
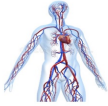


Treatment Options For Venous Thoracic Outlet Syndrome In Dialysis Patients

VEITH 2024 (7 min)

Center for Quality, Effectiveness, and Outcomes in Cardiovascular Diseases




Disclosures

- Specific Disclosures
 - None
- General Disclosures
 - None

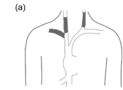

Central Venous Stenotic Disease

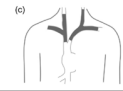

- 7-40% of patients needing a central venous catheter for dialysis
- 19-41% of hemodialysis patients who have had a prior central venous catheter
 - Half of these patients will be asymptomatic before placement of an ipsilateral arteriovenous access site
- True incidence of vTOS in HD is not known




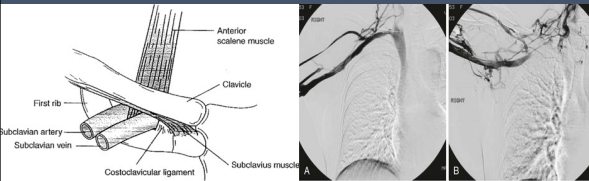
Thoracic Central Venous Obstructions

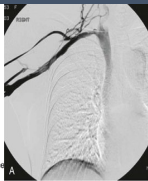
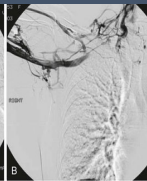
- Type 1: obstruction of right internal jugular (IJ) vein with or without obstruction of left internal jugular or one subclavian vein;
- Type 2: obstruction of IJ with extension into the brachiocephalic vein;
- Type 3: obstruction of bilateral brachiocephalic veins with involvement of cephalic superior vena cava;
- Type 4: obstruction of the entire superior vena cava preventing flow to right atrium.



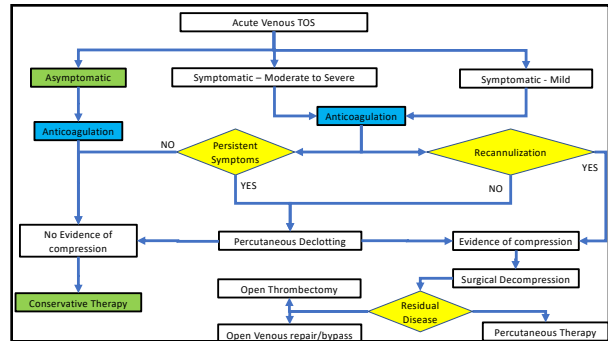
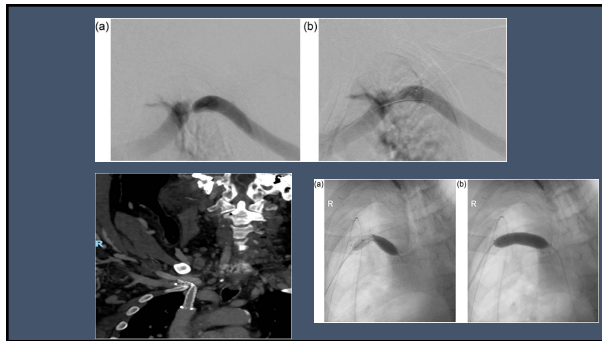


vTOS pathophysiology to consider

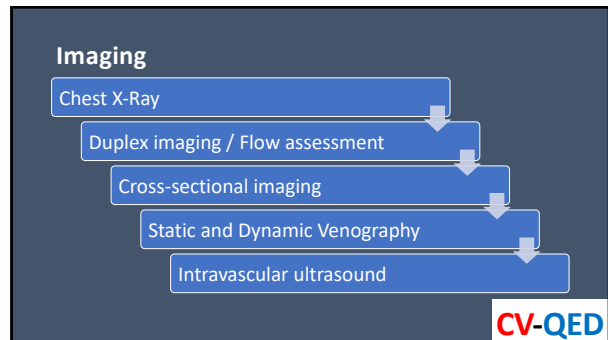
- **Intrinsic Injury**
 - Luminal
 - Mural
- **Extrinsic Injury**
 - Bone
 - Soft Tissue
- **Iatrogenic Injury**
 - Post intervention remodeling /inflammation
 - Endotrash
- **Compensatory issues**
 - Collaterals





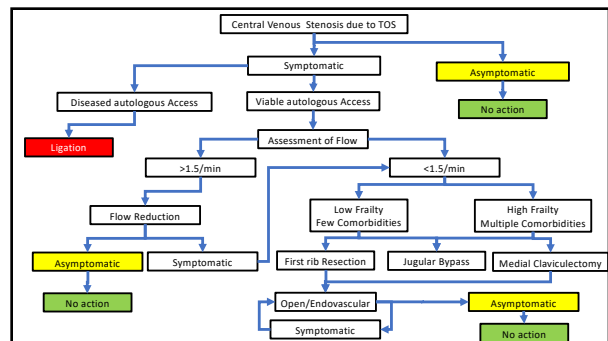
Presentation **CV-QED**

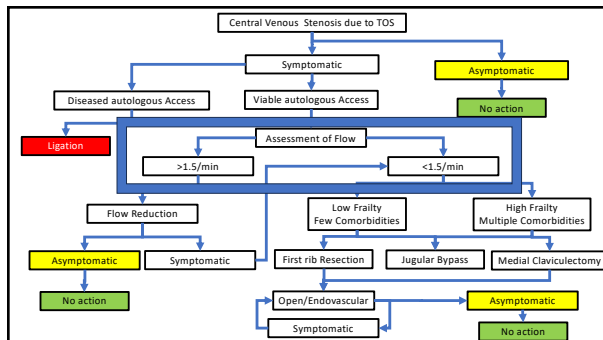
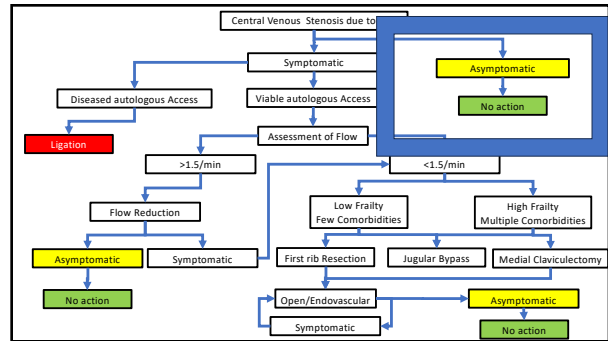
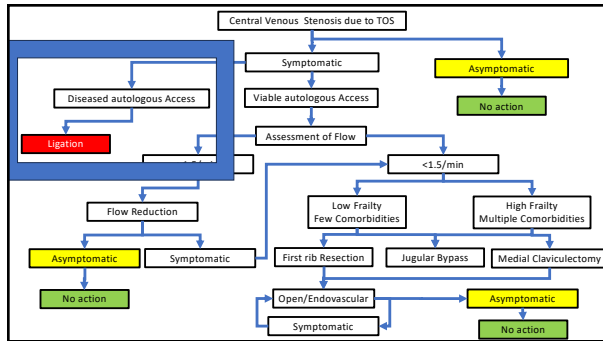
- Symptoms
 - Arm Swelling
 - Reduced ROM
 - Pain
- Function
 - Dysfunctional hemodialysis
 - High venous pressures
 - Increased Bleeding



Decision Making **CV-QED**

- Presentation
- Dialysis History
 - Is the current access viable?
 - What access real estate is left?
 - What were the prior interventions?
 - Is PD still an option?
- Physiological Risk
 - Comorbidities
 - Frailty
 - Longevity

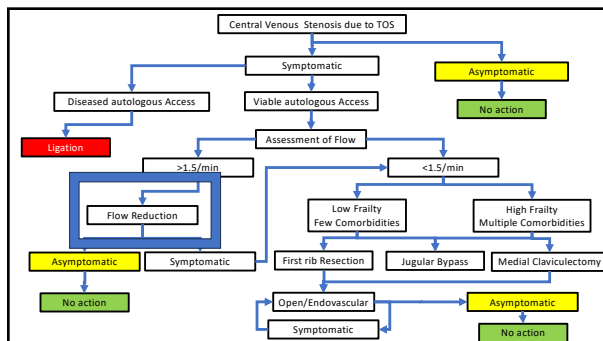




Interventions

- Flow reduction Techniques
- Endovascular interventions
- Catheter-based interventions
- Subclavian vein Reconstruction or Bypass
- Decompression Techniques

CV-QED

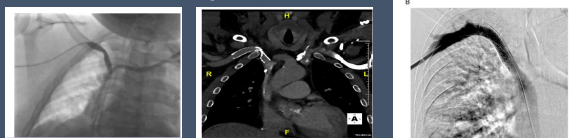


Flow reduction Techniques

- Flow reduction Techniques
- Banding
- Plication
- Interposition grafting
- Proximalization

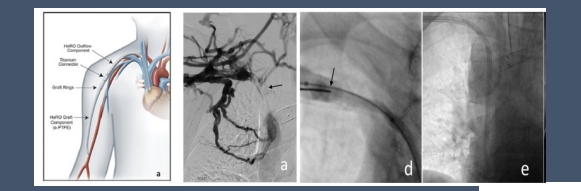
Endovascular interventions

- Endovascular interventions
 - Primary
 - PTA
 - Secondary (after decompression)
 - Covered Stenting



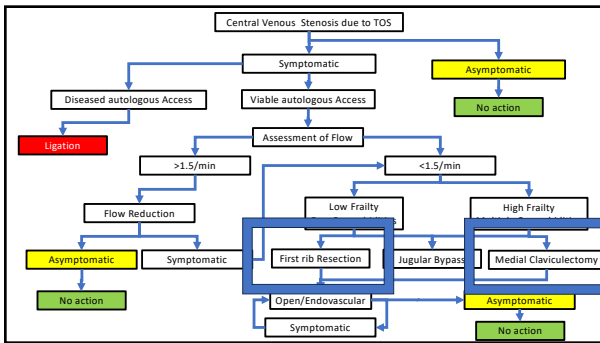
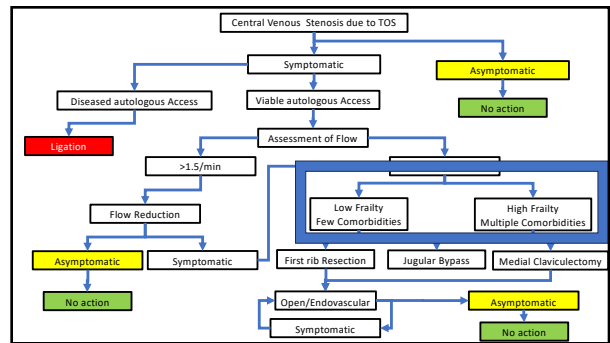
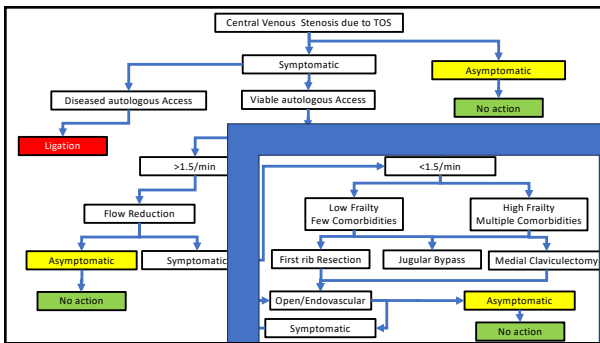
Catheter-based interventions

- HERO



HERO Graft: Indications, Technique, Outcomes, and Secondary Intervention
David M. Sacks, MD, MPH¹, Robert Kozum, MD, PhD²

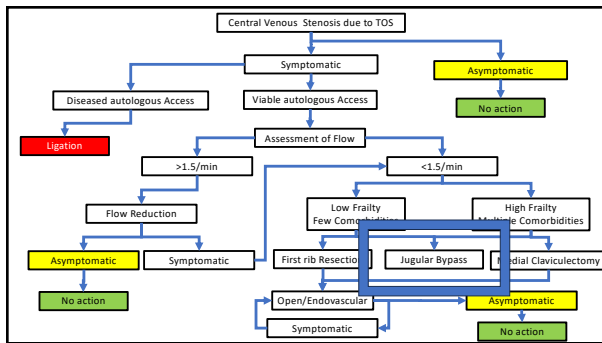
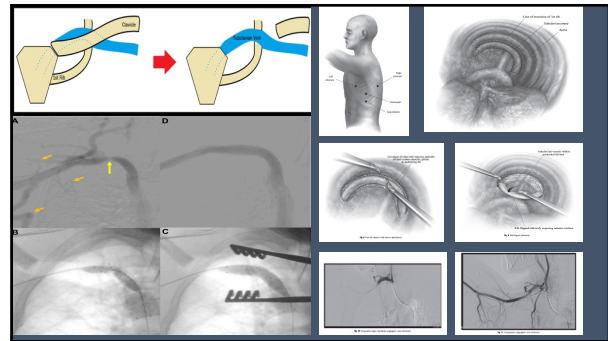
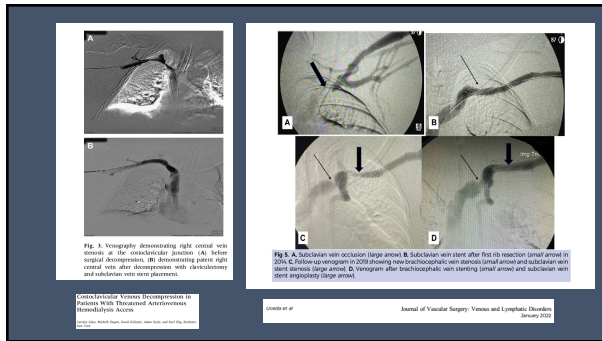
CV-QED



Decompression Techniques

- Decompression Techniques
 - Anterior Approach
 - Medial Claviculectomy
 - Trans-axillary Approach
 - Robotic Trans-thoracic
- Secondary Venous interventions
 - PTA and Stent
 - PTA and Covered Stenting
 - Reconstruction

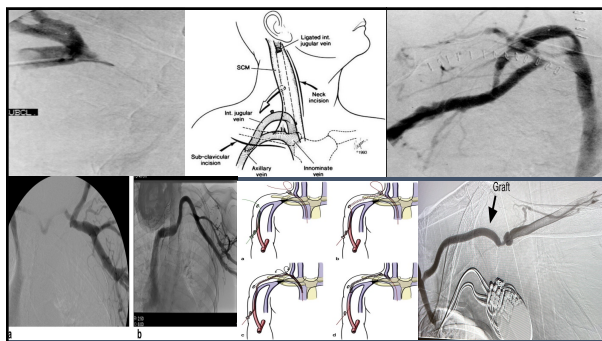




Subclavian vein Reconstruction or Bypass

- Subclavian vein Reconstruction or Bypass
 - Bypass
 - Internal jugular
 - Right atrium
 - Reconstruction with First Rib Resection
 - Bypass
 - Autologous
 - Allograft
 - Prosthetic
 - Patch
 - IJV Turndown

CV-QED



Year	Author	Reference	n	1st Rib Procedure				EV Interventions				Open Interventions		
				Trans/Axillary	Anterior Approach	Partial claviculectomy	No EV Intervention	Angioplasty	Uncovered Stent	Covered Stent	Patch Angioplasty	Bypass		
2011	Glass	10	10	6	0	4	2	5	3	0	0	0	1	
2015	Hilig	11	24	0	21	3	0	0	1	0	0	0	2	
2019	Auxiang	12	21	0	0	21	0	4	11	6	21	0	0	
2019	Wooster	13	34	0	31	5	6	0	34	0	0	0	0	
2019	Edwards	14	4	0	0	4	0	0	0	0	0	0	4	
2022	Lim	15	19	18	0	0	10	7	3	0	0	0	0	
2022	Ueda	16	15	5	10	0	0	0	7	8	0	0	0	

Year	Author	Reference	F/U Months	MACE	Outcomes		
					1-yr Primary	1-yr Secondary	1-yr Access Functionality
2011	Glass	10	7	0%			
2015	Hilig	11	10	0%	40%	85%	85%
2019	Auxiang	12	17	0%	28%	84%	68%
2019	Wooster	13	11.9	6%	NR	NR	NR
2019	Edwards	14	30	25%	NR	NR	NR
2021	Lim	15	39	0%	43%	69%	53%
2022	Ueda	16	35	0%	33%	NR	NR

F/U = Follow Up
NR = not reported
MACE = Major Adverse Cardiovascular Events

