# TRANSAXILLARY RESECTION FOR THORACIC OUTLET SYNDROME

Syed Sohail Siddique*, Rana Shakil Ahmad, Veerta Ali Ujaan, Abdul Aziz, Faiz Rasool, Kamran Ahmad, Aqeel Ahmad, Zahid Pervez, Ajmal Hassan Naqvi.

**Department of Cardiothoracic Surgery, Skaikh Zayed Hospital Lahore.**

## ABSTRACT

***OBJECTIVE:*** ***The aim of this study was to analyze the open transaxillary surgical resection and its results for the treatment of thoracic outlet syndrome cases presenting in our unit over a period of eighteen months.***

***METHODS:*** ***A prospective study was done of 11 cases of thoracic outlet syndrome which were operated through open transaxillary resection for thoracic outlet syndrome between November 2010 to April 2012. These patients were surveyed on routine follow up and their symptoms analyzed in terms of outcome of surgery.***

***RESULTS:*** ***8 patients (88.88%) were females and the mean age was 22+/-1 (range 17-36 years). The most important symptom was localized pain in the effected upper limb. There was paresthesia in 7 (77.77%) cases, muscle atrophy in 7 cases (77.77%), and coldness of the hand in 4 cases (44.44%). Adson's test was found to be positive in 60% of patients. Postoperative EMG values were significantly higher than the preoperative EMG values. Upon radiological investigation, 4 patients were found to have cervical ribs. All patients were operated upon using the open transaxillary resection. 10 patients had marked improvement in their symptoms on follow up.***

***CONCLUSION:*** ***The open transaxillary resection provides an excellent exposure for the relief of thoracic outlet syndrome including resection of cervical ribs, the first-rib and excision of fibrous ligaments and scalene muscle with good clinical and cosmetic results.***

***Key Words:*** *Thoracic outlet, tranaxillary, cervical ribs.*

**Address for Correspondence:**
Dr. Syed Sohail Siddique.
Assistant Professor
Dept. of Cardiothoracic Surgery
Shaikh Zayed Hospital Lahore.

## RATIONALE

The spectrum of disorders identified as thoracic outlet syndrome includes nerve compression, arterial compression and venous compression. These have been documented at the scalene,

costo-clavicular and subcoracoid levels[1]. Various resections and methodologies exist for the treatment of this disorder because the etiology and level of compression varies. This was elucidated by Roos et al in 1966 with the classification of the fibrous bands into types I to VII[2]. In the 1980s however, there was growing realization of the complications associated with cervical rib resection and thereafter efforts have largely focused on endoscopic dissection in an attempt to reduce tissue trauma and therefore the complications[3].

We have undertaken an institutional review of the open transaxillary resection (TAR) with first rib resection and its clinical results. The purpose of this review was to evaluate the efficacy of the procedure and justify its continued use in our practice for all cases diagnosed with refractory Thoracic outlet syndrome regardless of the symptom complex, or the level of compression.

## OBJECTIVE

The aim of this study was to analyze the open transaxillary surgical resection and results of thoracic outlet cases presenting in our unit by auditing procedures done at Shaikh Zayed Hospital between November 2010 and March 2012.

## MATERIAL AND METHODS

A prospective study was decided upon for evaluation of results without adding bias to the procedure or the selection of patients.

**Inclusion Criteria:**

All patients with a diagnosis of thoracic outlet syndrome who were not responsive to conservative treatment lasting 3 months or more; and who thereafter underwent open transaxillary resection at Sheikh Zayed hospital between November 2010 and April 2012.

**Exclusion Criteria**

1. Patients who responded to conservative treatment for the symptoms of thoracic outlet syndrome.
2. Patients operated upon for TOS through any other surgical resections.

**Data Collection:**

A detailed history was taken and Adson's test, Falconer –Weddel test, Wright's test, Roos test and Elvey Hunter's tests were used to elucidate the signs of neurovascular compression. Diagnostic modalities were incorporated in the form of Roentgenograms of chest and neck in all patients, CT scan/ MRI, Nerve Conduction studies and angiography were conducted in patients where there was diagnostic confusion, or to see the flow in the subclavian artery, where clinical suspicion was suggestive of compromised flow.

All patients were operated under general anaesthesia. No double lumen endotracheal tube was employed in any of these patients. Patients were positioned in the lateral position with the effected side up. The effected upper limb was placed in sustained abducted position over a sling with a weight of 2.5 kilograms attached to the hand. A transverse incision was made over the 3rd rib just inferior to the axillary hairline and deepened between the pectoralis major and the latissimus dorsi to the chest wall. Scalene muscle attachments to the 1st rib (cervical rib if present were released and the rib was excised extraperiosteally (fig-2) from the chondrosternal articulation to the costotransverse articulation. The rationale for this resection was that first rib resection permits the widening of both the interscalenic triangle and the

costoclavicular space. Closed suction using Redivac drain was used and removed on the first postoperative day. Physiotherapy was started after removal of the drain and all patients were sent home on third postoperative day with an advice for regular physiotherapy and follow up. These patients were surveyed on routine follow up in the outpatient department and their symptoms analyzed in terms of outcome of surgery. The physicians observing symptomatology at follow up were blinded to the study as well as the patients reporting symptoms. The patients were requested to be followed up in Clinic with EMGs which were compared with their preoperative EMG findings. Data was collected and analyzed using SPSS 11.5.

**RESULTS**

Patient distribution was predominantly female 8 patients (88.88%) and the mean age was 22+/-1SD (range 17-36 years).

Symptomatology at presentation showed that the most important complaint was significant pain in the effected upper limb rendering 8 patients (88.88%) incapacitated enough not to carry out their normal activities. There was paresthesia in 7 (77.77%) cases, muscle atrophy in 7 (77.77%) cases (fig-1), and coldness of hand in 4 cases (44.44%). No patient was found to have localized swelling in the neck. Upon radiological investigation 3 patients were found to have cervical ribs (27.27%). Adson's test was found to be positive in 60% of patients (table-1). All patients were operated using the open transaxillary resection. One patient had a staged bilateral procedure with a gap of 3 weeks between procedures.

In 6 patients, postoperative EMG values (p value) were significantly higher than the preoperative EMG values.

8 patients had marked improvement in their symptoms on follow up (88.88%). No patient had the long term complications mentioned in literature of recurrent compression symptoms, and no patients had iatrogenic nerve injury. One patient had no relief in symptoms. Good to excellent results have been published in about 80% of cases following this procedure (4,5). On the other hand, Dale has reported in 1982 the occurrence of complete paralysis of the upper extremity following an uneventful TAR in a 43-year-old patient, who fortunately obtained complete return of the upper extremity function at 4 months postoperatively. Thereafter, a national inquiry among the members of the International Cardiovascular Society in April 1981 revealed a 2.6% occurence of plexus injuries after TAR. Nerve injury may occur during TAR by either stretching the plexus or cutting one of its elements. Following description of these complications with TAR, there was a progressive loss of interest among surgeons for TAR, in favor of the supraclavicular route.

| | |
|---|---|
| Female : Male | 8:3 |
| Mean age in years (S.D.) | 22 (17-36) |
| Presence of a cervical rib | 3 |
| Neurological symptoms | 7 |
| Arterial symptoms | 4 |
| Pain | 8 |
| Localized swelling | 0 |
| Cervical rib | 3 |

**table-1: Patient symptomatology.**

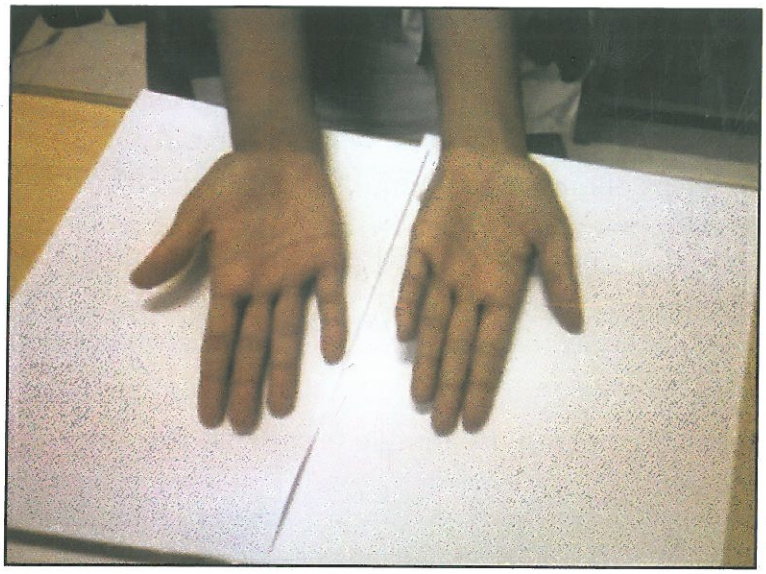

**fig-1: Left Hypothenar Eminence Atrophy.**

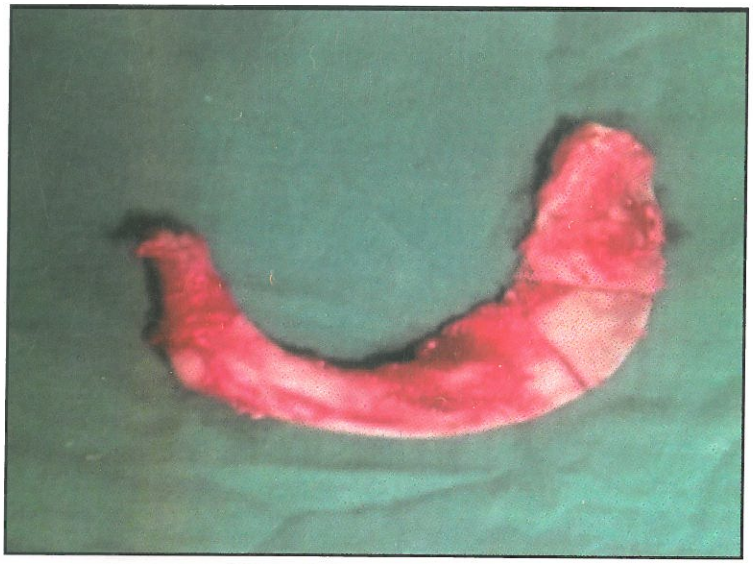

**fig-2: Resected first rib.**

**Fig-3: Post operative scar.**

## CONCLUSION

Though endoscopic resections are being advocated in the current literature for the operative management of thoracic outlet syndrome, our experience with the open transaxillary resection validates its continued use. Endoscopic resections have their own advantages and disadvantages, but in our set up it becomes financially unviable and we are left with only the choice for open procedures. Of these, the open transaxillary resection has been best documented historically and in our practice. We propose to continue using this technique in our own practice and encourage other third world institutions to consider a trial in their practice.

## REFERENCES

1. Thoracic Outlet Syndrome. Huang, Jason H. M.D.; Zager, Eric L. M.D. Neurosurgery: October 2004 - Volume 55 - Issue 4 - pp 897-903
2. Thoracic Outlet Syndrome David B. Roos, MD; J. Cuthbert Owens, MD AMA Arch Surg. 1966;93(1):71-74.
3. Thoracic Outlet Syndrome Pang D, Wessel HB Department of Neurosurgery, University of Pittsburgh, School of Medicine, Pennsylvania.Neurosurgery: 1988,22(1Pt 1):105-21.
4. Davies AH, Walton J, Stuart E, Morris PJ. Surgical management of the thoracic outlet compression syndrome. BrJ7 Surg 1991; 78:1193-5.
5. Sanders RJ, Monsour JW, Gerber WF et al. Sclenectomy versus first rib resection for treatment of thoracic outlet syndrome. Surgery 1979;85:109-21.