

THORACIC OUTLET SYNDROME



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Thoracic outlet syndrome (TOS); It is a syndrome that occurs after compression of at least one of the following: subclavian artery, subclavian vein or brachial plexus. Symptoms differ in nerve and vascular compression. Neurogenic TOS (NTOS) accounts for between 90-95% of clinical cases and is caused by compression or irritation of the brachial plexus. The remainder of cases is venous TOS (VTOS), which results from stenosis of the subclavian vein. Arterial TOS (ATOS) is the least common type and has been shown to be 1-6% in case series [1-3]. There are many etiological factors in the development of TOS (Table 1).

History

TOS-related surgery was established in 1861 by Mr Holmes in London with the resection of the 1st rib [5]. In 1912, after radiological developments, TOS was reported in a patient without presence of a cervical rib [4]. Technically, due to the difficulties in resection of the 1st rib, scalenectomy was defined by Adson and Coffey [5]. Scalenectomy gained popularity due to its technical simplicity, while the posterior approach for the 1st costal resection was defined by Clagett in 1962. Alternatively, transaxillary approach was shown by David Roos [6,7]. Recently, surgical approach using VATS has been defined.

Anatomy

For the management of TOS patients, the complex anatomy must be well understood. The areas where pressure is potentially seen, medial to lateral, are the interscalene triangle, the costoclavicular space and the subcoracoid region. The space between the anterior scalene, middle scalene muscles and the 1st rib is defined as the scalene triangle. The brachial plexus and subclavian artery exit the thorax on the 1st rib and travel between the muscles. Embryologically, scalene muscle mass originates from the C3-C7 vertebrae and adheres to the 1st and 2nd ribs. As a result of incomplete separation of this mass and tight bands, compression develops in neurovascular structures [8,9]. The costoclavicular space is formed by the clavicle and the 1st costa. There is the costoclavicular ligament in front and the middle scalene muscle at the posterior border. This space includes the brachial plexus, subclavian artery, subclavian vein, and subclavian muscle. The subcoracoid space is located under the pectoralis minor muscle, and the brachial plexus runs through this region and extends to the arm.

The compression of neurovascular structures may develop due to the length of the 7th transvers process of cervical vertebra or the space formed by the accompanying cervical rib. In addition, fibrous bands between these structures may ac-

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not preferred in some centers, many centers prefer the old incision. In a study where the results of 12 patients with recurrent TOS were shared by Kendall et al., they reported that they preferred the transaxillary approach in patients who underwent supraclavicular surgery and the supraclavicular approach in patients who underwent transaxillary [35].

Our surgical experience for TOS surgery in our clinic encompasses 131 patients on who 138 (7 bilateral) surgical operations were performed. Of these surgeries, 1 involved a recurrence of symptoms after surgery. The mean operation time was 89 (58-124) min. Before and after surgery we administer a survey for patient satisfaction. Based on this survey 85% of patients responded as excellent, 12% responded as satisfactory, while 3% as fair.

CONCLUSION

Surgical treatment of TOS is based on clinical diagnosis, the presence of symptoms, and the inability of these symptoms to improve with appropriate physical therapy.

Imaging studies, electrophysiological tests, and vascular laboratory examinations may be useful in excluding other conditions, but they contribute little to the specific diagnosis of NTOS.

With appropriate surgery for well selected patients, TOS surgery has very encouraging outcomes.

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