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An effective approach to diagnosis and surgical repair of refractory medial epicondylitis

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Background: Medial epicondylitis of the elbow, an overuse injury characterized by angiofibroblastic tendinosis of the common flexor-pronator origin, generally responds to nonoperative treatment. Refractory cases may require surgical débridement and repair. This study discusses physical examination and imaging findings and an updated surgical technique used in patients with recalcitrant medial epicondylitis.

Methods: The surgical records of 60 patients with refractory medial epicondylitis were reviewed. All received a course of nonoperative care. After 3 to 6 months of failed therapy, imaging was obtained, and surgical intervention was offered when indicated. This open procedure consisted of thorough débridement with repair and restoration of the flexor-pronator origin, using a suture anchor. Accelerated rehabilitation, emphasizing early motion, was used. One-year follow-ups were obtained. The Mayo Elbow Performance Score was calculated preoperatively and postoperatively.

Results: Pronation weakness at 90° was a critical physical examination finding. Preoperative magnetic resonance images demonstrated pathologic partial tearing at the flexor-pronator origin. Ulnar neuritis was addressed in 20%. Postoperatively, the Mayo Elbow Performance Score significantly increased (preoperatively, 58 ± 7.7; postoperatively, 88 ± 7.8; $P = 5.6E-34$), and pain significantly decreased (preoperatively, 2.2 ± 0.3; postoperatively, 0.6 ± 0.5; $P = 3.8E-33$). There was one retear in a patient noncompliant with the postoperative protocol. He responded positively to reoperation.

Conclusion: Identification of weakness on pronation is a reliable physical examination finding for determining clinically significant pathologic changes in patients with medial epicondylitis. Débridement with restoration of the flexor-pronator origin is an efficacious procedure. In this large series of patients, surgical repair with aggressive rehabilitation was shown to be reliable and safe in restoring function and relieving pain in recalcitrant cases of medial epicondylitis.

Level of evidence: Level IV, Case Series, Treatment Study.

Keywords: Medial epicondylitis; golfer's elbow; flexor-pronator tear; surgical repair; tendinosis; sports injury

Medial epicondylitis of the elbow is less commonly encountered than lateral disease, with a relative incidence of 9.8% to 20%.[2,4,6,7,17] However, with the continuation of sports and active use of the elbow in the aging population, it is being diagnosed with increasing frequency.[3,4,7] The

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underlying etiology of medial epicondylitis is described as an angiofibroblastic tendinosis of the common flexor-pronator origin.[14] It has also been characterized as a microtearing in the origin of the flexor mass.[19] Specifically, the confluence of the flexor carpi radialis and pronator teres is frequently the common site of injury.[2,9] Pain, therefore, is usually exhibited with flexion of the wrist and fingers and pronation of the forearm.[3] The injury may progress to subsequent attritional partial tearing in the later stages and, in extreme cases, complete disruption of the superior flexor-pronator origin.[9] This has been demonstrated on magnetic resonance imaging (MRI).[8,20]

Medial epicondylitis is primarily a condition of the middle aged.[2,7,19] Most injuries are degenerative in nature; in select cases, an acute trauma may precipitate symptoms.[3] Certain sports and activities have been associated with the development of medial epicondylitis.[19] The golf swing is noted to exert significant tension across the medial aspect of the elbow.[4] Other activities involving repetitive use have also been implicated. These may include tennis, swimming, weightlifting, and work-related activities.[2,3]

Treatment of medial epicondylitis is initially with nonoperative modalities. These include activity modification, supervised physical therapy, acupuncture, and oral analgesics and anti-inflammatories. Corticosteroid injections are often used with limited success.[11,18] A more recent intervention, platelet-rich plasma, has been shown to be a treatment modality without significant adverse effects. It has been shown to have various clinical applications. Of note, in chronic epicondylar pain, platelet-rich plasma injections showed remarkable improvement in pain after therapy. Whereas this modality shows promise, more extensive studies will be necessary to properly validate its use.[12,16] Conservative treatment has been shown to relieve pain in 88% to 96% of cases[5]; however, this may be dependent on the stage of presentation. Surgical intervention is indicated for refractory symptoms, typically after at least 6 months of nonoperative care. Several surgical interventions have been proposed to address the pathologic process. These may encompass open procedures, percutaneous release, and arthroscopic repair of the common flexor tendon.[1,21]

Concomitant ulnar nerve issues may be present; 20% to 24% of refractory cases of medial epicondylitis have been cited as requiring a concomitant ulnar nerve release.[19]

For the past decade, we have been addressing refractory medial epicondylitis as a surgical lesion involving a discrete degenerative tear, typically located at the flexor carpi radialis/pronator teres origin. We have identified critical physical examination components that are correlated with significant pathologic changes. In addition, MRI has been used to reliably demonstrate and confirm these findings. The purpose of this study was to identify critical physical examination findings and imaging data as well as to describe surgical technique for evaluation and treatment of refractory medial epicondylitis.

Materials and methods

Study participants

A review was carried out on the records of 60 patients who underwent surgery for the treatment of refractory medial epicondylitis between 2008 and 2013. The average age was 52.5 years; 73% of the patients were male. Average duration of symptoms was 144.2 weeks from onset until surgery. The most common mechanism of injury involved participation in golf, which represented 33% of cases. This was followed by tennis, weightlifting, and construction-type activities. In 20% of patients, a concomitant ulnar nerve release was required. The decision to perform ulnar nerve release was based solely on the clinical presentation of cubital tunnel pain and ulnar neuritis; electromyography and nerve conduction studies were not indicated. This was typically performed either in situ or as a subcutaneous transposition, depending on nerve stability. Refer to Table I for a summary of the characteristics of the patients. All patients had undergone a supervised nonoperative course of treatment. The majority of patients received 1 to 3 corticosteroid injections during this time. One patient had received 8 steroid injections. Inclusion criteria consisted of the diagnosis of medial epicondylitis, without underlying instability, arthritis, or prior surgical procedures. Coexisting ulnar neuritis was not exclusionary. One patient was excluded because of multiple surgeries to the same elbow.

The diagnosis was made on a clinical basis. On physical examination, the patient typically demonstrated full range of motion without significant restriction. Tenderness to palpation can generally be isolated to a location just distal to the apex of the superior medial epicondyle, corresponding to the flexor carpi radialis/pronator origin. Pronation strength is measured on a side-to-side basis with the elbows flexed at 90°. Approximately 20 pounds of resistance is used. During preoperative assessment, partial tears of the flexor-pronator origin often result in significant weakness on testing for pronator strength. Wrist and finger flexion testing was less reliable.

After 3 to 6 months of symptoms unresponsive to nonoperative care, MRI was obtained. Standard sequences of axial, coronal, and sagittal images were employed. Typical findings included a substantial defect on water gradient coronal images consistent with partial tearing of the flexor-pronator origin (Fig. 1). No medial collateral ligament injuries were encountered. Concomitant findings were minimal.

Surgical technique

Symptomatic patients were offered surgical treatment. The average duration of time from onset of symptoms to surgery was >2 years. This may reflect a tertiary referral practice. All procedures were performed by the senior author (G.R.). The surgical procedure consisted of an open resection, with repair of the pathologic flexor-pronator origin. The incision was carried out posterior to the medial epicondyle and was typically 5 to 6 cm in length. Care was taken to avoid injury to the medial antebrachial cutaneous nerve. Soft tissues were swept superiorly, and the flexor-pronator origin was exposed (Fig. 2, *A*). The partially torn tissue was typically located at the confluence of the flexor carpi radialis/pronator teres interval. There is often a vertical septum in this area, which was resected.[6] Approximately 30% of cases