Disclosures

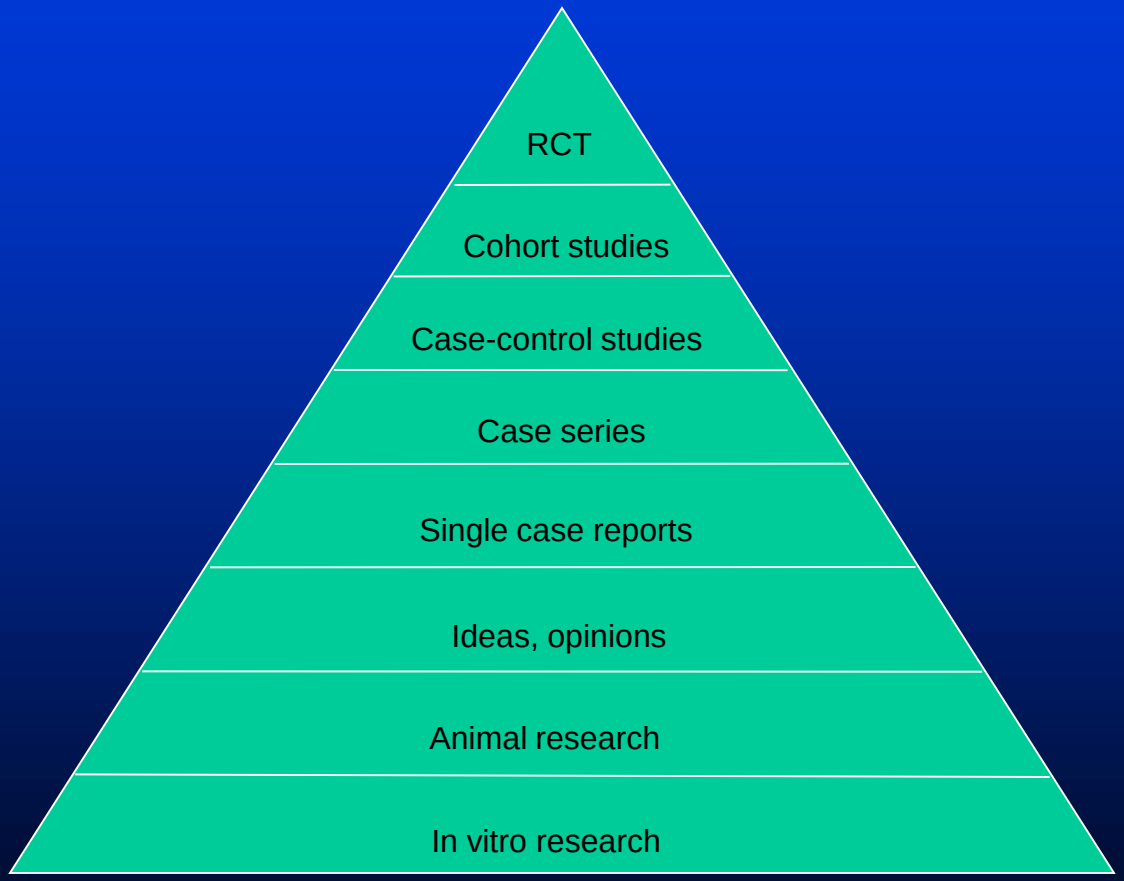
Consultant/Independent Contractor:
B Braun, Teleflex, MedComp, Cook, Bard, WL Gore
Royalty: Cook, Teleflex

Penn IR

What You Don't Know About Central Venous Stenosis

Penn IR

CVS: Long on opinion, Short on Evidence



Penn IR

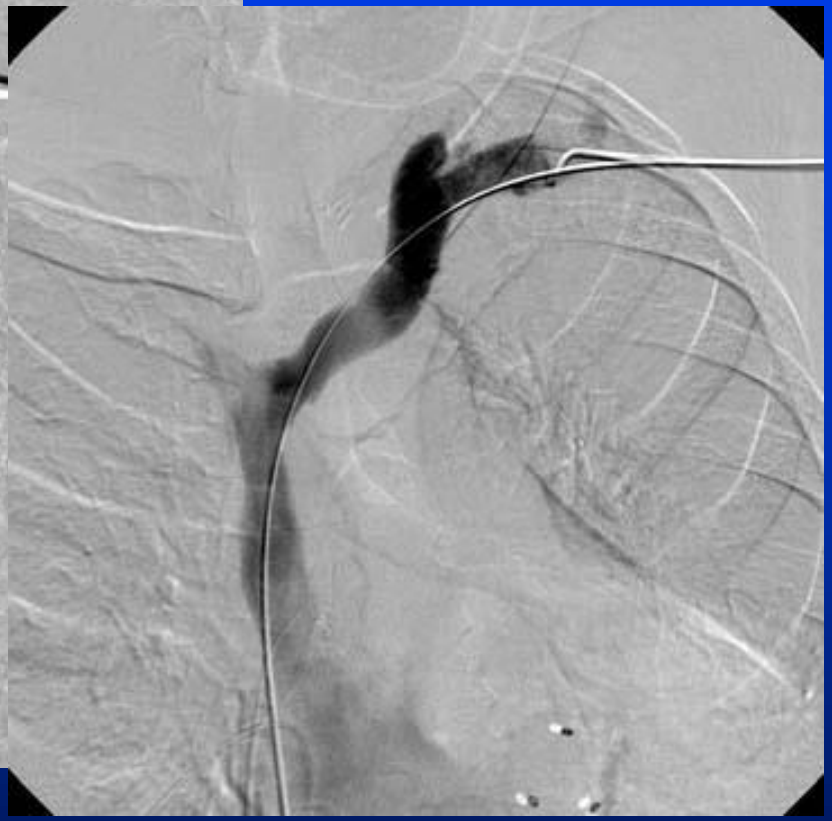
Myth #10: Adequately tailored (diameter and length) stent grafts are available for the treatment of central venous stenosis in France

- Largest self-expanding SG in France 14 mm
- New balloon-expandable SG up to 16 mm
- SCV diameter 12-14 mm
  - Some SG barely adequate
  - SCV stenosis now less common than BCV
- BCV diameter 14-18 mm
  - Left long and tortuous-no good device
  - Right short/straight-new BESG may be ideal
- SVC-not relevant (see Myth #6)

Penn IR

Arm swelling, LUA fistula

PTA 14 mm



PTA 16 mm

Penn IR

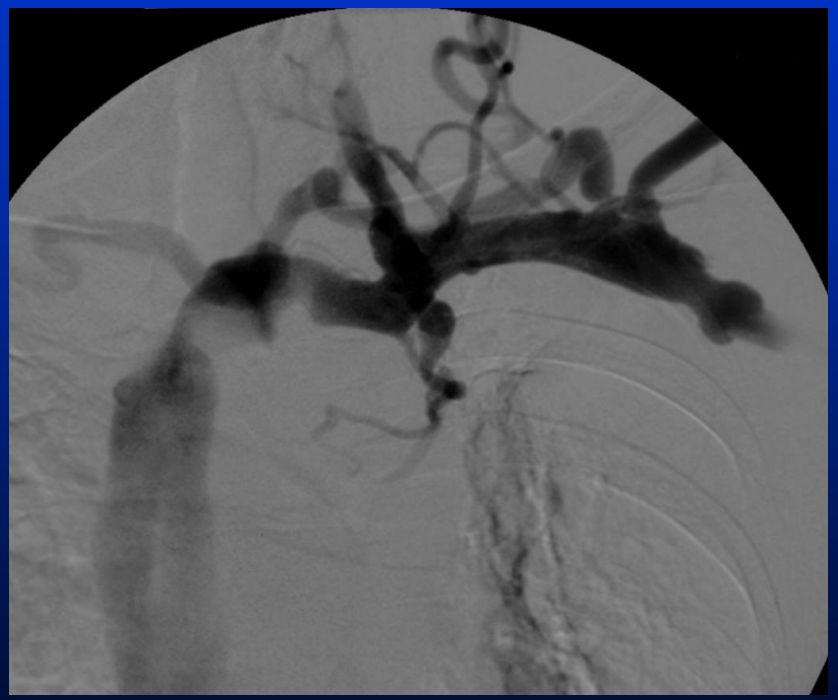
Myth #9: All central venous occlusions must be treated with stents or stent grafts

- No RCT exists
- Available Level 2 and lower data contradictory
- Major downsides if misplaced
- Thus, risk without benefit at present
- RCT desperately needed

Penn IR

Myth #8: All central venous stenosis is caused by prior catheterization

- Primary
  - Primary axillosubclavian thrombosis
  - Extrinsic compression
  - Malignancy
- Secondary
  - Catheters
  - Trauma
  - Pacemakers
  - ? High flow*



*Oguzkurt et al Eur J Radiol 2005;55:237-242

Myth #8: All central venous stenosis is caused by prior catheterization

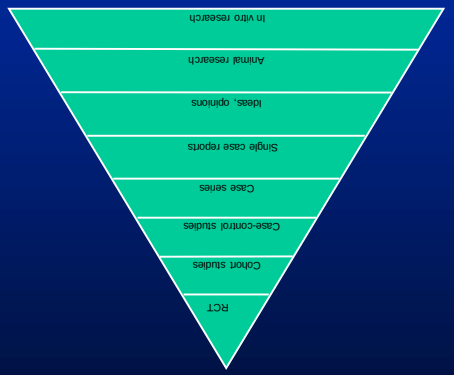
- 103 pt w/CVS, half symptomatic
- 63% of pts had NO prior catheter
- All had fistulae
- Flow?

Renaud et al, NDT 2012, 27;1631-1638

Penn IR

Myth #7: Central venous stenosis usually affects access function and/or flow

- Little evidence that CVS affects access function
  - Exception is high anastomosis with proximate CVS (high axillary, chest wall) where CVS is VOS
- Available evidence shows little relationship*
  - Prospective study, n=25



*Yan et al, JVIR 2015;26:984-991

Penn IR

CVS and Intra-access Flow

- Before PTA of CVS: 1424 ± 635 mL/min, range 565 – 2765 mL/min
- After PTA of CVS: 1535 ± 627 mL/min, range 598 – 2545 mL/min
- Mean change in flow from before PTA of CVS to after PTA of CVS
  - 111 ± 456 mL/min, range ↓1372 – ↑892 mL/min
  - 15 ± 34 %, range ↓70% – ↑100%
- 95% CI for percentage change in flow after PTA of CVS: 1% - 29%

Yan et al, JVIR 2015;26:984-991

Penn IR

Clinical Results

- CVS symptoms were reduced in 23 (96%) pts
- Ipsilateral HD-access-related swelling recurred in 14 (58%) patients within a mean of 110 days (range 7 – 459 days) after PTA of CVS
- Mean follow-up was 371 days (range 17 – 592 days)

Yan et al, JVIR 2015;26:984-991

Penn IR

Myth #6: SVC syndrome in HD patients is caused by SVC stenosis

- True SVC stenosis uncommon in HD population, even when CRDs in place
- Most SVC syndrome caused by bilateral BCV disease
  - Prior trach exacerbates
  - Jugular disease can be a factor
- Critical to understand this relationship for correct treatment

Riutta JC et al, JVIR 2005;16:727-731

Penn IR

Patient with long-standing left arm fistula, no arm swelling

Penn IR

Myth #5: Symptomatic central venous stenosis is manifested by arm swelling alone

- Arm swelling most common
- Unilateral breast swelling
  - w/o arm swelling
  - Mistaken for inflammatory breast CA
- SVC syndrome (see Myth #6)
  - Neck swelling, face swelling w/o full blown SVC syndrome
- Leg swelling (thigh access)

Penn IR

Clinical Nephrology, Vol. 75 – Suppl. 1/2011 (S56-S59)

Unilateral breast swelling as a complication of innominate vein stenosis in a hemodialysis patient

U. Yalavarthy[1], V.K. Agrawal[2] and A. Showkat[1]

One of many…

Penn IR

Myth #4: Internal jugular catheters don't cause central venous stenosis

- US: Fistula First Catheter Last program working on reducing catheters
- Infection major focus
- CVS still common from catheters in IJ era ~10%
- Much more common w/SVC (~50%)
  - Loss of institutional memory

Penn IR

Myth #3: Central endovascular interventions are the only way to manage CVS

- PTA is the mainstay
- Stents/stent-grafts presently backup
- BUT other options to consider
  - Flow reduction
  - Clavicle-first rib complex release
  - Bypass (SCV lesions)
  - Watchful waiting esp if fistula and mild sx
- Interplay between flow and central obstruction needs research

Penn IR

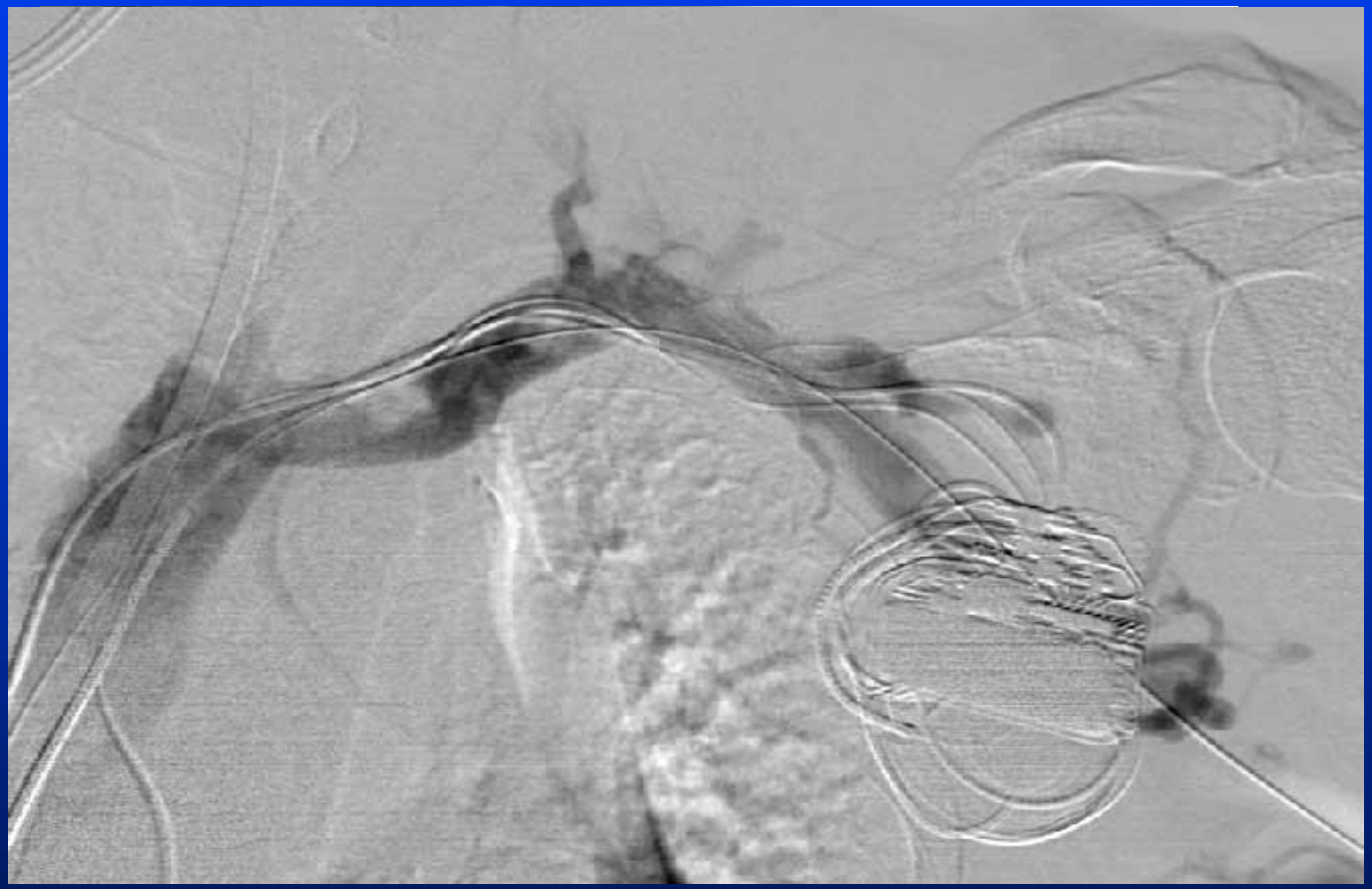
Myth #2: It's "OK" to stent over cardiac rhythm device wires

- >50% of veins traversed by CRDs stenotic or occluded
- CRDs still common in ERSD population
  - Use waning esp prophylactic
  - Transition to epicardial
- Published guidelines against stenting across* (PTA mainstay…)
  - Have discussion w/EP before stent/SG

*Wilkoff BL et al, Heart Rhythm 6:1085–1104, 2009

Penn IR

Penn IR



Not great but leave it

Penn IR

Myth #1: All central venous stenosis should be treated regardless of symptoms

- Common, esp with fistulae
- Collaterals provide decompression
- Treating asx patients can worsen CVS[1]
  - No untreated pts progressed
  - 8% of treated asx worsened or escalated
- Asx CVS progresses slowly if at all[2]
  - 40% progression to sx at 4 years
  - No decrement in results in spite of waiting to sx

[1]Levit et al Radiology 2006;238:1051-1056

[2]Renaud et al, NDT 2012, 27;1631-1638

Penn IR

Left forearm AV fistula, no symptoms, unchanged for years
CVS prevalence 50% in US fistula patients, most asymptomatic*

*Trerotola et al, JVIR 2015;26:240-246

Penn IR

Top 10 Myths About CVS

1. All central venous stenosis should be treated regardless of symptoms
2. It's "OK" to stent over cardiac rhythm device wires
3. Central endovascular interventions are the only way to manage CVS
4. Internal jugular catheters don't cause central venous stenosis
5. Symptomatic central venous stenosis is manifested by arm swelling alone
6. SVC syndrome in HD patients is caused by SVC stenosis
7. Central venous stenosis usually affects graft or fistula function
8. All central venous stenosis is caused by prior catheterization
9. All central venous occlusions must be treated with stents or stent grafts
10. Adequately tailored stent grafts are available for the treatment of central venous stenosis in France

Penn IR