How To Treat Resistant Central Venous Occlusion: A New Technique

Antegrade wiring with retrograde ballooning and stenting

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What is your diagnosis?

SA, female, 79 yrs old

- Progressive edema of the left upper arm, neck, face and left chest with venectasia since 3 months
- CAD, PCI with 2 DES implanted 2005
- Chronic renal failure, on chronic hemodyalisis 2007
- Risk factors: Hypertension (1999), Dyslipidemia

Lab: Hb 9.1 g/dL, ureum 105 mg/dL, creatinine 6.28 mg/dL

ECG: old anteroseptal wall MI.

Chest film: cardiomegaly, no congestion

MR-venography: stenosis of left brachiocephalic vein
Central Vein Stenosis (CVS):
One of the most common causes for AV fistula & AV graft dysfunction in chronic hemodialysis (HD) pts

- Incidence: 11-40%\(^1,2\)


- Symptom\(^3-9\):
  - May be asymptomatic,
  - But can result in edema of the ipsilateral extremity, face, neck or chest, possibly superior v. cava syndrome due to high flow of blood through the HD fistula or graft
  - Elevated venous pressure may lead to prolonged bleeding from needle sites after dialysis, significantly declined in access blood flow & inadequate HD

Central Vein Stenosis (CVS): When & How to Treat

- **When to treat?**
  - Symptomatic CVS (edema of upper extremity, face, chest wall)
  - Inadequate HD secondary to CVS
  - CVS with thrombosis of AV access
- **How to treat?**
  - Surgery: difficult as vessels are located deep in chest placement
  - PTA with stenting: after crossing the lesion (Terumo Glidewire or excimer laser), use 0.035” Amplatz superstiff to aid balloon dilatation & stent placement

Brachiocephalic Vein Occlusion

What would be your strategy?

Total occlusion of brachiocephalic vein (BCV) (arrow: “nipple” – starting point to begin probing with the Glidewire)
Brachiocephalic Vein Occlusion

Total occlusion of brachiocephalic vein (BCV) (arrow: “nipple” – starting point to begin probing with the Glidewire)

What would be your next strategy?

Even “made stiffer ‘Terumo Glidewire (by gradually cutting its distal end for a 5-15 mm) failed to cross the occlusion site”
What Would Be Your Next Strategy?

1. Retrograde approach using stiffer guidewire:
   - Risk of false root & perforation
2. Retrograde approach guided by antegrade contrast injection:
   - If yes, where to choose the access
3. Surgical correction
4. Others
Brachiocephalic Vein Occlusion

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Dialysis needle (AV fistula set) introduced in the Cimino shunt.

Retrograde contrast injection though the dialysis needle showed a long occlusion in the BCV
Antegrade Wiring

300 mm Fielder Guidewire introduced via the dialysis needle could antegradely cross the occlusion & enter the RA
It Is A Very Thin Coronary Wire ... 

What to do next?

1. Pull the dialysis needle out, introduce a sheath & catheter, then do balloon dilatation, etc.
2. Externalize the antegrade wire, introduce a sheath & catheter, then do balloon dilatation, etc.
Fielder FC wire was snared (arrow), pulled down & externalized. Subsequently the sheath & GC was easily changed to a bigger GC (9F MPA)
Balloon dilatation

Stepwise dilatation from 4.0 to 8 mm (maximum BCV diameter of this lady) with high pressure balloon

Externalization of the 300 mm Fielder FC wire provides a very strong support to introduce balloon (& later stent)
Successful Recanalization

Central venogram through 9F MPA guiding catheter (GC) showed successful recanalization.
SMART 10x60 mm (oversized 2 mm relative to the BCV diameter) stent introduced into the GC & appropriately positioned ensuring that the entire lesion is covered.

GC was retracted & stent was slowly & successfully deployed.
Excellent final result: Venogram after postdilatation to appose stent to the vessel wall

(note: patent internal jugular vein)

- Dialysis needle was subsequently used for post-procedural hemodialysis
- Ipsilateral upper arm, neck, face and chest edema disappeared completely on day 2.
Antegrade Wiring with Retrograde Ballooning & Stenting is an Excellent New Technique for Endovascular Treatment of CVS

**Summary:**
- Antegrade wiring with retrograde ballooning & stenting is a feasible alternative if conventional retrograde approach failed.
- Externalization of antegrade wire will provide an extraordinary good back up support for ballooning and stenting.
- Other potential variation of the technique:
  - For antegrade access: 6-7F sheath (instead of dialysis needle)
  - For antegrade wiring: 260 – 300 mm Fielder FC or rotawire (+ microcatheter or MP catheter with OTW balloon for back up support)