

SHOULDER IMPINGEMENT PRESENTING AS NECK PAIN

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Background: Chronic neck pain can be a difficult problem to evaluate and treat, as it can have several different causes. We studied a series of patients with neck pain near the superomedial aspect of the scapula that was referred pain from inflammation of the shoulder secondary to chronic impingement. We postulate that some patients with specific clinical findings and neck pain can benefit from treatment of shoulder impingement.

Methods: We conducted a retrospective review of the charts of thirty-four patients with neck pain who met three criteria for the diagnosis of shoulder impingement syndrome: (1) a positive impingement sign with pain referred to the neck, (2) radiographic abnormalities, and (3) relief of neck pain after injection of lidocaine and cortisone into the subacromial space. Subjective pain scores were determined before and after the injection.

Results: Thirty of the thirty-four patients obtained immediate relief of the neck pain following injection into the subacromial space, and the remaining four had substantial pain relief when they were evaluated three weeks following the injection. Avoidance of the shoulder impingement position (forward elevation of the arm above 90°) subsequently minimized recurrences.

Conclusions: In selected patients, chronic neck pain may be caused by shoulder impingement, which can be easily diagnosed with standard techniques. The difficulty in making this diagnosis is that the patient presents with neck pain rather than with the typical shoulder pain. The differential diagnosis of chronic lower neck pain should include shoulder impingement syndrome, which can be identified by classic physical and radiographic signs and can be treated with injection into the subacromial space and avoidance of the shoulder impingement position.

Level of Evidence: Diagnostic study, Level IV-2 (poor reference standard). See Instructions to Authors for a complete description of levels of evidence.

Neck pain is very common and the cost in human and economic terms is enormous¹. It has many causes, and it is often difficult to make an exact diagnosis². The term “neck pain” is commonly used to describe pain in the region between the occiput and the upper back. Precise diagnosis may be challenging because neck and shoulder pain may coexist and overlap. Few studies have actually defined neck pain^{3,4}. Most cases are acute and resolve quickly, but some become chronic. Traumatic and degenerative conditions of the cervical spine, such as sprains and arthritis, are the major causes of neck pain⁵.

This report describes chronic neck pain that was a referred pain syndrome originating in the shoulder. Patients with this disorder present with pain in and around the origin of the supraspinatus muscle that is localized to the superomedial part of the scapula, at the junction of the base of the neck and the upper back.

In 1934, Codman described bursitis of the shoulder as an inflammation of the rotator cuff causing shoulder pain⁶. Watson-Jones, and then Neer, further delineated this condi-

tion as the “impingement syndrome.”^{7,8} Neer theorized that the supraspinatus tendon of the rotator cuff and the subacromial bursa are compressed and inflamed by the anterior aspect of the acromion and by the coracoacromial ligament when the arm is elevated overhead. Neer’s impingement sign and impingement test are the standard tests for diagnosing impingement syndrome^{8,9}. Codman and others have described the abnormal radiographic findings^{6,9-13}. We utilized a variation of Neer’s impingement sign and impingement test and the abnormal radiographic findings described by Codman to diagnose shoulder impingement in a group of patients presenting with neck pain.

Materials and Methods

Data on thirty-four patients presenting with neck pain in the area of the superomedial border of the scapula were acquired over a six-year period in the setting of an adult orthopaedic practice. The history, findings on physical examination, test results, and radiographs were available for review for all thirty-four patients. During this same six-year period, 630

patients with neck pain and 342 patients with shoulder pain were evaluated.

Patients reporting neck pain in the area of the superomedial border of the scapula were tested for a positive "referred" shoulder impingement sign in the following manner. The arm was moved through forward elevation to the full overhead position, both actively and passively, with the hand pronated. The patient was asked if pain was present in the shoulder or neck with the arm in the full overhead position. If the patient reported no pain in the shoulder, he or she was deemed to have a negative shoulder impingement sign⁹. If pain in the neck was reported, the patient was deemed to have a positive "referred" shoulder impingement sign. The test was performed bilaterally, with both active and passive forward elevation of the shoulder up to 180°.

Patients who reported shoulder pain with forward elevation of the arm above 90°, a positive impingement sign, were excluded from this study. The only difference between the shoulder impingement sign and the "referred" shoulder impingement sign was whether the symptoms occurred in the shoulder or in the neck.

Radiographs of the shoulder were obtained for all thirty-four patients. The radiographic findings of impingement included trabecular atrophy (pseudocyst formation) under the greater tuberosity of the humeral head and sclerosis of the undersurface of the acromion (sourcil sign) and/or the cortex of the greater tuberosity.

If the referred shoulder impingement sign was positive for neck pain and there were abnormal radiographic findings in the shoulder, 4 mL of lidocaine (2% plain) with 1 mL of methylprednisolone (40 mg/mL) was injected into the subacromial space of the shoulder through a posterior portal. This portal is identified by palpation of a "soft spot," 1 cm inferior and 1 cm medial to the posterolateral corner of the acromion. After five minutes, the patient was again tested for the referred shoulder impingement sign, with exactly the same range of motion as had previously caused the pain, to determine if there was relief of the neck pain. If the neck pain was relieved after the injection into the subacromial space, the referred shoulder impingement test was considered positive. If there was no relief initially or by three weeks, the referred shoulder impingement test was considered negative, a second injection was not given, and other causes of neck pain were pursued. Patients fulfilling the diagnostic triad of (1) a positive referred shoulder impingement sign, (2) abnormal radiographic findings, and (3) a positive referred shoulder impingement test were included in this study. Subjective pain ratings on a scale of 1 to 10 points (no pain) were obtained before and five minutes after each injection. This evaluation was repeated at each visit. Progressive subjective improvement three weeks after each of three injections was considered confirmation of the initial diagnosis.

Results

The charts and radiographs of thirty-four patients with the diagnostic triad of a positive impingement sign, radio-

graphic abnormalities, and relief after injection were reviewed. There were twenty-seven women and seven men. Their ages ranged from eighteen to fifty-eight years, with a mean age of thirty-three years. The duration of symptoms ranged from three months to ten years, with a mean of five years. Mild to moderate limitation of neck motion was usually present. No patient presented with shoulder pain, and all denied having shoulder pain on direct questioning. Seventy-one percent (twenty-four) of the thirty-four patients reported the onset of symptoms after a motor-vehicle accident.

Radiographically, the most common finding (seen in 94% [thirty-two] of the thirty-four patients) was a pseudocyst in the proximal part of the humerus, which ranged in diameter from 4 to 15 mm. The other two patients had a positive sourcil sign¹³ and irregularity and sclerosis of the greater tuberosity.

Eighty-eight percent (thirty) of the thirty-four patients had an immediately positive referred shoulder impingement test, with relief of neck pain five minutes after injection of the lidocaine and methylprednisolone into the shoulder. The remaining four patients had a delayed positive referred shoulder impingement test; they did not have subjective reduction of the pain until the routine follow-up visit three weeks after the injection.

Early in our experience, patients were treated with only one cortisone injection. Five patients then had recurrence of symptoms and underwent shoulder decompression surgery, with relief of neck pain. There were no recurrences requiring surgery after we instituted a routine of three cortisone injections and instructed the patient about ways to avoid the shoulder impingement position.

Calcific tendinitis developed three years after the initial treatment in one other patient. It responded to repeat cortisone injection. Another patient, who habitually slept in the "impingement position," had recurrence of symptoms after many months but expressed satisfaction because treatment of the shoulder had enabled him to avoid proposed surgery on the cervical spine. On the basis of the experience of seven patients, recurrent pain was anecdotally correlated with resumption of the overhead impingement position while the patient was asleep or engaging in recreational or work activities. This recurrent pain could be relieved again by avoidance of the impingement position.

Over three months, the patients were evaluated four times, at approximately three weeks after each injection. Consistent improvement, with an average increase of 3 points (of 10) on the pain rating scale, was reported three weeks after each of the three injections. The cumulative subjective pain rating after the three injections averaged 9 of 10 points. Eight patients had bilateral neck pain and bilateral referred shoulder impingement syndrome, with four presenting with the bilateral neck pain and the other four first noting contralateral neck pain after improvement on the initial side. These eight patients all elected to undergo treatment of the contralateral shoulder after successful treatment of the first side. Results were similar on both sides.

Twenty patients (59%) were available for long-term follow-

up (at an average of seven years) by telephone and chart review. All reported long-term subjective relief of the chronic neck pain dating from the time of treatment.

Discussion

We believe that shoulder impingement is a previously undescribed cause of chronic neck pain along the medial border of the scapula. Patients with intractable neck pain in this region can easily be evaluated for referred shoulder impingement syndrome with use of standard tests to diagnose shoulder impingement⁹. The triad consisting of the referred shoulder impingement sign, abnormal radiographic findings in the shoulder, and a positive referred shoulder impingement test (pain relief following injection into the subacromial space) forms the basis for diagnosis and treatment of this condition.

The hallmark of this condition is presentation with neck pain exclusively. A negative referred shoulder impingement test (no relief of neck pain) effectively rules out the condition.

Patients with pathological changes in the shoulder frequently have no symptoms in the shoulder^{5,14,15}, and neck pain has been reported to decrease after the performance of surgery to treat shoulder impingement¹⁶. This referred pain syndrome may be due to antidromic nerve conduction, which can be blocked by lidocaine injection into the subacromial bursa. Common innervation or overlapping of nerve fibers from different dermatomes supplying the neck, upper back, and shoulder may be the cause of the referred pain. Neck pain may also result from a protective mechanism causing muscle overload and spasm of adjoining muscles and tendons. Lidocaine injection may allow the supraspinatus muscle to relax, thereby alleviating the pain.

Almost three-quarters of the patients in this series had been involved in an automobile accident. Chronic neck pain following an automobile accident has been putatively linked to the “whiplash” mechanism of acceleration/deceleration forces on the head and neck¹⁷. However, no objective evidence of a pathological lesion in patients with whiplash has ever been found^{18,19}. In a review of the literature, the Quebec Task Force on Whiplash-Associated Disorders concluded that little is known about the cause and treatment of chronic neck pain²⁰. The shoulder can be injured along with the neck in an automobile accident²¹. Collision forces are transferred to the shoulder from the arm while the individual is holding the steering wheel. Additional forces on the shoulder may result from inertial effects of a chest restraint. These forces can result in compression of the rotator cuff and subacromial bursa between the humeral head, the acromion, and the coracoacromial ligament²², but the frequency of this proposed etiology of neck pain is unknown. Most of our patients had tried multiple conventional and unconventional therapies directed at the neck without success prior to the diagnosis and treatment of the referred shoulder impingement syndrome. These observa-

tions should prompt a prospective trial to evaluate the benefit of prophylactic shoulder therapy in patients with chronic neck pain after a motor-vehicle accident.

Patients with a hooked acromion anteriorly who pursue occupational and recreational activities involving the overhead arm position are prone to the development of impingement syndrome^{23,24}. Habitually sleeping in the “shoulder impingement position” (with the hand under the pillow) is a likely mechanism for neck pain at night or upon waking. We have found that sleeping with the arm against the body under a nightshirt or with a shoulder immobilizer minimizes shoulder impingement and is very effective in reducing sleep disturbance and neck pain in the morning.

There is debate about the importance of the radiographic finding of a pseudocyst in the diagnosis of shoulder impingement syndrome^{25,26}. Its presence is considered to be sensitive but not specific for impingement syndrome^{27,28}. Pseudocysts are reported commonly and may even be considered a normal variant²⁹, especially if, in the absence of shoulder symptoms, a patient is not further examined for referred shoulder impingement syndrome. Thirty-two of our thirty-four patients demonstrated a pseudocyst radiographically, leading us to pursue a diagnosis of shoulder pathology—in this case, impingement syndrome.

This study had several limitations. It was a retrospective review of a series of patients selected because they had positive findings. There was no control group or blinding against bias, as would be found in a prospective study. We were able to contact only 59% of the patients for long-term follow-up. Also, records were not kept on patients who had been excluded because of a negative impingement test or because they refused diagnostic injections.

In conclusion, intractable chronic neck pain localized in the upper back may be due to referred shoulder impingement syndrome in selected patients. Standard treatment with lidocaine and cortisone injections and avoidance of the impingement position^{30,31} can help these patients. ■

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