Outcomes after Surgical Treatment of Pediatric Neurogenic Thoracic Outlet Syndrome

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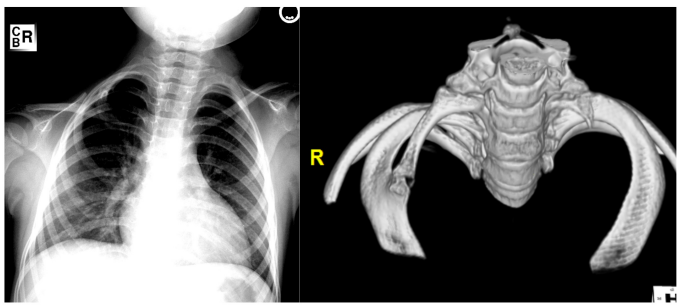
Introduction

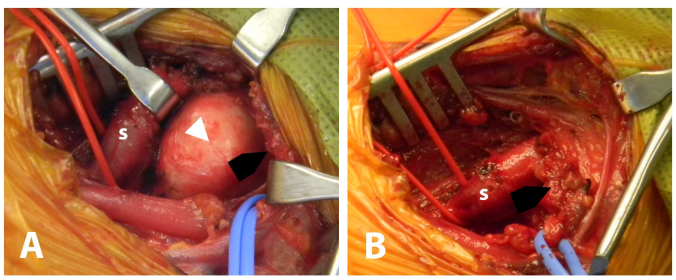
Neurogenic thoracic outlet syndrome (nTOS) is a rare compression syndrome of the brachial plexus that presents with pain in the affected limb and often sensory changes and motor weakness. There is very little published literature about outcomes following treatment of nTOS in children.

Methods

After IRB approval, a prospectively collected database of peripheral nerve operations was reviewed from April 2010 to December 2016 and cases of nTOS in patients age 18 years or younger were analyzed. Baseline patient characteristics, imaging and neurophysiologic data, operative findings, and outcomes and complications were assessed



Plain CXR and CT chest reconstructioin 14 year-old girl with cervical rib and thoracic outlet syndrome



Intra-operative view of supraclavicular brachial plexus exploration, anterior scalenectomy and resection of the ceribical rib. Panel A: Black arrow indicates pseudoarthrosis at the junction of the cervical rib and first rib. White arrow indicates the cut edge of the anterior scalene. The subcalvian artery is marked with the letter "S." The vessel loop is placed around the lower trunk of the brachial plexus. Panel B: After resection of the psuedoarthorsis and cervical rib. Markers are unchanged.

Results

Twelve patients with fourteen cases of nTOS who underwent supraclavicular exploration, anterior scalenectomy and neurolysis were identified. One -third of the patients were male. Disabling pain was the most common presenting symptom (100%), followed by numbness (35.7%), then tingling (21.4%). Average duration of symptoms prior to surgery was 15.7 months (SD 6.5). Sports -related onset of symptoms was seen in 70% of cases. Imaging revealed four cervical ribs, four prominent C7 transverse processes, and two abnormal first thoracic ribs. Neurophysiologic testing was normal in 85.4% of cases. All patients failed conservative management with physical therapy. With a mean follow-up of 7 months (SD 10.8), pain was completely resolved in 57.1% of cases, improved greater than 50% in three cases, stable in two case, and worsened in one case. Patients with poor outcomes (stable or worse pain), were more likely to be older than age 17. There were three minor complications within 30 days of surgery, all managed conservatively; a small pneumothorax, persistent hiccups, an a fall at home.

Conclusions

Pediatric nTOS presents with disabling pain and is frequently associated with bony anomalies. Surgical decompression of the brachial plexus results in good response rates, particularly in younger children.

Learning Objectives

By the conclusion of this session, participants should be able to:

1) Describe the anatomy of the thoracic outlet