



Rotational Atherectomy For FP Disease: *How to Improve Efficiency?*



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Treatment Options for TASC II C/D FP Disease

- Balloon PTA alone
- BMS
- Atherectomy
 - Directional / Rotational

- *Drug-coated balloons*
- *Atherectomy + DCB*
- *Interwoven nitinol stent*
- *Drug-coated stents*



**The main devices
of these days**

- Graft stent

.....

Treatment Options for TASC II C/D FP Disease

- Balloon PTA alone
- BMS
- Atherectomy
 - Directional / Rotational

- *Drug-coated balloons*
- *Atherectomy + DEB (AART)*



Nothing behind

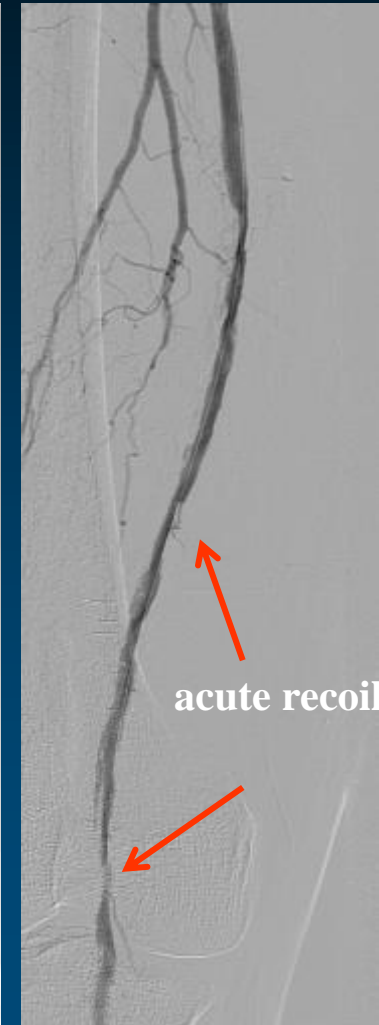
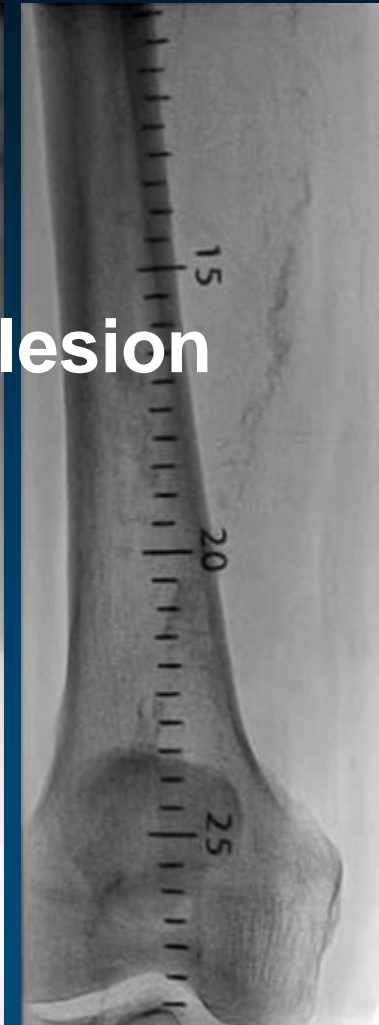
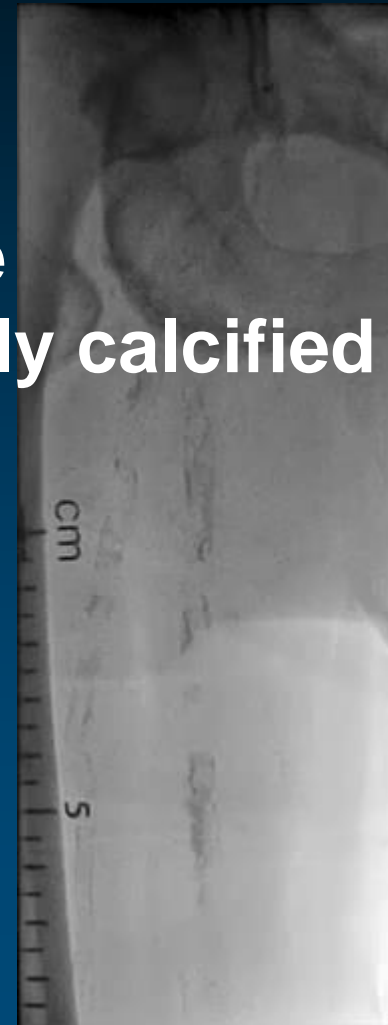
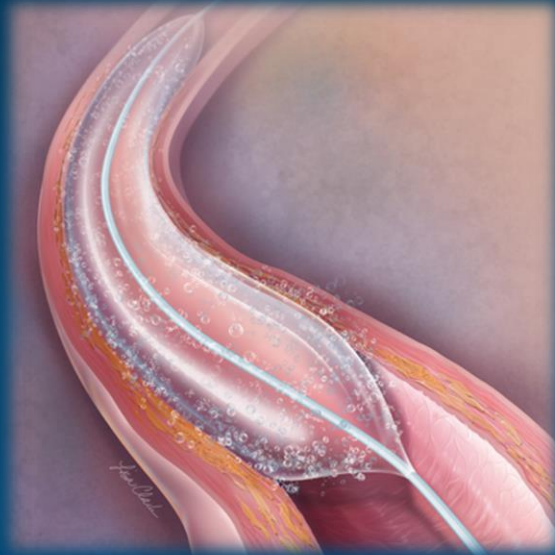
- *Drug-coated stents*
- *Interwoven nitinol stent*
- Graft stent

AART=Atherectomy+AntiRestenotic Therapy

Limitation of DEB for TASC II C/D FP Disease

Just a balloon itself...

- Smaller lumen gain
- Elastic recoil
- Dissection and Acute closure
- Low drug efficiency for heavily calcified lesion



Treatment Options for TASC II C/D FP Disease

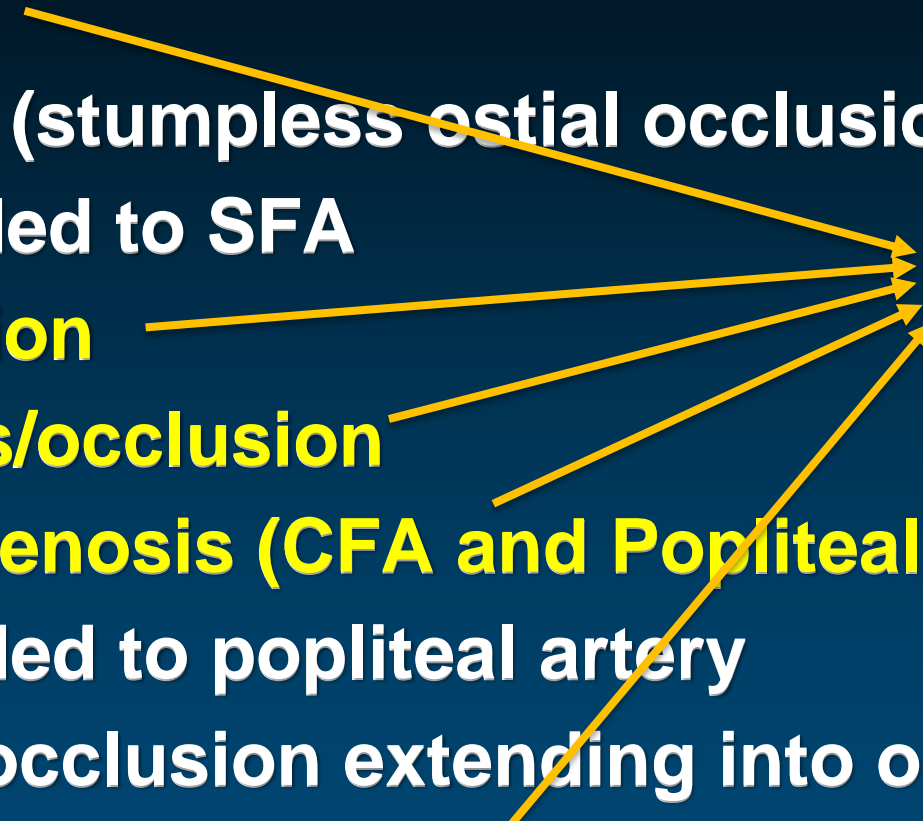
- Balloon PTA alone
- BMS
- Atherectomy
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- *Drug-coated balloons*
- *Atherectomy + DEB (AART)*
- *Drug-coated stents*
- *Interwoven nitinol stent*
- Graft stent



**Nothing behind
with minimizing
dissection**

AART=Atherectomy+AntiRestenotic Therapy

Complicated SFA Intervention

- **Long SFA CTO**
 - Flush occlusion (stumpless ostial occlusion)
 - Iliac CTO extended to SFA
 - **Heavy calcification**
 - **In-stent stenosis/occlusion**
 - **Bending zone stenosis (CFA and Popliteal)**
 - SFA CTO extended to popliteal artery
 - Distal popliteal occlusion extending into origin of all tibial vessels
 - **Acute limb ischemia with thrombus**
 - Previous failure of endovascular treatment
- Target lesions for AART**
- 
- The diagram consists of several yellow arrows pointing from specific list items to the text 'Target lesions for AART'. The arrows originate from the following items: 'Long SFA CTO', 'Heavy calcification', 'In-stent stenosis/occlusion', 'Bending zone stenosis (CFA and Popliteal)', and 'Acute limb ischemia with thrombus'. The arrows converge towards the text on the right side of the slide.

Jetstream Device: XC & SC

eXpandable Cutter – for FP

BD=blade down, BU=blade up

XC 2.1/3.0 mm

XC 2.1/3.0 mm



XC 2.4/3.4 mm



XC 2.4/3.4 mm



Single Cutter – for BTK

SC 1.6 mm



SC 1.85 mm



SC 1.6 mm



SC 1.85 mm



- Two sizing options in a single device (eXpandable Cutter)
- Rotational/differential cutting tip removes all plaque types
- Active Aspiration ports collect plaque & thrombus
- 135 cm and 120 cm OTW lengths
- .014GW / 7F sheath compatible

- Single Cutter technology for tortuosity
- Rotational/differential cutting tip removes all plaque types
- Aspiration ports collect plaque & thrombus
- 145 cm OTW
- .014GW / 7F sheath compatible

Jetstream Device: Size Selection

Confirm the Minimum Vessel Diameter *Proximal to the Lesion*



Minimum Vessel Diameter Blades Down **3.5 mm**

Minimum Vessel Diameter Blades Up **4.5 mm**



Minimum Vessel Diameter Blades Down **3.0 mm**

Minimum Vessel Diameter Blades Up **4.0 mm**



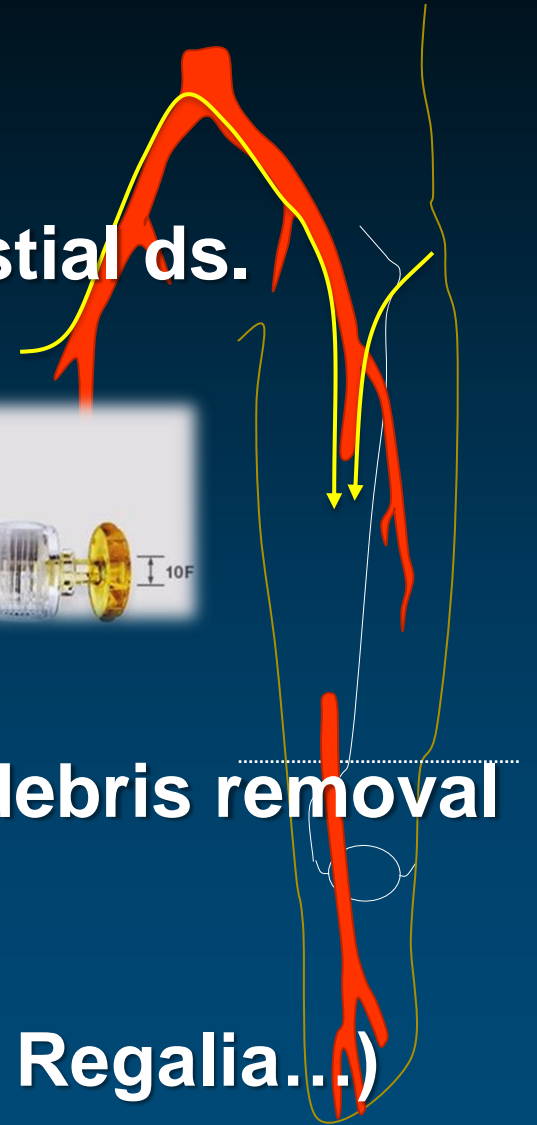
Minimum Vessel Diameter Blades Down **2.75 mm**



Minimum Vessel Diameter Blades Down **2.5 mm**

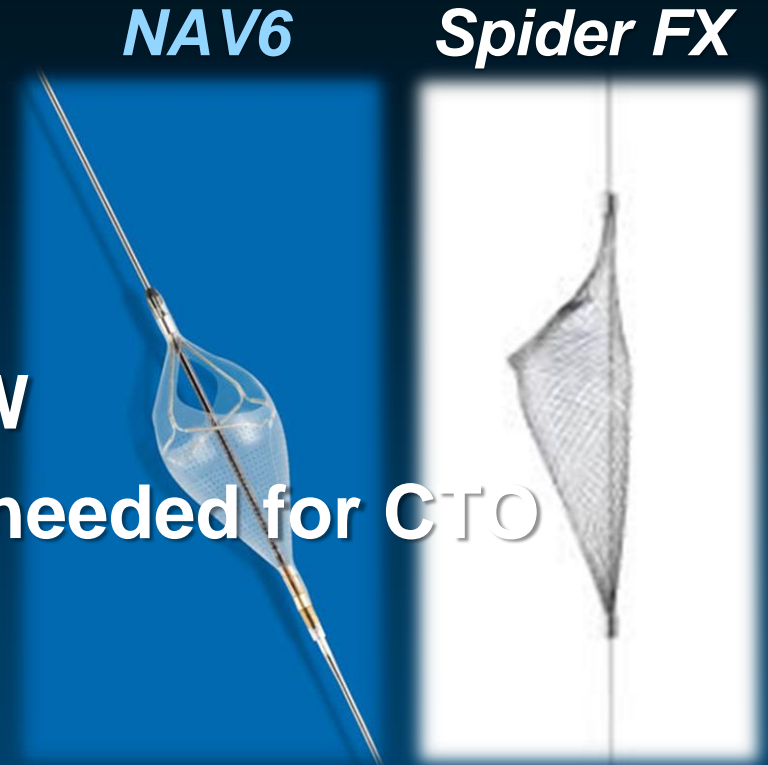
My Personal Equipments For Jestream Atherectomy

- Favor ipsilateral femoral approach
 - Contralateral approach for iliac/CFA or SFA ostial ds.
- 7 Fr Ansel sheath at all case
- Tuohy-borst valve type (OKAY II)
 - Company doesn't recommended this but,
 - Less blood leakage, Wider lumen & Effective debris removal
- 0.014 inch 300 cm guidewire; Thruway™
 - Do not use hydrophilic coated (eg. Command, Regalia...)



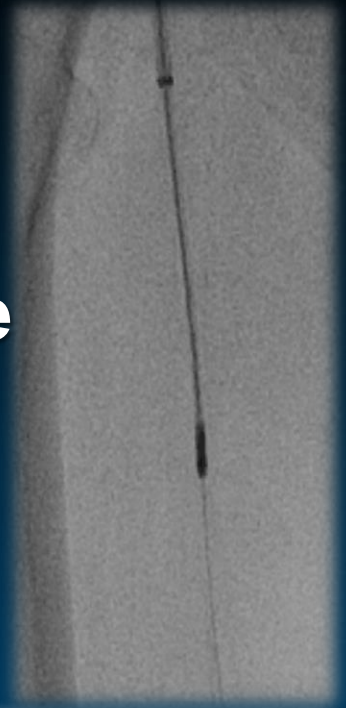
Distal Protection Devices For Jetstream

- DPD; Always recommended especially for
 - Calcified, Long CTO, ISR, Thrombotic ...
- Amboshield NAV6 >> Spider FX
 - Need to change long 315 cm dedicated GW
 - Microcatheter (CXI) assisted GW delivery needed for CTO
 - 7.2 mm (4.0-7.0 mm) for FP intervention
 - Advantages
 - ; Wire & filter are not attached
 - GW placement at the tibial arteries → stable GW position
 - ; Enhanced capture efficiency (100 ug debris)



Jestream Cutter Advancement

- 1L saline + 1 mg NTG + 5 mg Verapamil
- *Very very very...* slow advancement for the first passage
 - Almost invisible movement on the screen
- 2 mm forward → 1 mm backward
- Keep BD advancement until friction disappears
 - Then, change to BU
- Spare distal CTO cap until the proximal part is clean
- Watch your eyes on the GW loop
 - Forward → larger / Backward → smaller



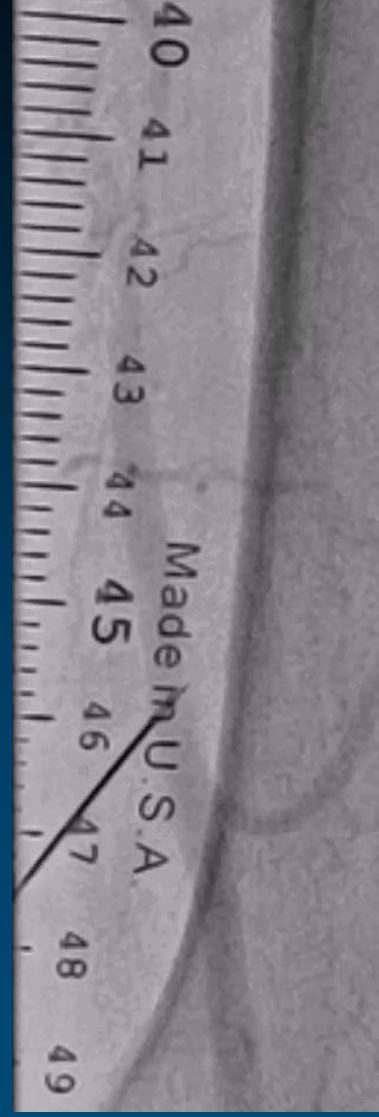
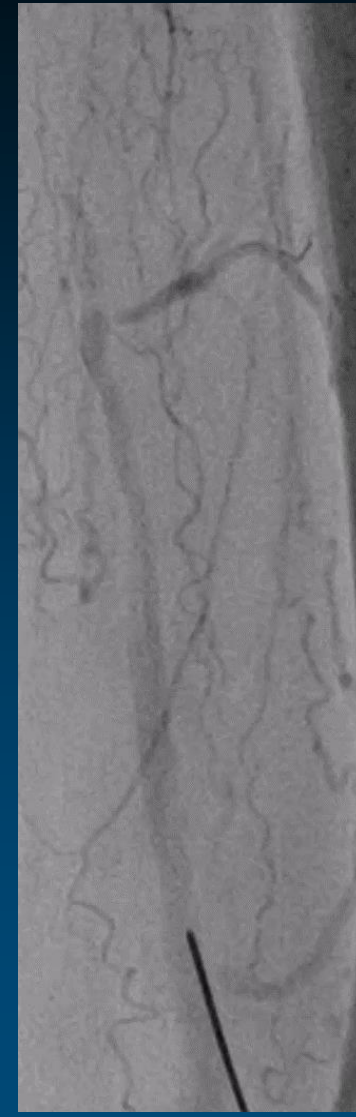
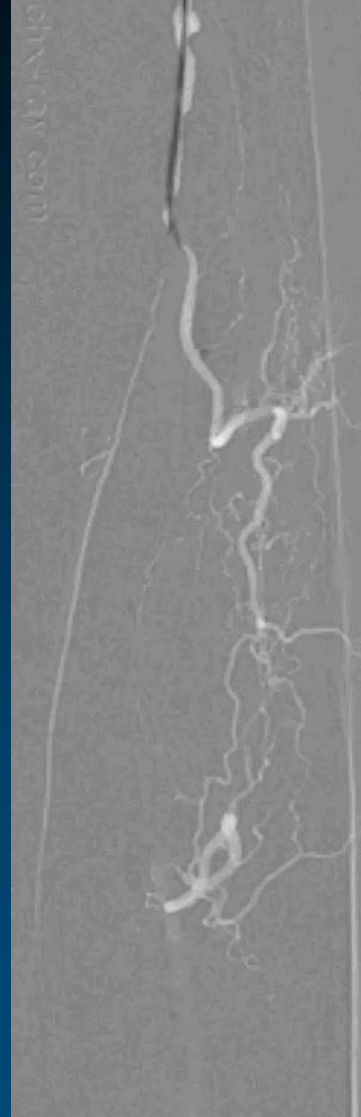
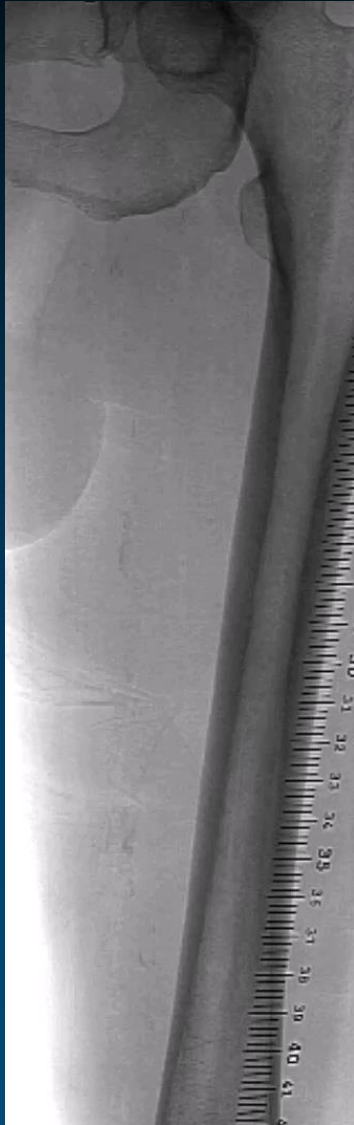
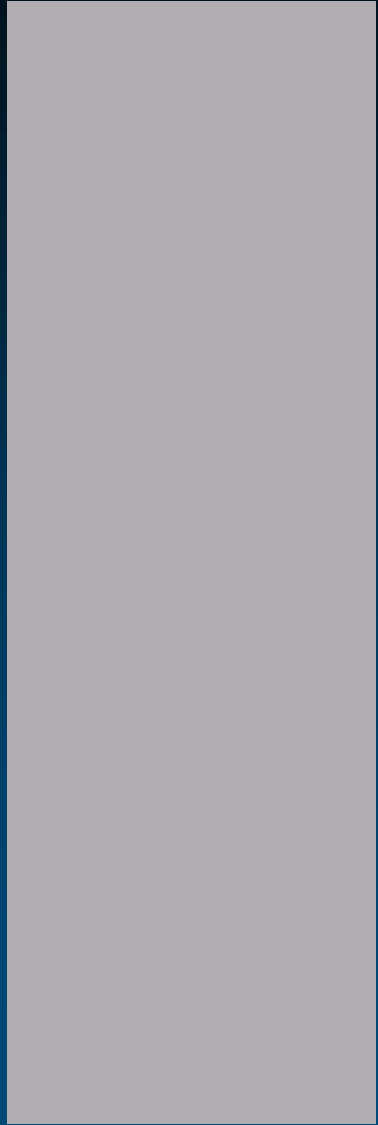
BD=blade down, BU=blade up

Minimizing Cutter & GW Friction

- **Do not kink GW during lesion passage**
 - Use microcatheter for CTO lesion passage & filter delivery
 - Predilation with small balloon; for atraumatic filter delivery
- **Clean GW before entering the cutter**
- **Slow forward advancement of the cutter**
- **Watch the GW loop change**
- **If the GW loop changes inadequate**
 - Check distal GW position and movement
 - If GW stuck is suspected, take out the cutter and flush it

Learning with Cases

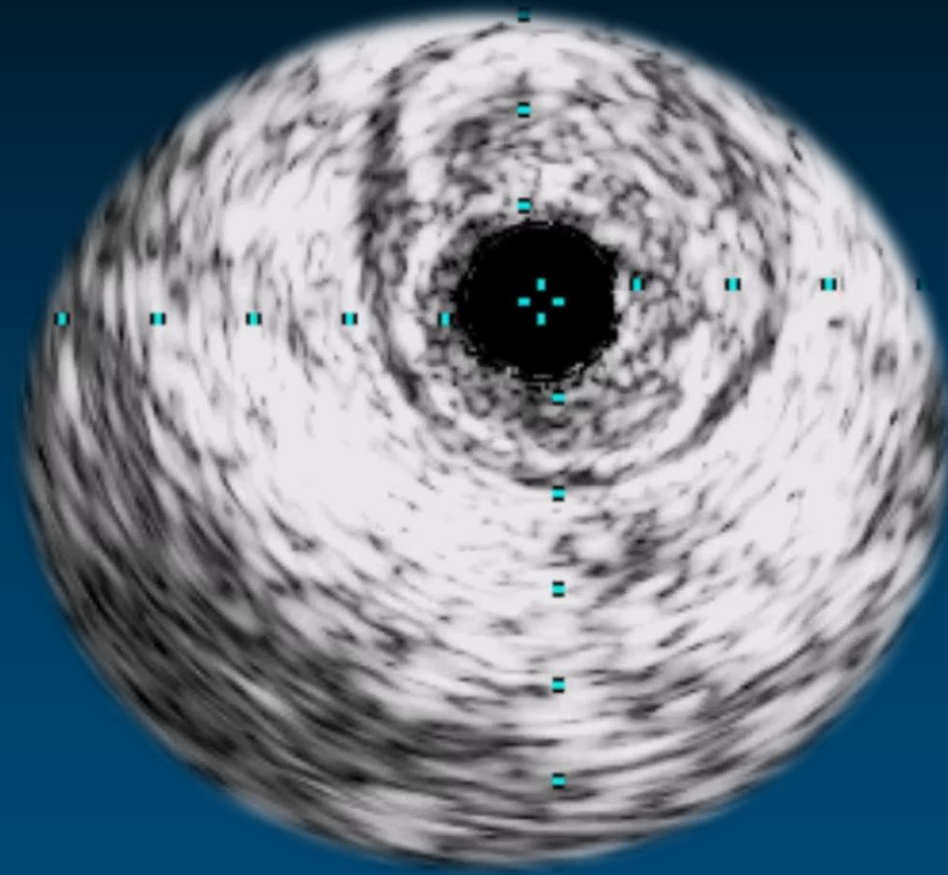
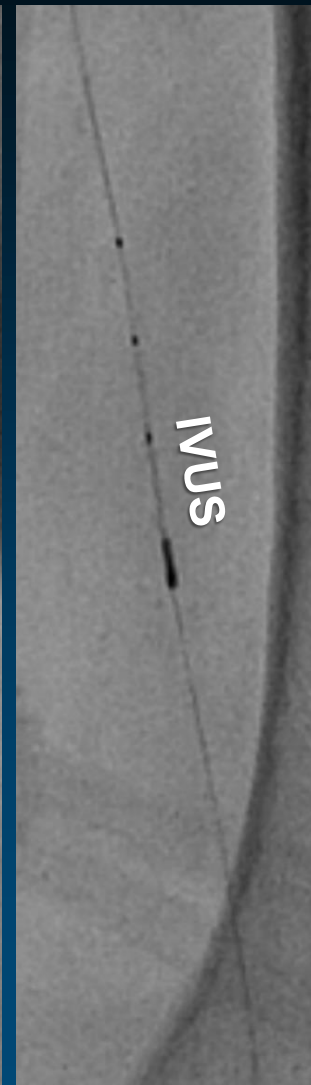
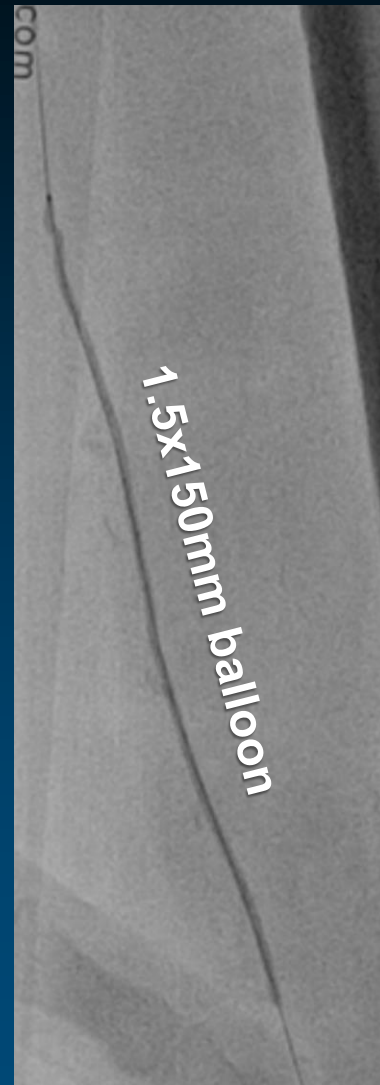
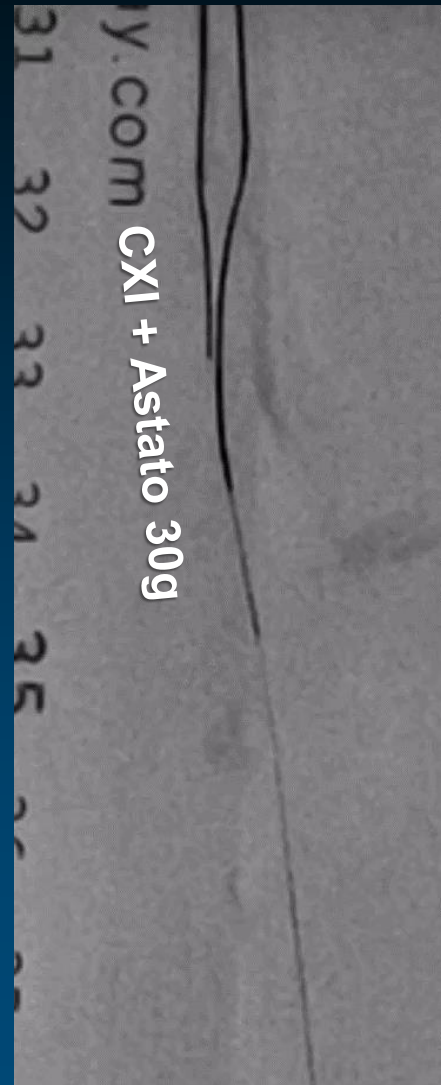
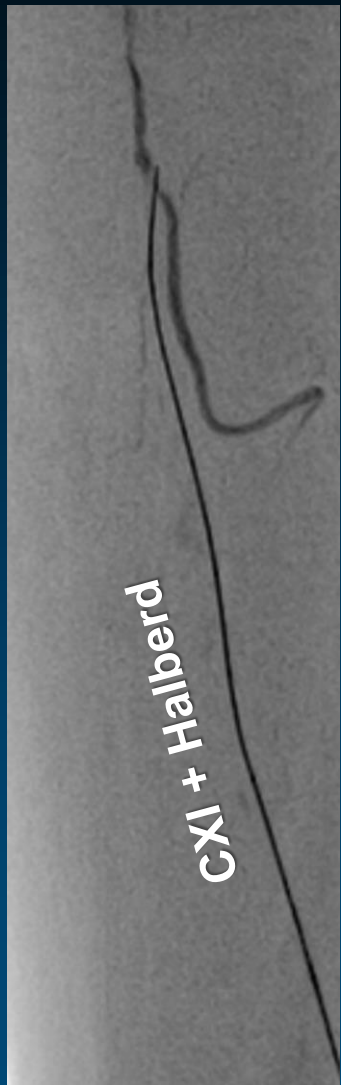
68/M, ESRD on HD, Rutherford 3 claudication Calcified SFA CTO



Long calcified SFA CTO → RAART planned

Failed proximal cap digging → Retrograde

Bidirectional Approach → Failed Intraluminal Passage

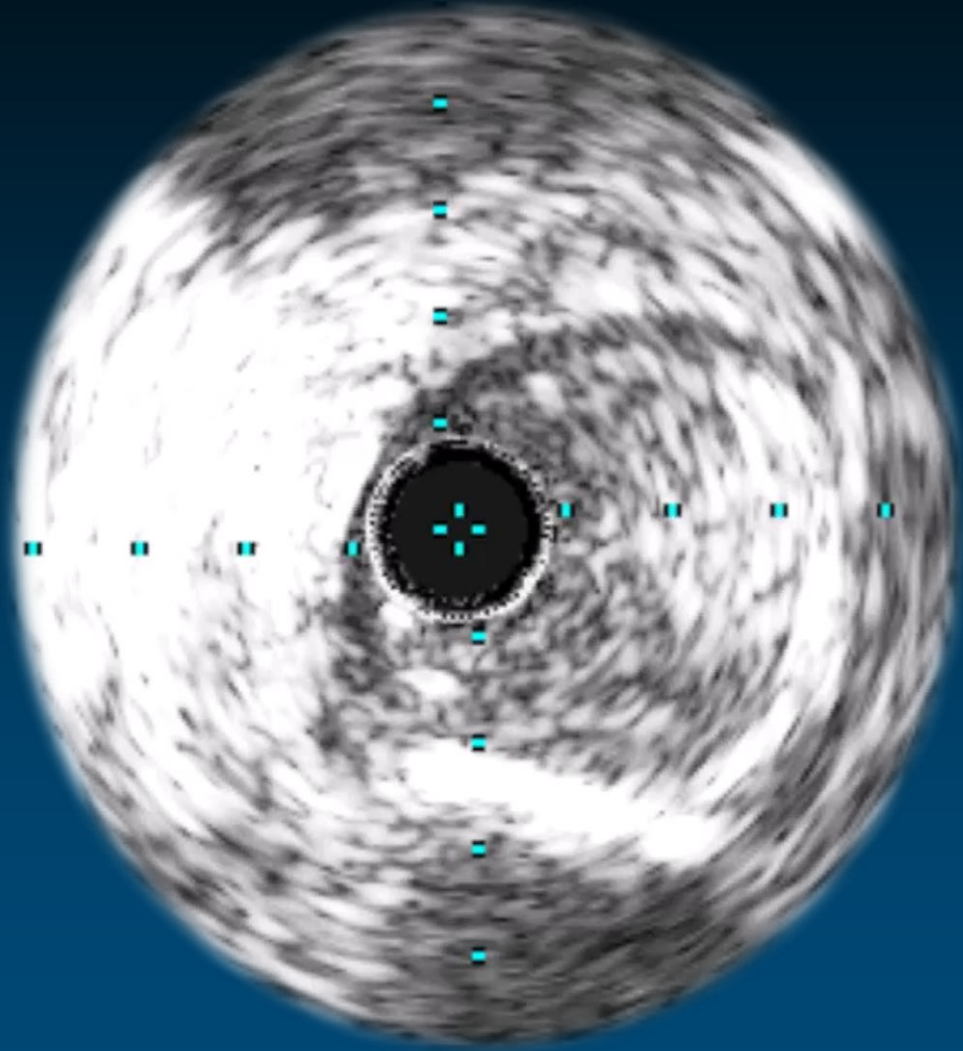


Bidirectional GW passage → 1.5 mm balloon → IVUS → Subintimal passage confirmed

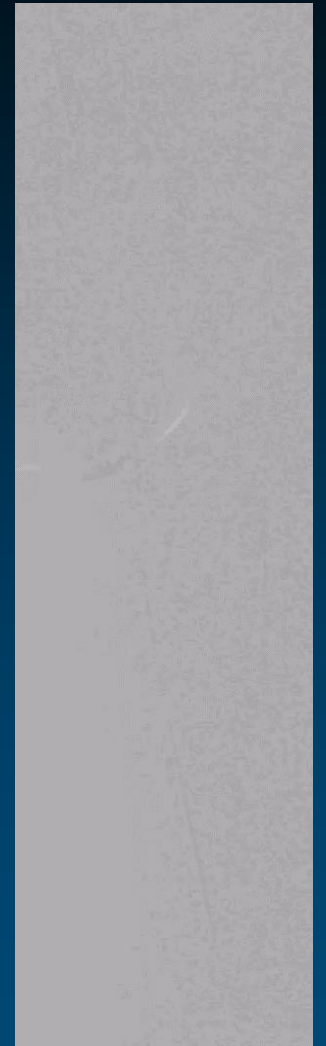
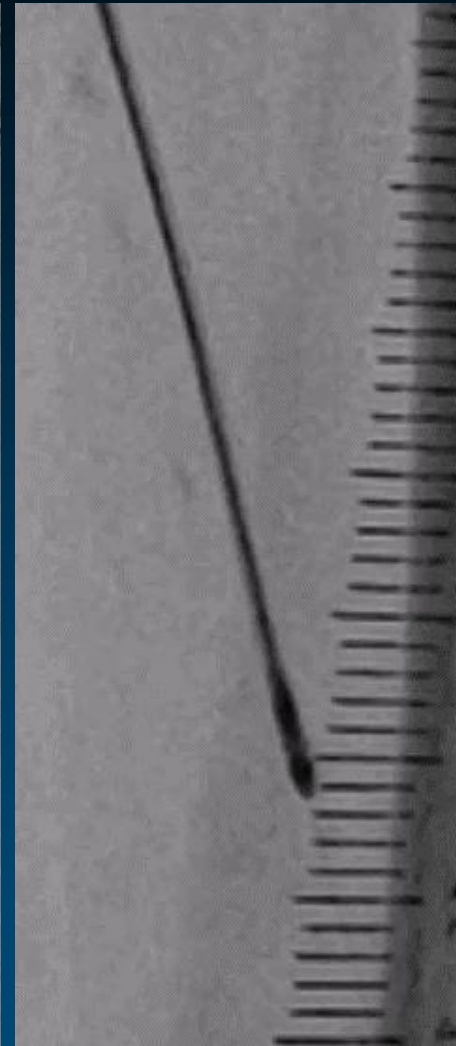
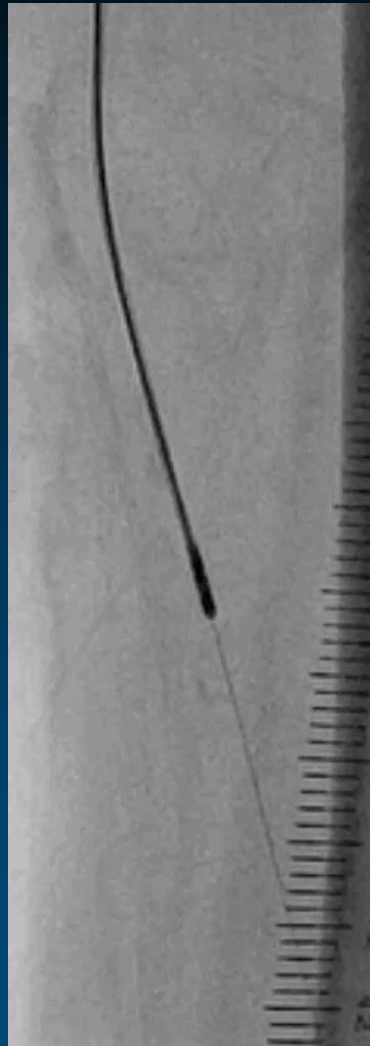
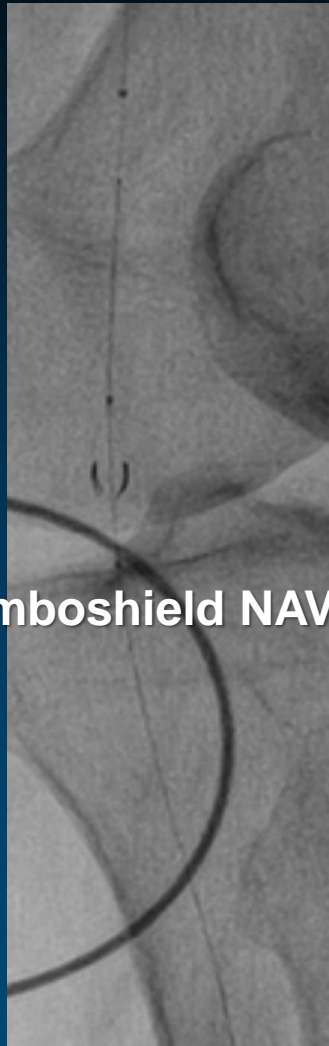
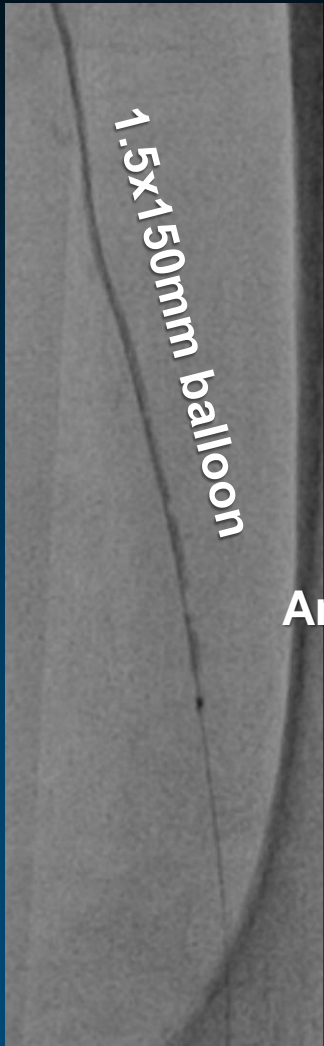
IVUS-assisted Redirection of Guidewire



0.014" Command + IVUS
CXI + 0.018" Astato 30g



RAART with 2.4/3.4 mm Jetstream Device



Sticky burr, BD → Repeat until free motion → BU → Final exit (BD→ BU)

DCB Angioplasty & Final Result



After balloon angioplasty



6.0x150mm

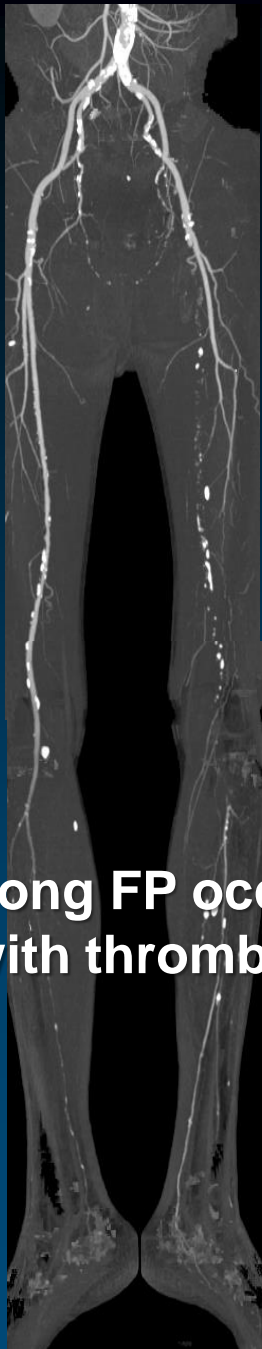


5.0x150mm

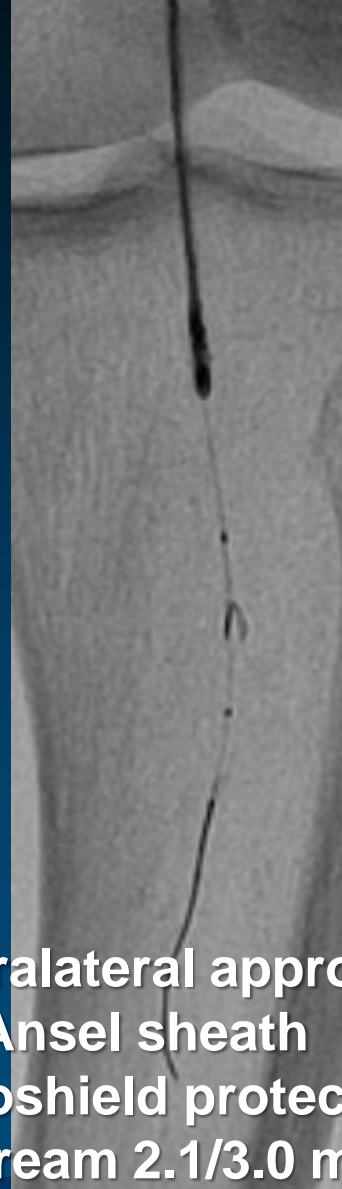


Final

75/M, Rutherford 3 Long FP CTO



Long FP occlusion
with thrombus



Contralateral approach
7 Fr Ansel sheath
Emboshield protection
Jetstream 2.1/3.0 mm



No reflow after
Jetstream atherectomy
→ Mechanism?
Next option?

Injection in the CTO with a suction catheter

Repeat
Jetstream



Repeat
Jetstream



Repeat
Jetstream



 Suction catheter tip
(Export™ or Thrombuster II ...)



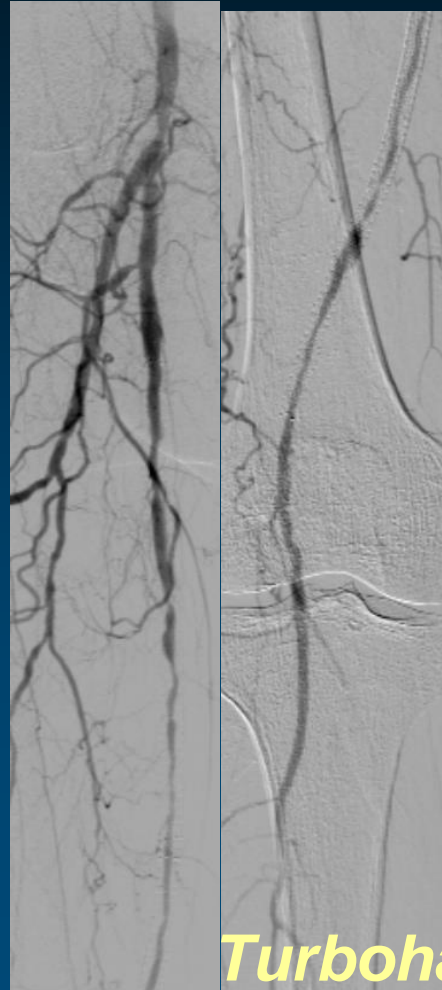
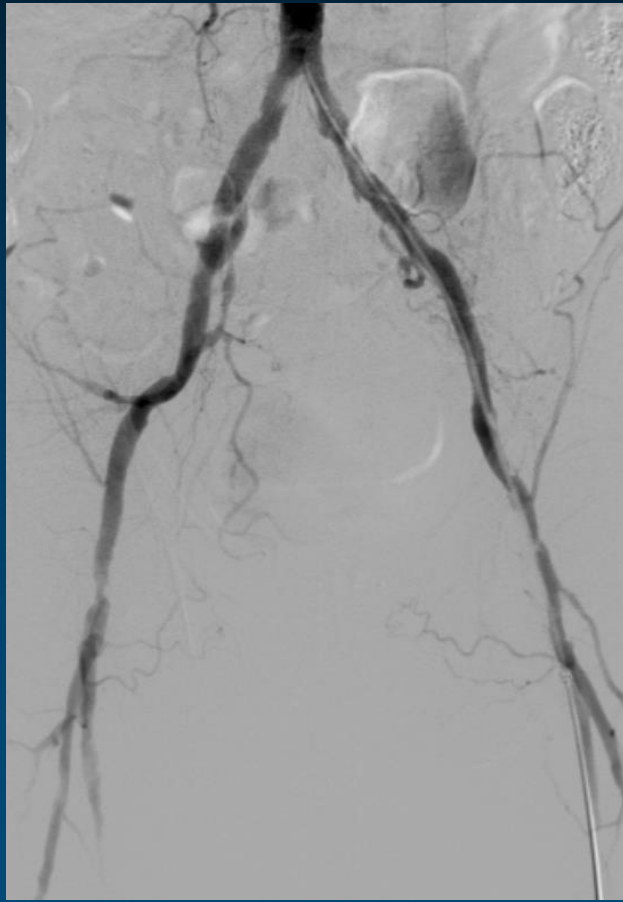
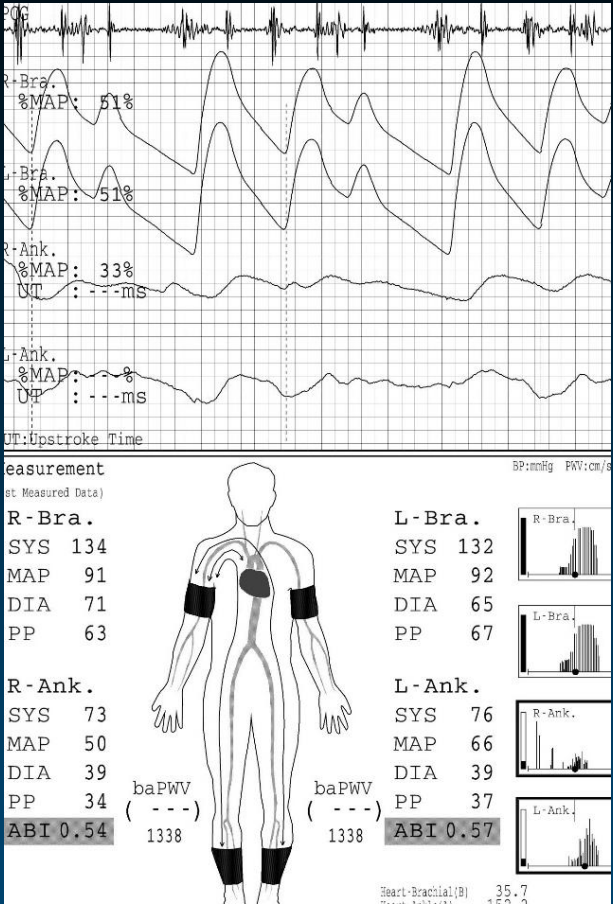
Solved problem

In-Stent Restenosis

M/69, DM

**Both L/E CLI & Claudication, Rutherford 5 / 3
S/P both SFA long stenting, 3 YA**

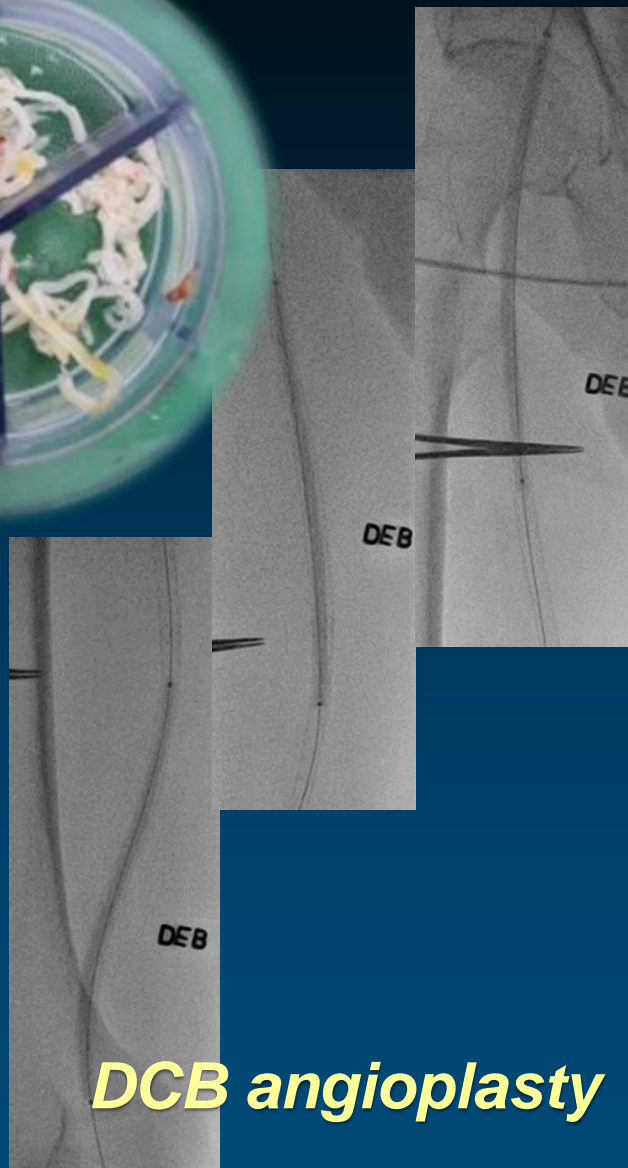
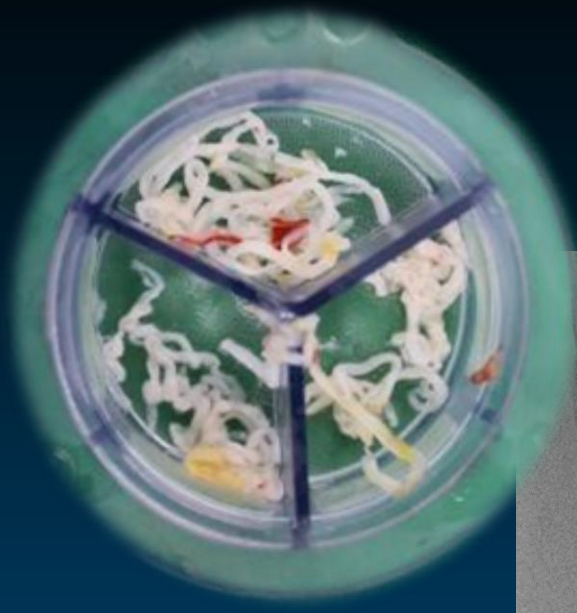
**→ 6 sessions of repeat intervention
(other hospital)**



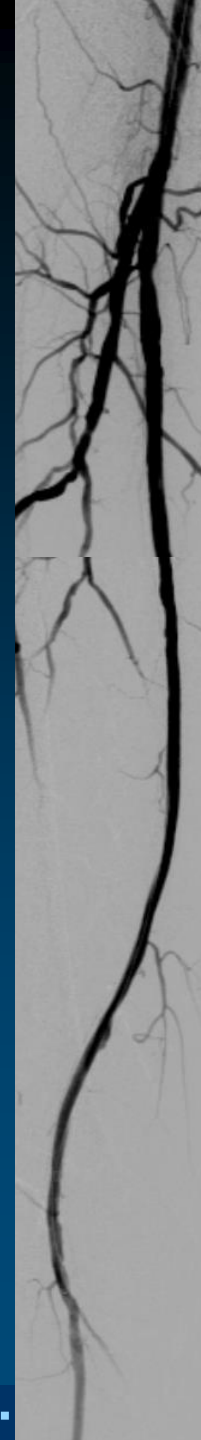
Turbohawk Artherectomy



After directional atherectomy



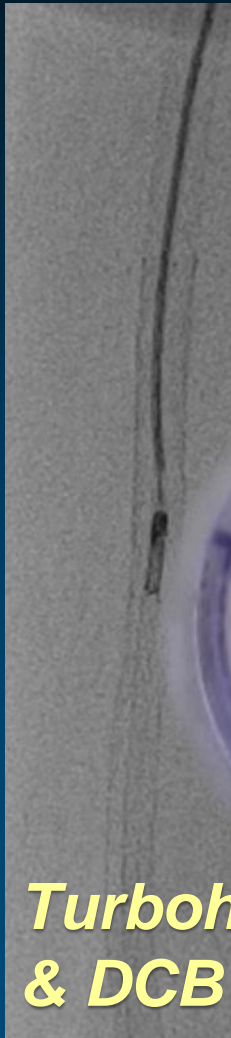
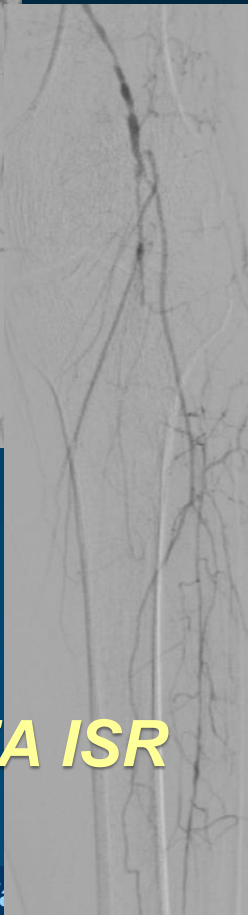
DCB angioplasty



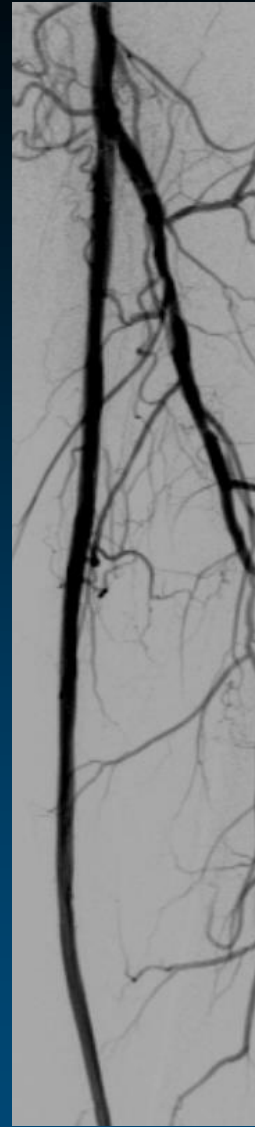
Final



Left SFA ISR

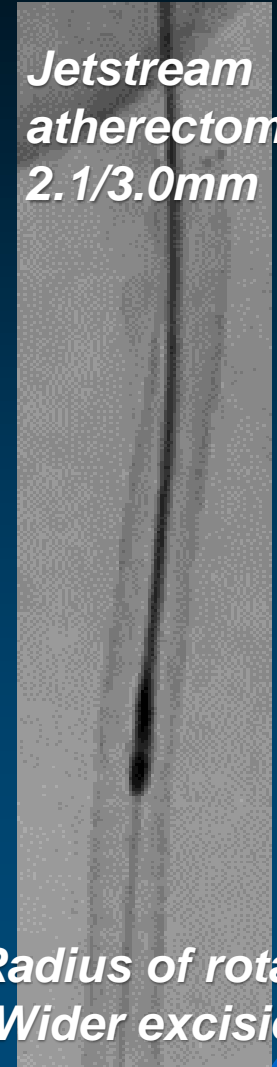
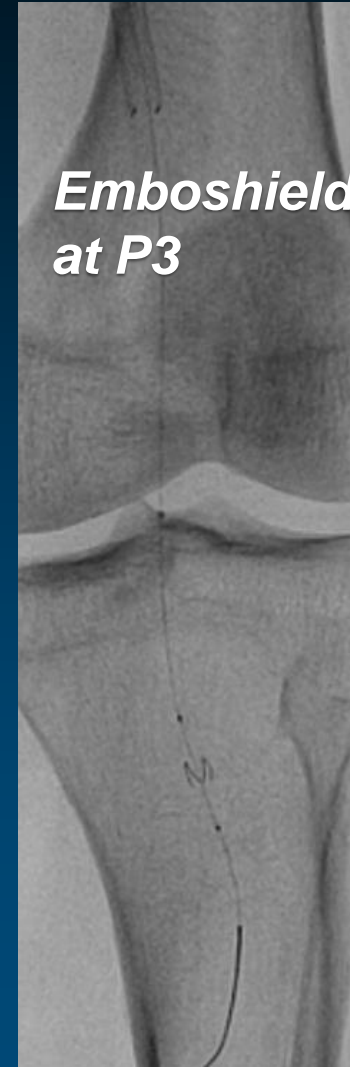


**Turbohawk atherectomy
& DCB angioplasty**



Final

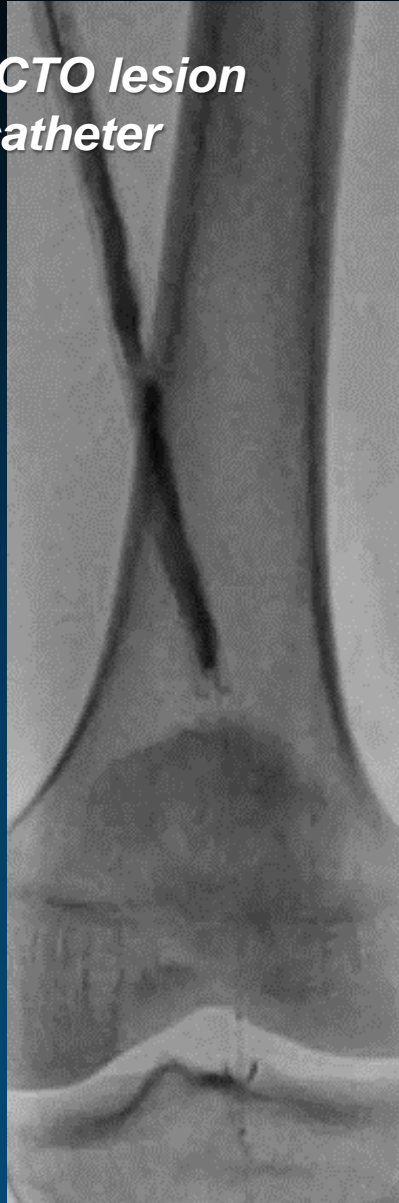
Recurred claudication at 3 years ABI 0.78/0.95



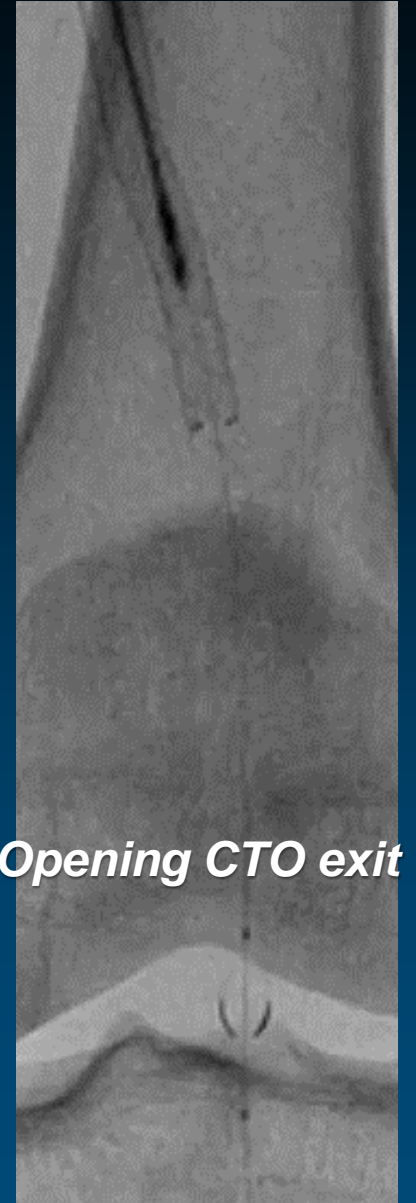
*↑ Radius of rotation
→ Wider excision*

*No reflow after Jetstream,
Mechanism?*

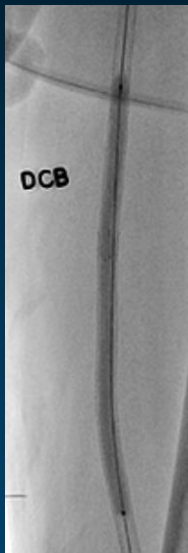
*Injection in the CTO lesion
with a suction catheter*



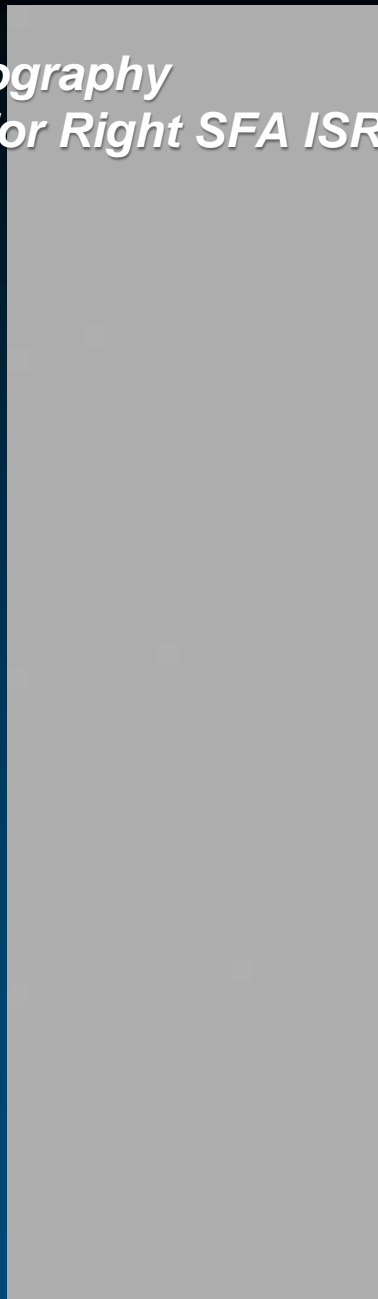
Opening CTO exit



**DCB angioplasty
(ART; AntiRestenotic Therapy)**



**Final angiography
- RAART for Right SFA ISR CTO**

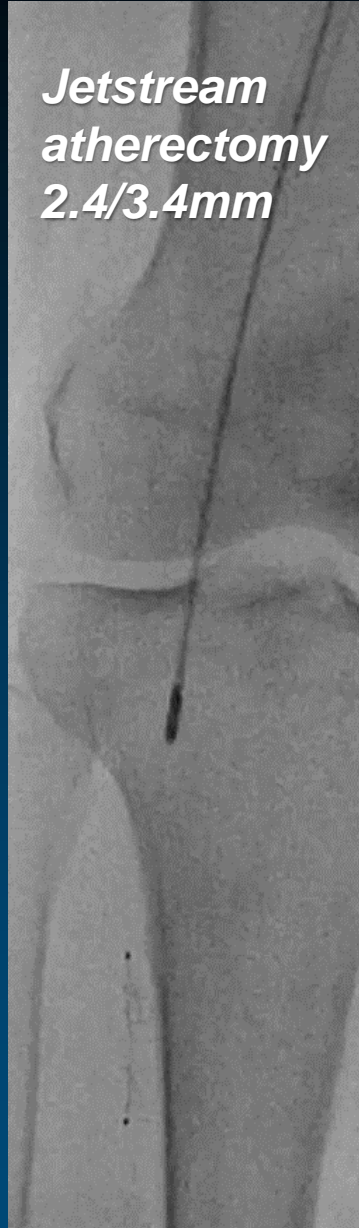


**After Jetstream
atherectomy**

*Right SFA ISR CTO
Ipsilateral antegrade approach
7 Fr sheath*



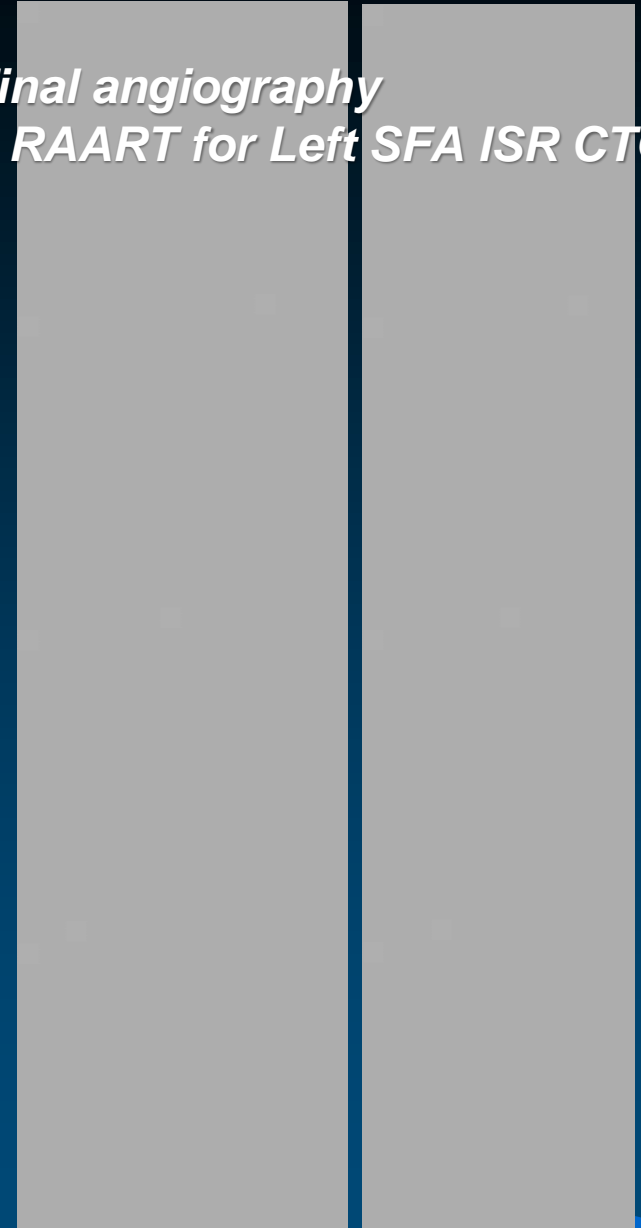
*Jetstream
atherectomy
2.4/3.4mm*



*Fully filled
Emboshield*

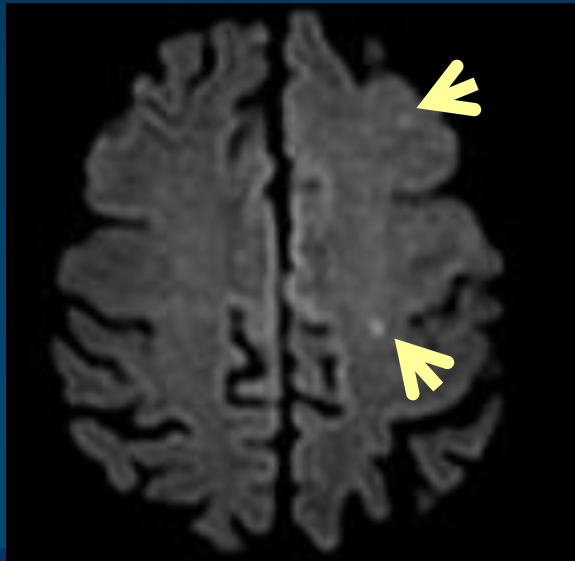


*Final angiography
- RAART for Left SFA ISR CTO*



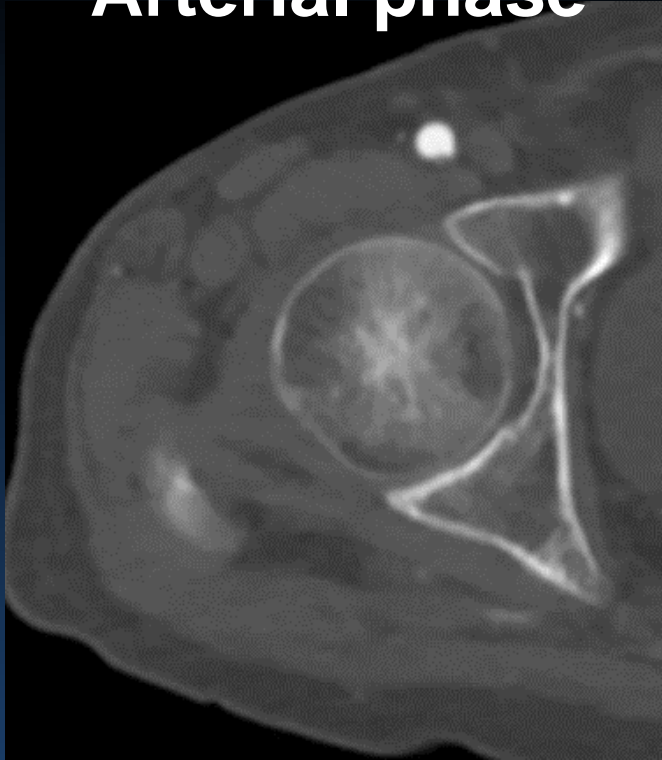
ALI IIb case presented with cerebral, mesenteric and L/E embolism

- 85 YO woman, DM, HTN
- Right-side weakness and abdominal pain for 2 days
 - motor : GIV/GV
 - Rt. side hypothesia
- Right foot pain, coldness, numbness and flexion difficulty

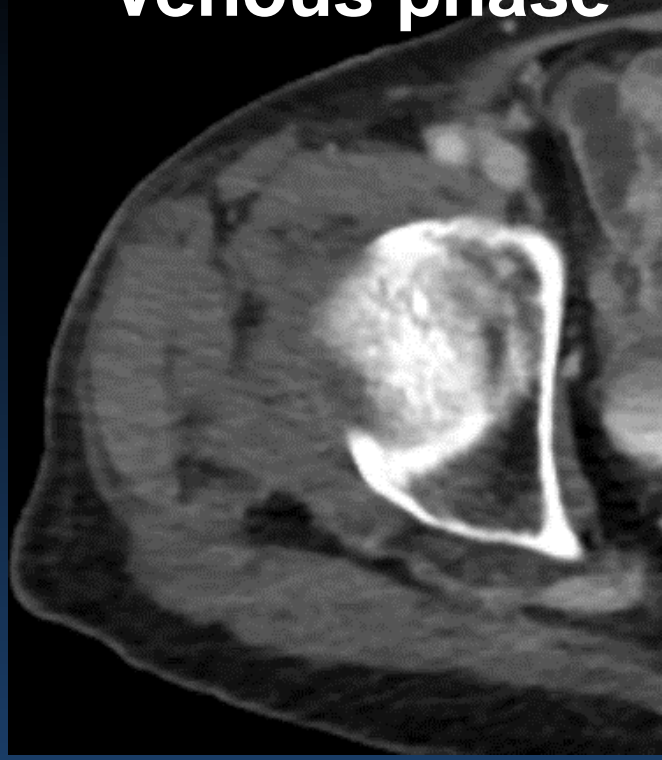


L/E CT angiogram

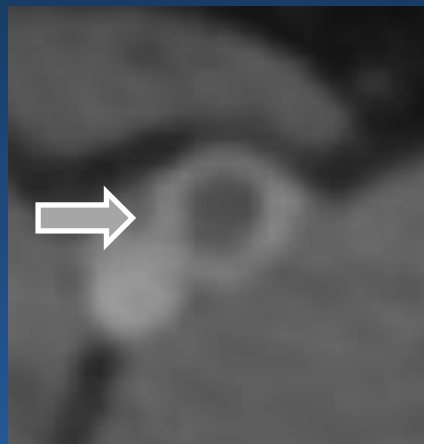
Arterial phase



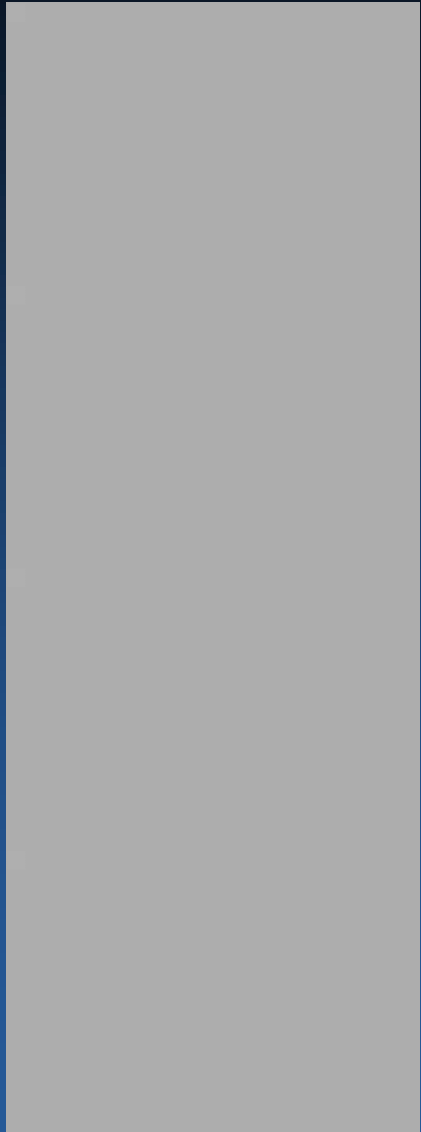
Venous phase



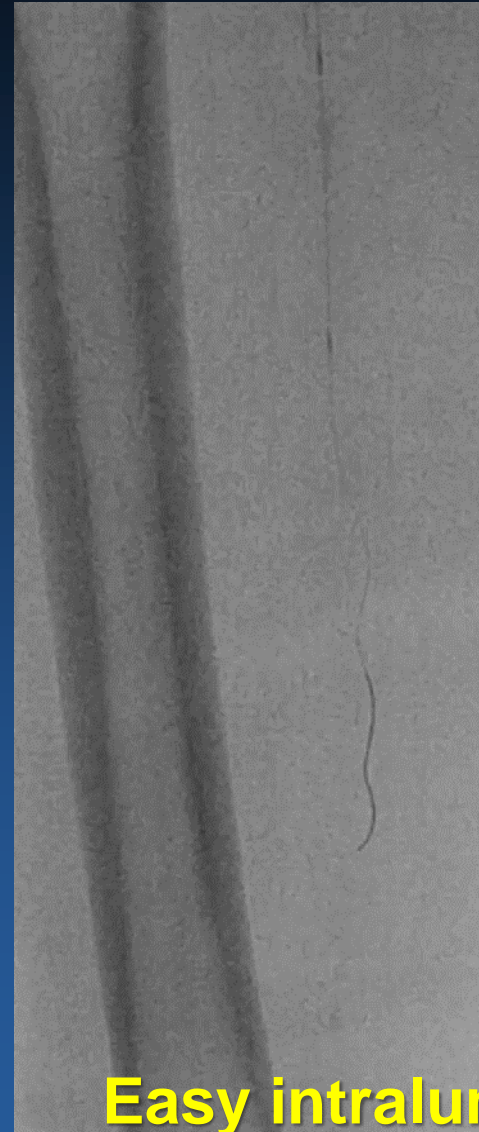
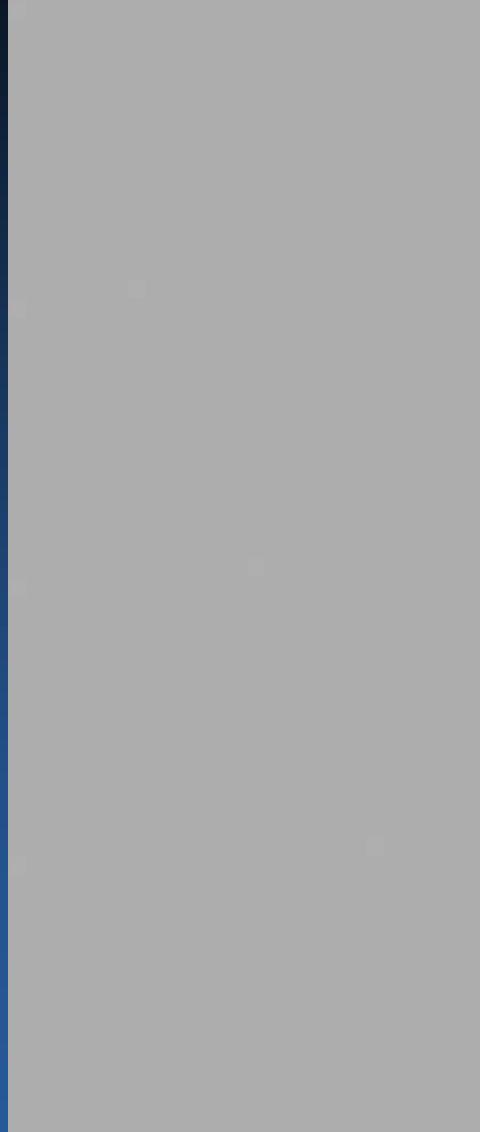
Ring enhancement
on venous phase



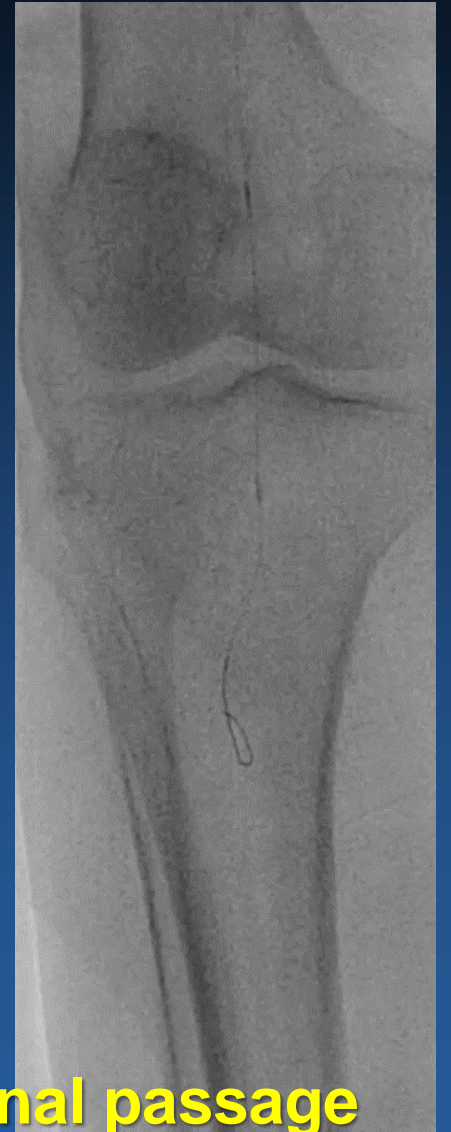
Baseline Angiography



SFA & popliteal occlusion

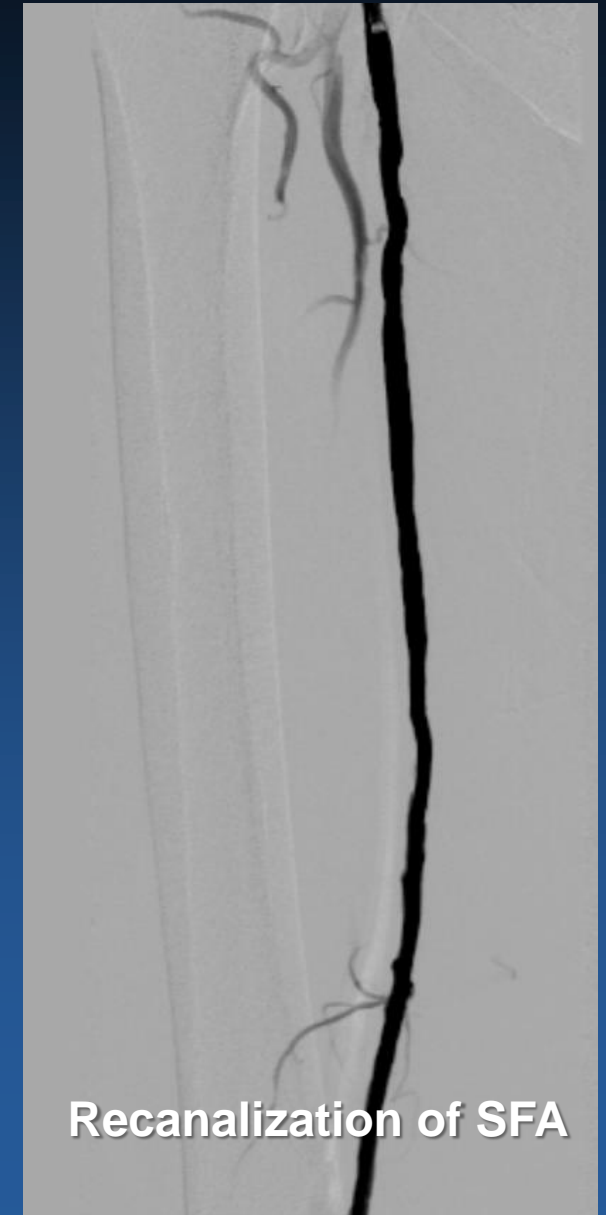
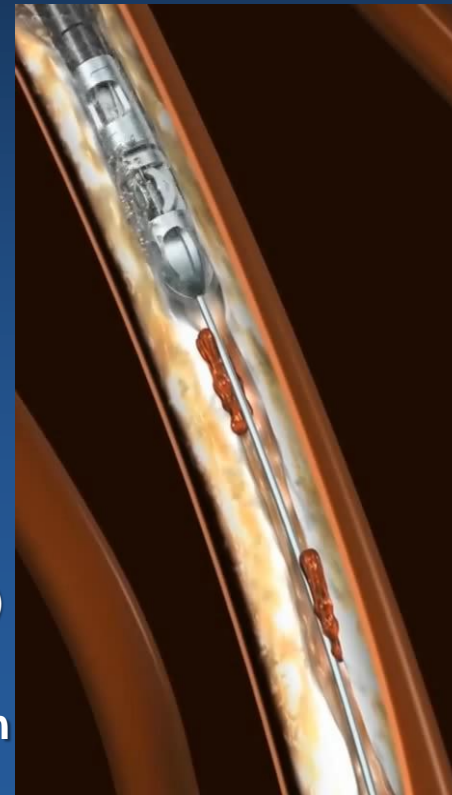
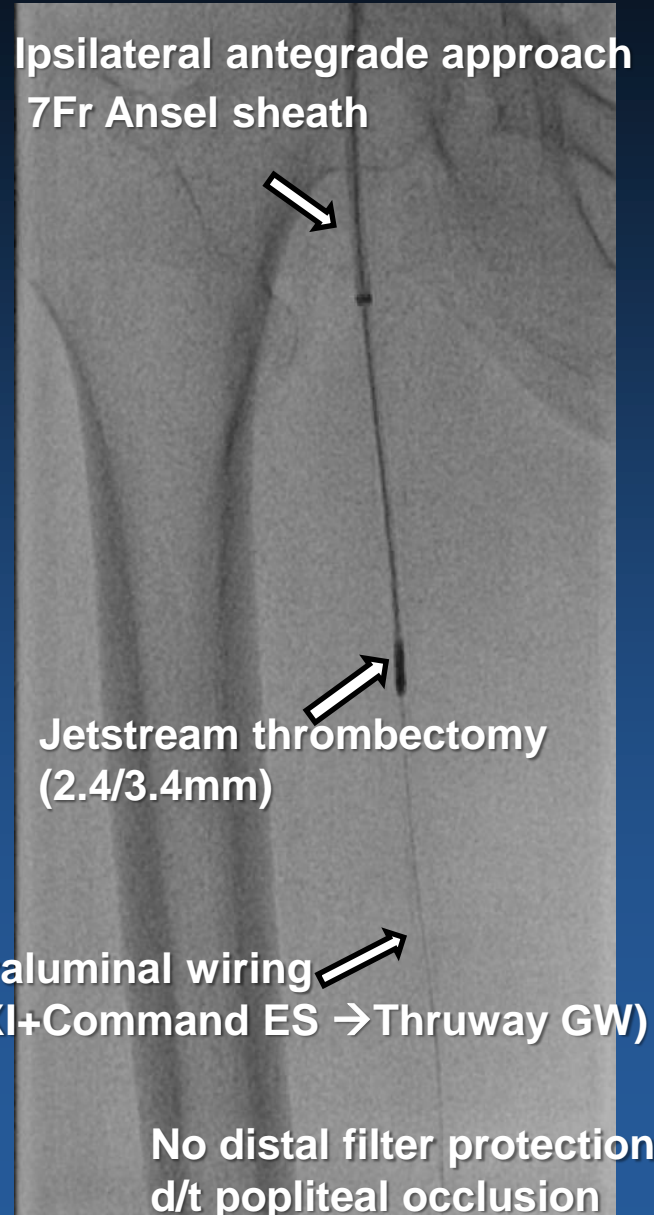


Easy intraluminal passage



CXI microcatheter + Command ES GW

Jetstream Thrombectomy, p-dSFA and Popliteal



Suction thrombectomy & balloon angioplasty for ATA and PTA



Suction thrombectomy for ATA-dorsalis and PTA
→ 2.5x80mm balloon angioplasty for ATA and PTA

Final angiogram

SFA

Pop and BTK

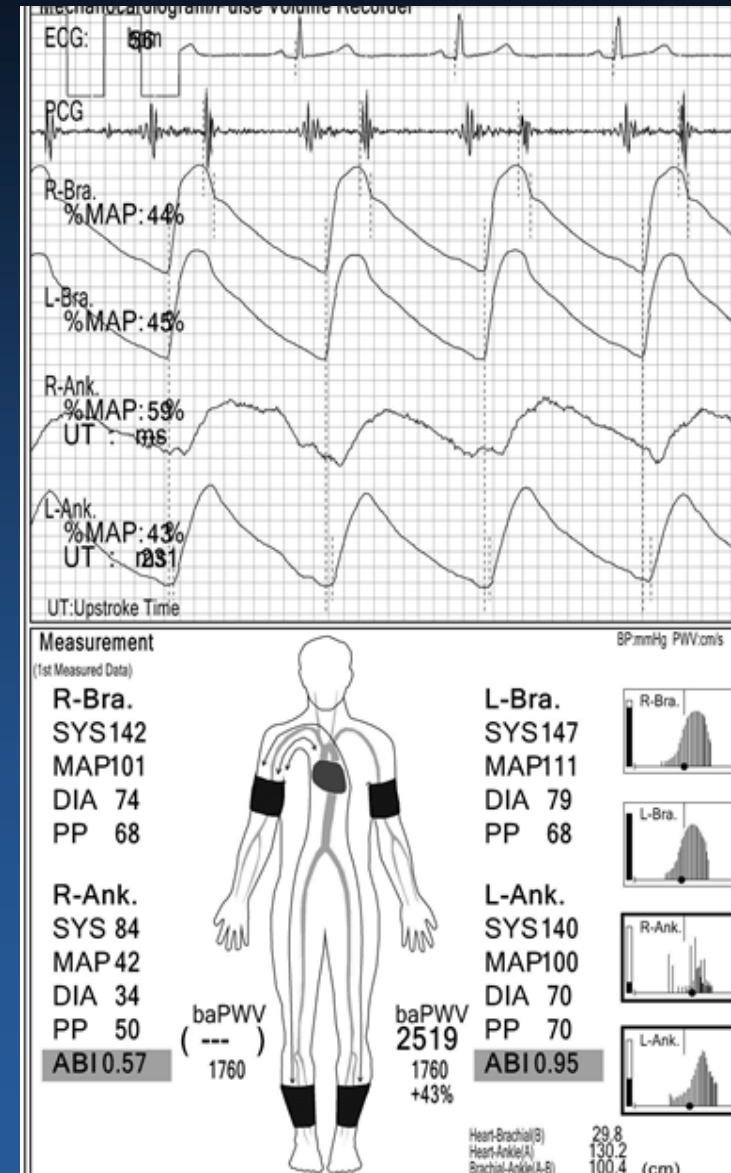
Foot

Readmission

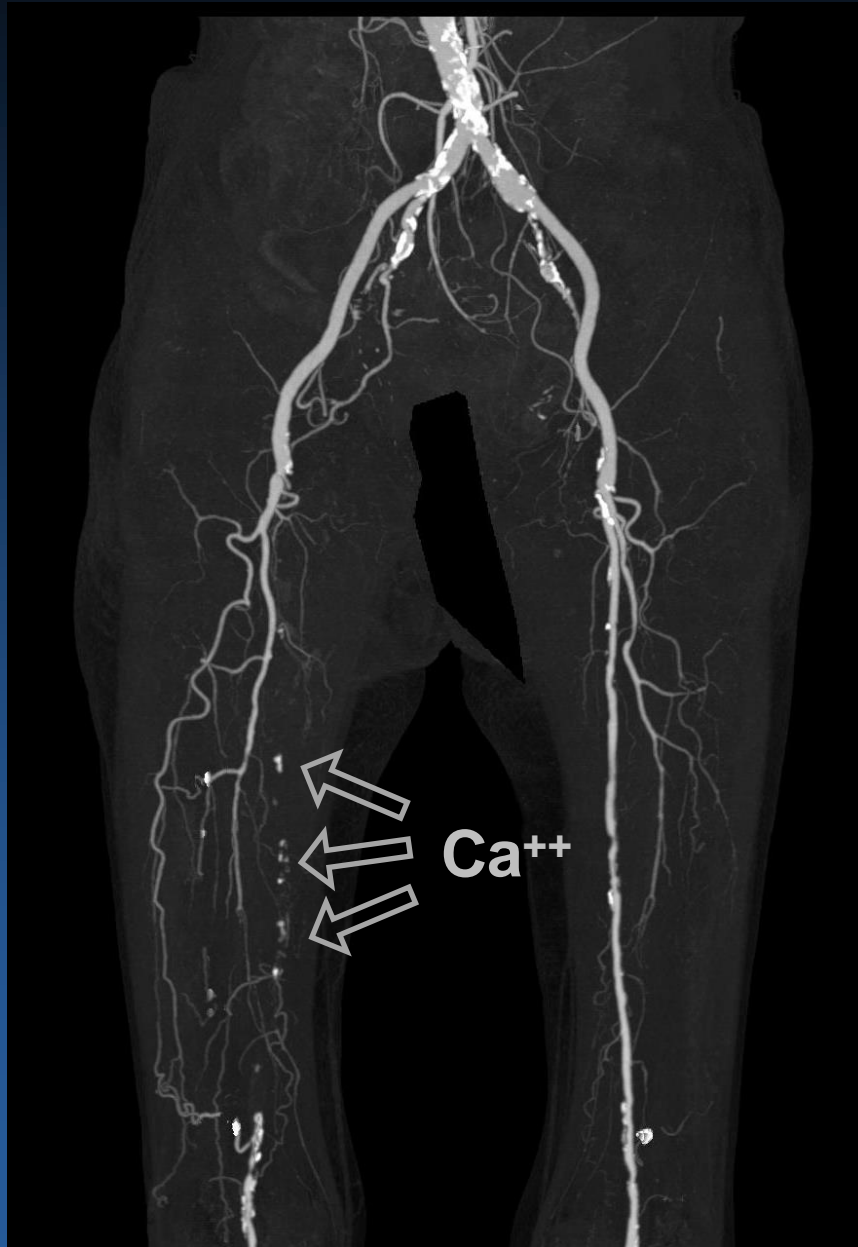
Four months later,

- Recurred resting leg pain, right
- Right popliteal pulse (-)
- ABI 0.57 / 0.95

→ Critical limb ischemia, Rutherford 4



CT angiogram (ALI → CLI)



Baseline angiogram



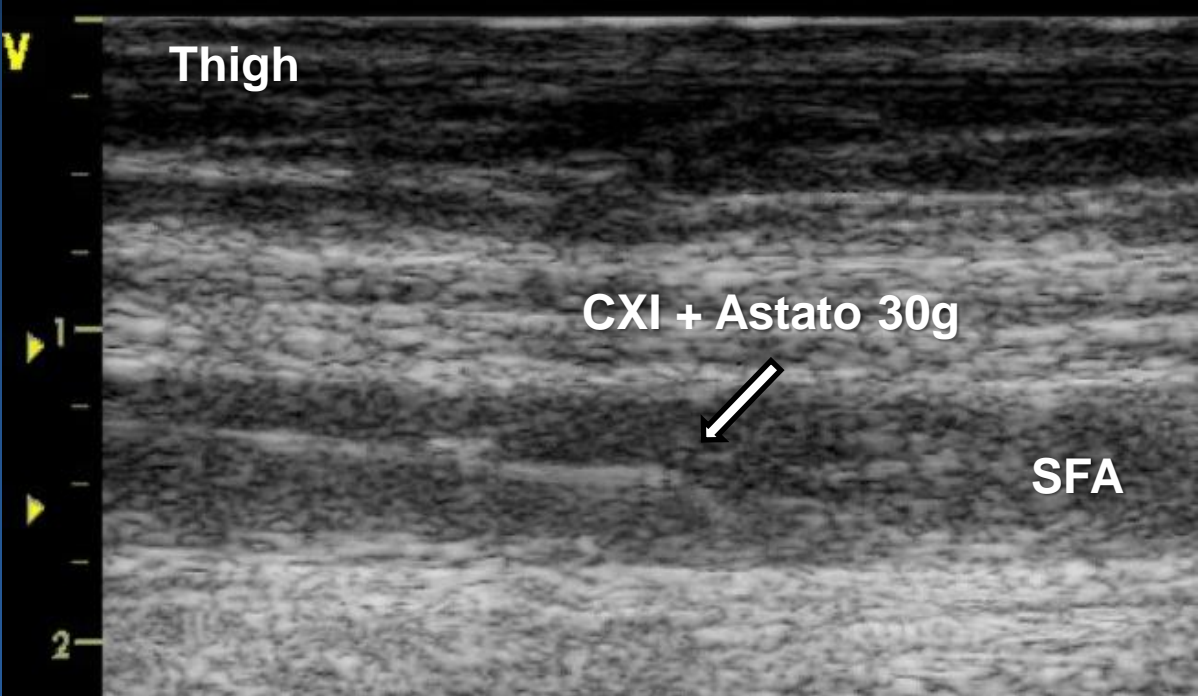
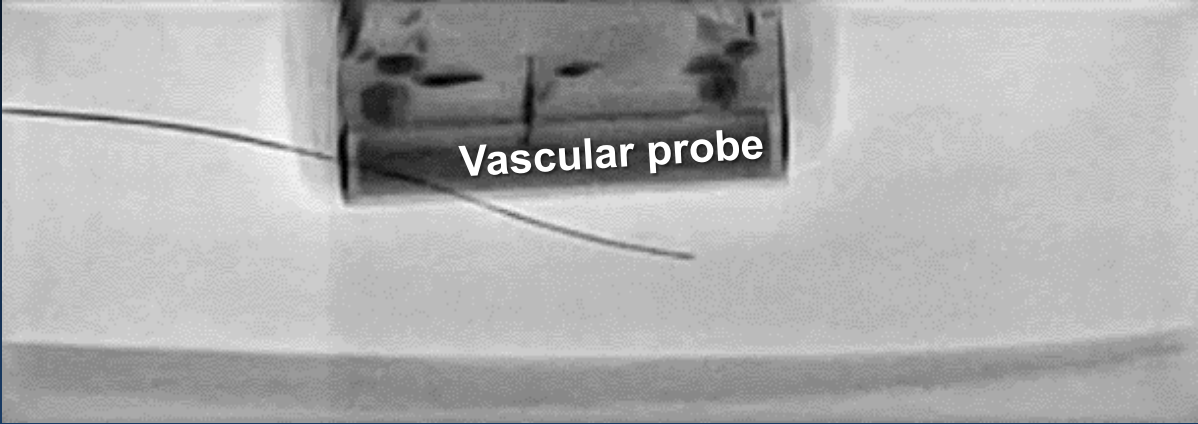
Ipsilateral antegrade approach, 7Fr Ansel sheath

Intraluminal guide wire passage tried



Failed GW passage at mSFA level

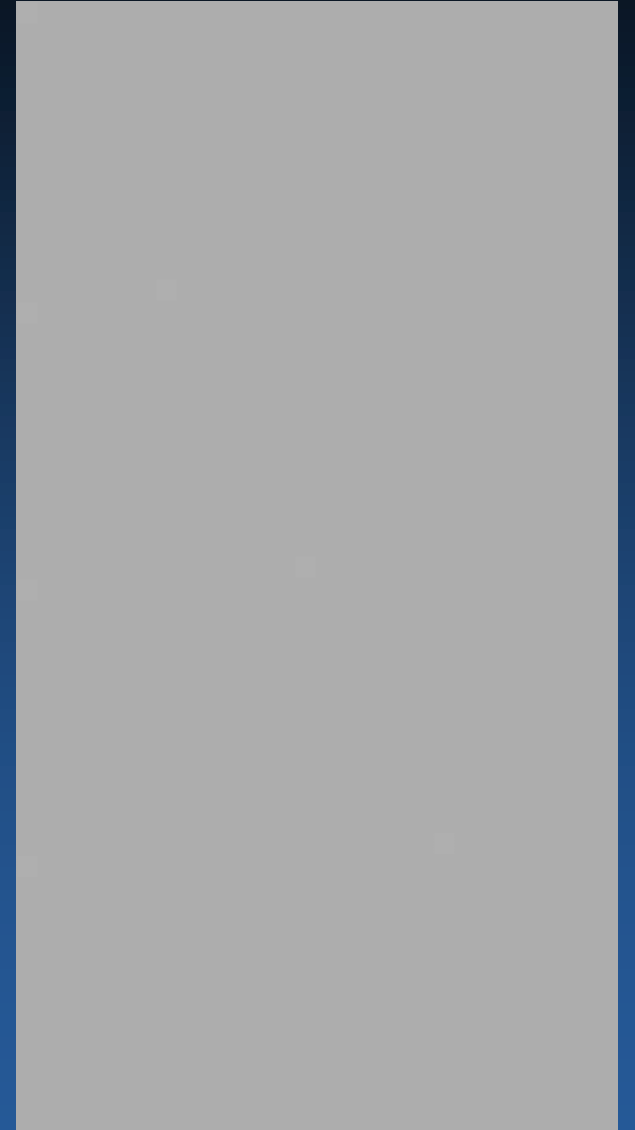
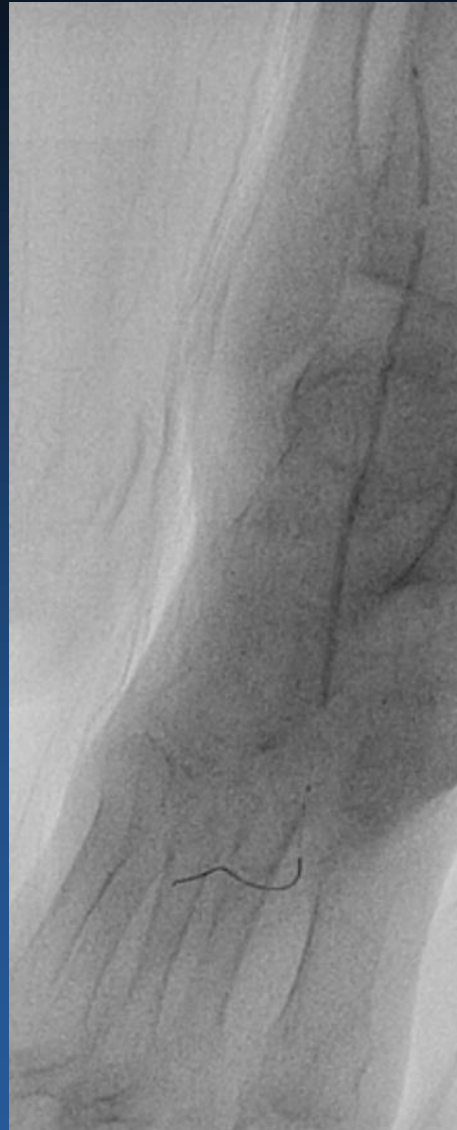
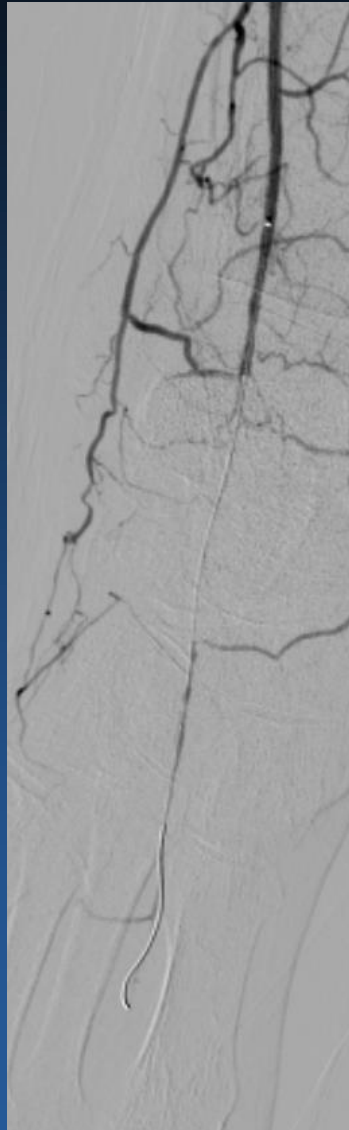
USG-guided Intraluminal wiring



Jetstream Atherectomy and DEB Angioplasty



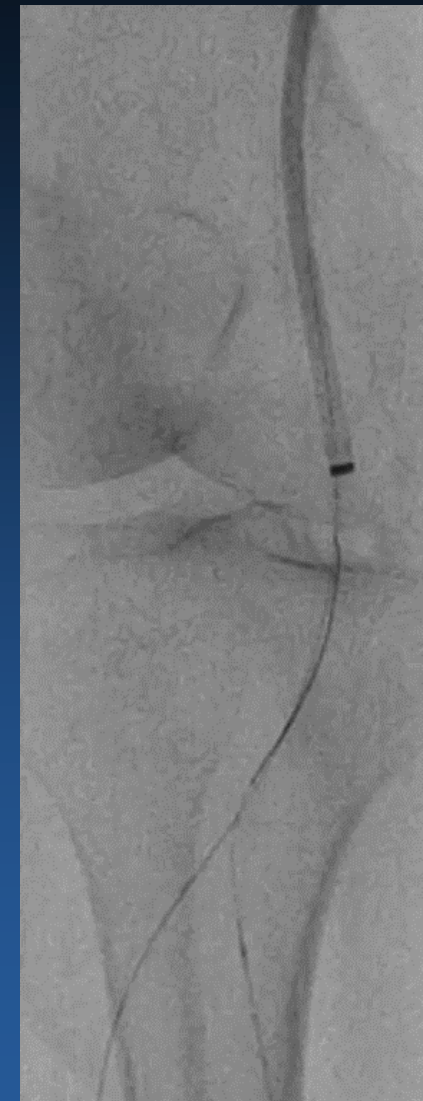
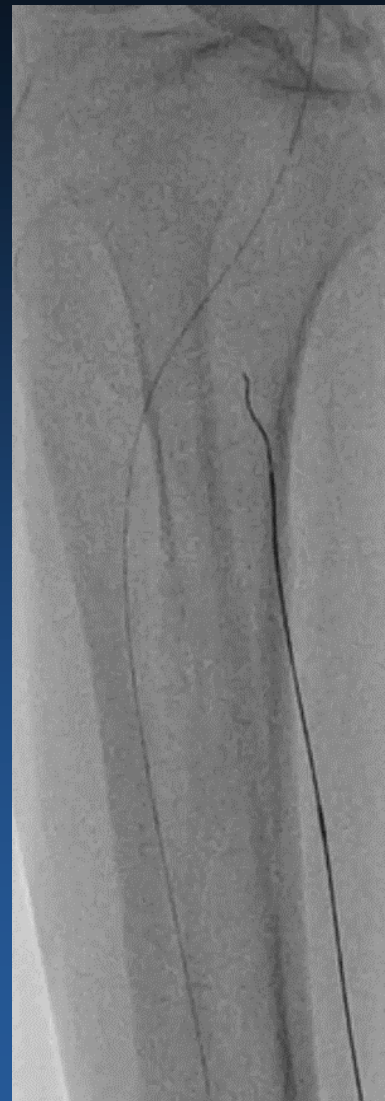
Dorsalis Pedis Recanalization



TP trunk and dorsalis occlusion

2.5x150mm balloon

Pedal-Plantar Loop Access



CXI microcatheter + Command ES GW

CXI microcatheter + Halberd GW

BTK Balloon Angioplasty



2.5/3.0x210mm

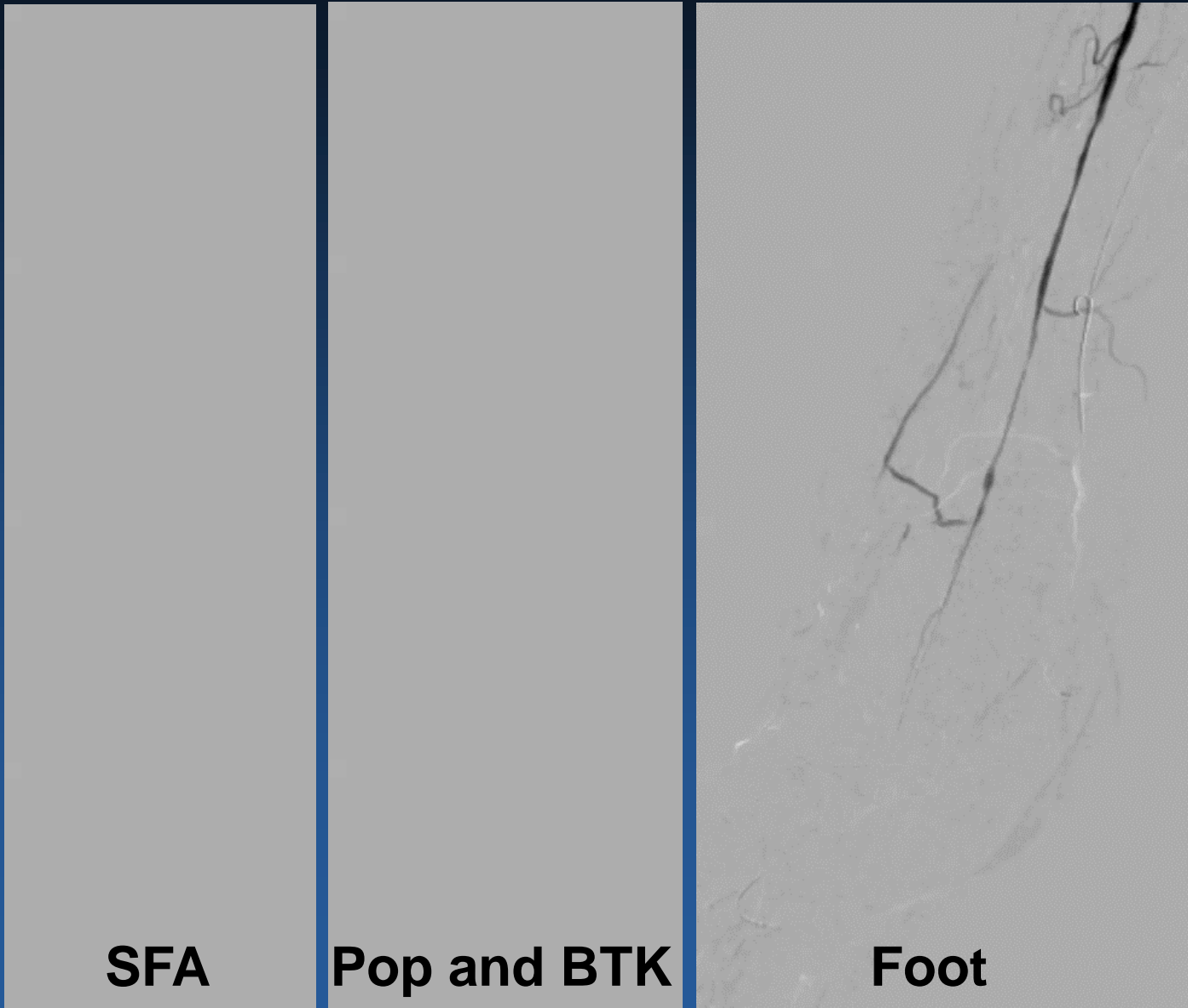
SFA DCB Angioplasty



5.0x150mm

6.0x150mm

Final angiogram



- The leg pain and the sensory were all improved.
- The foot drop was almost improved, and the activities without aids were possible.

89/F

HTN

S/P TKRA, both

Old inferior MI, 2VD, 9YA

Resting left leg pain and coldness, 10 DA

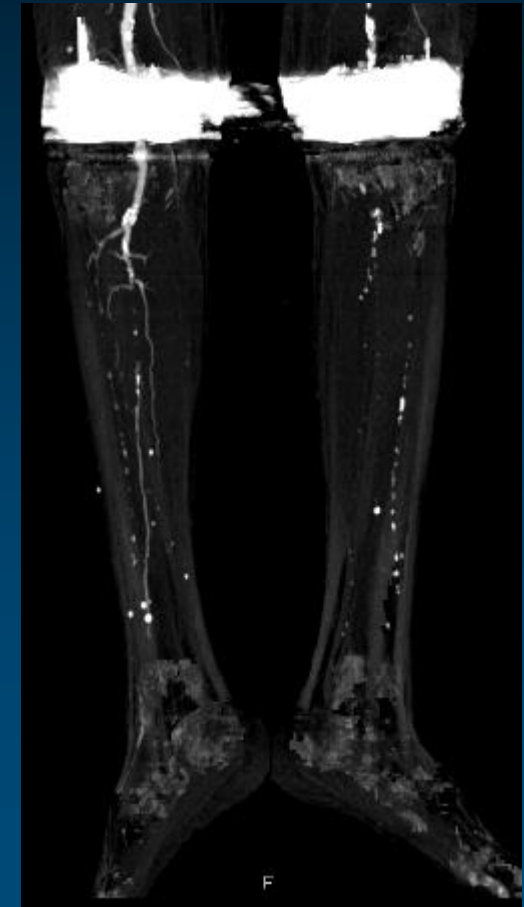
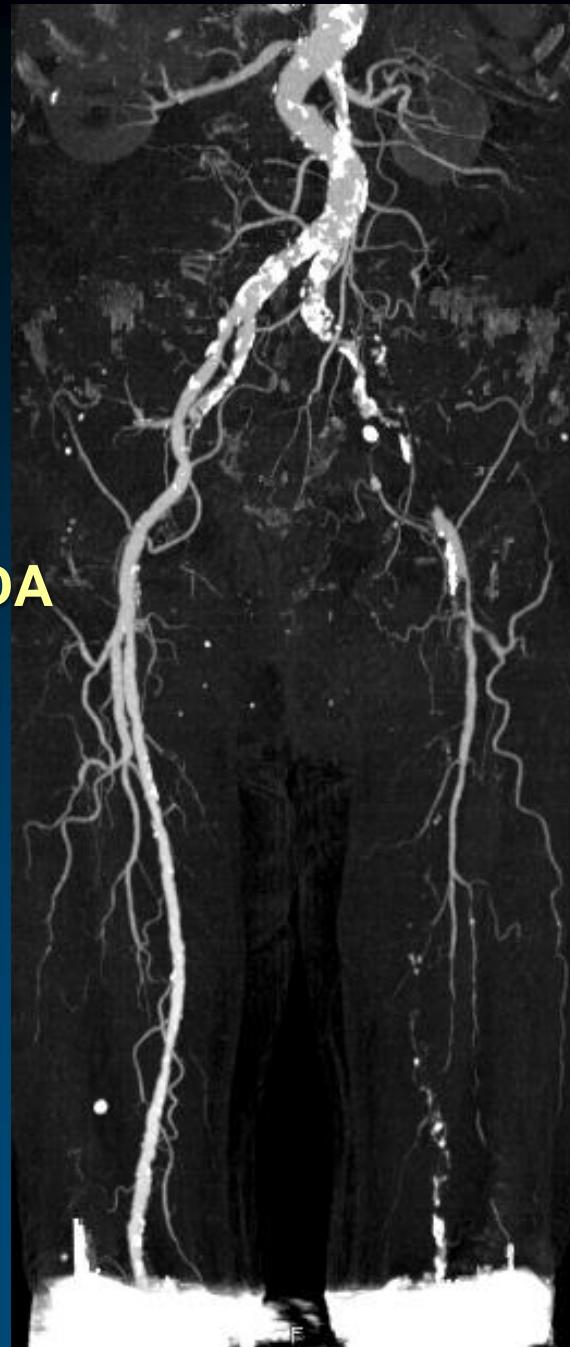
→ Decreased sensory on foot dorsum

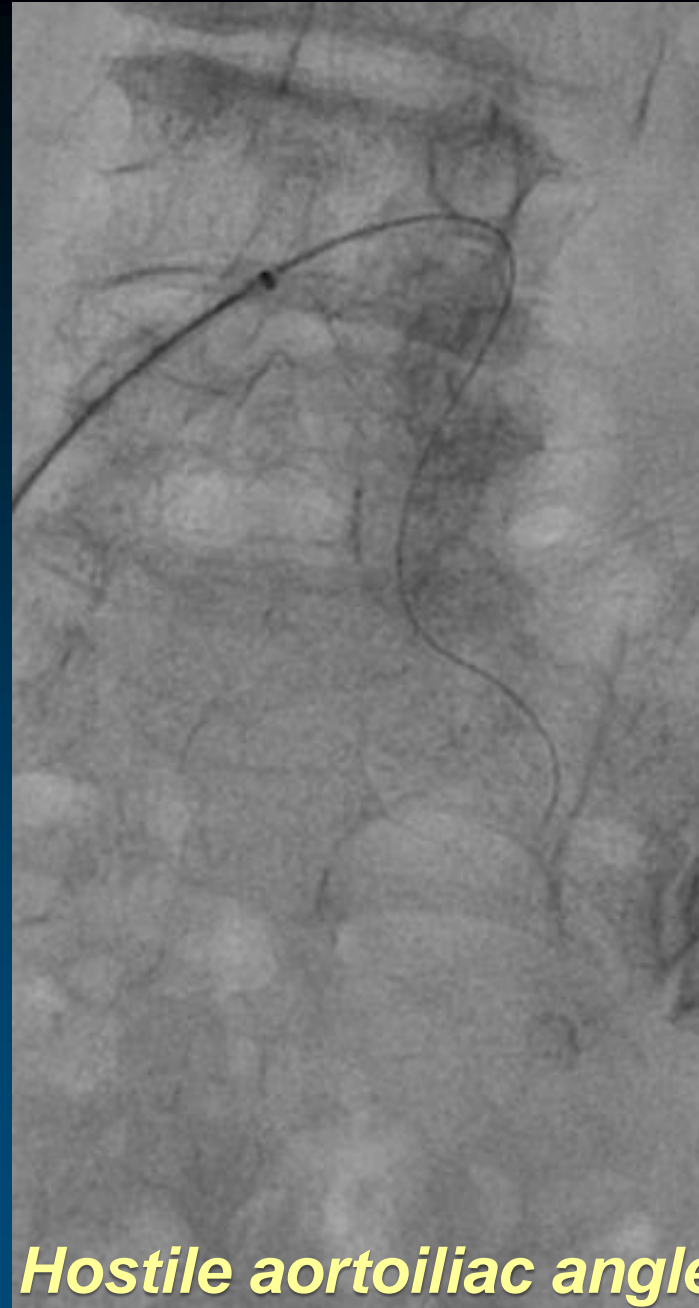
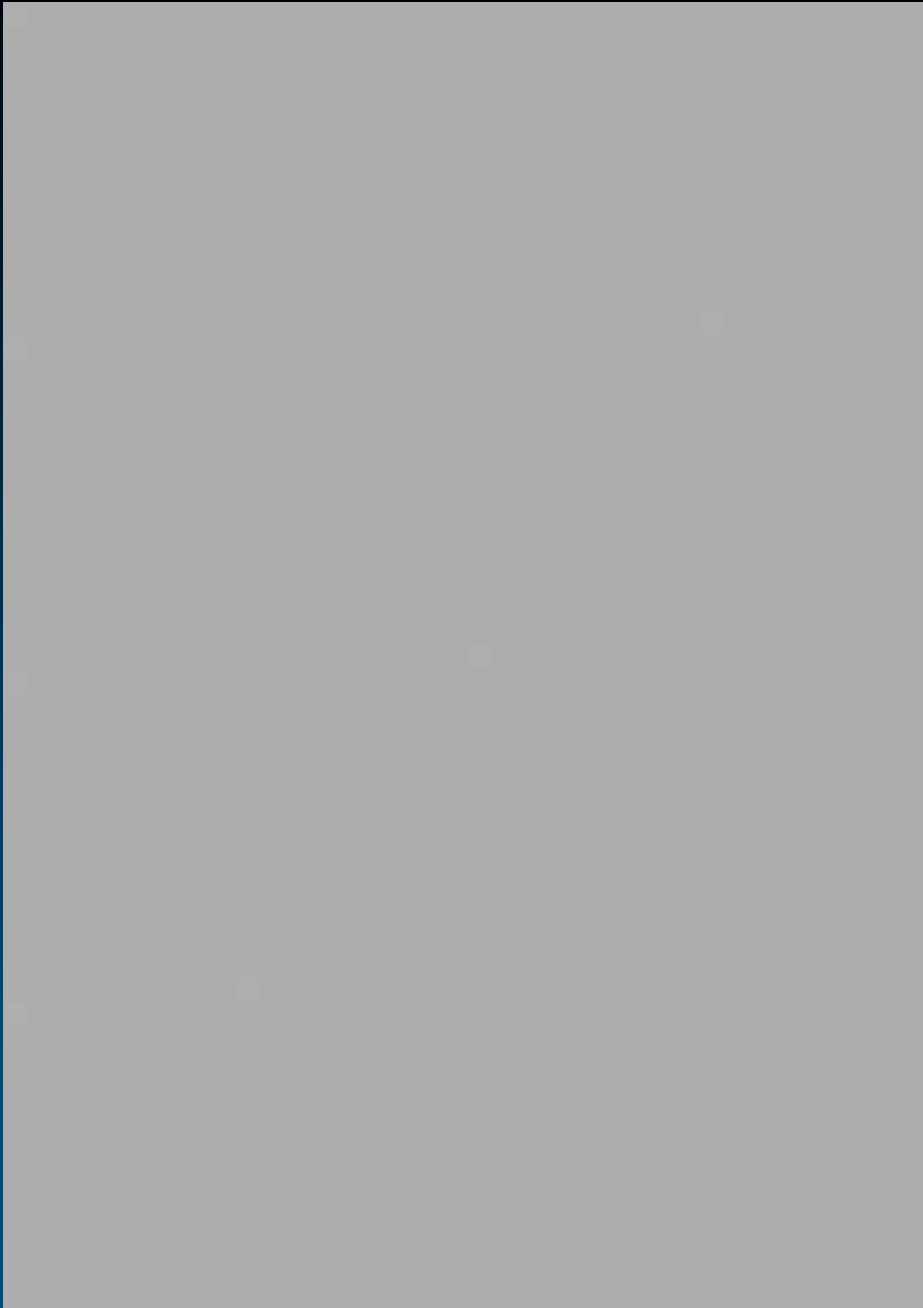
Difficulty of dorsiflexion, toes

ALI on chronic ASO

- Rutherford IIb ALI limb

Surgeon refused surgery





Hostile aortoiliac angle



**Easy GW passage
(0.035" Terumo)**



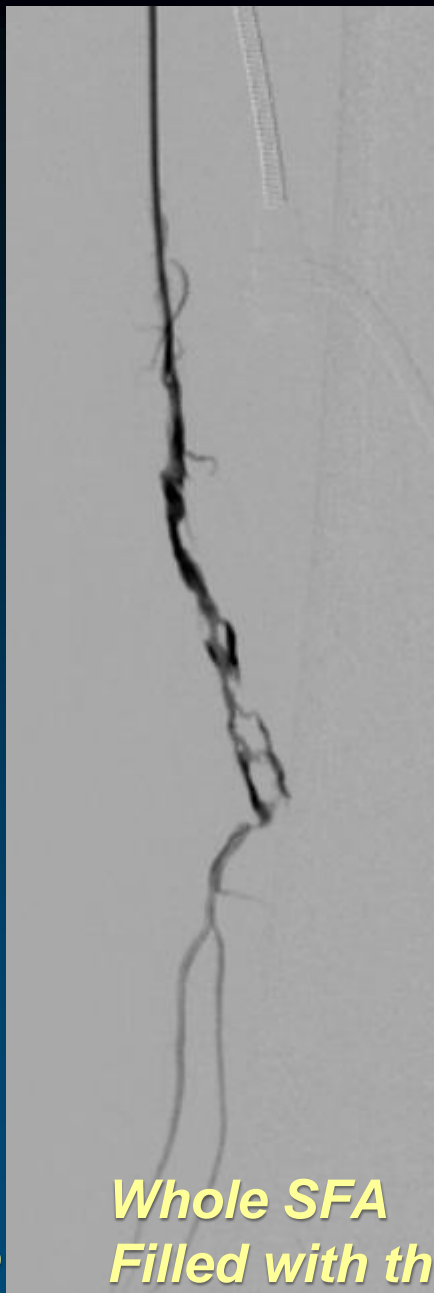
**Snare the contra. wire
→ 7 Fr Ansel from Rt. CFA**



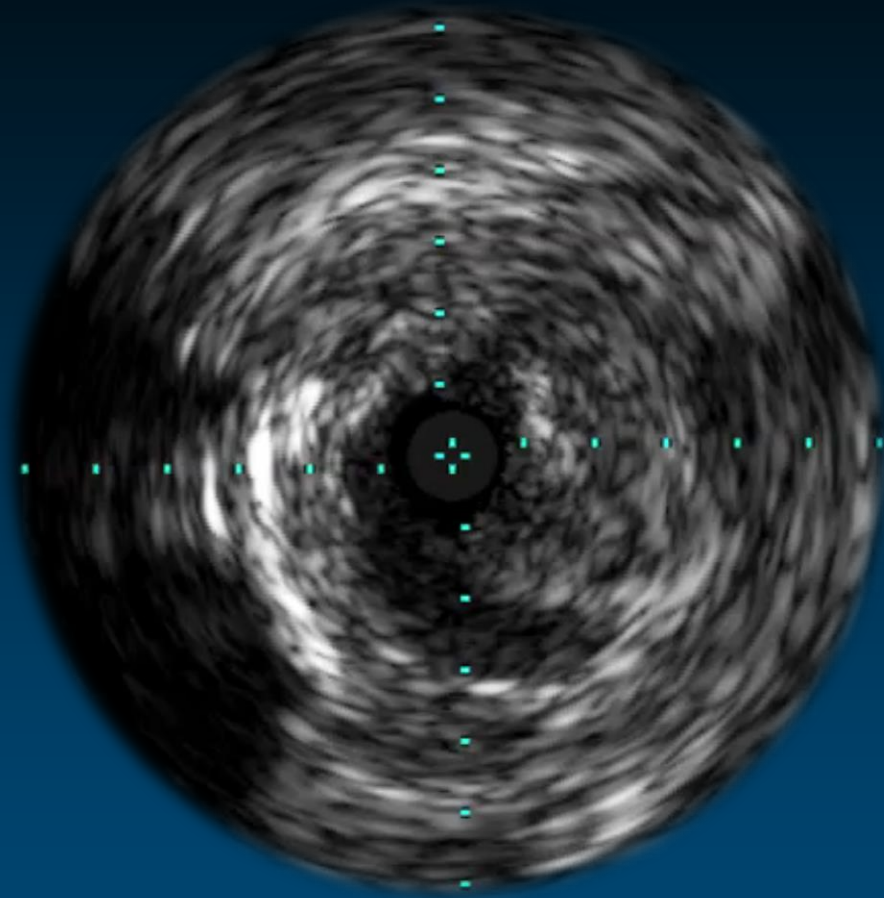
SFA occlusion



**Easy GW passage
(0.014" Command)**



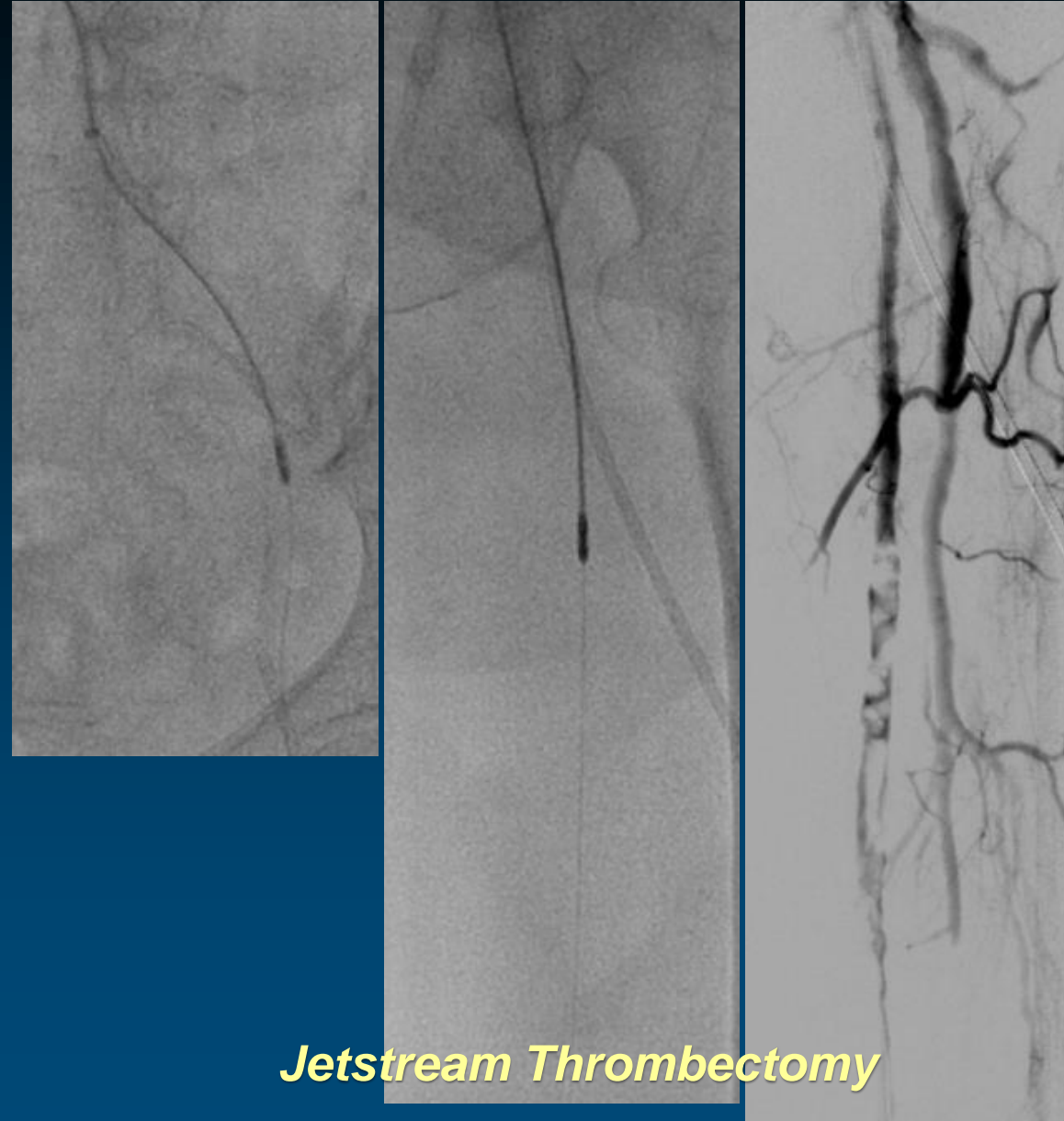
**Whole SFA
Filled with thrombi**



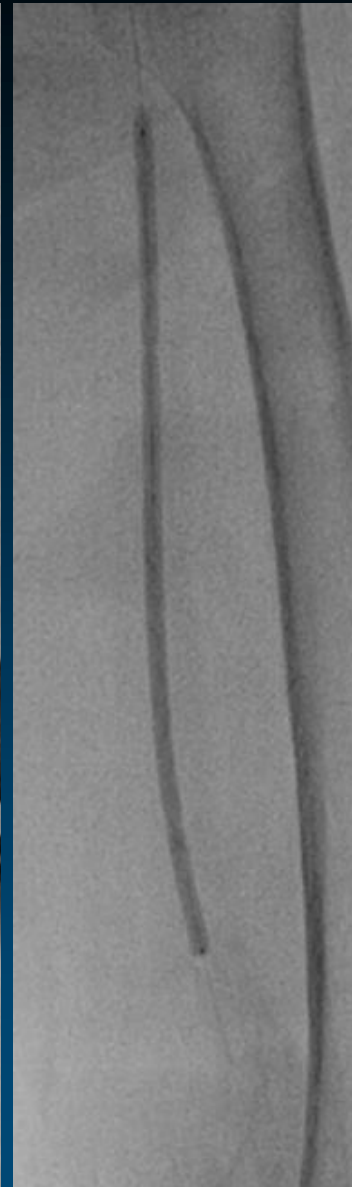
IVUS
- Intraluminal GW passage
- Filled with thrombi



GW passage to pATA

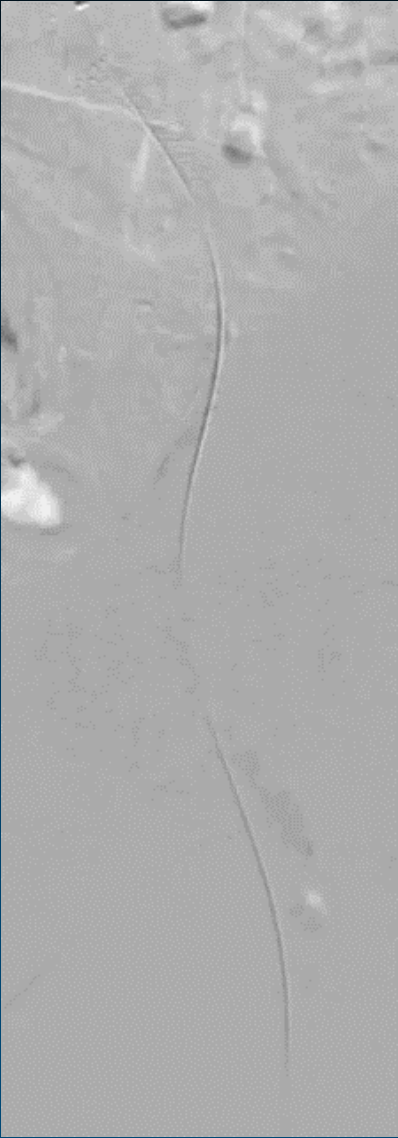


Jetstream Thrombectomy

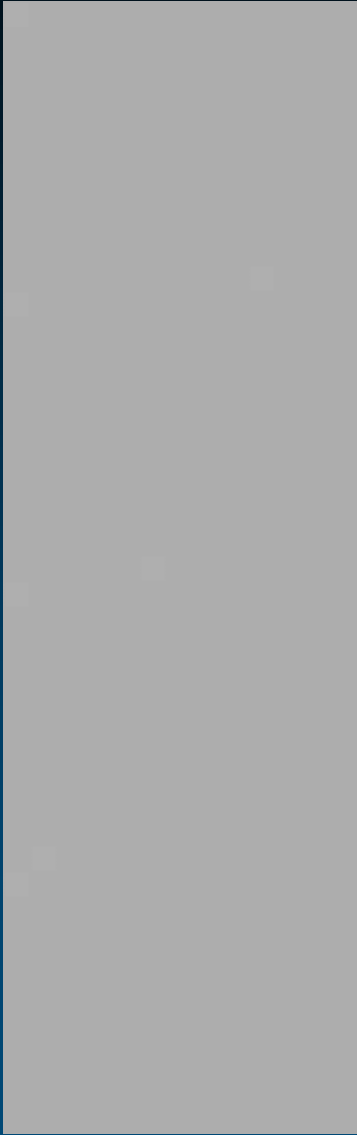


Jetstream Thrombectomy → POBA 5.0x200 mm → DCB 5.0x150 mm

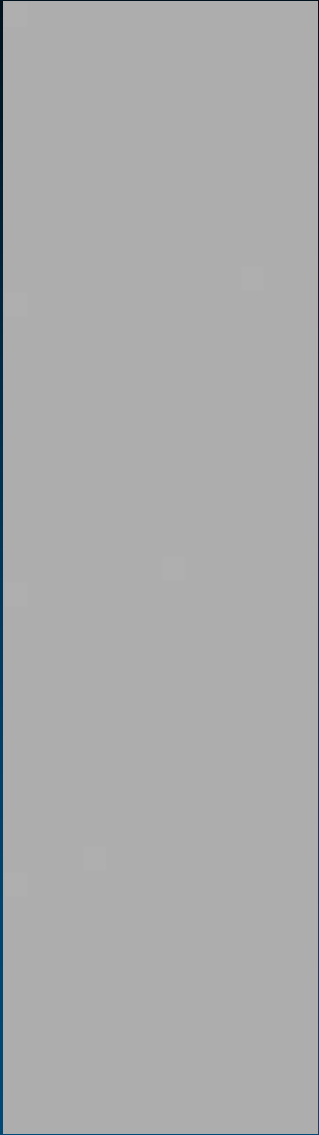
Final Angiogram



EIA; 10x100mm SE stent



Femoropopliteal; Nothing behind



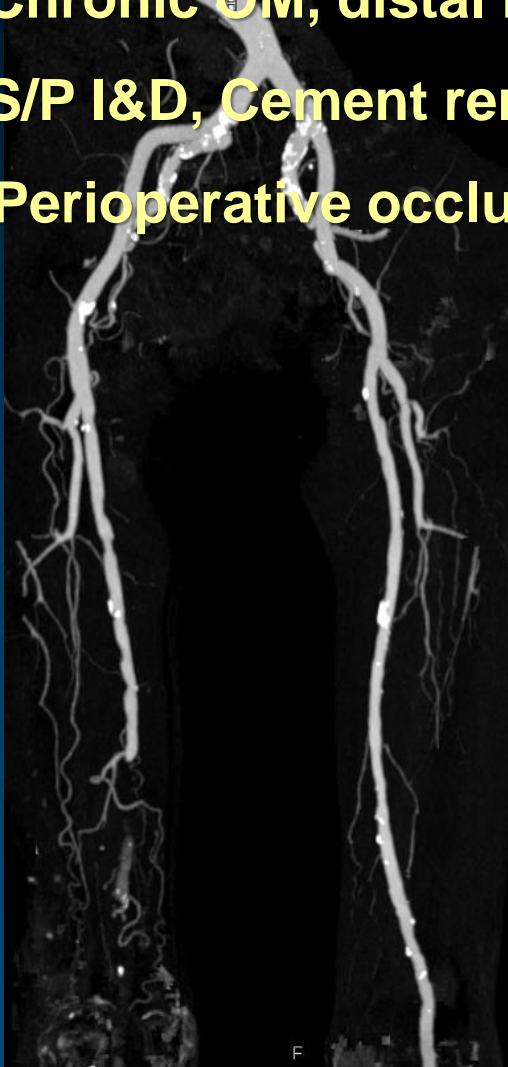
79/F

H/O Distal femur Fx, S/P Repeated surgery, 14 YA

→ Chronic OM, distal femur & proximal tibia, Rt

→ S/P I&D, Cement removal & Antibeal insertion

Perioperative occlusion of dSFA & P1

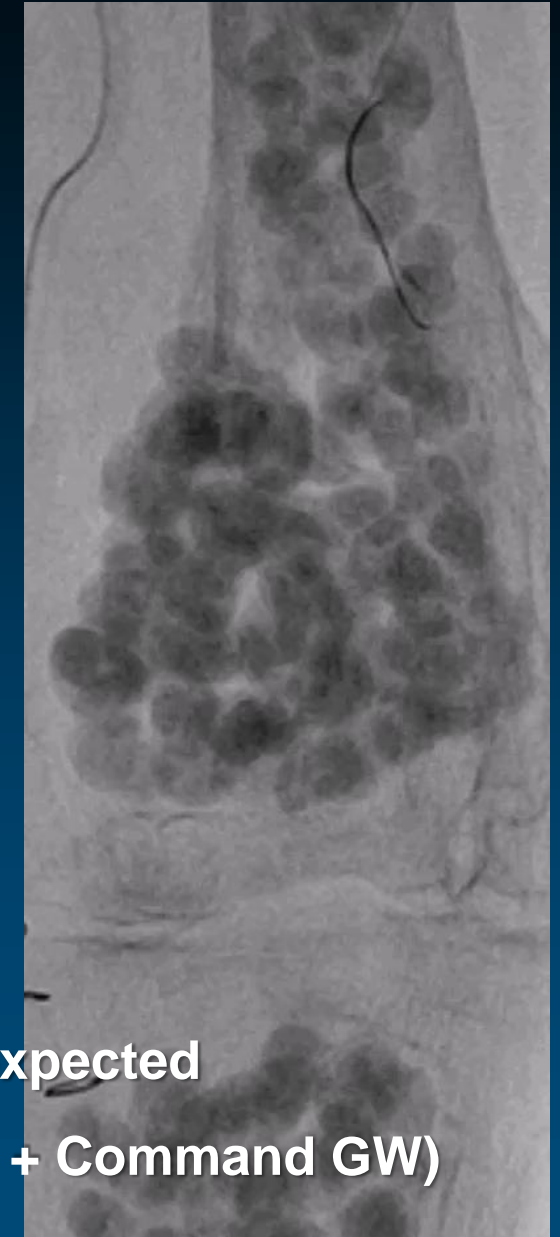


Ipsilateral antegrade approach

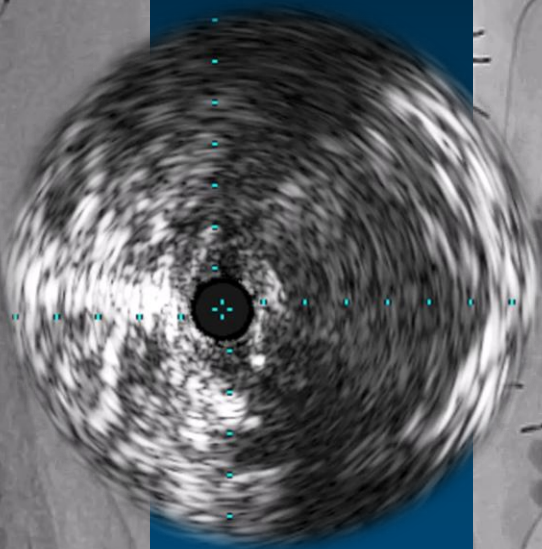
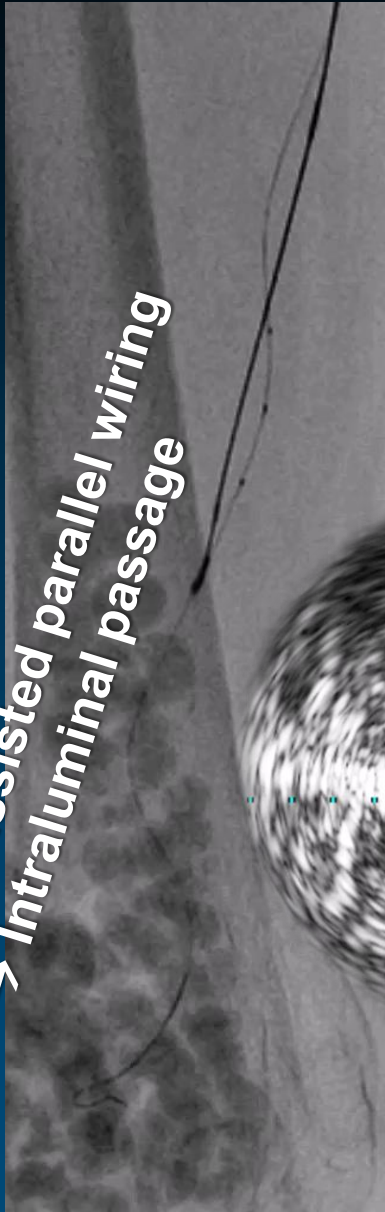
7 Fr Ansel sheath

Easy intraluminal passage was expected

→ but, subintimal passage (CXI + Command GW)



IVUS-assisted parallel wiring
→ Intraluminal passage

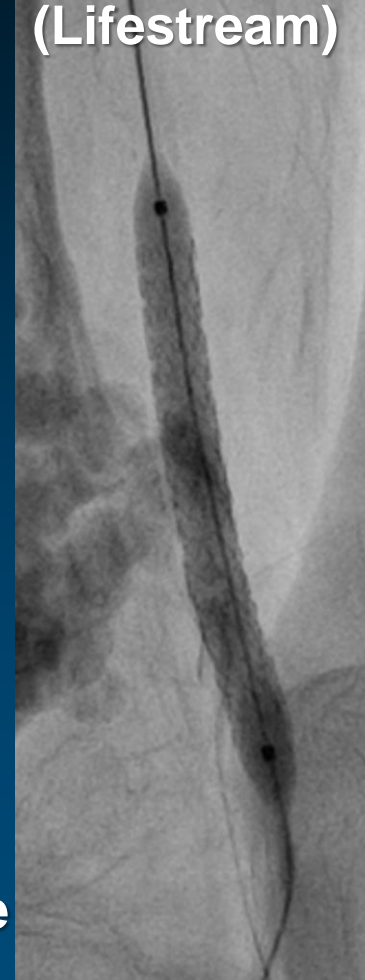


NAV6

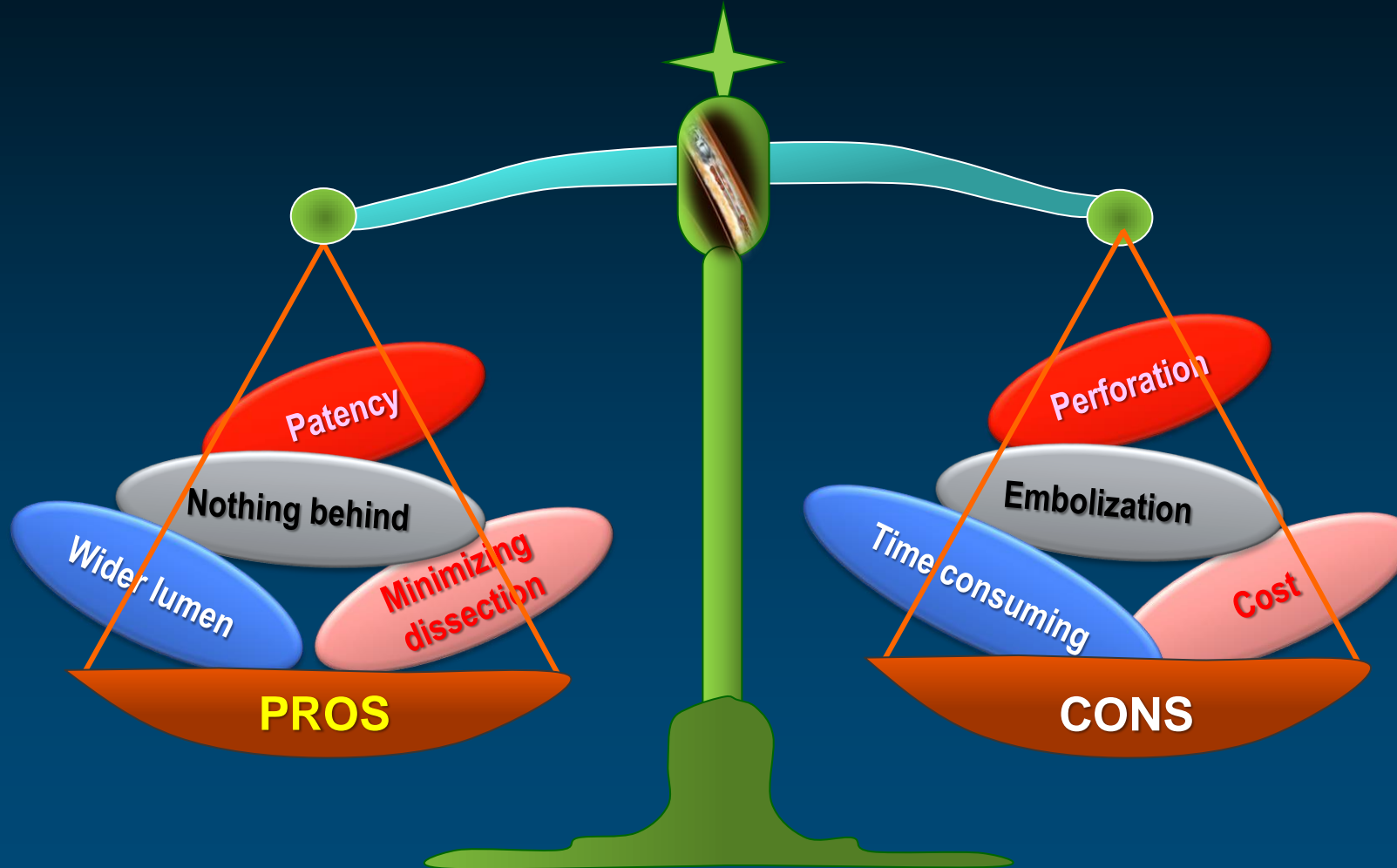


Severe pain &
Perforation after
BU 3.4 mm passage

Bail out
Graft stenting
(Lifestream)



Rotational Atherectomy: PROS & CONS



Rotational Atherectomy: *How To Improve Efficiency?*

- **Efficiency** ↑
 - Wider lumen gain
 - Less dissection
 - Better patency?



- **Complication** ↑
 - Perforation
 - Pseudoaneurysm
 - Embolization

Efficient Atherectomy?

Effective Debulking without Complication



Leave Good Thing vs. Nothing Behind In Your Leg

Depends On Your Choice