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Posttraumatic Cervico-Axillary Syndrome (Thoracic Outlet Syndrome)

By David BenEliyahu

Thoracic outlet syndrome (TOS) is a documented sequella of whiplash-CAD type injuries.^{1,2,3} In a study by Magnusson et al., 31 percent of the patients they studied who were injured in an MVA (motor vehicle accident) developed TOS. In a retrospective study on the incidence, etiology, diagnosis and management of TOS that I am currently working on, we have found that about 40 percent of whiplash-CAD patients will develop posttraumatic TOS.

This syndrome presents with a constellation of signs and symptoms in the upper extremity, often including pain, paresthesias, weakness and temperature changes in the arms and hands. It is often exacerbated by provocational arm movements, usually in hyperabduction. The patient will display symptoms from myofascial, neurologic and vascular structures.

After a whiplash injury, the scalenes and pectoralis minor muscle become stretched and injured, developing fibrotic adhesions and becoming taut and hypertonic. This can cause myofascial referred pain into the extremity, but can also lead to entrapment of the associated neurovascular bundle. The first rib will often exhibit joint dysfunction, either due to traumatic subluxation or abnormal pull from the hypertonic scalenes. To successfully treat these disorders requires manual techniques such as active myofascial release; spray and stretch; cervical and rib manipulation therapy or mobilization; and home care exercises.

While TOS may be considered a controversial diagnosis in some circles, it is my opinion that the primary reason there is a controversy is because of the lack of comprehensive knowledge of the complex anatomy involved, and the variant subtypes of TOS. In 1996, Ranney proposed an anatomically-based redefinition of TOS to the cervico-axillary syndrome.⁴ This new name encompasses the three sites of possible compression or irritation sites:

1. scalene triangle;
2. costoclavicular spine;
3. subcoracoid or pectoralis minor space.

What many people call the thoracic outlet is really the scalene triangle, which is divisible into an upper aperture "cervical outlet" and lower aperture "thoracic outlet." One of the most reliable indicators to diagnose this condition is called the "TOS index" proposed by Ribbe⁵ and supported by Lindgren.⁶

TOS Index Must Have 3/4 of the Following:

1. Aggravation of symptoms with arm elevation;
2. History of parasthesias over the C8/T1 dermatomes;
3. Tenderness over the brachial plexus (Erb's point; there is often a positive Tinel's here, and pressure causes referred arm pain and/or tingling);
4. Positive Roo's test or elevated arm stress test in abduction and external rotation causing parasthesias.

Of all the orthopedic tests (Wright's, Adson's, etc.), Roo's is considered the most reliable.

Objective diagnostic tests that I have found to be sensitive, reliable and predictive include a combined protocol of evoked potentials (SSEP) and color-coded duplex ultrasonography (CCDS). In a study I published in Topics in Clinical Chiropractic, SSEP/CCDS were valuable in documenting TOS.³

In Lindgren's two-year followup study of conservative treatment for TOS, he found that 88 percent of the 119 patients had a good outcome from their nonoperative care program of rehab exercises and mobilization.⁶ He emphasized the importance of identifying and correcting first rib joint dysfunction to reduce TOS. He used a cervical rotation and lateral flexion test (CRLF) to note ipsilateral reduced ROM indicating first rib dysfunction.

It's been my experience that a well-constructed, in-office conservative care package, in addition to a home care program of stretching and strengthening, is efficacious. Conservative chiropractic management of TOS that consists of the following will often resolve 8 out of 10 cases within a reasonable period of time.

Treatment Protocol:

1. Cervical spine manipulation -- lower cervical spine.
2. First rib mobilization -- manually or with Activator.

3. Myofascial active release of the scalenes and pectoralis minor muscles.
4. Spray and stretch technique to the muscles with vapocoolant spray or ice massage.
5. Postisometric relaxation technique (contact-relax).
6. Adjunctive physiotherapy (ultrasound in combination with galvanic stimulation).
7. Home care shoulder girdle strengthening; scalene and pectoralis stretching; cervical spine isometrics; and the use of heat.

Conservative care has been found to be effective in treating TOS by many authors, including myself, Lindgren, Novak, Kenny and Bilancini.⁶⁻⁹ Surgical intervention is rarely necessary, but in resistant cases, a consult with a vascular surgeon may be indicated. I recently had a resistant case that only after an MRI of the brachial plexus revealed a large lipoma compressing the neurovascular bundle.

Thoracic outlet syndrome or cervico-axillary syndrome subsequent to whiplash or other similar trauma is common. When properly identified to the region and specific structures involved, a comprehensive and conservative approach is clinically effective. Treatment considerations must include active rehabilitation in addition to passive therapy to insure a good outcome.

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