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The Difficult-to-Diagnose Thoracic Outlet Syndrome

Warren Hammer, MS, DC, DABCO

Thoracic outlet syndrome (TOS) may be more prevalent than you think. It is a condition that requires a diagnosis made more by a history and physical examination than by radiological or electrodiagnostic tests. While cervical ribs and other anatomic variations may be more common in TOS, they are not necessarily a prerequisite for a diagnosis. Of the 282 patients who required surgery for TOS, two-thirds had had normal electromyography testing results.

The problem with establishing a diagnosis is that since both nerves and blood vessels may be compressed, a patient may present with a variety of signs and symptoms. Originally, it was thought that vascular compression created most of the symptoms, but recent studies show that neural compression is responsible for most of the complaints.[2]

Forty-one percent of the 282 patients had a history of trauma preceding the onset of symptoms, with the shoulder girdle most affected, followed by the neck, arm and hand. Thirty-two percent of the patients blamed their symptoms on the workplace. Poor posture was a significant cause.

Symptoms

In the study of 282 patients,[1] paresthesias in the hand was the most common complaint (90%), with the little finger involved four times as often as the thumb. The medial forearm and arm were also common sites. Seventy-five percent of the patients complained of nocturnal paresthesias, mostly on the ulnar side; some awoke at night with an entire limb numb or swollen. Eighty-nine percent of the patients complained of upper-limb symptoms during overhead activities, carrying loads, or while driving. Subtle weakness of the hand was a common complaint. Forty-five percent of the patients complained of neck pain, but only nine percent of this group had restricted cervical motion.

Physical Examination

A majority of patients showed "scapular ptosis" and atrophy of the ipsilateral trapezius muscle. Firm downward pressure on the ptotic scapula often reproduced paresthesias in the hand and arm, confirming the postural causation. Weakness of the trapezius may occur from trauma or a traction injury to the spinal accessory nerve, or some distal upper limb problem, causing the shoulder to be immobilized. All of the above may create a postural ptosis resulting in compression by pulling the nerves and vessels down onto the first rib.

Of the provocative tests used to help diagnose the condition, the most reliable are: Wright's test (patient's arm is raised in varying degrees of elevation above the level of the shoulder); the costoclavicular test (patient brings the shoulders back in an exaggerated posture); and the overhead exercise test (patient holds the arms up and rapidly flexes and extends the fingers for 30 seconds). The

Adson test was found to be the least reliable by the authors: "Many individuals who are healthy and asymptomatic can obliterate a pulse or produce a plethysmographic abnormality by assuming different positions."[1] For the first two tests to be considered positive a patient must state that the symptoms have been reduplicated, i.e., paresthesias or pain and cramping in the limb. The overhead exercise test requires a complaint of cramping or fatigue to be considered significant. Association of the typical symptoms of TOS (with at least one and preferably two of the provocative tests positive) leads to the probability of this condition.

Manual muscle testing may reveal subtle deficits: in more severe cases, frank weakness of the interossei and hypothenar muscles and less in the flexor profundi of the little and ring fingers. The authors found that if the ulnar-innervated intrinsic hand muscles were severely atrophied, the median thenar muscles were also atrophic.

Cervical radiculopathy must be considered in a differential diagnosis, but involvement of C8 and T1 is rare in cervical radicular complaints. Carpal tunnel usually affects the median nerve. Ulnar neuropathy can usually be localized along the ulnar nerve and with electrodiagnostic studies. Patients with ulnar neuropathy may also complain of nocturnal symptoms. If they do, find out if they sleep with their elbow flexed, which can compress the ulnar nerve at the cubital tunnel. Other possibilities such as Pancoast tumors must also be considered.

Treatment

Treatment of a conservative nature should concentrate on therapeutic exercises to correct postural abnormalities of the shoulder girdle. These exercises should not include overhead motions or movements with the shoulders braced backward. Alexander's technique would be very beneficial, as would freeing of vertebral subluxations and rib fixations. Fascial restrictions in the anterior cervical and pectoral areas must be evaluated and treated. Evaluation of activities of daily living and the workplace environment is a must.

References

1. Leffert RD. Perlmutter GS. Thoracic outlet syndrome: Results of 282 transaxillary first rib resections. *Clin Orth & Rel Res* 368:66-79.

2. Rayan GM. Lower trunk brachial plexus compression neuropathy due to cervical rib in young athletes. *Am J Sports Med* 16,1988:77-79.

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