MRI of the Elbow

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Elbow pain occurs in as many as 50% of tennis players over the age of 30 and 60% of high school and college baseball pitchers. The majority of these are due to cumulative microtrauma and eccentric loading; although acute trauma is also a common cause of elbow pain and disability. Moreover, recently introduced dedicated extremity MRI is well suited for imaging the elbow and offers a number of practical and economic advantages offer conventional whole-body MRI that may result in increased utilization in the future. Other technical innovations including rapid multiline imaging sequences such as *fast* spin echo (FSE), higher-resolution capabilities, improved fat-suppression methods, and greater scope for generating contrast among articular soft tissues offer even greater diagnostic power to MRI.

TECHNICAL CONSIDERATIONS

The elbow presents numerous challenges to proper MRI. It is optimally imaged in full extension, but this is often not possible in patients with certain elbow injuries and locking. In addition, the elbow is most comfortably positioned at the side with the patient supine. This requires imaging off the isocenter of the magnet, and occasionally limits coil choice. The alternative of placing the elbows over the patients head is uncomfortable and usually leads to motion artifacts that degrade image quality. Since many of the structures of clinical concern in the elbow are extremely small, requiring the use of high resolution sequences that often necessitate prolonged imaging times to achieve sufficient signal-to-noise, even slight patient motion can be a serious limitation.

With the arm at the side, a commercial volume coil intended for the wrist can often be employed to acquire high-quality images. However, adequate coverage can be a problem, and a partially flexed or locked elbow cannot be imaged. An extremity coil detached from its base can also be used to image the elbow off center. Alternatively the arm may be extended through the opening in a shoulder coil and imaged in flexion.

Routine MRI of the elbow should include images taken in three orthogonal planes. However, because of the anatomy of the elbow, sagittal and coronal planes in this joint are actually oblique. This requires careful selection of imaging planes from initial localizers. Optimal coronal imaging, in fact, requires angulation off both axial and sagittal localizers. In this context, it must be remembered that high-resolution 3D sequences are generally not capable of obtaining oblique slices directly. This necessitates reformatting the image data to generate the appropriate images, and offsets some of the original gain in spatial resolution.

T1-weighted sequences provide excellent signal-to-noise ratio and sharp delineation of nerves owing to perineural fat. Bone contusions in fatty marrow are also well depicted with this sequence. T2-weighted sequences are necessary for depicting edema and hemorrhage associated with significant injury or inflammation. However, conventional T2-weighted spin-echo sequences require long imaging times and render insufficient signal-to-noise ratio to support high spatial resolution. Gradient-echo sequences provide rapid T2*-weighted imaging, but poor soft-tissue contrast, and are vulnerable to magnetic susceptibility effects in cancellous bone rendering the technique insensitive to marrow pathology. STIR (Short Tau Inversion Recovery) is extremely sensitive to marrow changes both because it is additive for slow T1 relaxation and slow T2 decay as well as because it suppresses adjacent marrow fat. However, STIR sequences also take a long time to acquire and offer poor spatial resolution. A more useful alternative in the elbow is T2-weighted *fast* spin-echo with fat suppression. This provides heavily T2-weighted images with sufficient signal-to-noise ratio to allow the use of high-resolution matrixes. Suppression of fat further enhances the conspicuity of bone and soft-tissue injury. Chemical-shift based fat-suppression techniques are susceptible to field inhomogeneities arising in unevenly shaped body parts, but this is not a problem in the elbow.

MRI ANATOMY

Coronal: The coronal images provide excellent depiction of the articular surfaces of the ulnotrochlear and radiocapitellar joints. The elbow is a highly congruent hinge joint stabilized by its bony configuration as well as ligamentous and capsular structures. The capsule is relatively weak in front and behind the elbow, where the joint is stabilized by the brachialis and triceps respectively. The ulnar collateral ligament (UCL) is a thickening of the medial capsule and the principal stabilizer of the elbow in valgus stress [1]. It is composed of three separate ligaments: the anterior, posterior and transverse UCLs. The anterior UCL is the largest and most important component, and extends from the inferior aspect of the medial epicondyle of the humerus to the medial surface of the coranoid process of the ulna. It is taunt in extension and lax in flexion. On MRI, the UCL appears as a linear low signal intensity band extending along the medial surface of the joint. It is best visualized in the coronal plane with the elbow in full extension, and most salient on proton-density weighted images. The posterior and transverse ligaments are difficult to visualize by MRI without special positioning, and since they are only of secondary importance with respect to elbow stability, not routinely imaged. The radial collateral ligament extends from the lateral epicondyle to the annular ligament and ulna, and is also best visualized in the coronal plane.

Coronal images are also useful for evaluating the common extensor and flexor tendon insertions on the lateral and medial epicondyles respectively. Chronic overuse of these tendons resulting in lateral and medial epicondylitis is best evaluated in this plane. Coronal images also show the anatomy of the radial head and physeal plates of the distal humerus. The intermediate signal-intensity ulnar nerve surrounded by perineural fat is usually well seen as it courses behind the medial epicondyle of the humerus.

Axial: Axial images are most useful for delineating the course of major vessels and nerves about the elbow. These structures travel in the intermuscular fascial planes and are usually surrounded by fat, which provides clear demarcation or their anatomy. Static GRASS images are useful in depicting flow within these vessels and distinguishing them from adjacent nerves. The brachial artery and median nerve course together over the medial aspect of the brachialis muscle and along side the humeral head of the pronator teres. The median nerve passes deep to the pronator teres and travels with the recurrent ulnar artery and subsequently the ulnar artery superficial to the flexor digitorum profundus as the brachial artery divides into radial and ulnar branches. The radial nerve travels alone in the fascial plane between the brachialis muscle medially and the brachioradialis and extensor carpi radialis longus muscles laterally. Just proximal to the supinator, the radial nerve divides into superficial and deep branches. The superficial branch continues distally in the volar forearm, while the deep branch turns dorsally between the superficial and deep portions of the supinator to run beneath the extensor digitorum. The ulnar nerve runs along the medial margin of the distal triceps muscle to lie alone behind the medial epicondyle of the humerus in a small fat-filled compartment (cubital tunnel). As the ulnar nerve courses distally behind the common flexor tendon it passes close to the medial collateral ligament visible as a thin low signal-intensity band between the medial epicondyle of the humerus and olecranon process of the ulna. This positioning makes the ulnar nerve vulnerable to injury during trauma of the UCL.

Axial images are also useful for evaluating the muscles and tendons of the elbow. Movement at the elbow is limited to flexion and extension; supination and pronation occurs between the radius and ulna. Flexors include the large brachialis muscle crossing anterior to the capsule to insert on the proximal ulna near the coranoid process, the biceps brachialis muscle and tendon, which cross the elbow anterior to the brachialis to insert on the radial tubercle, and the brachioradialis arising from the lateral supracondylar ridge and inserting into the base of the styloid process of the distal radius. The main extensors of the elbow are the triceps (especially the medial head) and the anconeus. The anconeus arises from the posterior lateral epicondyle and extends medially to the lateral ulna. The conjoined insertion of the triceps is best seen on sagittal images. One of the main pronators of the forearm is the pronator teres, which originates from the medial supracondylar ridge and coranoid, and crosses anteriorly and laterally over the distal brachialis to insert on the mid radius. The chief supinator is the biceps, but it is assisted by the supinator muscle, which is a deep structure that originates from the lateral epicondyle, adjacent ligaments and ulna, and winds around the posterior and lateral surface of the radial neck. The deep branch of the radial nerve runs between the superficial and deep portions of this muscle. Most of the forearm flexors and extensors arise from common origins on the medal and lateral epicondyles of the humerus respectively that are best evaluated in the coronal plane.

The axial plane provides a good view of the olecranon and coranoid fossae and is useful for identifying loose intraarticular bodies, that tend to collect in these cavities. Intracapsular but extrasynovial anterior and posterior fat pads are also visible at this level.

Sagittal: Sagittal images also provide good visualization of the olecranon and coranoid fossae as well as the articular surfaces of the ulnotrochlear and radiocapitellar joints of the elbow. It is the optimal plane for evaluating the triceps tendon insertion on the olecranon. The anconeus muscle is well depicted in this plane. The brachialis and biceps tendons are particularly well delineated on sagittal images.

OVERUSE INJURIES

Lateral Epicondylitis: Lateral epicondylitis, colloquially refereed to as "tennis elbow" presents as pain and tenderness over the common extensor tendon insertion on the lateral epicondyle elicited by active supination of the forearm and dorsiflexion of the wrist [2,3]. The condition is common among individuals who perform repetitive forearm rotation, such as tennis players and carpenters. This form of tendon injury in the elbow is analogous to rotator cuff disease in the shoulder. Central to both is chronic tendonitis. Repetitive microinjury of the tendon results in local inflammation that weakens individual collagen fibers; rupture of the weakened fibers in turn stimulates the inflammatory cascade, and a vicious cycle of chronic tendonitis, fibroblastic degeneration and partial rupture ensues [3]. Unlike rotator cuff injury, however, complete tear of the common extensor tendon of the elbow is extremely uncommon. At surgery, degeneration and thickening rather than active inflammation of the tendon is typically seen. The initial treatment of lateral epicondylitis is conservative, with a program of rest, systemic antiinflammatory medication and local steroid injections. Chronic cases may be treated with surgical release of the extensor tendon.

The MRI appearance of lateral epicondylitis is also analogous to that of rotator cuff injuries, except that "magic-angle phenomenon" (see Advances in Musculoskeletal MRI) is generally not a problem. Thickening and/or increased signal intensity in the common extensor tendon can be seen on T2-weighted spin-echo, T2*-weighted gradient-echo or STIR images in the coronal plane. Fat-suppressed Fast spin-echo sequences are particularly useful as they can combine heavy T2 weighting with high-resolution matrixes. A superficial lateral epicondylar bursa is present over the extensor tendon and should not be mistaken for a tear. Imaging evaluation of patients with lateral epicondylitis should include an examination of the underlying bone marrow for evidence of avulsion injury.

Lateral instability: Posterior dislocation and instability

Posterior dislocation of the elbow is relatively uncommon but is the 2nd most common major joint dislocation in young children. The usual mechanism involves a fall on the outstretched hand. This results from a mechanism including hyper supination, valgus stress and axial compression such as can occur during a fall on the outstretched hand.

Elbow instability occurs as a spectrum from subluxation to dislocation and has been divided into 3 stages: stage 1 includes posterolateral subluxation of the ulna and radius relative to the humerus, with disruption of the ulnar part of the lateral collateral ligament (lateral ulnar collateral ligament). This situation has been turned posterolateral rotatory instability. stage to is an incomplete dislocation (perched elbow). Stage 3 is complete dislocation.

Medial Epicondylitis: Chronic medial elbow pain is extremely common among throwing athletes (baseball pitchers, javelin throwers), and can include tendonitis of the common flexor pronator muscle group and/or injury to the ulnar collateral ligament (UCL) [4]. The MRI appearance of medial tendonitis is identical to that of lateral epicondylitis. Again, the superficial bursa in this area should not be mistaken for tear. Plain radiographs may show pericondylar calcification in up to 25% of patients [2,3]. Rupture is again rare, and the management is generally conservative.

Medial Instability: In contrast to medial tendonitis, UCL injury in the throwing athlete can be devastating. The UCL is the principal stabilizer of the elbow to valgus stress. Repetitive microtrauma to the ligament results from severe valgus stress to the elbow when in partial flexion. Accordingly, athletes who repetitively throw with high velocity and force commonly injure the UCL. Valgus instability and pain severely hamper athletic performance, and eventually require withdrawal from competitive activity. Recovery is typically slow, and often surgery is required. UCL injury presents with medial joint pain and tenderness, and increased valgus angulation (>5%) in partial flexion. Because of its proximity to the UCL, ulnar nerve compression may occur [1].

On MRI, the anterior UCL is best evaluated in the coronal plane with the elbow in full extension. High-resolution, fat-suppressed T2-weighted *fast* spin-echo images are again ideal for evaluating these injuries.

Discontinuity of the UCL is direct evidence of rupture. Other direct signs include loss of distinction or laxity of the ligament. Increased signal intensity in the UCL and adjacent tissues on T1-weighted and T2-weighted images reflects hemorrhage and edema associated with the injury. Joint effusion and osteophytosis are also often present. Occasionally, valgus instability leads to contusion or impaction of the lateral radiocapitellar joint [1].

Initial conservative management (rest, physiotherapy, nonsteroidal antiinflammatory drugs and steroid injections) of UCL injury is often unsuccessful, and surgery is required. Primary repair of the frayed UCL is usually not possible, necessitating reconstruction with tendon graft from the palmaris longus, plantaris or tensor fascia lata [5]. The ulna nerve is usually transferred anteriorly during the procedure to avoid injury. Postoperative recovery requires 12-18 months [5].

OSTEOCHONDRAL INJURIES AND CARTILAGE IMAGING

Osteochondral injury can complicate acute trauma to the elbow or arise from overuse in children and a significant proportion (8%) of adolescent athletes involved in throwing sports [6]. In adolescents, the condition is referred to as "little league elbow", or osteochondritis dissecans [7], and typically presents as a dull ache aggravated by throwing and ameliorated by rest. The mechanism is believed to be related to chronic severe valgus stress on the skeletally immature elbow, with chronic medial traction resulting in overgrowth of the medial epicondyle, and repetitive lateral impaction producing devascularization and ischemic necrosis of the capitellum. A similar condition, referred to as Panners disease, seen in males between the ages of 5 and 10 years is also typically associated with trauma, and probably represents the same process.

In both cases, conventional radiographs may demonstrate fragmentation and sclerosis of the capitellum, but only MRI has any significant potential for directly visualizing the associated cartilaginous injuries. MRI of articular cartilage in the elbow, as elsewhere, is limited by the tremendous demands on spatial resolution and poor contrast between cartilage and adjacent joint fluid and synovial tissue with conventional sequences. Continuous improvements in gradient hardware and coil design, along with the introduction of innovative pulse sequences, such as saturation transfer and fat-suppressed sequences, however, promise to bring this application of MRI out of its infancy in the very near future. Development of this unique capability will greatly expand the clinical utility of MRI and offer an intriguing new tool with which to study the pathophysiology of diseases that affect the cartilage.

Present recommendations include the use of T2-weighted *fast* spin-echo imaging for generating high in-plane resolution images with sufficient contrast between articular cartilage and adjacent joint fluid to delineate small focal defects. Submillimeter defects can be resolved with 3D gradient-echo imaging that combines high in-plane resolution (e.g. 256 x 256, or 512 x 384) with thin contiguous slices (0.7 mm). With this technique, high contrast can be generated between cartilage and joint fluid by adding pulsed magnetization transfer, which decreases the signal intensity of cartilage, to heavily T2*-weighted pulse parameters. Alternatively, high-resolution T1-weighted (e.g. high flip-angle spoiled GRASS) 3D gradient-echo sequences with fat saturation will depict articular cartilage as an isolated high signal-intensity band against adjacent low signal-intensity joint fluid and subchondral bone. However, these high-resolution sequences must be used with specialized imaging coils (e.g. quadrature design) to allow sufficient signal-to-noise ratio (to support the high spatial resolution) to be obtained within reasonable imaging times.

Conservative treatment is usually effective in early osteochondritis dissecans. However, in advanced disease with changes of secondary osteoarthritis, surgery is required to minimize incongruencies between the articulating capitellum and radial head [8]. Early removal of loose intraarticular fragments is important to limit the progression of joint deterioration. Loose bodies most commonly collect in the olecranon and coranoid fossae, and when calcified or ossific, are superbly depicted by conventional CT. However, even CT arthrography is insensitive to noncalcified, cartilaginous fragments in the articular space. Heavily T2-weighted or T2*-weighted MRI, can potentially visualize these cartilaginous loose bodies directly. However, small projections of intraarticular fat or synovial tissue can have an identical appearance, particularly with gradient-echo imaging, and obscure small loose bodies. Small osteophytic projections also mimic loose fragments on cross sectional imaging if not compulsively followed back to the parent bone and correlated in orthogonal planes.

BICEPS TENDON RUPTURE

Although rupture of the biceps tendon is one of the most common musculoskeletal injuries, only 3% of these involve the distal tendon [9]. Despite its rarity, the clinical presentation of distal biceps tendon rupture is so typical that the entity is well characterized [10]. This injury usually occurs in men aged 50 years or older, and is the result of forced flexion against strong resistance. Patients invariably experience an acute tearing sensation with a painful snap and subsequent weakness of flexion and supination. Physical examination reveals a characteristic "Popeye sign" as the torn tendon bunches up in the mid arm during flexion. Treatment is somewhat controversial. Initially, conservative therapy was advocated. However, this invariably results in residual weakness and disability, and unless the patient is old or debilitated, most now recommend surgical repair. Surgical attachment of the torn biceps tendon to the brachialis improves flexion, but not supination. Reinsertion onto the radial tuberosity improves flexion and supination, but requires two incisions and risks injury to the radial nerve.

On MRI, rupture of the distal biceps demonstrates discontinuity and retraction of the tendon, often with intervening hematoma [11], on sagittal images. Angled sagittal images are optimal for visualizing the tendon along its entire course. Axial images must extend beyond the radial insertion of the biceps. Cortical irregularity and marrow edema of the radial tuberosity is usually present. T2-weighted and STIR images may reveal associated intramuscular hemorrhage and edema in the brachialis, as well as other soft-tissue changes. Frequently, the radial tuberosity will show irregularity and hypertrophy (cause or effect?). Following surgery, MR signal intensity will return to normal only once healing is complete.

NERVE INJURIES

Injury to the nerves about the elbow frequently complicate fracture, dislocation and direct trauma. Traction, chronic friction or entrapment of nerves are common causes of neural symptoms in athletes. In most cases, the presence of perineural fat allows the course of the major nerves about the elbow to be delineated by MRI. Nevertheless, high-resolution sequences are necessary for optimal evaluation of cases with suspected neural injury.

Ulnar nerve: Most cases of compression of the ulnar nerve occur at the level of the elbow, where the nerve passes behind the medial epicondyle before entering the anterior compartment of the forearm several centimeters distal to the joint [12]. At this site the ulnar nerve is contained within a fat-filled compartment bound by an aponeurotic arch between the two heads of the flexor carpi ulnaris and the medial capsule (UCL) of the elbow, and is easily delineated on T1-weighted images. Nerve compression in this cubital tunnel can result from bony overgrowth of the medial epicondyle, hypertrophy of the flexor carpi ulnaris, or the presence of a space-occupying lesion, such as a ganglion cyst, hematoma or anomalous anconeus muscle (anconeus epitrochlaris). The simplest form of ulnar nerve injury, sometimes termed "sleep palsy", results from traction on the nerve due to prolonged elbow flexion during sleep. This neuropraxia usually resolves in a few minutes. More severe ulnar nerve injury is common in athletes with trauma to the UCL or medial tendonitis. Both motor (primarily intrinsic muscle weakness in the hand) and sensory deficit (5th finger and medial half of 4th finger) can be demonstrated in patients with injury of the ulnar nerve. Recurrent ulnar nerve subluxation occurs in up to 16% of throwing athletes [2], but is generally asymptomatic unless associated with trauma.

Mild neuropraxia resolves spontaneously, but persistent symptoms usually require surgical decompression of the cubital tunnel or transposition of the nerve. In the immediate postoperative patient, local edema and hemorrhage will often produce transient paresthesias in the distribution of the ulnar nerve, but chronic entrapment by postsurgical fibrosis can occasionally be seen.

Radial Nerve: The radial nerve is vulnerable to compression injury from the lateral margin of the triceps to the distal forearm. At the level of the elbow, the radial nerve courses anteriorly over the lateral epicondyle along the margin of the brachialis just medial to the brachioradialis, and divides into deep and superficial branches near the upper margin of the supinator. The superficial branch lies anterior to the extensor carpi radialis longus, while the deep branch runs dorsally through the supinator or between the supinator and extensor digitorum. This purely motor posterior interosseus branch can become compressed at the level of the supinator (supinator syndrome) [12], and result in insidious motor paralysis of the extensor muscles. Supinator syndrome can mimic lateral epicondylitis clinically and should be considered in cases of "tennis elbow" that do not respond normally to therapy.

Median Nerve: The median nerve courses adjacent to the brachial artery in the medial aspect of the upper arm between the brachialis muscle and biceps tendon. At the elbow, it passes deep to the pronator teres to run between the flexor digitorum superficialis and profundus in the forearm. Compression of the median nerve at the level of the pronator teres occasionally develops from repetitive lifting (pronator teres syndrome [13]), and can mimic carpal tunnel syndrome, in which the nerve is compressed at the wrist. Direct pressure on the nerve from a lover´s head, for example ("honeymooner´s palsy"), or from the edge of a guitar can result in a transient neuropraxia.

FRACTURES

In the elbow, as elsewhere in the skeleton, MRI is excellent at depicting osseous trauma, especially undisplaced fractures and bone contusions that are occult on plain radiographs and CT. The MRI appearance of bone injury is dominated by edema and hemorrhage in the marrow space, and is most conspicuous on STIR sequences and T2-weighted *fast* spin-echo images with fat suppression. Inherent insensitivity of T2*-weighted sequences to marrow pathology must be kept in mind when using gradient-echo imaging.

Supracondylar and Epicondylar Fractures: Approximately 80% of distal humeral fractures occur in children [14]. The most common mechanism of injury is hyperextension of the elbow during a fall on the outstretched arm. Displacement of the fracture can damage local neurovascular structures and produce the dreaded Volkmann´s ischemic contracture. Undisplaced fractures can be occult on plain radiographs, and evidenced only indirectly by the displacement of anterior and posterior fat pads indicative of joint effusion. In these cases, MRI allows direct inspection of the bones for occult fracture, while also delineating associated soft-tissue injuries that may otherwise be overshadowed by the fracture.

Avulsion of the medial epicondyle is extremely uncommon after fusion of the growth plate, but is a frequent injury among adolescent pitchers [15]. The medial epicondyle is especially vulnerable to injury from throwing sports between the ages of 9 and 14 [6,15]. Throwing curve balls in particular places extra stress on the medial epicondyle. Severely displaced fracture of the medial epicondyle also occasionally complicates posterior dislocation of the skeletally immature elbow, and entrapment of the fracture fragment in the joint may be seen following reduction. Fracture of the lateral epicondyle, in contrast, is exceedingly rare. MRI can depict the full spectrum of injury to the medial epicondyle, and is unique in its capability to image the nonossified portion. Complete separation or step deformity of the epicondyle is indicative of fracture. Linear low signal intensity or areas of increased signal intensity in the cartilage on T2-weighted spin-echo or long-TE T2*-weighted gradient-echo images is also consistent with significant injury; however, it must be remembered that a band of low signal intensity can normally be seen at the interface between articular and growth cartilage in the skeletally immature joint.

Radial Head Fracture: At least 1/3 of elbow fractures involve the radial head [16]. These usually result from a fall on the outstretched arm and impaction of the radial head on the capitellum. Accordingly, associated capitellar injury may also be seen. Undisplaced (<2 mm: Type I) and mildly displaced (<3 mm, <30° angulation) marginal fractures involving no more than 1/3 of the radial head (Type II) are generally treated conservatively, while open reduction and internal fixation or complete excision is required for more extensive or comminuted fractures (Type III). Type IV fractures are associated with dislocation of the ulnohumeral joint, and have a high incidence of myositis ossificans. Type I fractures are notoriously occult on plain radiography, but clearly discernible with MRI. As for other osseous injuries, STIR is extremely sensitive, but T2-weighted *fast* spin echo with fat saturation provides additional scope for high resolution, and is more likely to delineate the actual fracture line. Although 3D gradient-echo sequences can provide images with the smallest voxels and therefore greatest spatial resolution, because of the magnetic susceptibility effects in cancellous bone, marrow edema and hemorrhage may be obscured by this technique. Associated capitellar injuries can also be detected with great sensitivity by

MRI.

Coranoid Fracture: Coranoid fractures complicate up to 10% of posterior dislocations of the ulnohumeral joint and can lead to recurrent dislocation [17]. These fractures are often occult on routine radiography, but well depicted on MRI. MRI is also useful for demonstrating associated injury to the anterior UCL, epicondyles or radial head, as well as entrapment of the brachial artery or median nerve that can occur following reduction [18]. Posterior dislocation in adolescents can be complicated by avulsion of the medial epicondyle and entrapment of the fragment in the joint.

ELBOW BURSAE

Numerous bursae are present about the elbow. The olecranon bursa is the largest and lies in the subcutaneous tissue over the olecranon process. Intratendinous and subtendinous bursae are also often present within and deep to the triceps tendon. A small bursa can be found adjacent to the ulnar nerve in the cubital tunnel behind the medial epicondyle, and adjacent to the radial nerve in front of the lateral epicondyle. Superficial medial and lateral epicondylar bursae are also situated over the common flexor and extensor tendon insertions. A small bursa lies next to the distal biceps tendon and adjacent to the radius. This is known as the distal bicipital radial bursa. When inflammed, it can fill with fluid and present as an antecubital mass. Inflammation and distention of any of these bursae can be a cause of pain in the elbow; however, the importance of recognizing them on MRI rests primarily in not mistaking them from tendinous, ligamentous or neural pathology.

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