

Thoracic Outlet Syndrome

Description

Thoracic outlet syndrome (TOS) represents a constellation of disorders causing upper extremity symptoms, ostensibly due to compression of structures as they traverse the thoracic outlet, the rostral opening of the thoracic cavity. There are several types. True Neurogenic Thoracic Outlet Syndrome is an entrapment neuropathy of the lower trunk of the brachial plexus, and will be discussed in this section. Vascular Thoracic Outlet Syndrome involves disruption of vascular flow through the outlet due to compression of the vascular structures as they traverse this region. Disputed Thoracic Outlet Syndrome includes patients that present with arm pain, but have no objective findings such as EMG/NCS abnormalities, weakness, sensory loss, or muscle atrophy.

Anatomy

Compression of the plexus at this level is often due to kinking of the trunk as it is draped over a cervical rib, a ligamentous band arising from an elongated C7 transverse process, or other similar firm structure.

Clinical Presentation

Patients may present initially with arm pain and paresthesias in the medial antebrachial cutaneous and ulnar nerve distributions. Progression may cause clumsiness in fine motor control of the hand and sensory loss. Later findings can include weakness on examination and atrophy of the hand muscles. One key finding is loss of median motor function (lower trunk origin) with preservation of median sensory function (upper trunk origin).

Diagnosis

The diagnosis is made on history, careful peripheral nerve exam noting the above findings, and electrodiagnostic studies. Nerve conduction studies will typically demonstrate slowing across Erb's point (along the proximal lower brachial plexus) with preservation of median sensory conduction. Electromyography may show denervational changes in the median and ulnar innervated muscles in more advanced cases.

Treatment

As for other entrapment neuropathies, a trial of conservative therapy is utilized first. Shoulder girdle strengthening exercises, posture modification, and exercises to improve overall flexibility of the neck and shoulder regions may be quite helpful. However, in advanced cases with weakness, atrophy, and significant EMG/NCS findings, this nonoperative trial period may be kept fairly brief to minimize the injury from ongoing compression. Anterior supraclavicular brachial plexus exploration with external neurolysis of the lower trunk structures generally reveals the compressive structures, and allows for their removal. A posterior subscapular approach is an alternative strategy that may facilitate lower trunk decompression in the setting of previous anterior surgery, scar, or other structural abnormalities.

Outcome

The majority of patients improve with a trial of nonoperative therapy. Of those who require surgery, most often do well with plexus decompression in cases of true neurogenic TOS. Other varieties, especially Disputed TOS, may not fare as well, likely due to the uncertain pathophysiology of this disease.

Complications

As with any left-sided brachial plexus surgery, there is a risk of thoracic duct injury, resulting in lymphatic collections. Vascular, pulmonary, or neurological injury can occur. Phrenic nerve injury resulting in an elevated hemidiaphragm is one of the most common neurological injuries in these patients.