Thoracic outlet syndrome (TOS) is a comprehensive term used to describe symptomatology due to compression of neurovascular bundle in the thoracic outlet region of upper extremity. The term TOS was used for the first time in the literature by Rob and Standeven. It had also been termed costoclavicular syndrome, cervical rib syndrome, scalenus anticus syndrome, subclavius tendon syndrome, or musculus pectoralis major syndrome by various authors. Depending on the predominant structure involved in compression, it is further divided into three subtypes, namely, neurogenic TOS (n-TOS, compression of brachial plexus), arterial TOS (a-TOS, compression of subclavian artery), and venous TOS (v-TOS, compression of subclavian vein). The most common form by far is n-TOS, which accounts for >90% of all TOS cases. Brachial plexus and subclavian artery pass through the scalene triangle which is formed by the borders of anterior scalene and middle scalene muscle along with the first rib whereas subclavian vein compression occurs while passing through the costoclavicular space formed by clavicle, first rib, and costoclavicular ligament.

TOS usually affects younger population between 20 and 40 years of age and females are more affected. The predominant factors which lead to the development of TOS are congenital bony abnormalities of thoracic outlet, especially Gruber type II/III/IV cervical rib, first rib anomalies, and repetitive movements such as wrestling, weightlifting, swimming, and trauma pertinent to this region. Multiple bony exostosis in the thoracic outlet region such as other congenital bony abnormalities may exert compression in the narrow neurovascular bundle pathway leading to neurogenic and vascular TOS as described by the authors. Pain, paresthesia, weakness (n-TOS), arterial insufficiency in the form of chronic pain, muscle wasting, or acute pain due to embolization from subclavian artery aneurysm and thrombosis (a-TOS) and upper extremity edema with extensive collateralization (v-TOS) are the usual presentation of TOS. Sometimes, combined symptomatology of n-TOS and a-TOS is present. Likes et al. demonstrated significant number of coexistence of n-TOS and a-TOS and good outcome after early surgical intervention in this patient population. The diagnosis of TOS based on detailed clinical history with physical examination of neurovascular and musculoskeletal system of neck shoulder, arms, and hands. Imaging investigations such as cervical X-rays, computerized tomography, magnetic resonance imaging, and electromyography can aid in diagnosis but not specific.

Surgical decompression is the mainstay of treatment in symptomatic patients despite maximal physiotherapy. Resection of cervical rib, first rib, and fibrous bands along with other associated anomalies and scalenectomy through transaxillary or supraclavicular approach is carried out to decompress the neurovascular bundle. Some authors suggest that the first rib should be routinely removed to prevent recurrence of symptoms because it acts as a key insertion point for fibromuscular bands that cause vascular compression.

We prefer transaxillary approach as it provides complete visualization of the first rib for removal and poses minimal risk to critical neurovascular structures that are distant from the first rib. The supraclavicular approach is preferable for a-TOS as it allows resection of the cervical and first ribs, fibromuscular structures, and vascular reconstruction. However, care must be taken to identify and protect the brachial plexus and other structures.

Good outcome can be achieved with meticulous planning and execution of surgery preferably excision of both first rib and cervical rib and scalenectomy along with postoperative physical therapy. Success rate in the range of 82%–96% has been reported in literature.

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