Evaluating concomitant lateral epicondylitis and cervical radiculopathy

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This article describes a study of the prevalence of lateral epicondylitis or tennis elbow among patients with neck or arm pain, reviews the prevalence of concomitant cervical radiculopathy, and proposes a management plan for cases in which the conditions coincide.

Lateral epicondylitis, or tennis elbow, is an overuse injury to the common extensor tendon that presents as pain at the lateral epicondyle. C6 and C7 radiculopathy may cause referral of pain down the arm near the lateral epicondyle.

In earlier studies, elbow symptoms resolved in patients with recalcitrant lateral epicondylitis who were treated for cervical radiculopathy. To further understand the connection between C6 and C7 radiculopathy and lateral epicondylitis, we conducted our own study. In this article, we describe our study, the results, our conclusions, and treatment recommendations.

Background

A diagnosis of lateral epicondylitis, described as a condition causing pain in the lateral elbow of tennis players, was first made in 1883. This injury occurs most frequently in the extensor carpi radialis brevis (ECRB) tendon (Figure). The degree of injury may vary from a slight disruption of collagen fibers to a partial or full tear of the ECRB and its attachment to the lateral epicondyle.1-3 Patients with lateral epicondylitis present with pain at the lateral aspect of the elbow that often radiates down the forearm. Weakness in grip and arm strength often is reported. Tenderness is present with palpation of the lateral epicondyle over the extensor mass. The onset of symptoms often is gradual, but it may be related to a specific injury.4 Lateral epicondylitis may be managed nonsurgically or surgically. Nonsurgical treatment has a success rate of up to 90%.5 Operative treatment is indicated if extensive conservative care has not been successful or pain inhibits performance of activities of daily living. Surgical techniques include open surgery; arthroscopic lateral release; and percutaneous treatment to debride gray, friable, angiofibrotic tissue.5-7 Lateral epicondylitis may present concomitantly with cervical radiculopathy, which may radiate pain...
into the shoulders and down into the hands.\(^8\) Radiculopathy that occurs at the C6 or C7 level or both may cause referral of pain into the lateral elbow area.\(^1\)\(^-\)\(^3\)\(^,\)\(^9\)\(^-\)\(^13\) The radial wrist extensors are innervated by the C6 myotome, and the lateral epicondyle is in the C7 sclerotome.\(^14\) Gunn and Milbrandt\(^10\) investigated the effects of treatment directed to the cervical spine on 50 patients with lateral epicondylitis whose symptoms did not improve after 4 weeks of elbow treatment. Cervical spine treatment included 1 or more of the following: cervical traction, mobilization, isometric cervical exercises, and ultrasonography and heat. In an average of 5.25 weeks of cervical treatment, 43 patients (86%) experienced good or satisfactory relief of the elbow symptoms.

Our study examined the prevalence of lateral epicondylitis in patients who had a diagnosis of cervical radiculopathy after initially presenting with upper extremity or neck symptoms. Weakness and dysfunction of finger and forearm extensor muscles result from cervical radiculopathy, in particular C6 and C7 radiculopathy.\(^15\) The weakness in the extensor muscles may allow for easy onset of lateral epicondylitis. The pain and symptoms resulting from lateral epicondylitis could then contribute to arm symptoms.

Diagnoses of lateral epicondylitis and cervical radiculopathy as the cause of the symptoms may be made separately, delaying the dual treatment needed for timely and maximal recovery. Awareness of a high incidence rate of concomitant lateral epicondylitis and cervical radiculopathy could help physicians manage resistant cases of lateral epicondylitis and serve as a red flag for identifying underlying cervical radiculopathy. In conducting our study, we predicted a high incidence of lateral epicondylitis presenting with cervical radiculopathy.

**Methodology**

A total of 102 patients were evaluated and treated at the office of a physician board-certified in physical medicine and rehabilitation and neuromuscular and electrodiagnostic medicine. Patients had been referred with complaints of neck pain and upper extremity weakness, numbness, tingling, and pain.

All study participants had a diagnosis of cervical radiculopathy. This diagnosis was based on symptoms, abnormal neurological findings during physical examination, cervical MRI, and electromyography and nerve conduction studies (EMG/NCS).\(^9\)\(^,\)\(^16\) All but 6 of the patients had closed MRI above 1.5 tesla. EMG/NCS confirmed the diagnosis of cervical radiculopathy in 72% of patients. The remaining 28% did not undergo EMG testing, but MRI and physical examination were conclusive of a radiculopathy. The patients were selected with no bias of diagnosis and were a sample of convenience.

We examined patient charts from February 2008 through June 2009 and documented the level of cervical radiculopathy and whether the patient had a diagnosis of lateral epicondylitis. The patient's sex and age were noted, along with whether the presentation of lateral epicondylitis was bilateral or 1-sided. The diagnosis of lateral epicondylitis was reached by documenting tenderness to palpation at the common extensor tendon 1 cm distal to the lateral epicondyle while the patient's elbow was flexed at 90° with the forearm supinated. Pain radiating down the forearm with straightening or lifting of the arm, gripping of an object, or making a fist also contributed to the diagnosis.\(^16\)

**Results**

The prevalence of bilateral or unilateral epicondylitis by sex and age-group is shown in Tables 1 and 2. Of the 102 patients studied, 68 (66.7%) had a diagnosis of lateral epicondylitis; bilateral epicondylitis occurred in 56 of the 68 patients (82.4%), and 1-sided lateral epicondylitis occurred in 12 patients (17.6%). Cervical MRI scans of the 68 patients with a diagnosis of lateral epicondylitis revealed cervical disk...
displacements and foraminal or central narrowing or stenosis localized to the C5-6 or C6-7 region. Seven patients (10.3%) had only abnormal C5-6 MRI findings consistent with C6 radiculopathy; 5 patients with lateral epicondylitis (7.3%) had only abnormal C6-7 cervical MRI findings and an overall presentation consistent with C7 radiculopathy. The remaining 56 patients (82.4%) had abnormal C5-6 and C6-7 cervical MRI findings and an overall presentation consistent with C6 and C7 radiculopathy. Seventy-two percent of patients did undergo EMG/NCS, which confirmed the diagnosis of C6 or C7 radiculopathy or both and ruled out radial nerve entrapments.

**Discussion**

The study results indicate that lateral epicondylitis is common in patients who have a diagnosis of C6 or C7 radiculopathy or both, presenting in slightly fewer than 70% of cases. Bilateral epicondylitis presented much more frequently in our study than did 1-sided epicondylitis. Women presented with lateral epicondylitis at a rate 15% higher than men. Lateral epicondylitis presented somewhat evenly throughout all age ranges in the women. The men had the highest percentage of lateral epicondylitis in the 20- to 39-year age range. This latter finding could be correlated with occupational hazards of work that men often perform or by chance of sample. The statement that patients with cervical radiculopathy at the C6 and C7 levels present with elbow and forearm pain or symptoms is consistent with the findings in our study.\(^1\,^3\,^11\,^13\) All patients in our study presented initially with upper extremity or neck symptoms or both and then received a diagnosis of cervical radiculopathy. A previous study documented that when patients with underlying cervical radiculopathy receive a diagnosis of lateral epicondylitis alone and are treated only for lateral epicondylitis, their symptoms do not resolve.\(^10\) Gunn and Milbrandt\(^10\) reported on such patients in their study. Gunn stated, “conditions of the tennis elbow were related to the cervical spine; therefore, when treatment to the elbow failed, neck treatment was tried— with good results. It is probable that in many patients some degree of cervical degeneration preceded the elbow condition.”

We propose a mechanism that explains coexisting C6 and C7 radiculopathy and lateral epicondylitis. C6 and C7 radiculopathy results in weakness and dysfunction of the wrist and finger extensor muscles, in particular the ECRB muscle, which is innervated by C6 and C7 nerve roots. Overuse injury to the ECRB tendon occurs more frequently with everyday activities when it is weakened by the C6 and C7 radiculopathy. The C6 and C7 radiculopathy also may cause weakness of multiple wrist and finger extensor muscles, resulting in an imbalance of the wrist and finger extensor and flexor muscles during any functional use. This weakness and imbalance might trigger injury to the ECRB tendon and initiate lateral epicondylitis.\(^15\)

From the clinical perspective, proper diagnosis of both the lateral epicondylitis and the cervical radiculopathy when they present together is important. Clinicians should check for lateral epicondylitis whenever they examine patients with cervical radiculopathy. Management of the lateral epicondylitis should be incorporated into the management program for coexisting cervical radiculopathy for resolution of all symptoms. A plan such as this addresses the source of the presenting arm symptoms by managing the cervical radiculopathy and the actual injury near the lateral epicondyle. With management of the cervical radiculopathy and the lateral epicondylitis, optimal and timely recovery from symptoms may be achieved. For more on treatment, see the Box, “Cervical radiculopathy and lateral epicondylitis treatment objectives.”
Whenever a patient receives a diagnosis of lateral epicondylitis, an underlying cervical radiculopathy should be ruled out before treatment is started. Clinicians should seek a history of any neck, arm, forearm, or hand pain; numbness; and weakness. To check for cervical radiculopathy, they should include in the physical examination a thorough neurological examination of muscle strength or weakness, sensory loss, and abnormal reflexes. If lateral epicondylitis does not respond to the traditional treatment regimens, reevaluation for cervical radiculopathy is recommended before surgical treatment is considered. Closed MRI with at least 1.5 tesla is the best imaging test for documenting a potential cause of cervical pathology. However, studies have shown the rate of false-positive results of cervical MRI to be as high as 19%.

Needle EMG testing of sufficient muscles to reveal the specific pattern of abnormal findings described for radiculopathy has the highest specificity and is considered diagnostic for cervical radiculopathy. In our study, 28% of the patients did not undergo EMG testing for cervical radiculopathy. A combination of cervical MRI to verify the cervical pathology and EMG testing for confirmation is optimal in the diagnosis of the cervical radiculopathy.

Conclusions
The high incidence of lateral epicondylitis in patients with cervical radiculopathy suggests a correlation between C6 and C7 radiculopathy and the onset of lateral epicondylitis. Future studies may include a study similar to this on a much larger scale or one similar to Gunn’s that uses a larger patient sample and tracks patient symptoms for an extended period after cervical treatments. Additional studies that examine the relationship of cervical radiculopathy with shoulder and other elbow tendinitis and bursitis are recommended.

References:

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