MRI, Arthroscopy, and Histologic Observations of an Annular Ligament Causing Painful Snapping of the Elbow Joint

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napping of the elbow joint is a pathologic condition in which an interposed or impinged tissue in the elbow joint clicks when the elbow is flexed and extended. The causes of snapping elbow have been attributed to intraarticular loose bodies, instability, synovial plicae [1], and a torn or loose annular ligament [2]. Diagnosis and monitoring of treatment regimens is most commonly done using arthroscopy [1].

The noninvasive nature and internal resolution power of MRI make it an attractive technology to evaluate internal derangements of joints. However, no reports to our knowledge have shown the value and usefulness of MRI in identifying the causes and interposed tissues for snapping elbow. We report a case of painful snapping of the elbow joint caused by a torn or loose annular ligament. MRI clearly showed the interposed tissue of a loose annular ligament in the radiocapitellar joint. The MRI findings correlated well with arthroscopic and histologic data.

Case Report
A 21-year-old man came to our orthopedic surgery outpatient clinic for relief of pain and a snapping sensation in the lateral aspect of his right elbow. He reported that he first became aware of the clicking sound in the right elbow during flexion and extension some years previously, when he was in junior high school. The snapping sensation had persisted over the intervening years. Two years before his admission, he began to experience pain in the lateral aspect of the right elbow. The patient then visited the local medical clinic for help. Lateral epicondylitis was diagnosed. The pain persisted and was not relieved by regular oral doses of nonsteroidal antiinflammatory drugs. Although he had played baseball occasionally and recreationally since elementary school, the patient was not a pitcher or a participant in an organized league. This activity had ceased since the development of the lateral elbow pain.

The patient was right-handed. No history of trauma to the right elbow was reported. Physical examination confirmed a snapping sound in the right elbow that occurred when the elbow was in pronation and passively flexed 110°. The snapping reoccurred when the pronated elbow was passively extended to 70°. No instability or limitation of the range of motion of the right elbow joint was present. Mild tenderness without redness or swelling of the lateral aspect of the right elbow was present. Anteroposterior and lateral radiographs of the right elbow were normal. MRI examination showed a meniscuslike tissue of low signal intensity outlined by a small effusion of high signal intensity in the anterolateral aspect of the radiocapitellar joint and interposed between the radial head and capitellum on T2-weighted coronal (Fig. 1A) and sagittal (Fig. 1B) images. The meniscuslike tissue, which was attached to the capsule at its periphery, showed a region of high signal intensity considered to be myxoid change within the tissue substance. The interposed meniscuslike tissue was like a thickened synovial fold. A slightly wavy ligamentlike tissue of low signal intensity was present around the anterolateral aspect of the radiocapitellar joint (Figs. 1A and 1B). This tissue was positioned close to the capsule and the outer margin of the interposed meniscuslike tissue.

At the time of the MRI examination, a torn or loose annular ligament was thought to be present. In addition, on T2-weighted MRI, a kissing lesion of radiocapitellar cartilage was identified. The lesion displayed chondral defects of the radial head and capitellum, with a narrow edema of the radial head and mild sclerosis of the capitellar subchondral bone (Figs. 1A and 1B). The interposed meniscuslike tissue was not conspicuously shown on T1-weighted MRI (images not shown).
Arthroscopy was performed from the postero-lateral approach. The examination showed a white, hard meniscuslike band (Figs. 1C and 1D) attached to the capsule. The band was located in the anterolateral aspect of the radio-capitellar joint and was interposed between the radial head and capitellum.

At surgery, intraoperative physical examination of the right elbow joint verified that the snapping originated from the interposed tissue slipping out of the radio-capitellar joint when the elbow was passively flexed to 110° and when the interposed tissue fell into the radio-capitellar joint when the elbow was passively extended to 70°. The interposed meniscuslike tissue was excised. The associated erosions and defects of the cartilage of the radial head and capitellum were found and shaved. No intraarticular bodies were found. Histologic examination of the removed tissue showed a ligamentous tissue containing oriented collagen fibers.
and focal regions of myxoid change (Figs. 1E and 1F). No fibrocartilage or chondroid component was present within the removed tissue. No synovial layer on the surface of the removed tissue was found. Based on the MRI findings, arthroscopy, and histology, the interposed meniscus-like tissue in the radiocapitellar joint was thought to be a torn or loose annular ligament.

After surgery, the snapping sensation of the right elbow joint immediately disappeared, and the lateral elbow pain was improved at an 8-month follow-up examination.

Discussion

Snapping of the elbow joint can be painful, inconvenient, and persistent. The condition more commonly occurs laterally than medially [1, 2]. Painful lateral elbow caused by elbow snapping can be misdiagnosed as lateral epicondylitis or tennis elbow, since many clinicians are not familiar with this pathologic condition [1].

Snapping of the elbow joint has been attributed to the interposition of a lateral synovial fold [1] and a torn or loose annular ligament in the radio-capitellar joint [2]. The fold is a remnant of embryonic septa, similar to that in the knee joint. Chronic impingement and irritation of the interposed tissue during elbow motion leads to inflammation, fibrosis, degeneration, and hardening of the synovial fold and the annular ligament, which is a prelude to the snapping and pain that occurs on flexion and extension [3].

Lateral snapping of the elbow is thought to arise from a torn or loose annular ligament, as initially documented in one case by Wrightman [4]. In that case, a torn annular ligament displaced in the radiocapitellar joint, causing a visible click in the lateral part of the elbow. The author observed that when the elbow extended, tightening of the anterior capsule tend to pull the annular ligament proximally, and this caused the separated band to slip over and cover the radial head. When the elbow flexed, the separated band slipped distally and uncovered the radial head. In our case, intraoperative examination confirmed that the snapping arose from slippage of the ligamentous band out of the radial head at elbow flexion and from the ligamentous band slipping over the radial head at extension.

Imaging evaluation used to establish the causes of snapping elbow has been thought to be of limited value [1, 2]. The use of MRI in this regard has not been widely considered [1, 2]. In one report [1], MRI performed on six patients with synovial plicae causing painful snapping elbow was interpreted as normal in five patients and showed mild edema of the annular ligament in one patient. Another report [2] documented two patients with snapping annular ligament of the elbow joint in which MRI showed no abnormal findings in one case and only slight effusion in the other case. The underestimation of MRI in demonstrating the snapping tissue may have been due to inadequate joint effusion outlining the snapping tissue in the radiocapitellar joint. In addition, unfamiliarity with this clinical entity may have led the radiologists to misdiagnose the nature of the images. In this patient, the snapping annular ligament over the radial head delineated by joint effusion was clearly identified on T2-weighted coronal and sagittal images. MRI arthrography would be helpful for patients with no obvious effusion in the elbow joint. Associated chondral lesions of the radial head and capitellum may occur and have been described in patients with snapping synovial fold [1]. T2-weighted MRI identified the chondral defects and bone marrow abnormalities of the radial head and capitellum.

In conclusion, a torn or loose annular ligament as a cause of painful snapping of the lateral elbow joint has been described. Familiarity with this entity may obviate the misdiagnosis in patients with lateral elbow pain. In our experience, MRI with T2-weighted sequence or MRI arthrography is useful in identifying the snapping annular ligament and other interposed tissue in the elbow joint.

References

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