a general orthopedic surgeon. On physical exam the patient had limited flexion of the elbow from 10 to 110 degrees. His supination and pronation were symmetric and full at 90 degrees. There was no palpable effusion and the neurovascular examination was normal. Initial treatment was conservative, with intra-articular injection of lidocaine and steroid. However, this treatment failed to relieve his symptoms and restore full flexion and extension, and he was referred to a sports fellowship-trained orthopedic surgeon. Digital radiographs showed a mobile, irregular, calcific opacity over the elbow joint (Figure 1).

MR image of the elbow was then ordered to validate and characterize location, consistency and mobility of this body. Multiple intra-articular bodies were found at subsequent arthroscopy. This case emphasizes the close correlation among the clinical, radiographic, MR and arthroscopic findings.

Elbow arthroscopy was then performed with a standard 30 degree arthroscope through anterolateral, medial and posterolateral portals. There was no evidence of medial collateral ligament insufficiency, with less than 2mm of medial opening on provocative testing.

Anteriorly, the large fragment noted on MR and two smaller fragments were removed with a variety of hand held instruments and a 4.5 mm shaver. An arthroscopic
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**Figure 1A.** Anteroposterior (AP) digital radiograph shows a faint, mobile, irregular, calcific opacity superimposed over the distal capitellum (arrow).

**Figure 1B.** Lateral digital radiograph shows a faint, mobile, irregular, calcific opacity superior to the coronoid process (arrow).

**Figure 2A.** Axial T2-weighted fast spin echo (FSE) MR image demonstrates a focus of irregular low signal intensity (arrow) anterior to the coronoid fossa, representing an intra-articular body. This is made more conspicuous by the small joint effusion surrounding the loose body.

**Figure 2B.** Coronal T2-weighted fast spin echo (FSE) MR image demonstrates a focus of irregular low signal intensity (arrow) anterior to the coronoid fossa, representing an intra-articular body. This is made more conspicuous by the small joint effusion surrounding the loose body.
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**Figure 3A.** Axial T1-weighted Spin Echo MR image demonstrates a low signal rim (arrow) outlining the loose body. This partial visibility of the border of the loose body helps support the calcific nature of the loose material.

**Figure 3B.** Coronal T1-weighted Spin Echo Echo MR image demonstrates a low signal rim (arrow) outlining the loose body. This partial visibility of the border of the loose body helps support the calcific nature of the loose material.

**Figure 4.** Arthroscopic view of the loose body (arrows), correlating well with the fragment seen on MR.
image demonstrating the loose body within the joint is shown in Figure 4. On arthroscopy, the donor site was shown to be from the capitellum. The posterior compartment revealed findings typical of throwing athletes with posterosmedial olecranon spurring. A loose body was removed with the use of a 4.0mm burr. Intraoperative video showing arthroscopic removal of this fragment can be reviewed online. Following this procedure, the elbow was wrapped in a sterile dressing and ace wrap with no splint. Motion was started in the immediate postoperative period and supervised by the athletic trainer.

Postoperative examination at one week showed return of full motion with some minor swelling and a medial antebrachial cutaneous nerve palsy that resolved over the next couple of weeks. He returned to play outfield with no limitations three weeks postoperatively.

Discussion

Since our patient was a pitcher in high school, osteochondritis dissecans (OCD) was a preoperative consideration, given the strong relationship between OCD and pitching (1). Besides OCD, other common elbow injuries in baseball and softball players include medial epicondylitis and ulnar collateral ligament injury (2). Other, less common, clinical differential considerations for the athlete presented include loose body from synovial metaplasia, ununited stress fracture of the olecranon (3), bicipital tendinitis, pronator syndrome, anterior capsule strain, osteophyte, other bony impingement and entrapment injury (4).

The elbow is known to undergo significant stress in pitchers and throwing motions (5-7). Osteochondritis dissecans is related to pitching, and it is often not attributable to an acute traumatic event. The extreme force and valgus overload seen in pitching places abnormal forces on the elbow, and is felt to contribute significantly to the disease process. The mechanics of pitching demand that the torque of the entire body and the force generated are placed directly on the medial elbow. This force is most significant in the early acceleration phase of pitching. The demands of this repetitive force placed on young athletes and their skeletally immature elbow is the clinically important aspect of this case.

MRI abnormalities in asymptomatic pitchers’ elbows are more common that not. Loose bodies in the elbow can contribute to decreased range of motion (ROM) as in the case presented here (8). Radiographic and MR findings can be subtle or even invisible -- especially if extremity coils are not used or proper pulse sequences are not optimally performed. Accurate diagnosis is imperative not only in athletes, but also in the population occupationally dependent upon their upper extremities, such as workers performing overhead movements. Prompt and accurate diagnosis can lead to immediate and dramatic therapeutic effects.

MR and CT arthrography have variable sensitivity (88 – 100%) and specificity (20-27%) in the detection of loose bodies (9). Indirect MR arthrography (IV administration of contrast for a quasiarthrorgraphic study) can be helpful in some cases, particularly with biphasic imaging in perplexing cases (10). Arthrography was not used in our patient since arthroscopy was already planned based on the radiographic and non-arthrographic MR findings. CT arthrography can also be used to detect loose bodies. CT, however, does display extra-articular soft tissue abnormalities as well as MR. MRI can also directly demonstrate evidence of osteochondritis dissecans, although these findings were not directly evident on the MR images of our patient (11).

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