Treatment of Paget-Schroetter Syndrome

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Paget-Shroetter Syndrome

• “Effort thrombosis” of the axillo-subclavian vein

• Is 1% to 2% of all episodes of venous thrombosis

• Incidence in US of 3,000 and 6,000 cases per year

• Mean age at presentation is in the early 30s

• 2:1 male-to-female ratio
“Effort thrombosis”

- 80% of patients with Paget-Schroetter syndrome report strenuous physical activity involving the upper extremities
- Typically younger patients who participate in competitive athletics
  - Overhead motion of the arm such as pitching, volleyball
  - Muscle development of the neck and shoulders such as weight lifting
- Or patients involved in a physically demanding occupation
  - Repetitive motion of arm over the head
  - Carrying heavy objects on the shoulder
Mechanism of thrombosis

- Compression of the subclavian vein at the thoracic outlet
  - Vein lies in the anterior aspect of the thoracic outlet
  - Compression by the junction of the first rib and clavicle
  - Compression as well between the subclavius and anterior scalene muscles

- Repetitive shoulder abduction causes compressive shearing injury
  - Fibrotic tissue around the subclavian vein
  - Venous wall fibrosis and thickening
  - Intimal damage with thrombogenic surface can result in acute thrombosis
Venography of subclavian vein compression

Arm at the side

Arm abducted
Presentation

• Acute thrombosis
  • Asymptomatic until sudden onset of arm swelling and pain
  • Increases over several hours to a day or two
  • Venous engorgement
  • Typically related to arm use event

• Subacute presentation
  • Progressive pain and swelling of the arm that increases over several weeks
  • May have been related to excessive arm use
  • Collaterals present on the shoulder/chest/neck

• Chronic
  • May have had this for years
  • Has had to limit use of the arm
  • Large collaterals and venous engorgement
  • Edema typically related only to use of the arm
Treatment of the thrombus

• Catheter directed pharmaco-mechanical thrombolysis
  • Ultrasound guided access to place access distal to any thrombus in the arm
  • TPA infusion
    • Standard side-hole catheter
    • EKOS
  • Mechanical disruption
    • Often required in delayed or sub-acute presentation
    • Masceration of thrombus with aspiration
    • Angiojet
    • Balloon
    • Terratola device
• Use of balloon in the narrowed TOS segement after thrombolysis controversial
  • Concern of increasing venous damage at the compressed site
34 year old male psychiatry resident
Active in recreational sports as well as a drummer
Mechanical thrombus disruption and aspiration

Terratola device in the subclavian thrombus

After Terratola and aspiration
Repeat disruption and aspiration and PTA

He was anticoagulated for 6 months and elected not to pursue first rib resection
First rib resection

• The standard for treatment of the problem after successful thrombolysis
• Often done in the next few days to weeks
• Supraclavicular approach
  • Allows for venous repair with endovenectomy/patch or bypass if vein injury severe
• Transaxillary approach
  • Less pain and cosmetic concerns
  • Does not allow for venous repair
• Follow up venography essential for both approaches
Residual disease in the vein at follow up

• Repeat PTA is recommended

• Stenting reserved for repeated failure after first rib resection and repeat PTA

• Stenting is a reasonable alternative but still carries a risk of fractures---even after first rib resection

• Active individuals may benefit from bypass in this setting

Summary

• Venous TOS can be successfully treated with early thrombolysis and first rib resection
• Occasionally early treatment with minimal venous damage can be treated with thrombolysis and anticoagulation alone with avoidance of the inciting arm activity and not require first rib resection
• Follow up venography after first rib resection is recommended
• Adjunctive stenting should only be considered after first rib resection and failure of post rib resection PTA
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