

*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 hemodialysis 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

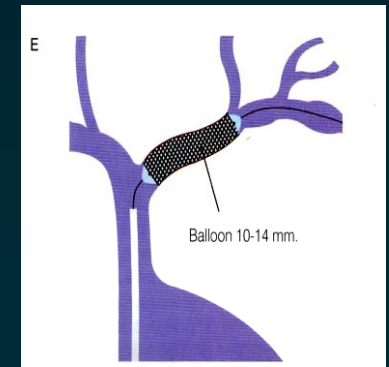
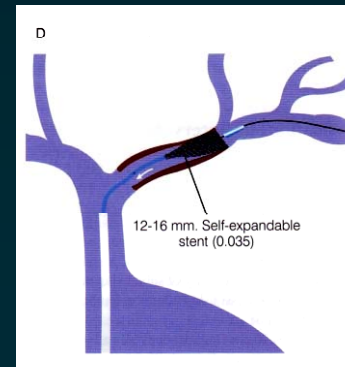
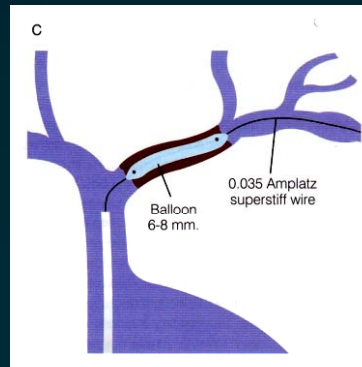
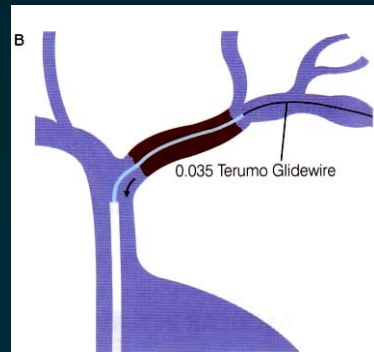
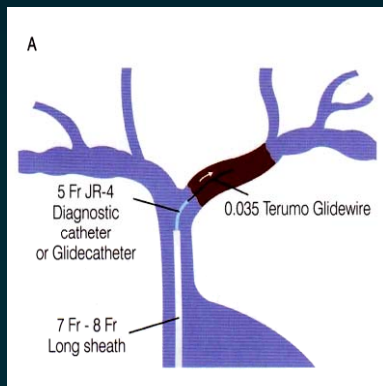
Central Vein Stenosis (CVS):

One of the most common causes for AV fistula & AV graft dysfunction in chronic hemodialysis (HD) pts

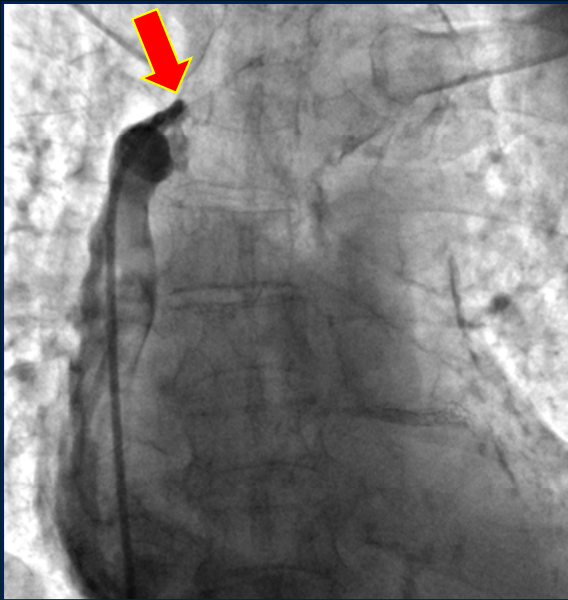
- Incidence: 11-40%^{1,2}
- Risk factors³⁻⁹: 1. Multiple CVC placement, longer catheter dwell times, 2. Subclavian location, 3. Left sided catheterization, 4. Catheter infection, 5. Larger caliber of CVC, 6. Catheter tip position in prox. SVC, 7. Catheter composition (polyethylene & teflon > polyurethane > silicone)
- Symptom³⁻⁹:
 - 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



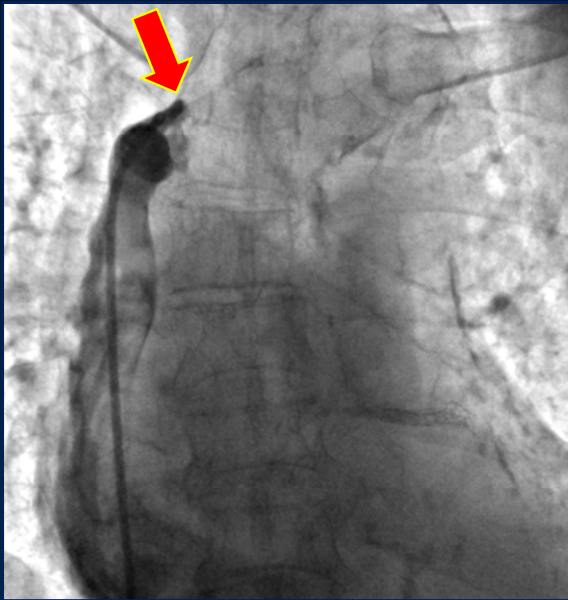
Brachiocephalic Vein Occlusion



What would
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strategy ?

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



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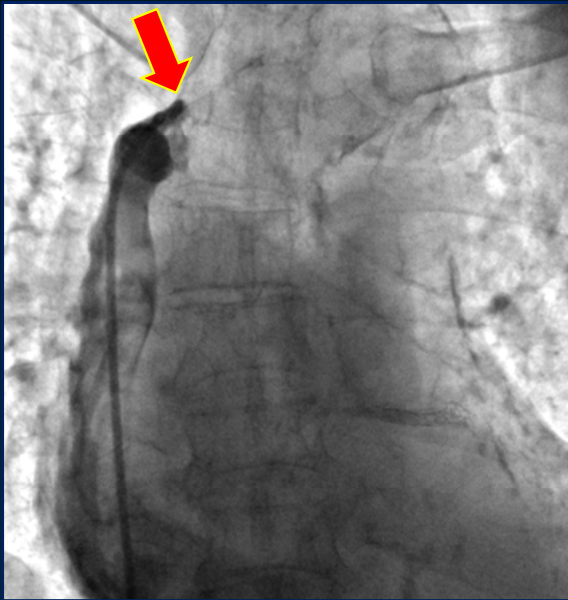
Even “made stiffer” Terumo Glidewire (by gradually cutting its distal end for a 5-15 mm) failed to cross the occlusion site

What would be your next strategy ?

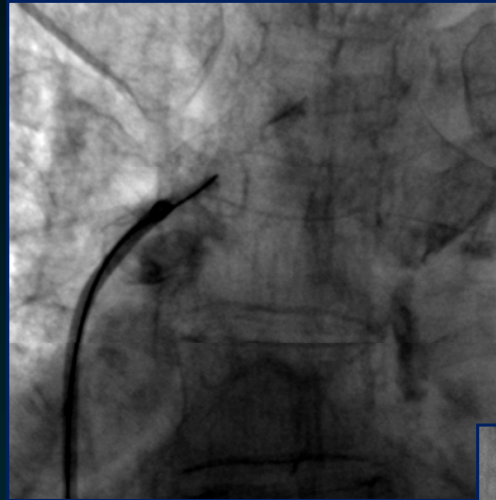
What Would Be Your Next Strategy ?

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

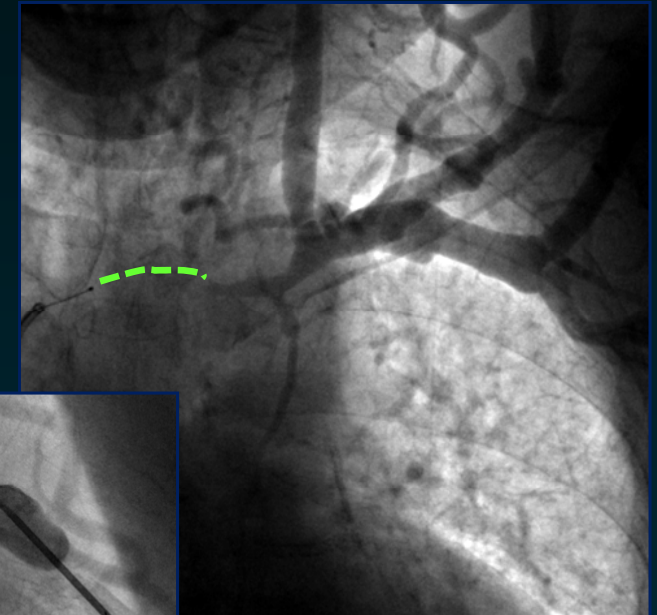
Brachiocephalic Vein Occlusion



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



Even “made stiffer” Terumo Glidewire (by gradually cutting its distal end for a 5-15 mm) failed to cross the occlusion site

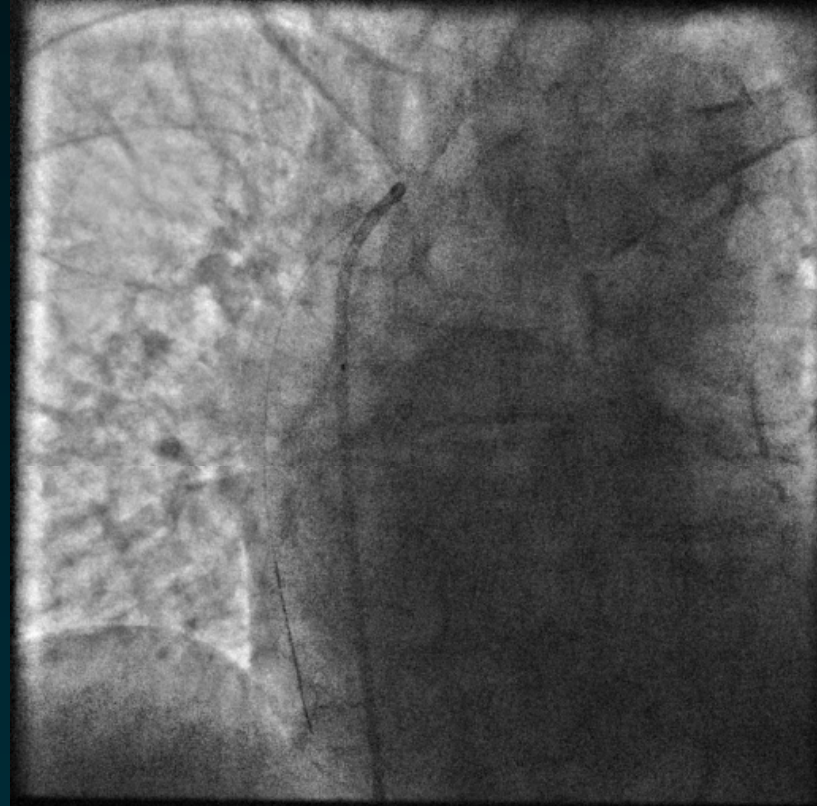


Retrograde contrast injection through the dialysis needle showed a long occlusion in the BCV



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

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 ?

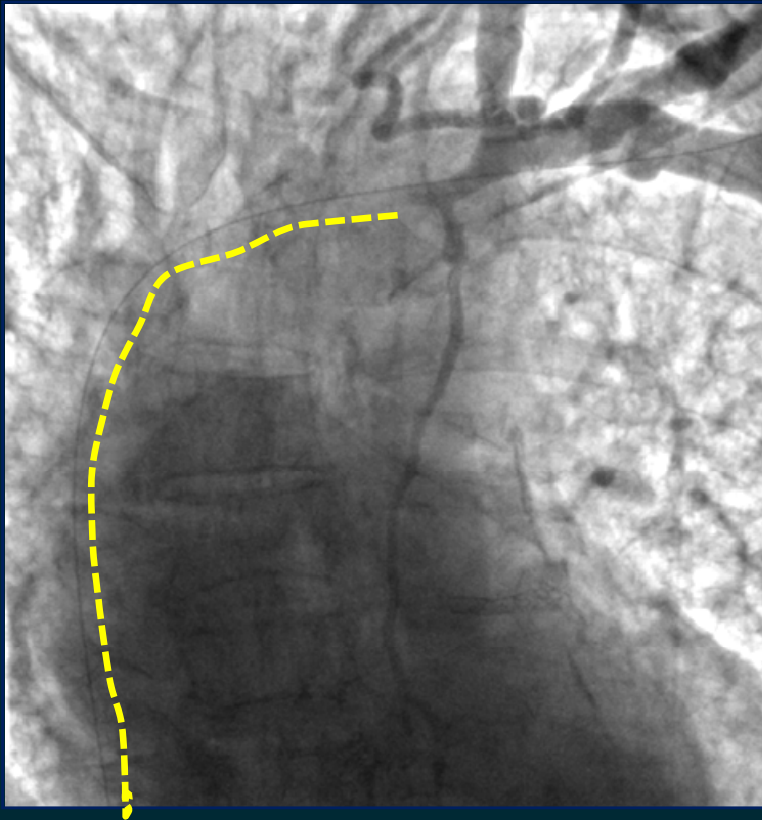
1. Pull the dialysis needle out, introduce a sheath & catheter, then do balloon dilatation, etc.
2. Externalize the antegrade wire, introduce a sheath & catheter, then do balloon dilatation, etc.

Antegrade Wiring Externalization



Fielder FC wire was snared (arrow), pulled down & externalized. Subsequently the sheath & GC was easily changed to a bigger GC (9F MPA)

Balloon dilatation

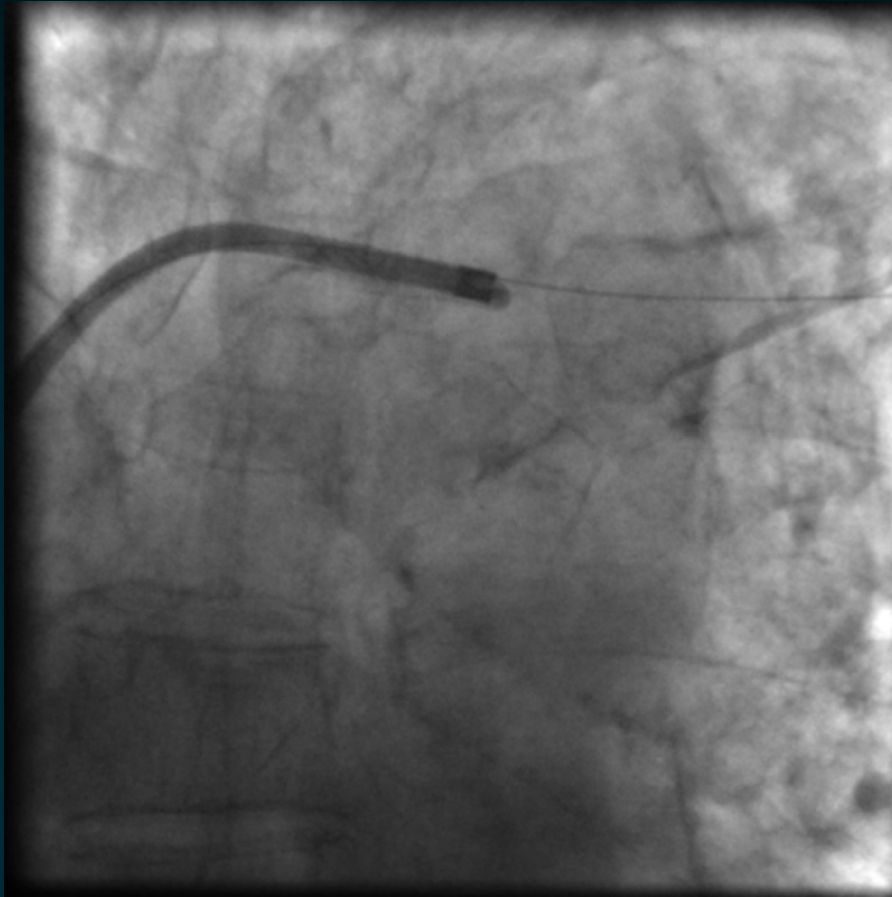


Externalization of the 300 mm Fielder FC wire provides a very strong support to introduce balloon (& later stent)



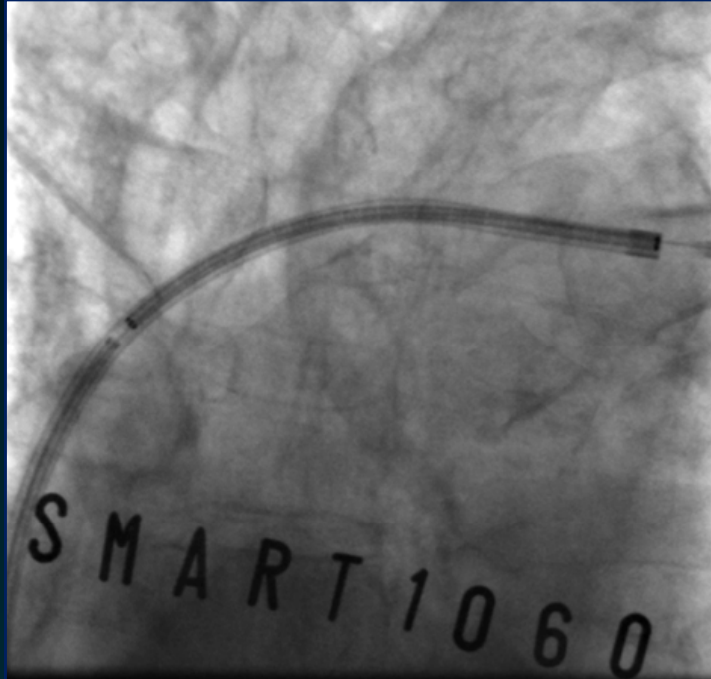
Stepwise dilatation from 4.0 to 8 mm (maximum BCV diameter of this lady) with high pressure balloon

Successful Recanalization

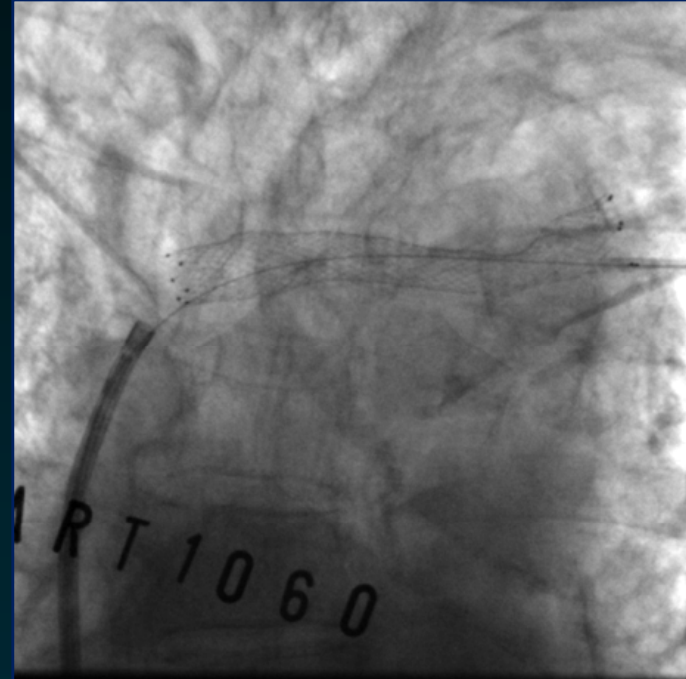


Central venogram
through 9F MPA
guiding catheter
(GC) showed
successful
recanalization

Stent Placement

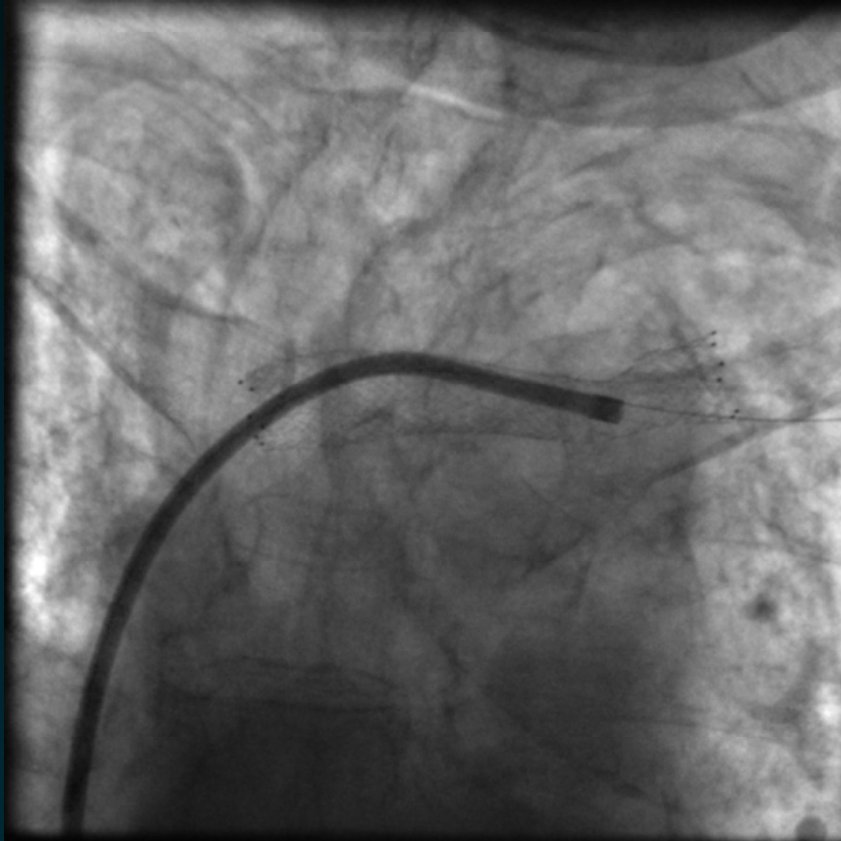


SMART 10x60 mm (oversized 2 mm relative to the BCV diameter) stent introduced into the GC & appropriately positioned ensuring that the entire lesion is covered



GC was retracted & stent was slowly & successfully deployed

Final Result



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 (\pm microcatheter or MP catheter with OTW balloon for back up support)