

EVALUATION OF DIFFERENT TREATMENT MODALITIES OF NEUROVASCULAR COMPRESSION IN THORACIC OUTLET SYNDROME

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ABSTRACT

objective: The aim of this study is to evaluate the results of different modalities of treatment of neurovascular compression manifestations of thoracic outlet syndrome (TOS) .

Patients and methods: This prospective study included 50 patients with neuro and / or vascular compression manifestations at thoracic outlet area. They were admitted to the Vascular Surgery Unit, Mansoura, University Hospital, Mansoura, Egypt, during the period from January 2000 to May 2003. Patients were classified into two main groups. Group I (Neurogenic TOS, 35 patients with 40 limbs): included patients presenting mainly with neurogenic manifestations. Scalenectionomy \pm cx. rib excision

was done in 22 limbs and combined Scalenectionomy + cx. rib in addition to 1st rib excision was done in 18 limb. Group IIA (arterial TOS, 9 patients with 10 limbs): This group included patients presenting mainly with arterial manifestations. They were subjected to surgical decompression, various methods of arterial reconstruction \pm sympathectomy. Group IIB (venous TOS, 6 patients): This group included patients presenting mainly with arterial manifestations. They were subjected to surgical decompression, various methods of arterial reconstruction \pm sympathectomy.

RESULTS

For neurogenic group : The outcome for patients treated by scale-
nectomy \pm cervical rib excision was

excellent in 14 limbs, good in 6 limbs and fair in 2 limbs. However, the outcome for patients treated by combined scalenectomy + cervical rib excision in addition to first rib excision was excellent in 11 limbs, good in 4 limbs and fair in 3 limbs.

For arterial group : The come was excellent in 8 limbs and good in 2 limbs. For venous group: Surgical decompression in the form of scalenectomy, venolysis and 1St rib excision was done for 2 patients and the outcome was good. Conservative treatment and also P.T.A. showed failure in two patients "out of the five thrombotic patients (40%)"

Conclusion :

In patients with TOS scalenectomy \pm cervical rib excision is as effective as combined scalenectomy and first rib excision ,however ,first rib excision is still indicated where there is tight costoclavicular space after scalenectomy, and also is indicated in patients with vascular manifestations.

INTRODUCTION

Thoracic outlet syndrome is defined as upper extremity symptoms due to mechanical compression of the neurovascular bundle in the thoracic

outlet area (1).

Three specific TOS clinical entities are described, neurogenic, arterial and venous TOS. Vascular TOS is fairly straight forward to diagnose and treat. Neurogenic TOS, in contrast, can be an extremely difficult surgical problem to diagnose and treat (2).

The surgical strategy remains controversial and variable, regarding the optimum mode of access, which bony elements to excise and the management of the vascular and recurrent cases (3).

Refinements in the management of patients with thoracic outlet syndrome (TOS) have occurred more recently. This has been in part attributable to advances made in accurate diagnosis of TOS, application of surgical procedures to TOS and the application of surgical procedures to appropriately selected patients (4).

AIM OF THE WORK

The aim of this prospective study is to evaluate the results of different modalities of treatment in the management of neuro and /or vascular compression manifestations of thoracic outlet syndrome (TOS).

PATIENTS AND METHODS

This Prospective study included 50 Patients presented with either unilateral manifestations (44 patients) or bilateral manifestations (6 patients) of TOS. They were admitted to the Vascular Surgery Unit, Mansoura, University Hospital, Mansoura, Egypt, during the period from January 2000 to May 2003.

Patients included in our study were divided into two main groups according to their presentation .

Group I (Neurogenic TOS 35 patients) : Patients presenting mainly with neurogenic manifestations.

Group IIA (Arterial group 9 Patients) : Patients presenting mainly with arterial manifestations.

Group IIB (Venous group 6 patients) : Patients presenting mainly with venous manifestations.

Pre-operative evaluation :

Thorough history was taken with stress upon included: Name, age, sex, occupation, complaint, analysis of the complaint and any associated disease .

Physical Examination all patients were subjected to thorough general

and local examination that included: Supraclavicular tenderness over scalene muscles, Tinel's sign over brachial plexus, Abducting arms to 90-degree AER noting symptoms. Supraclavicular bone swelling (Fig. 3). pulsating aneurysm, Cervical spine and dorsal spine tenderness, Trapezius and rhomboid muscle tenderness, Distal radial pulsation and compared to the other side (Fig. 3). This was done while the arm was abducted and shoulder retracted backwards. Carpal tunnel evaluation (Tinel's and numbness) and Limb edema and cyanosis.

Diagnostic studies

All patients were subjected to :

- Plain x-rays of both upper chest and cervical spine both postero-anterior and oblique views (Fig. 1A).
- MRI was done only in 10 patients with neurogenic manifestations.
- Nerve conduction velocity of the ulnar and median nerves .
- Scalene muscle block for neurogenic group, this was done by injection of 4 ml 1% of lidocaine into the belly of the anterior scalene muscle.
- Duplex scanning for arterial and venous group (Fig. 6).

- Angiography when indicated for arterial group (4 patients) (Fig. 4), and post contrast MR angiography (1 patient) (Fig. 5).
- Venography when indicated (3 patients in venous group) (Fig. 7).

Treatment :

Group I : Patients were subjected to surgical decompression after failure of conservative treatment over a mean period of 3 months. The operative procedures included one or more of the following: Scaleneotomy, Excision of cervical rib, Excision of fibrous bands, Resection of the central part of the first rib (if intraoperative assessment revealed tight costoclavicular space), Cervicodorsal sympathectomy (if there is associated Raynaud's phenomenon) and Tenotomy (flexor retinaculum release) (if there is associated CTS).

Operative technique :

Supraclavicular skin incision was done 2cm above and parallel to the clavicle. The posterior border of the clavicular head of the sternomastoid muscle was cleared and then partially cut (Fig.8B). The supraclavicular pad of fat was dissected carefully from below upwards. Gentle dissection of the phrenic nerve from the fascia over the

scalenus anterior was done (Fig. 8A). Scaleneotomy of the scalenus anterior from origin to insertion by piece meal cutting (Fig. 8B). The subclavian artery was dissected and retracted downwards after division of the thyrocervical trunk between ligatures. The roots and trunks (upper, middle and lower) of the brachial plexus were identified and dissected. The cervical rib was identified and resected completely. The scalenus medius was removed completely (piece meal). Any fascial band was dissected and removed. After removal of the cervical rib and division of the scalene muscles the thoracic outlet space was assessed in relation to neurovascular bundle. This was done while the arm was abducted and externally rotated at 90 degree. In 18 patients the space was narrow and this necessitated removal of the central part of the first rib. Cervicodorsal sympathectomy was done where there was associated Raynaud's phenomenon. The pad of fat replaced over the residual cavity. Flexor retinaculum release (tenotomy) was done in the same sitting, where there was associated carpal tunnel syndrome .

An upright chest film and chest fluoroscopy were done at the same

operative night. Postoperative physiotherapy was begun on the 2nd postoperative day (Fig. 1B).

Group IIA : Patients were subjected to surgical decompression, various methods of arterial reconstruction and sympathectomy (if needed). In addition, to the surgical decompression maneuvers previously mentioned in group I, by supraclavicular approach, different methods of subclavian and distal arteries reconstruction were performed (Fig. 9A). Additional infraclavicular exposure working around intact clavicle was done in some patients with long aneurysm to facilitate arterial reconstruction (Fig.9B).

Seven patients showed poststenotic aneurysmal dilatation (Fig.9B) [five cases with thrombosed aneurysm "recent thrombus" and two cases with ulcerated intima (Fig.9C)] they were operated upon by aneurysmectomy , catheter embolectomy for distal embolus and primary end to end anastomosis was preformed (Fig. 9D, 9E).

Localized stenosis of the subclavian artery distal to the cervical rib was detected in one patient to whom excision of the stenotic segment and pri-

mary anastomosis was preformed (Fig. 10).

Thrombosed poststenotic left subclavian aneurysm "old thrombus" with complete occlusion of the lumen without visualization of the distal main arterial tree proved by angiography was detected in one patient to whom sympathectomy was done. On the other side, asymptomatic dilatation of the right subclavian artery was detected by duplex and angio. Only surgical decompression was sufficient as arterial wall on palpation was healthy. Sympathectomy was done in another patient with subclavian artery stenosis with another level obstruction "brachial", the stenosed segment was resected and the ends anastomosed primarily. Brachial embolectomy was done in two patients as there were failed trials of brachial disobliteration via the subclavian arteriotomy. Post operative anti platelet for all patients. Oral anticoagulant was prescribed at full dose for the two cases needed sympathectomy due to distal arterial obstruction.

Group IIB: Five patients were thrombotic and one was non thrombotic. The non thrombotic patient was treated by surgical decompression.

Conservative treatment was done for the thrombotic patients, three months later reevaluation was done and percutaneous transluminal angioplasty (PTA) was performed in two patients with no improvement, (Fig.7B) so surgical decompression was done for one patient and the other one accepted the residual limb edema and pain. Supra and infra clavicular approach was used for two cases, venolysis was done by blunt finger dissection, the first rib was excised completely "piece meal" from the costocondoral junction to the transverse process.

Follow up sheet

Patients were followed up postoperatively over a mean period of 20 months: Once weekly for 1 month, once monthly for 2 months and once every three months up to the end of the follow up period.

RESULTS

Group I (neurogenic TOS)

A total number of 35 patients with 40 affected limbs were included in this group (5 patients with bilateral presentation). They were 29 females and 6 males, their age ranged from 18 to 54 with a mean of 32.8 years \pm 9.4 (table 1). The right limb was affected more than the left one. Thirty-two

dominant limbs (80%) were affected in comparison to 8 non dominant limbs (20%). Twenty patients (60%) were manual worker (table2).

Paresthesia, intermittent tingling and numbness in 34 limbs (85%) were the commonest symptoms (total distribution 21 limbs ulnar distribution 11 limbs median distribution 2 limbs). Pain in 10 limbs (25%), occipital headache in 4 patients (12.5%). Raynaud's phenomenon in 2 limbs (5%).

The comments physical findings in neurogenic group, tender scalene 37 limbs (92.5%), doubling symptoms at AER position in 37 limbs (92.5%).

The radiologic and the MRI findings of the neurogenic group was shown in (table 3).

The electrophysiologic findings showed no abnormality in 17 limbs (42.5%), proximal affection in 13 limbs (23.5%) "all nerves in 7 limbs (17.5%), lower trunk in 4 limbs (10%) and upper trunk 2 limbs (5%)" and carpal tunnel syndrome in 10 limbs (25%).

Scalenectomy \pm cervical rib excision was performed in 22 limbs (55%) and combined scalenectomy \pm cervi-

cal rib excision was performed in addition to first rib resection in 18 limbs (45%) (table 4).

In patients operated by scalenectomy, the mean operative time was 77.2 minutes (range 60 to 100), they stayed in the hospital for a mean of 1.2 days (range 1 to 3), with no risk of nerve complications. There were recurrent symptoms after 2 years in 1 limb 5% and the over all results were 14 Excellent (60%) "disappearance of all symptoms", 6 good (35%) "disappearance of the major symptoms" and 2 fair (10 %) "persistent symptoms" but the operation was worthwhile in these 2 limbs (table 4).

In patients operated by combined scalenectomy and first rib resection, the mean operative time was 93.3 minutes (range 80:120), they stayed in the hospital for a mean of 1.8 days (range 2:3) with nerve affection (2 plexus and one phrenic neuropraxia) in 3 limbs (17%). There were no recurrent cases. The over all results were 11 Excellent (61.11), 4 good (22.22) and 3 fair (table 4).

All patients were followed up post-operatively till the end of the study

with a mean follow up period 20.6 months (table 5).

Group IIA (Arterial TOS)

Nine female patients with 10 affected limbs were included in this group. their age ranged from 22 to 54 with a mean of 37.6 years ± 11.3 (table 1) the right limb was affected more than the left one (7 versus 3). 6 dominant limbs 60% were affected in comparison to 4 non dominant limbs (40%). Four patients (45%) were manual worker (table 2).

- Supra and infra clavicular exposure in 6 limbs (60%) however, supraclavicular exposure was sufficient in 4 limbs (40%), the central part of the first rib was done in 7 limbs (70%). scalenectomy and cervical rib excision in 10 limbs (100%), excision of the diseased segment of the subclavian artery and primary anastomosis after subclavian thrombectomy was done in 8 limbs (80%), brachial exposure and thrombectomy in 2 limbs (20%). sympathectomy was done in 2 limbs (20%).
- All patients were followed up to a period ranged from 12 to 36 with a mean of 2 ± 8.1 months. (table 5). The distal pulse was palpated postoperatively in 8 limbs (80%).

The operations were worthwhile for all patients with excellent results in 8 limbs (80%) and good results in 2 limbs (20%).

Group IIB (Venous group)

Six patients were included in this group they were 3 females (50%) and 3 males (50%), their age ranged from 24 to 61 with a mean of 35.5 ± 14.4 years (table 1). All patients presented with unilateral manifestations, 5 patients presented with thrombotic subclavian vein occlusion and 1 patient presented with non thrombotic subclavian vein occlusion, the right limb was affected more than the left one (4:2 or 66.7 : 33.3) , 4 dominant limbs 66.7 were affected in comparison to 2 non dominant limbs, 3 patients were manual workers (50%) (table 2)

Duplex findings included : Acute thrombosis of the axillo subclavian vein in 5 limbs (83.3%). Patent axillo subclavian vein in neutral position and obstructed vein in AER position.

Venogram : Was done in the non thrombotic patient 16.7% and showed occlusion of the vein in AER only. Follow up venogram was done 3 months after conservative treatment in 2 patients with residual symptoms (33.3 %), revealed residual stenosis and dilated by ballon angioplasty . Three months later following up venogram was done to the same 2 patients and showed no beneficial effect of PTA.

Conservative treatment showed success in 3 patients (60%) and failed in 2 patients (40%), the success rate was (100%) for the 2 patients treated by surgical decompression. All patients were followed up for a period ranged from 10 to 40 with a mean of 20 ± 9.1 months (table 5) the results were excellent for 3 anticoagulated patients and the operated non thrombotic one (all 66.7%) , good for 1 patient (16.7%) and poor for the anticoagulated patient who refused surgery and accepted the limb disability present .

Table (1): Age and sex distribution of the studied group

		Descriptive		
		n	Mean \pm SD	Range
Neurogenic	All	35	32.8 \pm 9.4	18.0 : 54.0
	Female	29 (82.8%)	32.6 \pm 9.4	18.0 : 54.0
	Male	6 (17.14%)	34.0 \pm 10.5	16.0 : 46.0
Arterial	Female	9 (100%)	37.6 \pm 11.37	22.0 : 37.6
Venous	All	6	35.5 \pm 14.4	24.0 : 61.0
	Female	3 (50%)	28 \pm 5.29	24 : 34
	Male	3 (50%)	43 \pm 18	25 : 61

Table (2): Other demographic data of the studied group

		Neurogenic	Arterial	Venous
Manual workers		20 (57.14%)	4 (44.44%)	3 (50%)
Side	Left	14 (35.0%)	3 (30.0%)	2 (33.3%)
	Right	26 (65.0%)	7 (70.0%)	4 (66.7%)
Dominance		32 (80.0%)	6 (60.0%)	4 (66.7%)

Table (3): Radiological findings of the neurogenic group.

		N & %
Plain x-ray (n=40)	No Abnormality	2 (5.0%)
	Abnormal	
	• Incomplete unilateral cervical rib	7 (17.5%)
	• Incomplete bilateral cervical rib	3 (7.5%)
	• Complete unilateral cervical rib	8 (20.0%)
	• Complete bilateral cervical rib	10 (25.0%)
	• Unilateral long transverse process	2 (5.0%)
	• Bilateral long transverse process	8 (20.0%)
	• Anomalous first rib	0 (00.0%)
MRI (n=10)	• Complete rib	4 (40.0%)
	• Incomplete rib	6 (60.0%)
	• MRI bands	0 (00.0%)

Table (4): Comparison between scalenectomy and combined scalenectomy and 1st rib excision

	Scalenectomy ± Cervical rib excision N=22	Combined Scalenectomy ± Cervical rib with 1 st rib excision N=18	Risk difference
Operative time (min)	Range 60:100 Mean 77.2 ± 12.02	Range 80:120 Mean 93.3 ± 11.37	
Hospital stay (days)	Range 1:3 Mean 1.2 ± 0.55	Range 2:3 Mean 1.8 ± 0.58	
Complications nerve affection:			
Phrenic	0	1(4.54%)	0.056
Brachial	0	2(9.09%)	0.111
Outcome*			
Excellent	14 (63.64%)	11(61.11%)	
Good	6 (27.27%)	4(22.22%)	
Fair	2 (9.09%)	3(16.67%)	
Recurrence	1(4.54%)	0	0.045

* $\chi^2 = 0.566$ $p = 0.754$ **Table (5):** Duration of complaint and follow up of the studied group

	Mean \pm SD	Range
Neurogenic group		
Complaint (years)	1.4 ± 0.6	1:3
Follow up (months)	20.6 ± 7.1	9: 36
Arterial group		
Complaint (days)	7.1 ± 2.5	4:12
Follow up (months)	21 ± 8.12	12 : 36
Venous group		
Complaint (days)	34.1 ± 71.4	2 : 180
Follow up (months)	20.0 ± 9.12	10.0 : 40.0

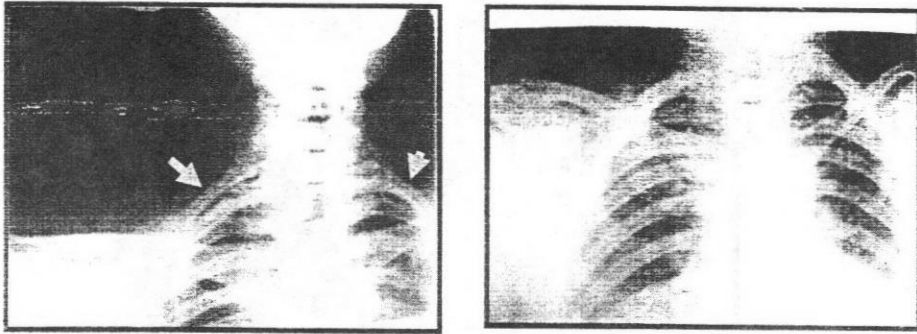


Fig. (1): Plain x-ray PA view of thoracic outlet region showing:

- (A) Bilateral complete bony cervical rib.
- (B) Early postoperative of Complete excision of the Rt. bony cervical rib of the same patient.

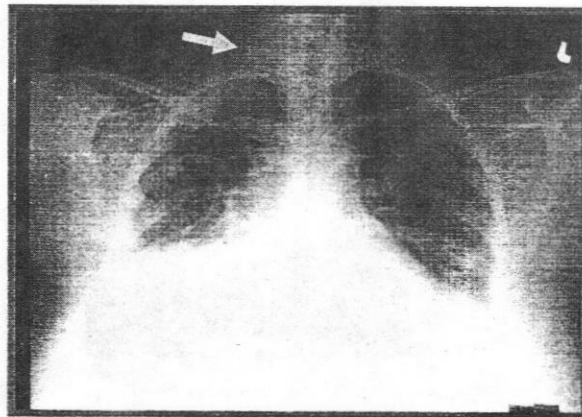


Fig. (2): postoperative x-ray PA view showing complete excision of the 1st rib.



Fig. (3): Preoperative female patient showing LT supraclavicular swelling and chronic ischaemia with dry gangrene of the tip of the middle finger.

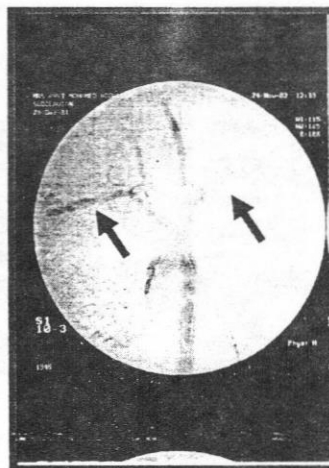


Fig. (4): Bilateral upper limb angiography: of patient in figure 3 showing complete arrest of dye at the second part of the left subclavian artery with no opacification of the distal arteries and dilatation of the right subclavian artery.

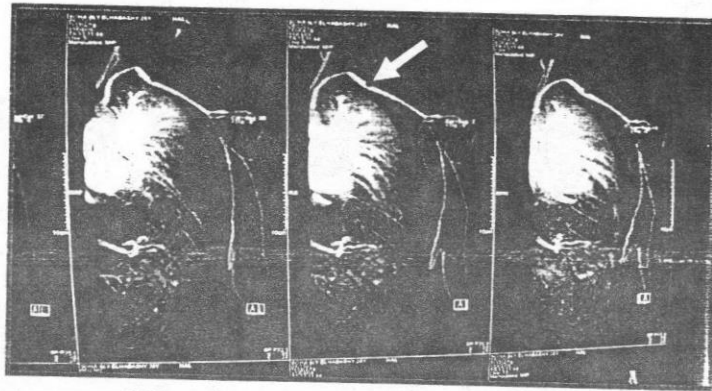


Fig. (5): Post contrast MR angiography showing Lt. Subclavian artery aneurysm with thrombus with distal brachial, radial ulnar arteries occlusion.

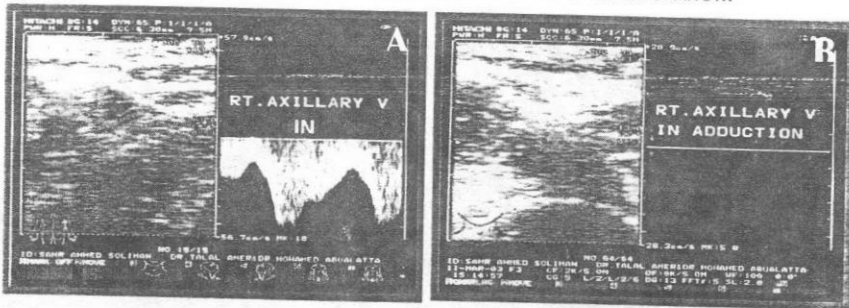


Fig. (6): Right upper extremity duplex showing .
A) initial duplex with good flow and waves.
B) positional duplex with the arm abducted and externally rotated with absent flow and no waves.

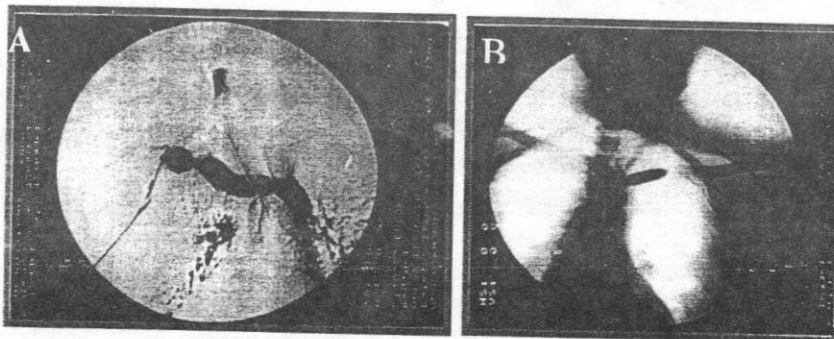


Fig. (7): Left upper extremity venogram showing
A) Complete reconalization with residual stenosis.
B) The same patient with ballon angiophosty.

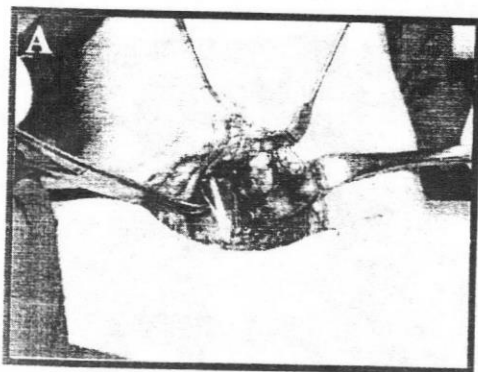


Fig. (8A): Phrenic nerve directly related to the anterior surface of the anterior scalene muscle.

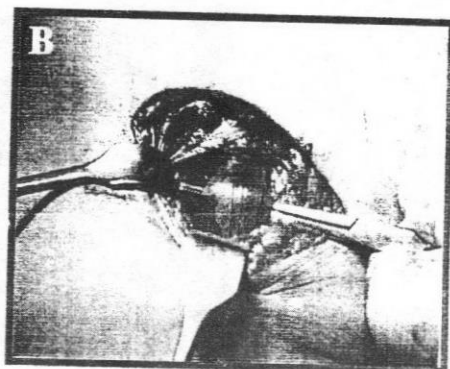


Fig. (8B): Scalenus anterior muscle appearing in the field behind the partially cut clavicular head of sternomastoid muscle.

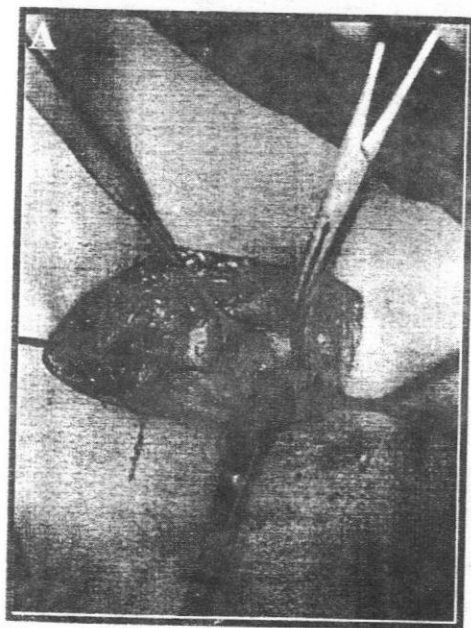


Fig. (9A): Supraclavicular incision showing hinging of the subclavian artery over the cervical rib with post stenotic aneurysmal dilatation.

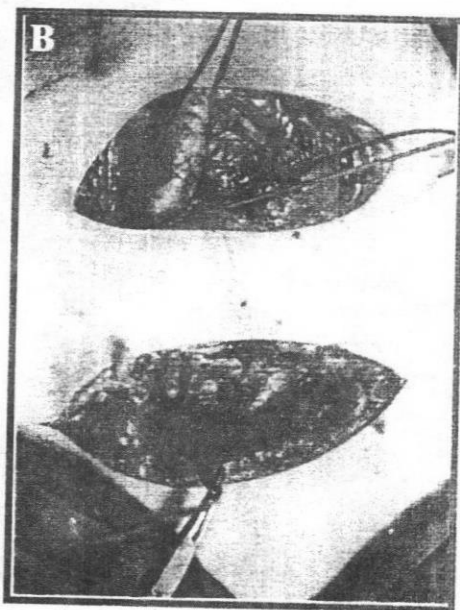


Fig. (9B): Supra and infraclavicular incision with subclavian aneurysm.

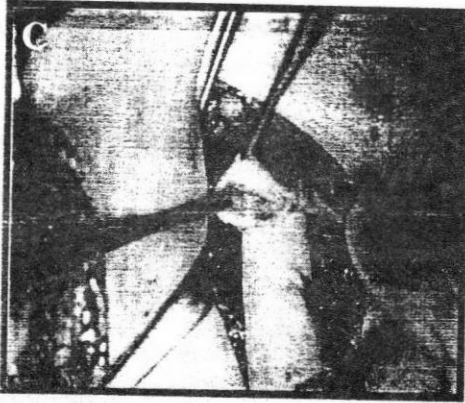


Fig. (9C): Longitudinal arteriotomy in the subclavian aneurysm showing the diseased intima inside.



Fig. (9D): Thrombectomy of brachial artery from inside the aneurysm using the fogarty catheter.

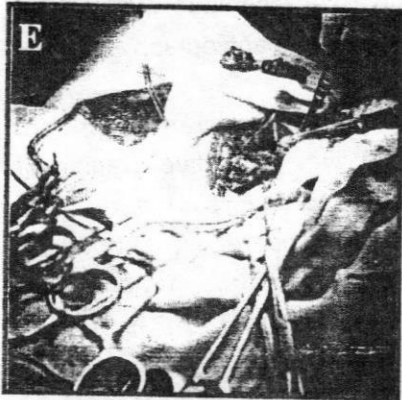


Fig. (9E): Primary anastomosis of the subclavian artery after excision of the aneurysm and cervical rib.

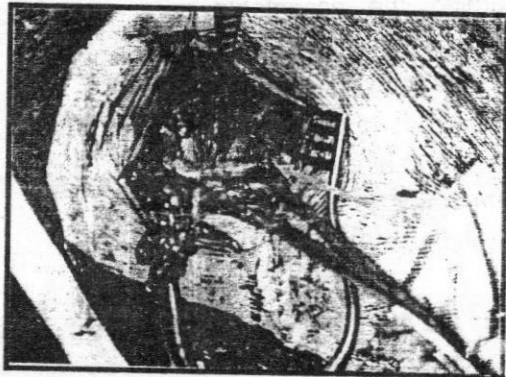


Fig. (10): Primary anastomosis of the subclavian artery after excision of the aneurysm via supraclavicular incision only.

DISCUSSION

Thoracic outlet syndrome is a surgical dilemma traditionally treated by vascular surgeons inspite of its main neurological presentation (5). The pathogenesis must be understood in terms of both anatomic variants and the dynamic factor (6).

In this study the incidence of bony abnormalities, primarily cervical ribs, was 80%. However, none had reported a history of trauma. This negative history cannot absolutely exclude "minor trauma" in the area, especially among 27 patients with manual occupations in the studied group.

Lack of objective finding in most neurogenic TOS patients has led to disagreement among physicians regarding the acceptable criteria for diagnosing TOS. One school of thought requires abnormal neuroelectric studies to secure a diagnosis (7), whereas the other relies on clinical data, namely history and a few physical findings (8).

In the present study the indications for surgery in more than 80% of patients of group I were subjective neurologic manifestations with no objective neurologic findings.

The presence of tender scalene, Tinel's sign over the brachial plexus, doubling symptoms on AER 90° position, and good response to scalene muscle block test were considered good predictor as a favorable outcome. These data are consistent with those of other published reports (6).

MRI in this study succeeded in demonstration of all cervical ribs previously discovered by plain radiographs in all examined cases. Panegyres et al., have described bands called MRI bands and decided that these bands often underlay the brachial plexus affection (9). In our study these bands unfortunately could not be detected in any examined case by our radiologist. However, MRA as a non invasive technique with no dye risk can replace angiography (Fig.5).

Most postoperative results are reported with subjective grading of success and failure of surgery to guarantee good results supports a conservative approach as a first choice in treating TOS, as well as treating associated conditions (6). In this study we found no more improvement of symptoms (plateaued) with conservative treatment over a mean period of 3 months.

In this study anterior and middle scalenectomy \pm cervical rib excision offer, statistically as good result as combined scalenectomy \pm cervical rib excision in addition to first rib resection. Our complication rate was low and all nerve affection complicated combined scalenectomy and first rib resection improved within one month by physiotherapy and medical treatment meaning that the nerve affection was due to traction not injury, the assessment of phrenic nerve affection was by chest fluoroscopy on two weeks interval while, that of the brachial plexus was clinically. No operations were preformed for recurrent TOS (recurrent TOS) was recorded in a patient underwent scalenectomy at two years follow up. In cases of double crush syndrome (more than 20% of this studied group) it is preferred to decompress the sites of compression simultaneously. These data are contestant also with those of other published reports (5).

In this study TOS patients with vascular symptoms comprise 30% of the TOS cases included in this study. The study of the arterial group confirms that the causative agent when arterial problems arise from thoracic outlet compression is always a bony

abnormality, especially cervical rib.

The therapeutic approach to the arterial complications of the thoracic outlet syndrome must be aggressive. It involves bony decompression, proximal arterial reconstruction and dealing with any additional distal embolic occlusion (10).

A supraclavicular approach either alone or in combination with an infraclavicular exposure facilitates the arterial reconstruction and allows adequate bony decompression. Thoracic outlet decompression is achieved by complete excision of the cervical rib. additional soft tissue compressive elements and first rib resection should be undertaken as a routine to improve associated neurologic symptoms when present and to allow excess length of the subclavian artery to be available for reconstruction. Arterial reconstruction in cases of aneurysm or stenosis can be done by resection and primary anastomosis. If the anastomosis under tension, a vein graft should be used (6).

Using these guide lines in our study resection of the diseased segment and primary anastomosis was performed in 8 limbs. However, first

rib resection was done in 7 patients after intraoperative assessment of the costoclavicular space and to facilitate primary anastomosis if preformed.

When the patient has acute limb threatening ischaemia and obliteration of the brachial and forearm vessels, several differing therapeutic options are available. When the runoff impaired by previous thrombo embolism with possibility of organized thrombus trials of disobliteration may be followed by extensive rethrombosis and may jeopardize the viability of the limb. Cervicodorsal sympathectomy is the most obvious surgical alternative to consider in these cases (3). Using these guidelines also, subclavian thrombectomy was done in 8 limbs, brachial thrombectomy in 2 limbs and cervicodorsal sympathectomy was done in 2 limbs no patient was in need for local lytic therapy.

Axillo subclavian vein thrombosis is a serious disorder that affects young, otherwise healthy patients and has the potential to cause significant long- term morbidity (11).

Many patients without axillary vein thrombosis can appear to have venous obstruction with provocative ma-

neuvers, as thoracic outlet dimensions are reduced markedly with abduction and external rotation of the arm (12).

Machleder recommend to delay surgery for 3 months after the acute process to allow healing of the venous endothelium (13). Early catheter directed thrombolysis can restore venous potency in most patients and improve the outcome of this disabling disease (14).

The treatment approach to primary axillosubclavian vein thrombosis in our study differs in that surgical decompression of the thoracic outlet is used relatively infrequently after an episode of axillosubclavian vein thrombosis. In this study it is clear that a conservative approach even in patients with mild symptoms results in some disability, with approximately 40% of patients having residual symptoms. Two patients (33%) underwent PTA, in fact had negligible improvement.

Two patients (33%) underwent surgical decompression via supra and infraclavicular incisions, complete excision of the first rib, scalenectomy, venolysis and neurolysis were done

as the patients show associated neurogenic symptoms. There were neither mortality nor morbidity affecting the patient life style of the studied group. All patients were followed up for a mean period of 20 months + 9 " range 10:38 months".

In conclusion treatment of neurogenic TOS is primarily conservative and should be aimed at the restoration of functional capacity. When surgical intervention for neurovascular TOS is elected, it must be considered as an exploratory.

Scalenectomy is as successful an operation as combined scalenectomy and first rib resection and has fewer complications; first rib resection is still indicated for patients with tight costoclavicular space after scalenectomy, patients with vascular manifestation and for patients with recurrence of thoracic outlet syndrome after scalenectomy.

The treatment of the arterial TOS must be surgical, aggressive and on emergency or semi emergency basis.

Surgical decompression of thoracic outlet syndrome is a worthwhile procedure and is associated with relatively few complications with expert

hands. Conservative treatment of the venous group is fallacious in about 40% of patients so surgical decompression is an attractive alternative especially in suitable situation and carefully selected patients.

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تقييم الطرق المختلفة لعلاج حالات الضغط على الأوعية الدموية والأعصاب عند المخرج الصدرى

تعتبر متلازمة الضغط على الأوعية الدموية والأعصاب عند المخرج الصدرى مصطلح يشتمل على أعراض تحدث فى الطرف العلوى نتيجة الضغط على الضفيرة العضدية والأوعية الدموية تحت الترقوية. فى هذا البحث تمنا بدراسة مقارنة مستقبلية غير عشوائية لبعض الطرق العلاجية المختلفة لعلاج هذه الحالات فى الفترة من يناير ٢٠٠٠ حتى مايو ٢٠٠٣.

وقد تم تقسيم المرضى حسب الأعراض الى مجموعتين :

المجموعة الأولى: المرضى المصابون بأعراض الضغط على الأعصاب وشملت ٣٥ مريضاً أجريت لهم ٤٠ عملية جراحية .

المجموعة الثانية: (أ) المرضى المصابون بأعراض الضغط على الشريان تحت الترقوى وشملت ٩ من المرضى أجريت لهم ١٠ عمليات جراحية.

المجموعة الثانية: (ب) المرضى المصابون بأعراض الضغط على الوريد تحت الترقوى وشملت ٦ من المرضى تم علاج ٤ حالات تحفظياً و ٢ جراحياً وتم توسيع الوريد فى حالتين ببالونة توسيع الأوردة بمساعدة الأشعة.

وكانت النتائج كما يلى :-

المجموعة الأولى: نسبة نجاح عملية استئصال العضلات غير المتوازية عند المخرج الصدرى والضلوع العنقى الزائد مصحوبة باستئصال الضلع الصدرى الأولى كانت (١٠٠٪).

المجموعة الثانية: ٢ أ- كانت نسبة نجاح عملية استئصال العضلات عند المخرج الصدرى والضلوع العنقى والضلوع الصدرى الأول مصحوبة بالطرق الجراحية المختلفة لعلاج إصابات الشريان الترقوى (١٠٠٪).

٢ ب- كانت نسبة نجاح العلاج التحفظى فى نهاية العام الأولى (٦٠٪) فى حين

فشلت عملية توسيع الوريد تحت الترقوى ببالونة توسيع الأوردة فى تحقيق أى تقدم ملحوظ وكانت نسبة نجاح استئصال العضلات عند المخرج الصدرى والضلع الصدرى الأول (١٠٠٪) فى الحالات التى إحتاجت للتدخل الجراحى.

الاستنتاجات والنصائح :-

لما كانت كفاءة استئصال العضلات عند المخرج الصدرى تقارب كفاءه استئصال العضلات عند المخرج الصدرى مصحوباً باستئصال الضلع الصدرى الأول وكذلك نسبة حدوث المضاعفات أقل بشكل ملحوظ فى العملية الأولى فإننا على ضوء ذلك نرى أن يجب الاكتفاء باستئصال العضلات عند المخرج الصدرى أما اذا كان اللجوء لاستئصال العضلات مصحوباً باستئصال الضلع الصدرى الأول فانه لابد أن يتم فى أضيق اأحدود وذلك عندما يكون هناك ضغط على الشريان أو الوريد تحت الترقوى أو فى حالة بقاء ضغط على الضفيرة العظمية بعد استئصال العضلات نظراً لكثرة تكرار المضاعفات ونصح من يتعامل مع مثل هذه الحالات وخاصة الشريانية منها أن يعتبرها عملية استكشافية وأن يكون لديه من الكفاءة ما يؤهله للتعامل مع أى عطب موجود فى منطقة المخرج الصدرى.