Thoracic outlet syndrome

Essay

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Abbreviations

ant	**Anterior**
BTX	**Botulinum neurotoxin**
c	**Cervical**
CK-MB	**Creatinine phosphokinase- MB fraction**
CT	**Computed Tomography**
Dn TOS	**Disputed neurogenic thoracic outlet syndrome**
EAST	**Elevated arm stress test**
EMG	**Electromyography**
LMNL	**Lower motor neuron lesion**
MNCS	**Motor nerve conduction study**
MR	**Magnetic resonance**
MRA	**Magnetic resonance angiography**
MRI	**Magnetic resonance image**
NCS	**Nerve conduction study**
nTOS	**Neurogenic thoracic outlet syndrome**
PTT	**Partial thromboplastin time**
SCA	**Subclavian artery**
SCV	**Subclavian vein**
SNCS	**Sensory nerve conduction study**
SNAP	**Sensory nerve action potential**
SSEPs	**Somatosensory evoked potentials**
T	**Thoracic**
TOS	**Thoracic outlet syndrome**
UMNL	**Upper motor neuron lesion**
vTOS	**Vascular thoracic outlet syndrome**

INTRODUCTION

Thoracic outlet syndrome(**TOS**) is the compression of subclavian vessels and brachial plexus at the superior aperature of the thorax .It has been previously designated according to etiologies such as scalenus anticus, costoclavicular, hyperabduction, cervical rib, and first rib syndrome. The first rib syndrome seems to be a common denomoninator against which most compressive factors operate.**(Harold etal.,2007)**

Thoracic outlet syndromes are a nonspecific label.When employing it, one should define the type of thoracic outlet syndromes as arterial, venous, neurogenic. Each type has different symptoms and physical finding by which these three types can be easily identified .**(Sanders etal.,2007)**

The sex ratio varies depending on the type of **TOS** (eg neurologic, venous, arterial).Overall ,the entity is approximately 3 times more common in women than in men.

Neurologic female to male ratio 3.5:1

Venous more common in male than in female

Arterial no sexual predilection **(Battacharya etal.,2003)**

Because no objective confirmatory test is available for **TOS** , there is much disagreement with regards to its true incidence,

with reported figures ranging from 3-80 per 1000 people **(Degeorges,2004).**

TOS is a space problem . It occurs because there is insufficient space for the neurovascular structures. There are many factors that may cause compression of the neurovascular bundle at the thoracic outlet. The most common etiology of **TOS** is dearranged anatomy, among which bony abnormalities comprise 30%.(**Chon etal.,2005).**

The onset of symptoms usually occurs in persons aged 20 – 50 years **(Altobelli etal.,2005).**

Thoracic outlet syndromes can be classified as vascular type **TOS**(Arteial and Venous), true neurologic**TOS**, and the more recently coined disputed neurologic **TOS**(disputed N-**TOS**).True neurologic **TOS** is a rare entity that presents clinically with wasting of the small muscles of the hand,with established pathoanatomy that responds to surgical treatment aimed at preventing progressive neurologic deterioration .Vascular **TOS** has specific opjective clinical findings consistant with arterial compression,venous compression ,or both. Disputed N-**TOS**, on the other hand ,is a vague subjective pain syndrome with no specific underlying pathoanatomy ,and no objective clinical and electro physiological findings **(Naidu&Kothari,2003).**

The diagnosis of **TOS** remains a challenge for the treating physician . Many different clinical entities can encompass the presenting symptoms of pain and paraesthesia in the affected extremity and a number of specialists may be called upon during the treatment of this complex entity .In 2005 Kokne Talu recommendes that the diagnosis and treatment of **TOS** involve neurologists , physiatriast , family physicians , orthopedic surgeons , vascular surgeons , thoracic surgeons , neurosurgeons and psychatrists . All should be familiar with the presenting signs and symptoms of **TOS** , and include the syndrome in their different diagnosis.**(wilbourn ,1999)**

The management of **TOS** can be divided into conservative and surgical treatment. Conservative treatment is the first choice for the treatment of **TOS** if frank vascular or major neurological impairment is not present . It has been reported that nonsurgical treatment is successful in 58 % of cases. Physical therapy ,symptom-based medications ,and nerve blocks were indicated for patients with **TOS**.(**Kubota&Miyata,2005)**

Surgery is indicated for acute vascular insufficiency and progressive neurologic dysfunction . For subclavian venous thrombosis , Treatment addresses 3 problems: the clot , the extrinsic compression , and the intrinsic damage to the vein **(Sanders & Hammond,2004).**

Surgical approaches for treatment of **TOS** are ranging from transaxillary first rib resection of various fibromuscular bands and ligaments and neurolysis of supraclavicular brachial plexus **(Harold etal.,2007).**

Endoscopic assisted transaxillary first rib resection is anovel approach in management of **TOS**. It allows safe identification of different structures**.(Abdellaoui,etal 2007).**

Aim of the work

This easy aim to evaluate the different invasive and non-invasive techniques for management of the thoracic outlet syndrome in different age group and to review the recent advances in management of thoracic outlet syndrome.

Surgical anatomy

There is much confusion and controversy regarding the region termed by clinicians, the thoracic outlet. Anatomists refer to the thoracic outlet as the inferior thoracic aperture, which is the opening into the abdominal area and not the region between scalene muscles and the first rib. Anatomically the area between the scalene muscles and the first rib is termed the thoracic inlet (Mackinnon&Novak,2002).

The thoracic outlet is reniform, about 5 cm anteroposteriorly, and about 10 cm transversely. Its plane slopes down and forwards, bounded by the first thoracic vertebral body behind, the superior border of manubrrium sterni anteriorly and the first rib and costal cartilage laterally (Cooke,2003). Figure(1)

The middle and anterior scalene muscles, the five primary nerves and three trunks that comprise the brachial plexus, the phrenic nerve, the stellate ganglion, the subclavian artery and vein, the thoracic duct, scalene lymph nodes and the apex of the lung are found in this anatomical area (Han et al.,2003).