Venous Thoracic Outlet Syndrome: 
Lysis, Venoplasty, First Rib Resection; 
Staged Or Same Setting?

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No disclosures pertinent to this presentation

Anatomic Basis of Venous T.O.S.

Chronic subclavian vein injury produced by repetitive dynamic compression at the costoclavicular space

Neutral Position  Arm Elevation-Abduction Position

Venous T.O.S. : Treatment Algorithm

Suspicion of Axillo-subclavian vein Thrombosis

Confirm with Duplex U.S.

Immediate Heparinization

Expeditious Venogram/Thrombolysis (Max.3 weeks?)

Successful  Failure

Surgery/PTA-ASAP  Mid Term Anticoagulation

Aim of the Study

• To compare the result of venous thrombolysis and surgical decompression of the TO during the same hospital admission
• with those in patients who were treated in a staged fashion during separate hospital admissions

Methods

A prospectively collected database of patients treated for Venous TOS during a 9 year period was reviewed including:
• Demographics
• Procedural details
• Clinical and anatomic Outcome
• Cost estimates were obtained
TOS Decompression

First rib resection via supra & infraclav. incisions
PTA & Completion Venogram

Why two incisions?
S/P Trans-axillary 1st rib resection w/o resolution

Patients treated in 9 years

- 69 patients (53% female)
- Mean age 27 y. (Range: 14-59)
- Right side 44 (64%)
- Arm swelling/pain (100%)
- Average follow/up 11 months
- 46 (67%) treated during same admission
  - (initial thrombolysis and rib resection)
- 23 (33%) treated in staged admissions

Pathology

- 65 (94%) Vein thrombosis
- 4 (6%) Vein stenosis
- 13 (19%) Hypercoagulable state
  - 6 Heterozygous Factor V Leiden
- >7 (13%) Pulmonary embolism

Diagnosis and Treatment

- Diagnostic Venography in all
- 51 (74%) pre-op thrombolysis
- 48 (69%) pre-op anticoagulation
- 1.5 Trips to endo suite/patient (total 101)
- All underwent Rib resection & PTA
- All anti-coagulated 6 months

Anatomical Results by Ultrasound (11 m f/u)

- 40 (60%) widely patent
- 21 (29%) partially occluding thrombus
- 4 (4%) remained occluded
- 4 (4%) lost to f/u

Clinical Results

- 43 (66%) Symptoms resolved
- 22 (34%) Improved
RESULTS

<table>
<thead>
<tr>
<th></th>
<th>Widely Patent Vein</th>
<th>Residual Stenosis/Occlusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delay to Lysis</td>
<td>6.7 days</td>
<td>11.2 days</td>
</tr>
<tr>
<td>Delay to Decompression</td>
<td>77 days</td>
<td>115 days</td>
</tr>
<tr>
<td>Post-op Thrombosis</td>
<td>6%</td>
<td>41%</td>
</tr>
<tr>
<td>Trips to Endo Suite</td>
<td>1.1</td>
<td>2.2</td>
</tr>
<tr>
<td>Mean Hospital Stay</td>
<td>3.7 days</td>
<td>6.4 days</td>
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</tbody>
</table>

Results

<table>
<thead>
<tr>
<th></th>
<th>Staged Treatment</th>
<th>Single Admission</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptom Resolution</td>
<td>75%</td>
<td>91%</td>
<td>p=0.02</td>
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<tr>
<td>Venous Patency</td>
<td>70%</td>
<td>88%</td>
<td>p=0.18</td>
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<tr>
<td>Cost</td>
<td>$8,000</td>
<td>$0</td>
<td>$8,000</td>
</tr>
</tbody>
</table>

Conclusions

- Delay in lytic treatment and surgical decompression appears to be associated with lower venous patency rates.
- The treatment of VTOS during a single admission has higher rates of arm symptom resolution, less hospitalization and significant cost savings.
- Referral to centers where single stage treatment is feasible may improve results and reduce cost of treatment in these patients.

Thank you!