Progress in Robotic First Rib Resection For TOS: Advantages, Limitations And Costs
Hans Covelliens, MD, PhD, MBA
ASZ Hospital, Alost, Belgium

No Disclosures
Hans Covelliens, MD, PhD, MBA

Paget-Schroetter Disease

- “Effort Thrombosis” of the Subclavian Vein
- Type of Thoracic Outlet Syndrome
- Excessive Arm Activity combined with a compressive element at the Thoracic Inlet
- Paget of London --1875
- von-Schroetter of Vienna –1884

Management

- Thrombolytic Therapy
- Anticoagulation
- First Rib Resection
- Subclavian Venoplasty
- No Role for Anticoagulation alone
- Best Long Term Results: Prompt Thrombolytic Therapy followed by First Rib Resection and Short term Anticoagulation
Paget-Schroetter Disease Controversies
- True Pathophysiologic Mechanism
- Bilaterality
- Ideal Surgical Approach
- The extent of First Rib Resection
- Need for Scalenectomy
- Appropriate Management of Patients with Prolonged Subclavian Vein Occlusion

Paget-Schroetter Disease Surgical Approach to First Rib Resection
- Posterolateral Thoracotomy
- Anterior Thoracotomy
- Transaxillary
- Supraclavicular / Infraclavicular Approach
- Thoracoscopy

Paget-Schroetter Disease Shortcomings of Surgical Approaches
- "Key Hole Surgery" with All Surgical Approaches
- Poor Visualization of the Medial Aspect of First Rib
- Long Thoracic Nerve Injury
- Injury of Superficial Cervical Nerves
- Brachial Plexus Injury
- Inadequate Rib Resection

Robotic Surgical Systems
Paget-Schroetter Disease

Surgical Robot

Direct Minimally Invasive Transthoracic Approach to the Resection of First Rib and Scalenectomy

How to Do It: Surgical procedure

General anesthesia
Single lung ventilation
4 phases

Phase I: Thoracic access
Right lateral decubitus
1. Camera
2. Robotic Endograsper
3. Hook

Orientation!!

Phase II: floating rib

Phase III: VATS transsection
Phase IV: Robotic assisted venolysis

CSJ: costosternal junction
A: subclavian artery
R: lateral part first rib

Postoperative Care

Regular surgical ward
Chest tube (15cmH2O)
CXR
In Hospital 2 days

Advantages

- Anatomical: complete visualization/resection anteromedial/costosternal region
- Da Vinci system
- 3D vision
- Agility of endowrist
- Additional Venolysis
- Less Nerve Injury

Limitations

- Anatomical: visualization/resection posterior-lateral region: complete resection?
- Da Vinci system
- nTos : neurolysis?
- Resection of cervical rib
- Transthoracic access problems

Costs

- Da Vinci system
- Disposable material (trocarts, cauterization hook, grasp)
- Time : mean time 150 minutes
In Conclusion,
Robot-assisted first-rib resection is a feasible minimal invasive approach for first-rib resection in the management of thoracic outlet syndrome. This technique has the possibility to reduce the risks of neurovascular complications because of better sight and enables the surgeon to perform a more extensive venolysis at reasonable cost.

Thank you for your attention

Hans Coveliers, MD, Ph, MBA
ASZ Hospital Belgium
hans.coveliers@asz.be