Recanalization of Complex Aortoiliac Lesion

My EVT Strategy

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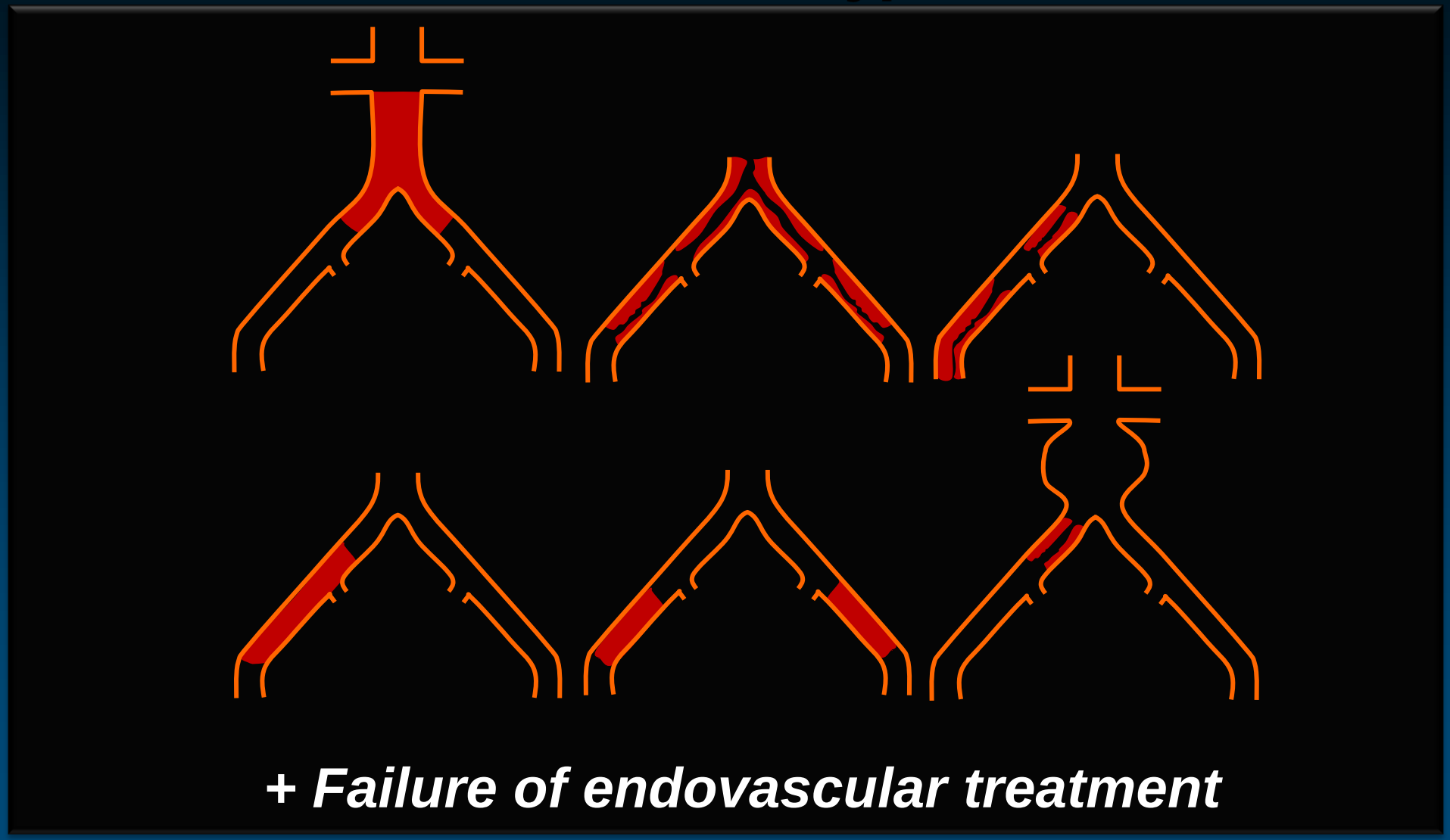
TASC IIb Classification

Aorto-Iliac Disease – Type D Lesions



+ Failure of endovascular treatment

Complicated Aortoiliac lesion ?

- Aortobiiliac CTO
- Flush common iliac CTO
- Iliac CTO extended to SFA
- Heavy calcification
- Hostile angulation of aortoiliac arteries
- In-stent total occlusion
- Acute limb ischemia with thrombus
- Previous failure of endovascular treatment

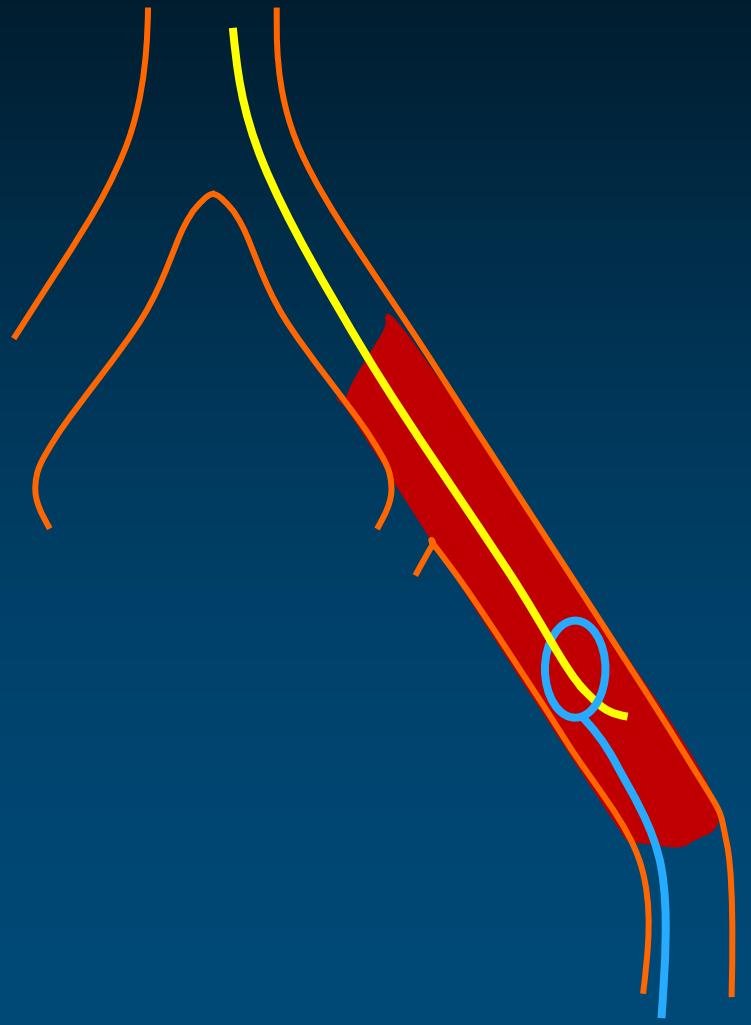
Iliac CTO Communication

- **Bidirectional technique mandatory**
- **Should communicate within the CTO segment**

  - to prevent CTO segment extension proximally or distally

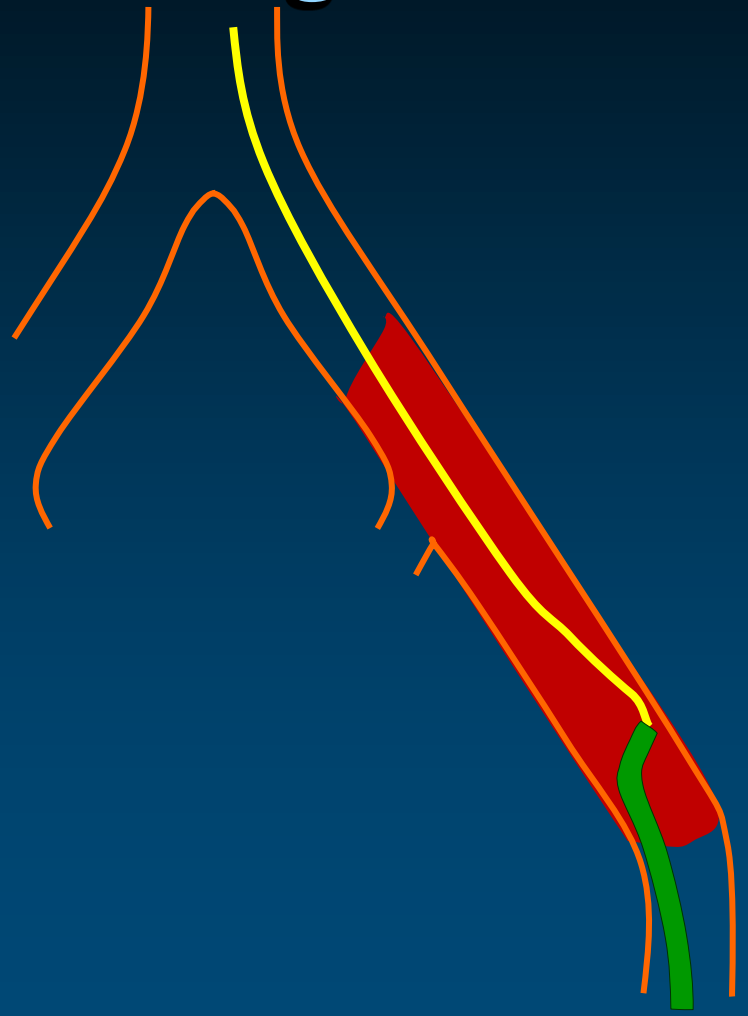
Iliac CTO Communication

Snaring



Iliac CTO Communication

Wiring to contralateral guiding / sheath



Iliac CTO Communication
Outback reentry to contra balloon

Courtesy from A. Schmidt

Iliac CTO Communication

Outback to aorta (flush occlusion)

Iliac CTO Communication

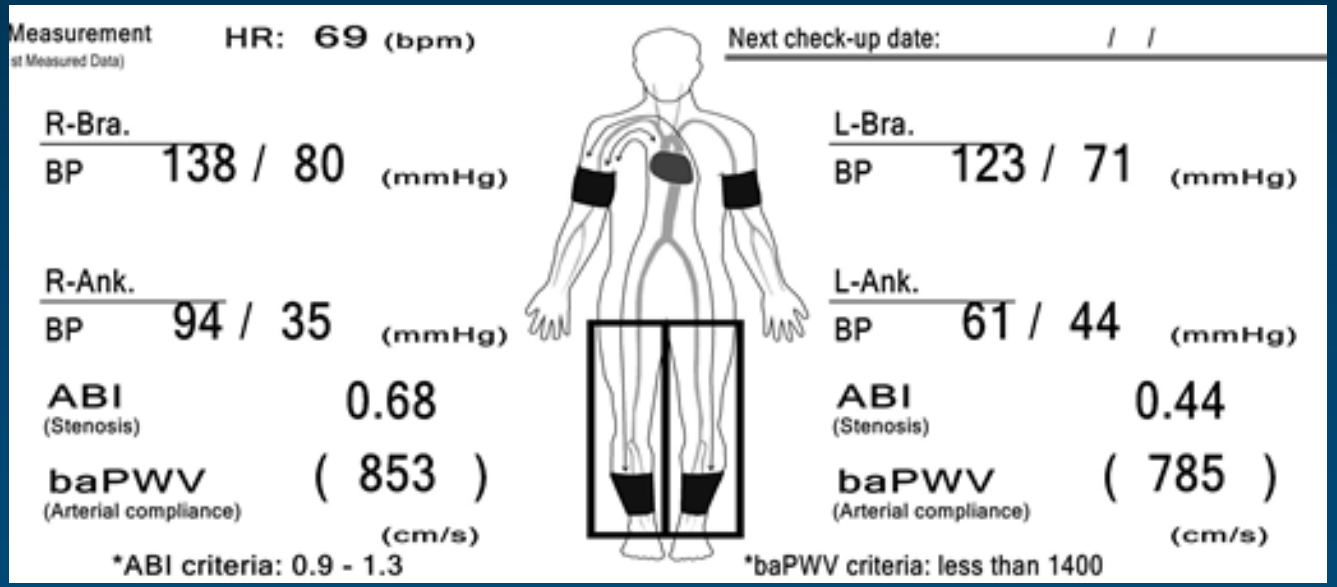
Outback to aorta (flush occlusion)

Aortoiliac Occlusion

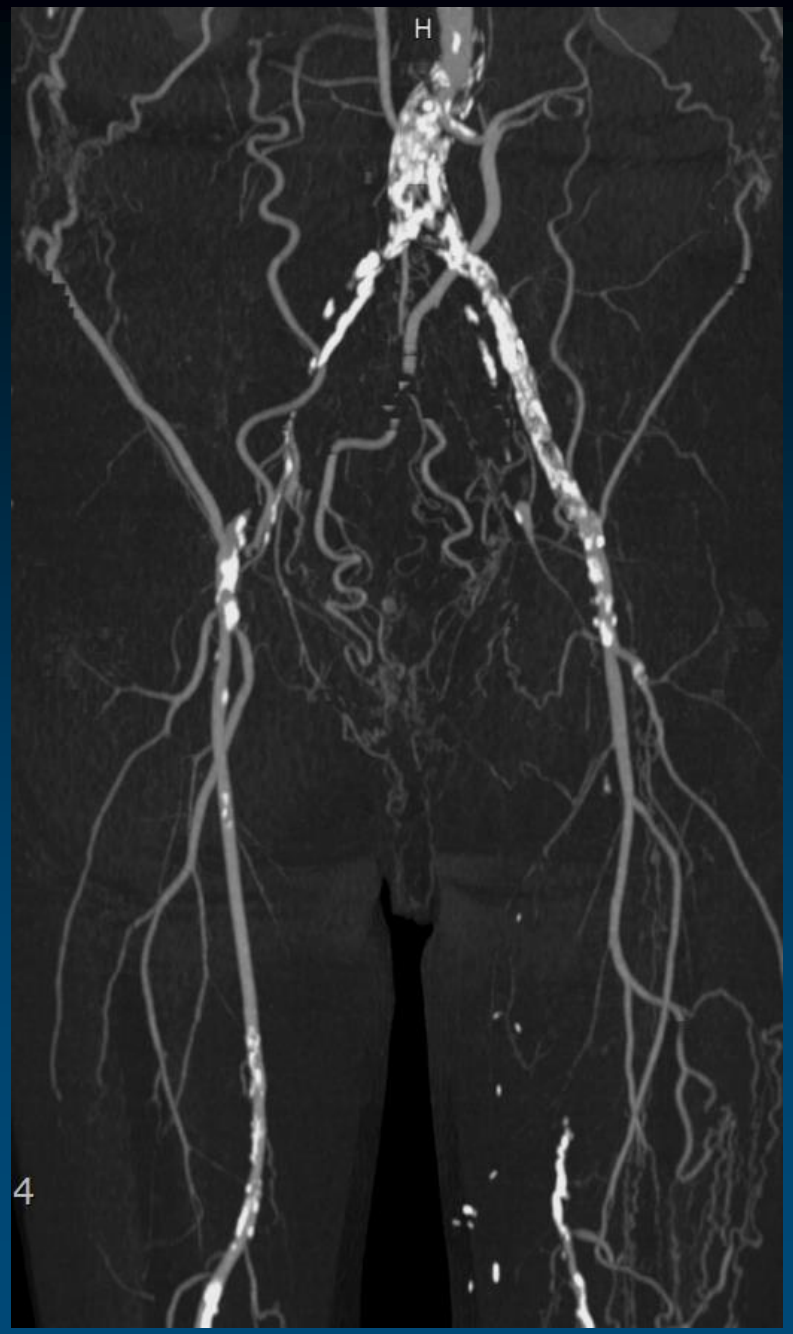
Aortobiiliac occlusion

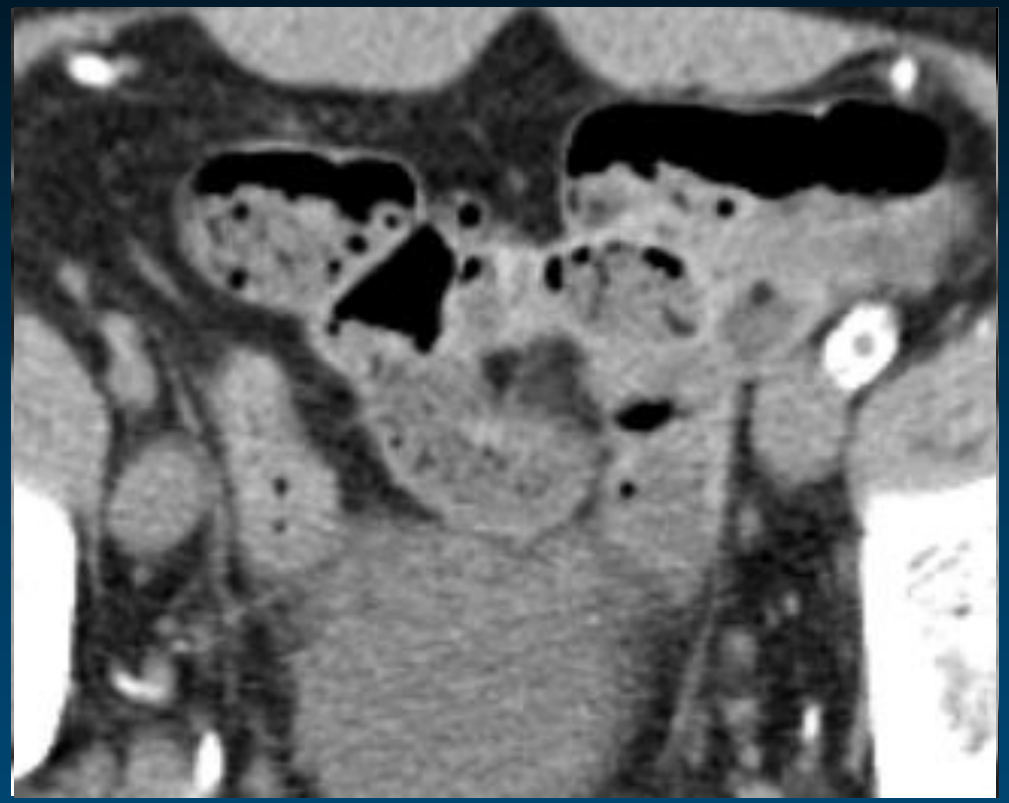
- 67 years old man
- 5 YA, S/P CABG (LIMA-LAD, TRA-Dx-OM, SVG-PDA)
  → Stenting for LIMA graft 4 YA
- DM, HTN, Hyperlipidemia
- CKD, Cr 1.5
- 4YA, S/P Left iliac stenting
- Claudication IIb, both
- Normal EF with apical hypokinesia
- Both femoral pulse; not palpable


Mechanocardiogram/Pulse Volume Recorder
ECG:
PCG
R-Bra.
%MAP:
L-Bra.
%MAP:
R-Ank.
%MAP:
UT :
L-Ank.
%MAP:
UT :

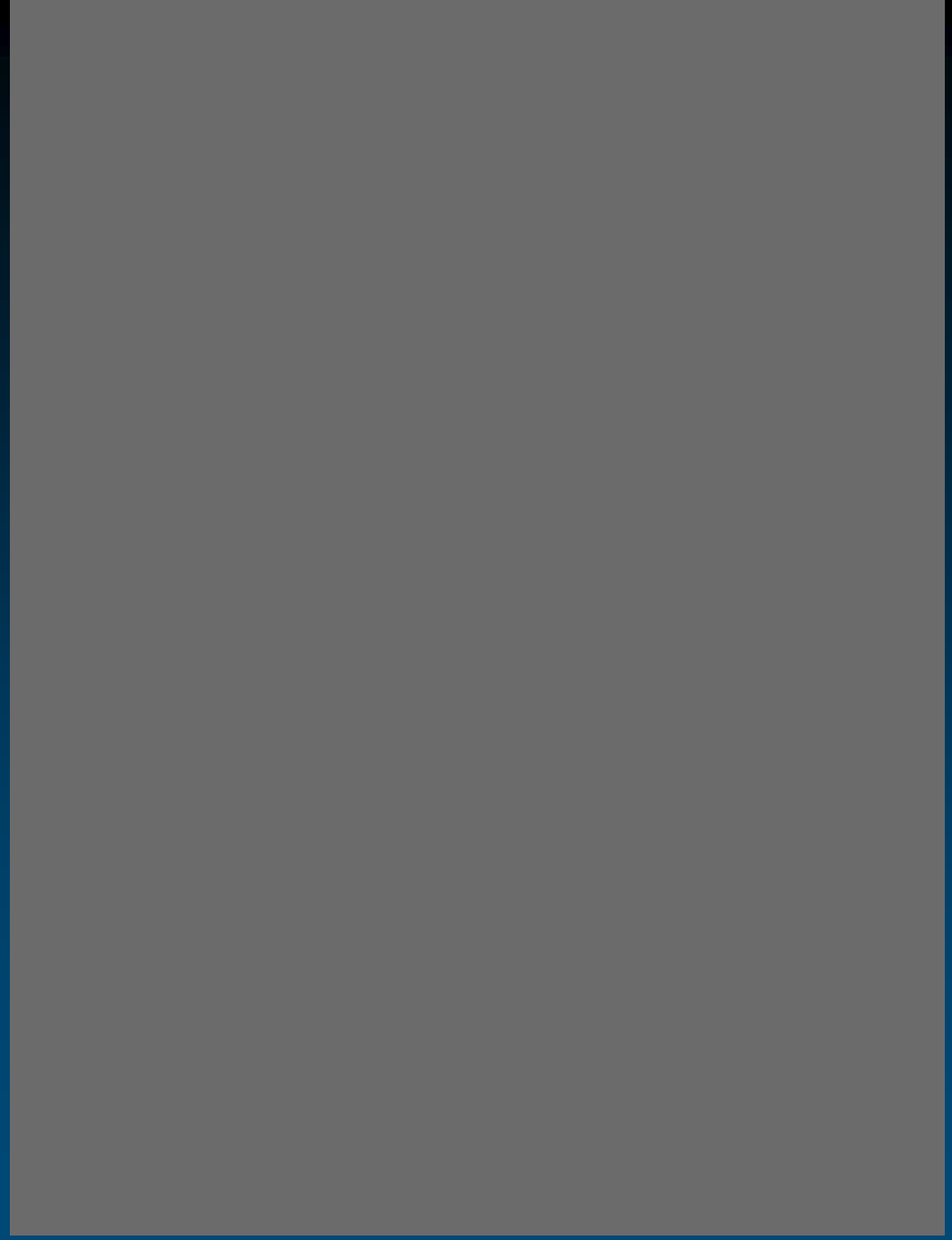

Measurement
HR: 69 (bpm)
Next check-up date: / /
R-Bra.
BP 138 / 80 (mmHg)
L-Bra.
BP 123 / 71 (mmHg)
R-Ank.
BP 94 / 35 (mmHg)
L-Ank.
BP 61 / 44 (mmHg)
ABI
(Stenosis)
0.68
ABI
(Stenosis)
0.44
baPWV
(Arterial compliance)
(853)
(cm/s)
baPWV
(Arterial compliance)
(785)
(cm/s)
*ABI criteria: 0.9 - 1.3
*baPWV criteria: less than 1400

Aortobiiliac Occlusion





Right radial 5Fr

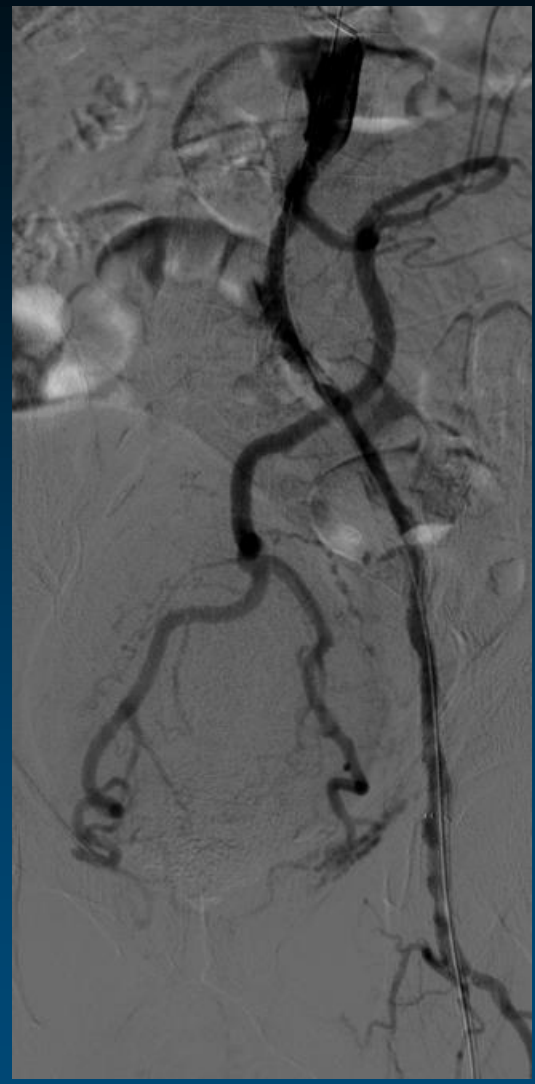


Bidirectional approach

TRI with 125cm Headhunter + Stiff Terumo

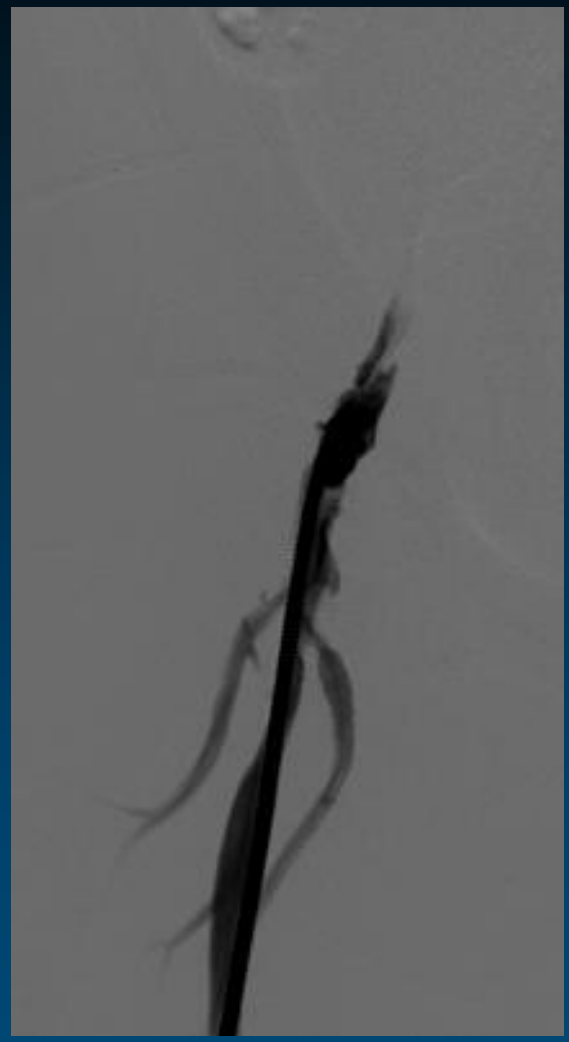
TFI with Glide + Terumo

Externalization of antegrade wire

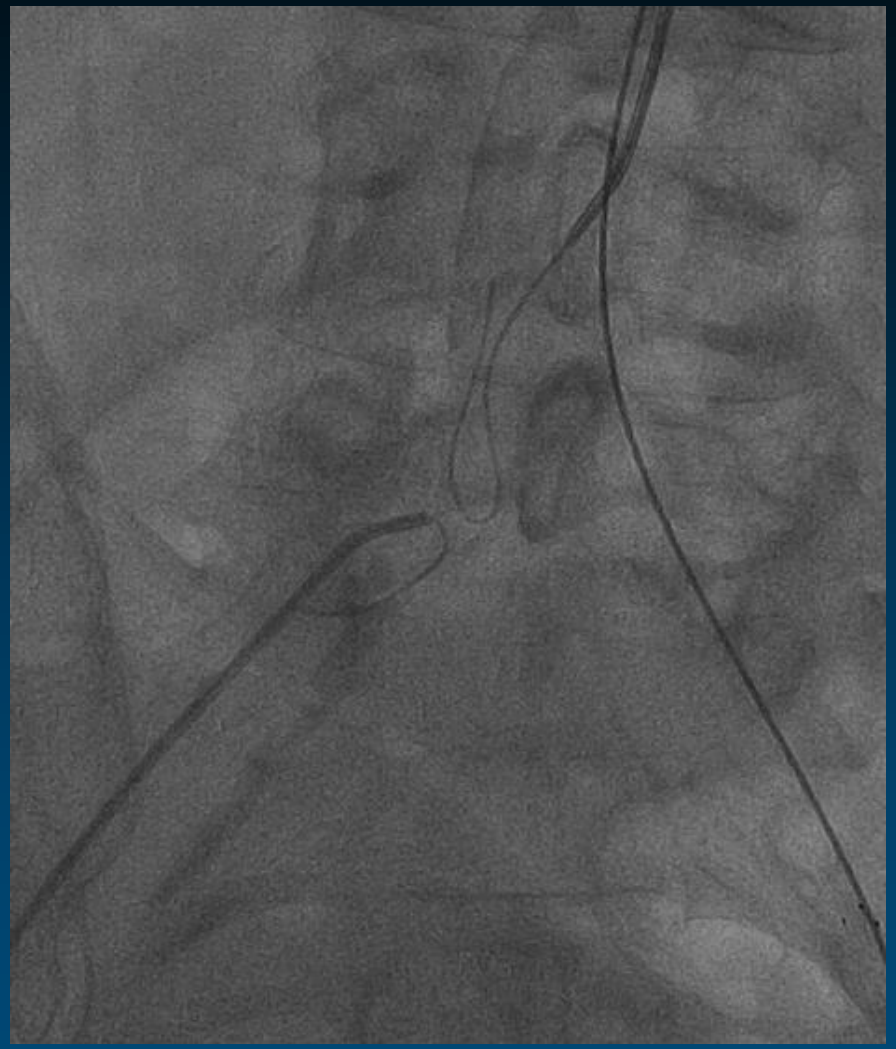


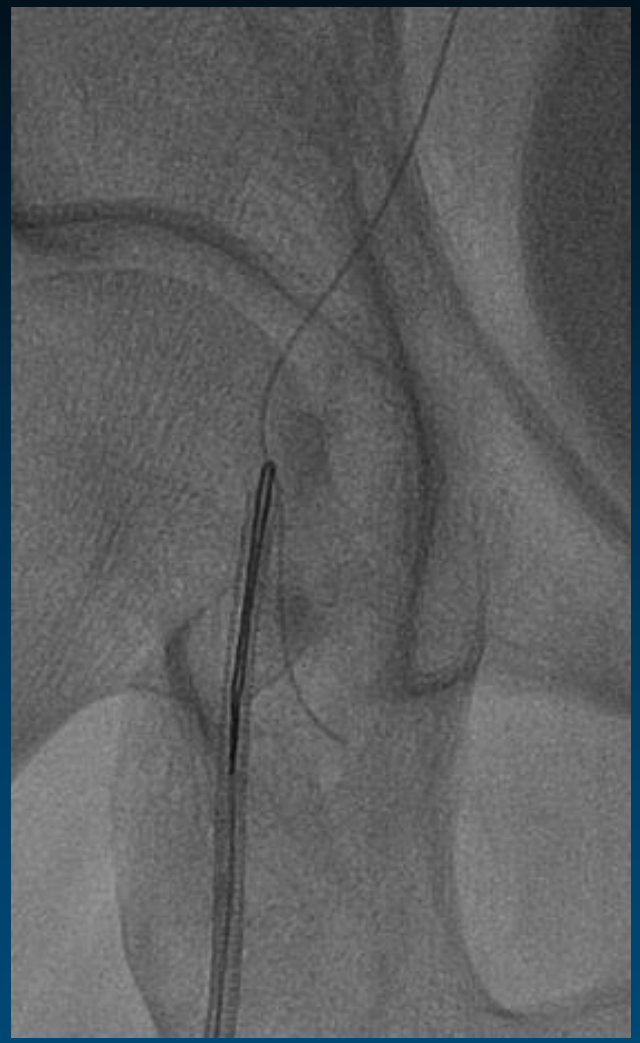
6.0x200mm, 10 atm

Fluoroscopy-guided pSFA puncture



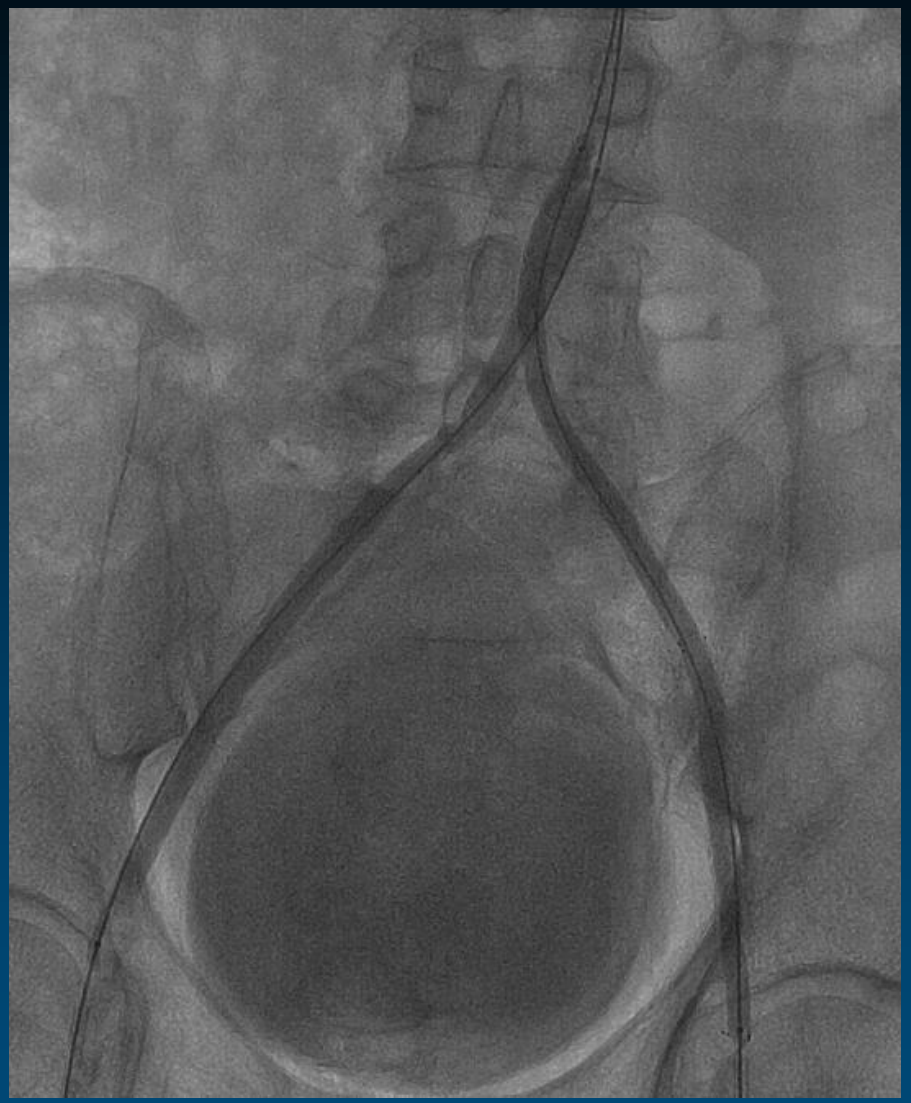
Bidirectional approach

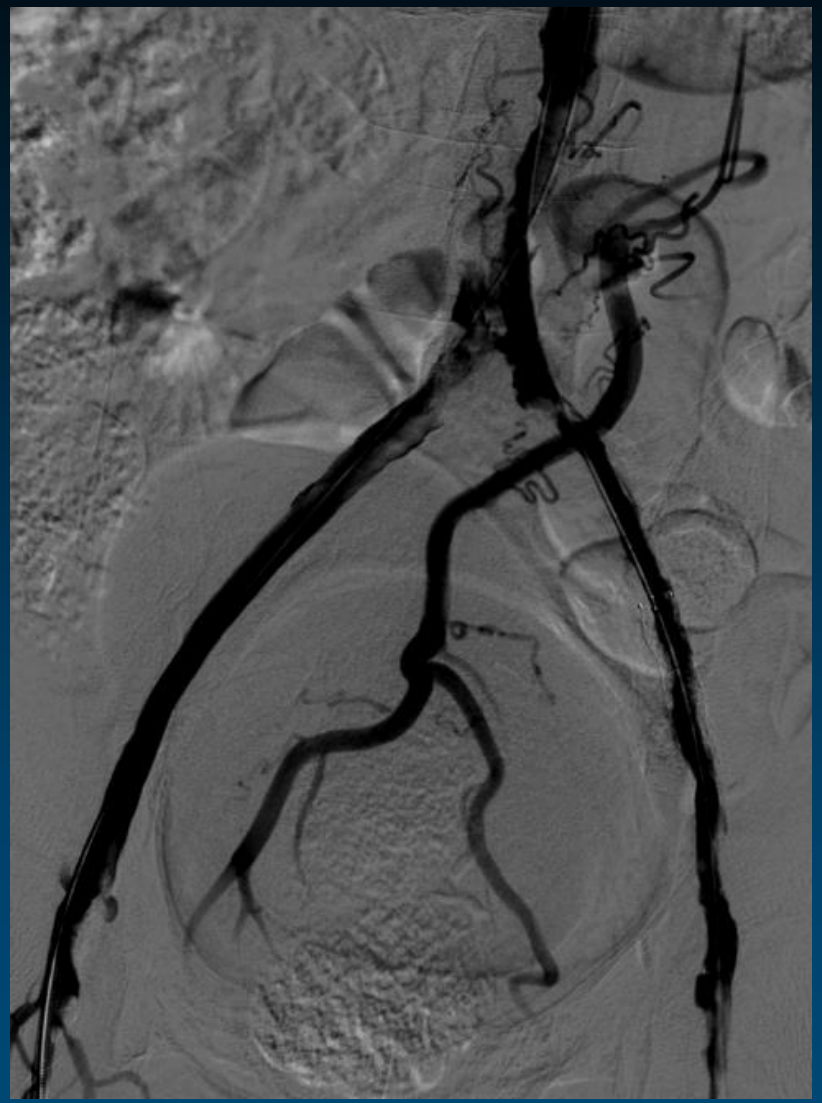




Externalization of antegrade wire with snare

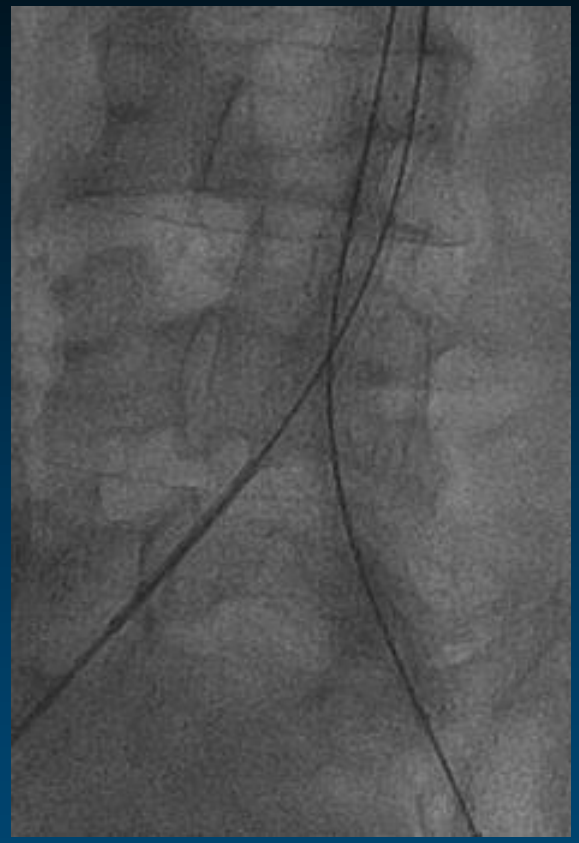
Kissing balloon angioplasty





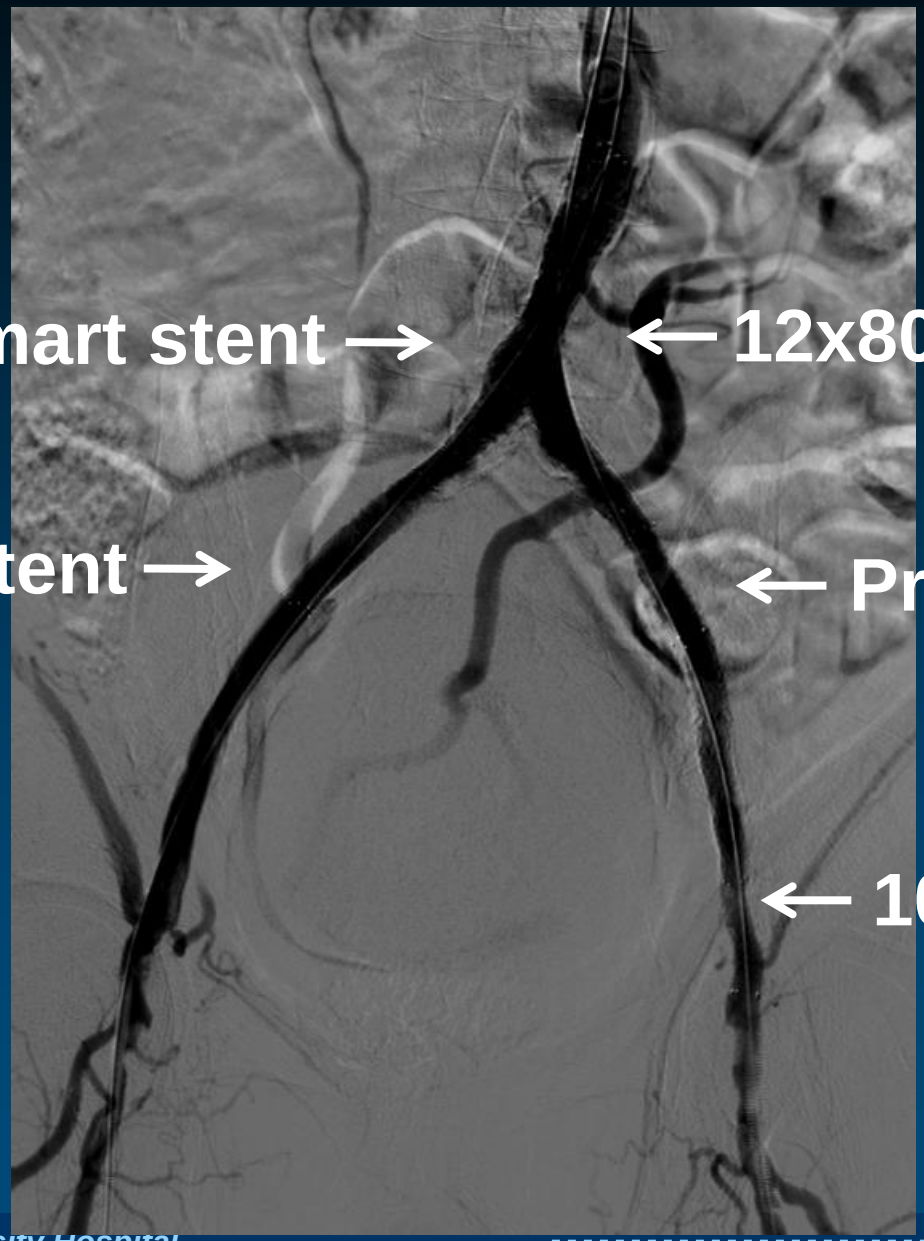
7.0x200 mm & 6.0x200 mm

Kissing stenting



Kissing stenting; Two 12x80 mm, SMART stents
KB balloon; Two 10x60 mm balloons

Two more stents for iliac arteries



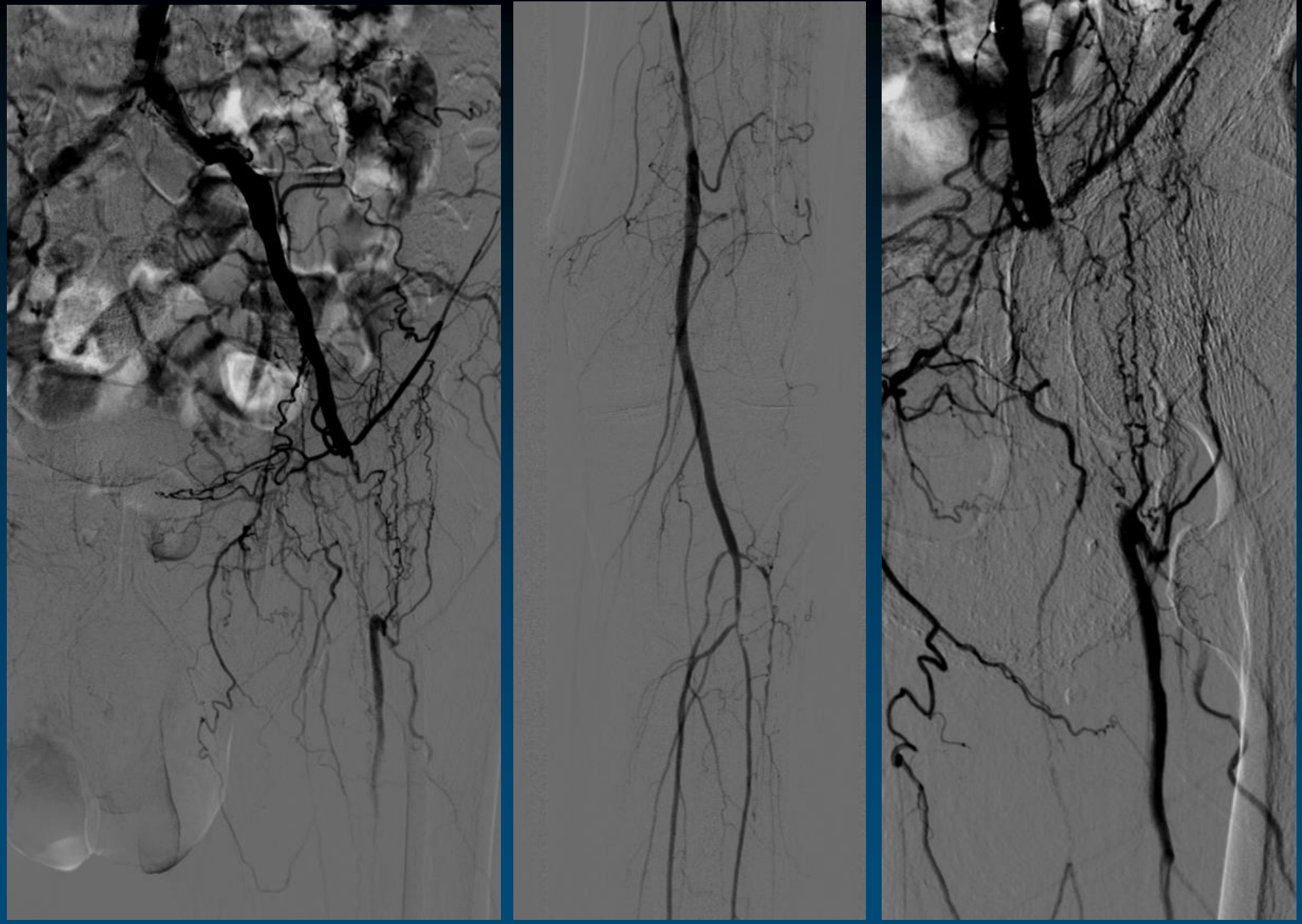
Pre

Post

At 5 yrs

Iliac CTO Extended To Femoral Artery

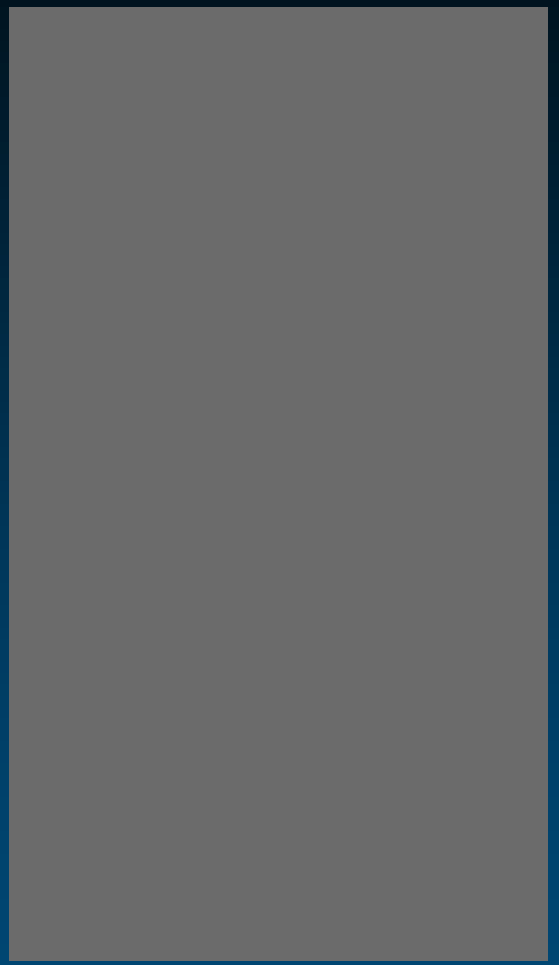
72 YO man, a hearing and speech-impaired person
HTN, Smoking
Left pretibial gangrene d/t repetitive hand scratch
NSTEMI with CHF





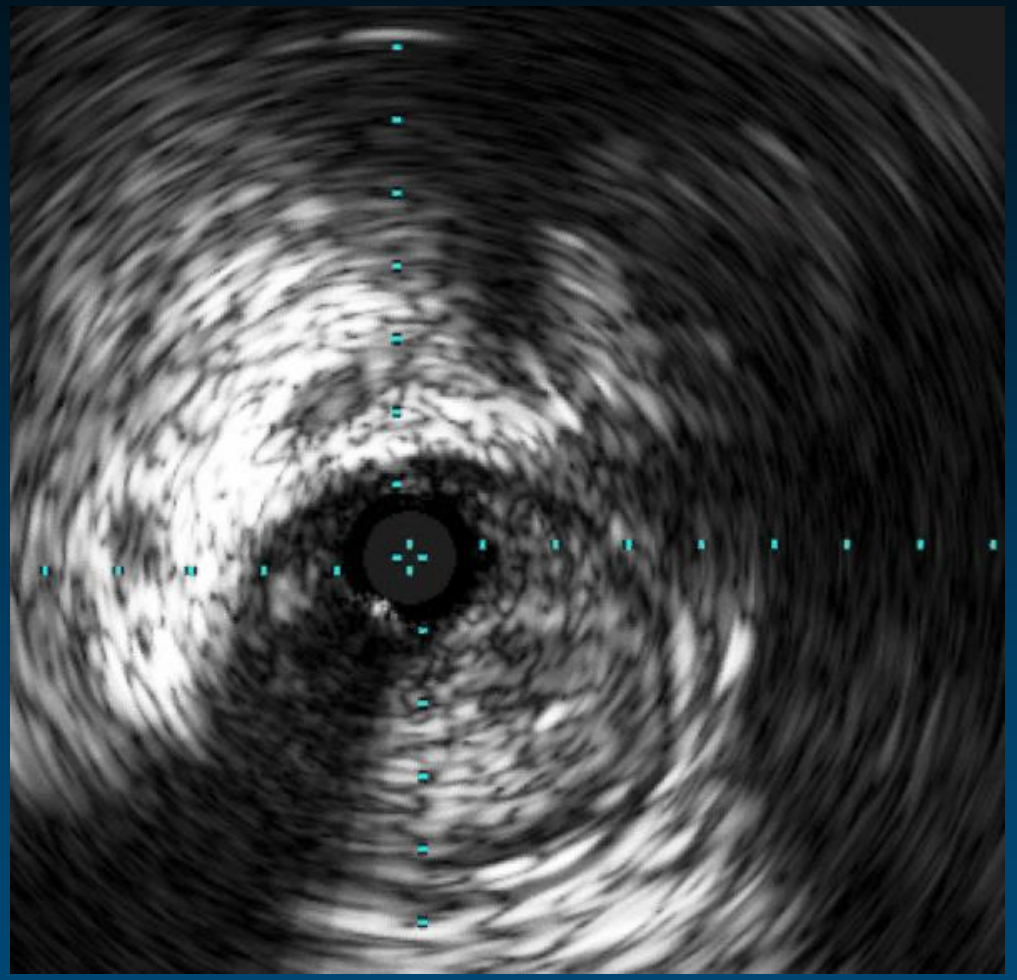
5 Fr Glide + Angled J Terumo

CFA to DFA ballooning



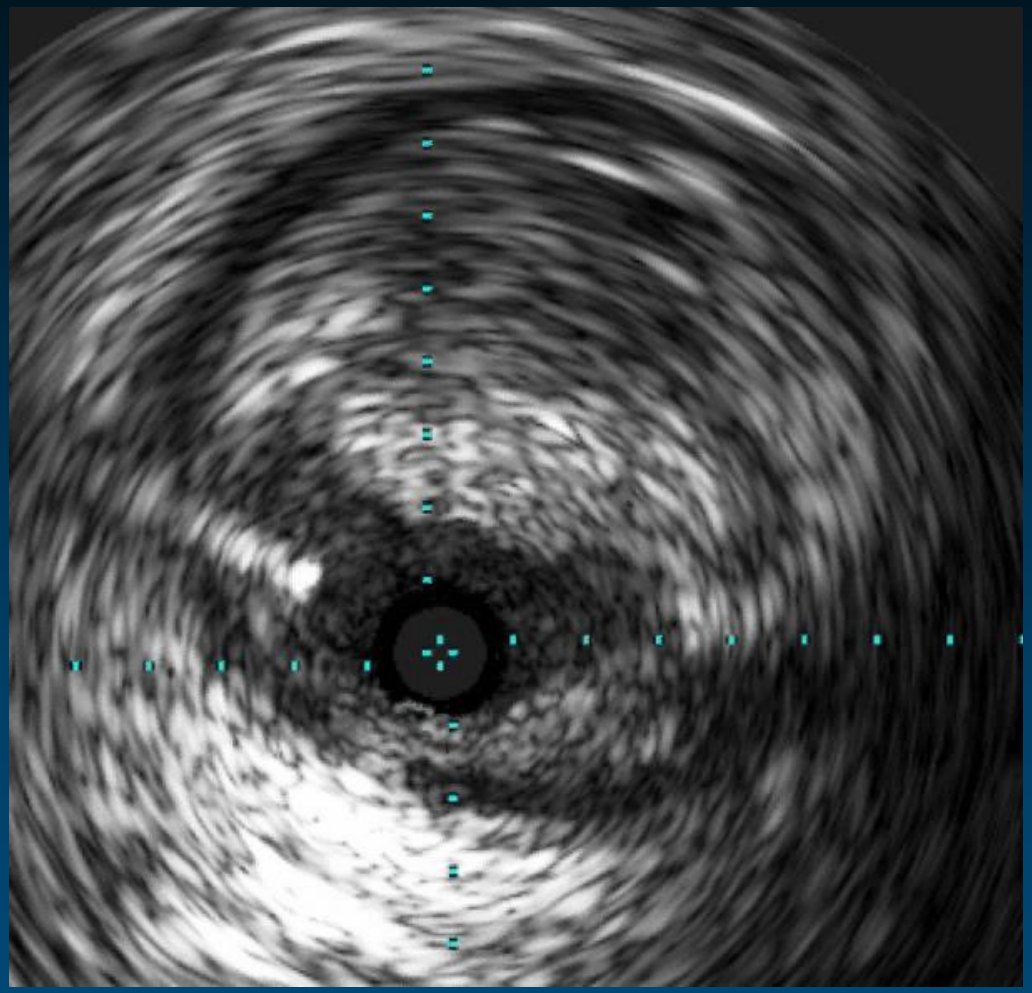
4.0×100 mm balloon, 10 atm

IVUS-guided SFA ostial wiring



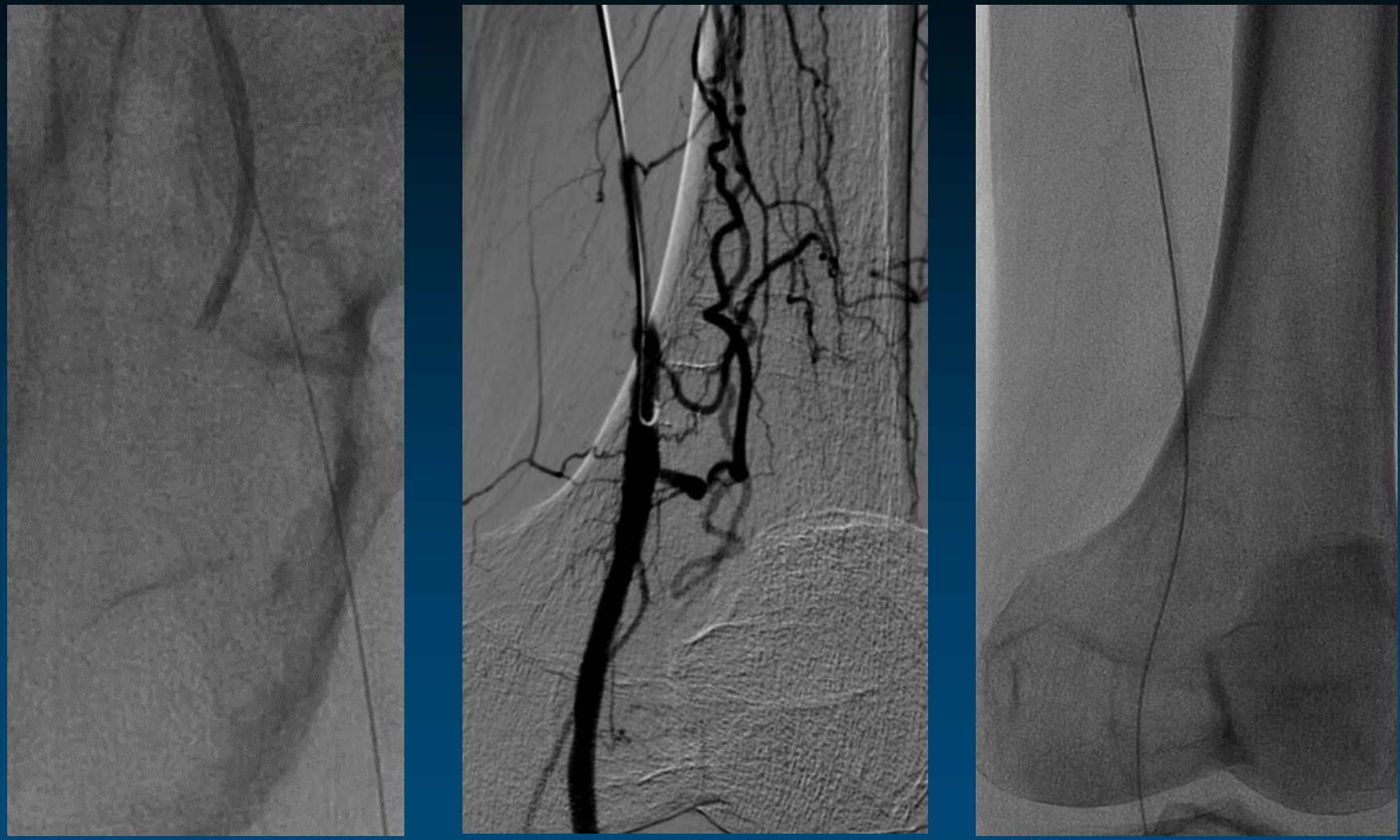
0.014” GW + Finecross

IVUS-guided SFA ostial wiring



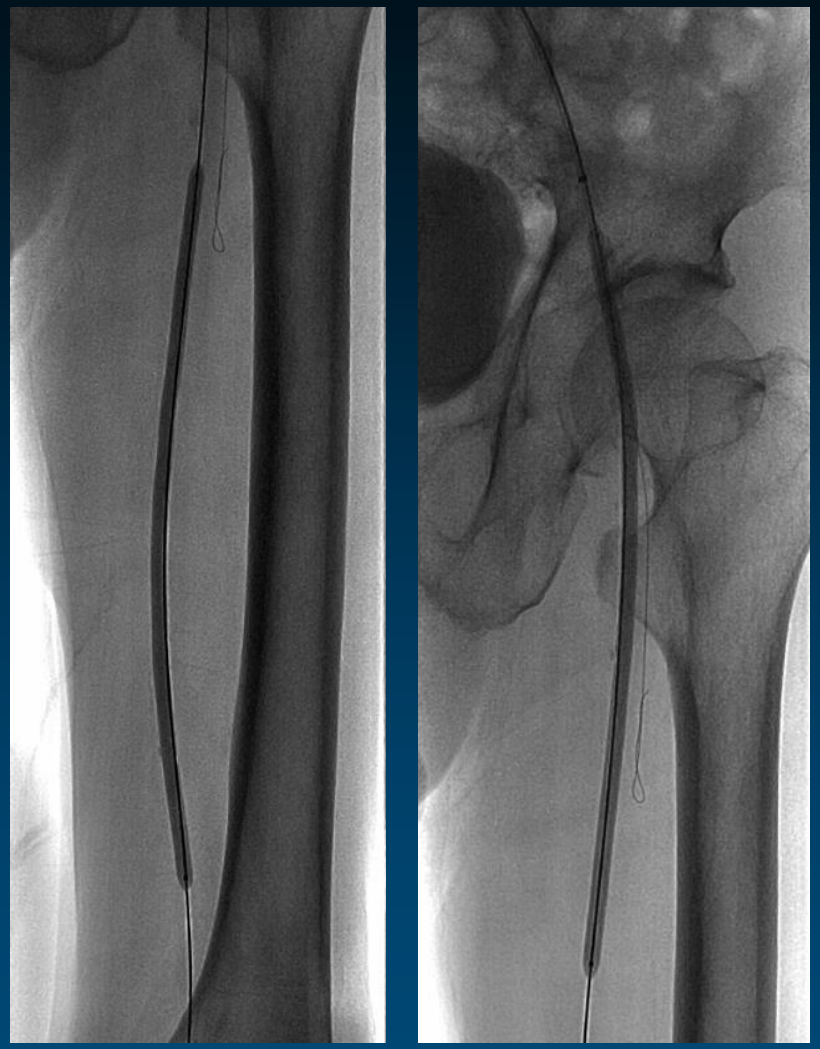
5 Fr Glide + 0.035” Terumo wire

Subintimal Angioplasty

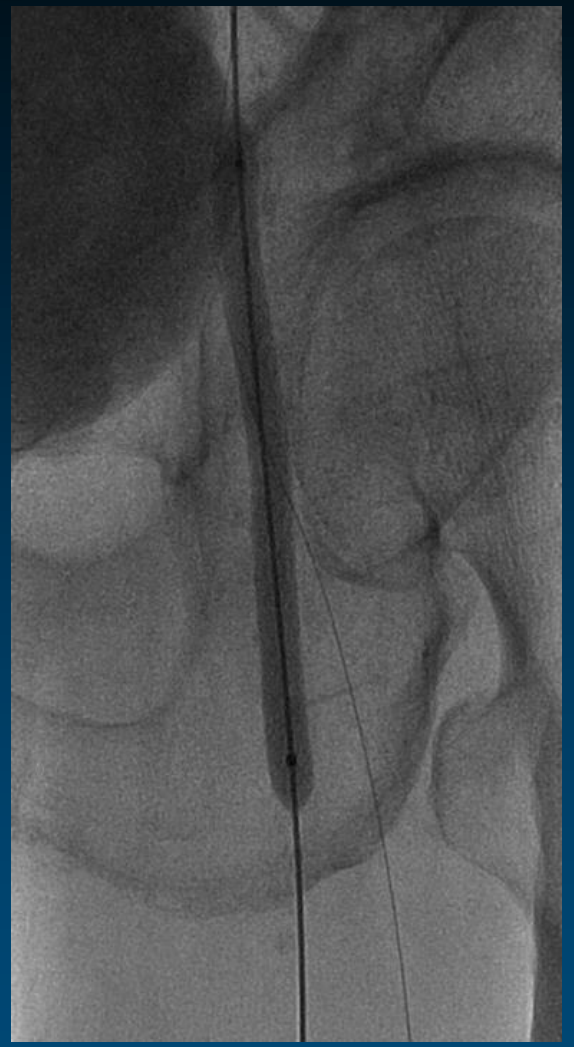


5 Fr Glide + Angled-J Terumo wire

Balloon angioplasty

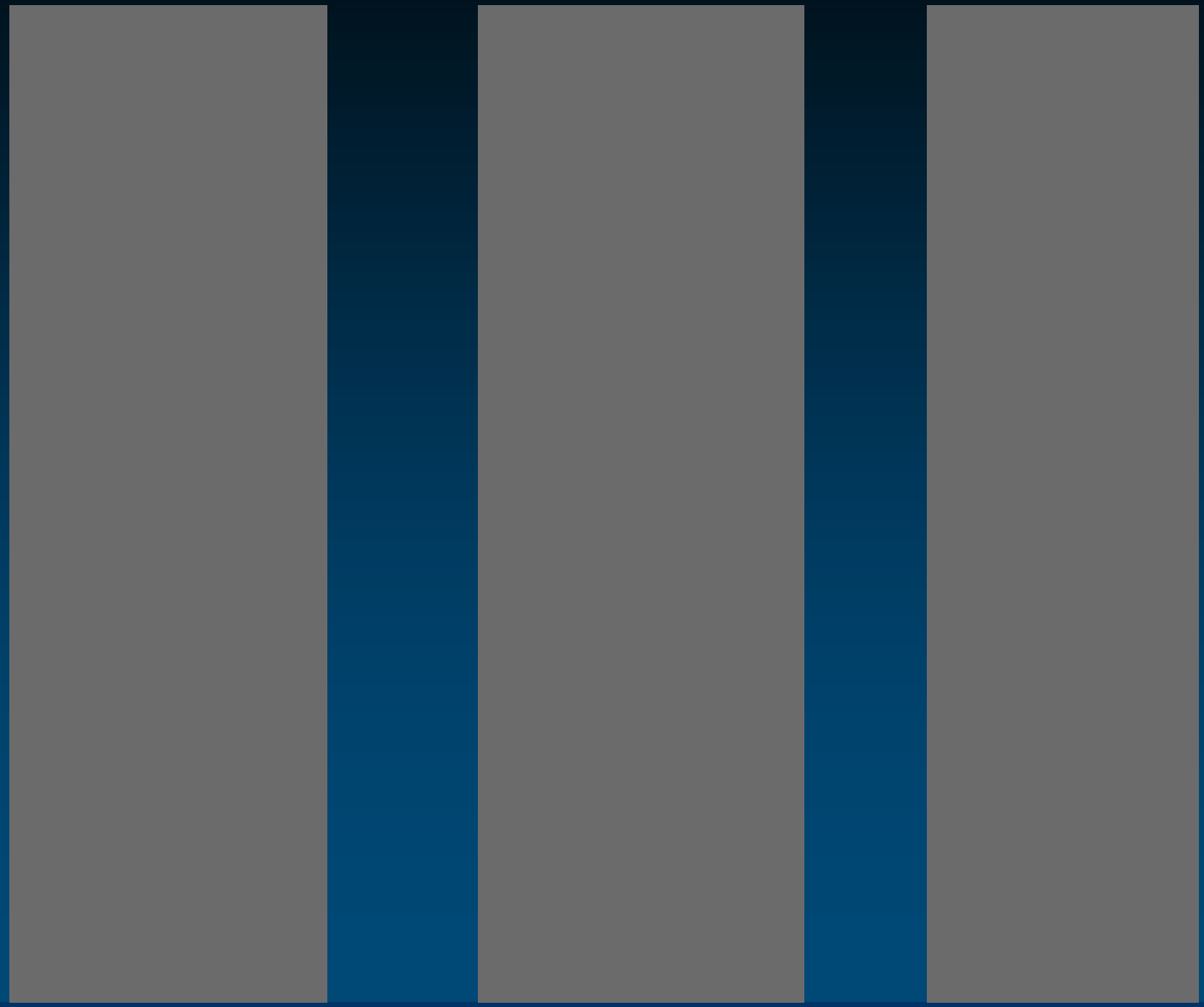


5.0 × 200 mm



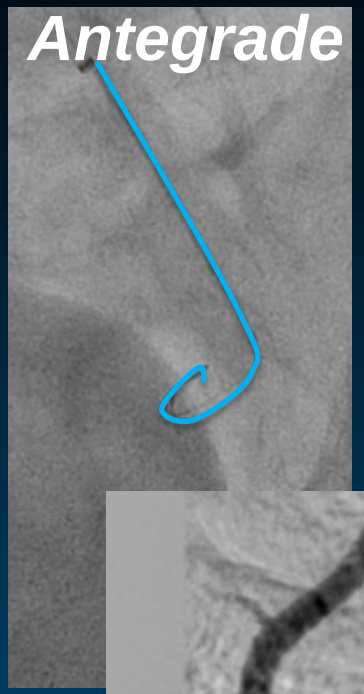
6.0 ×100 mm

Final Angiogram

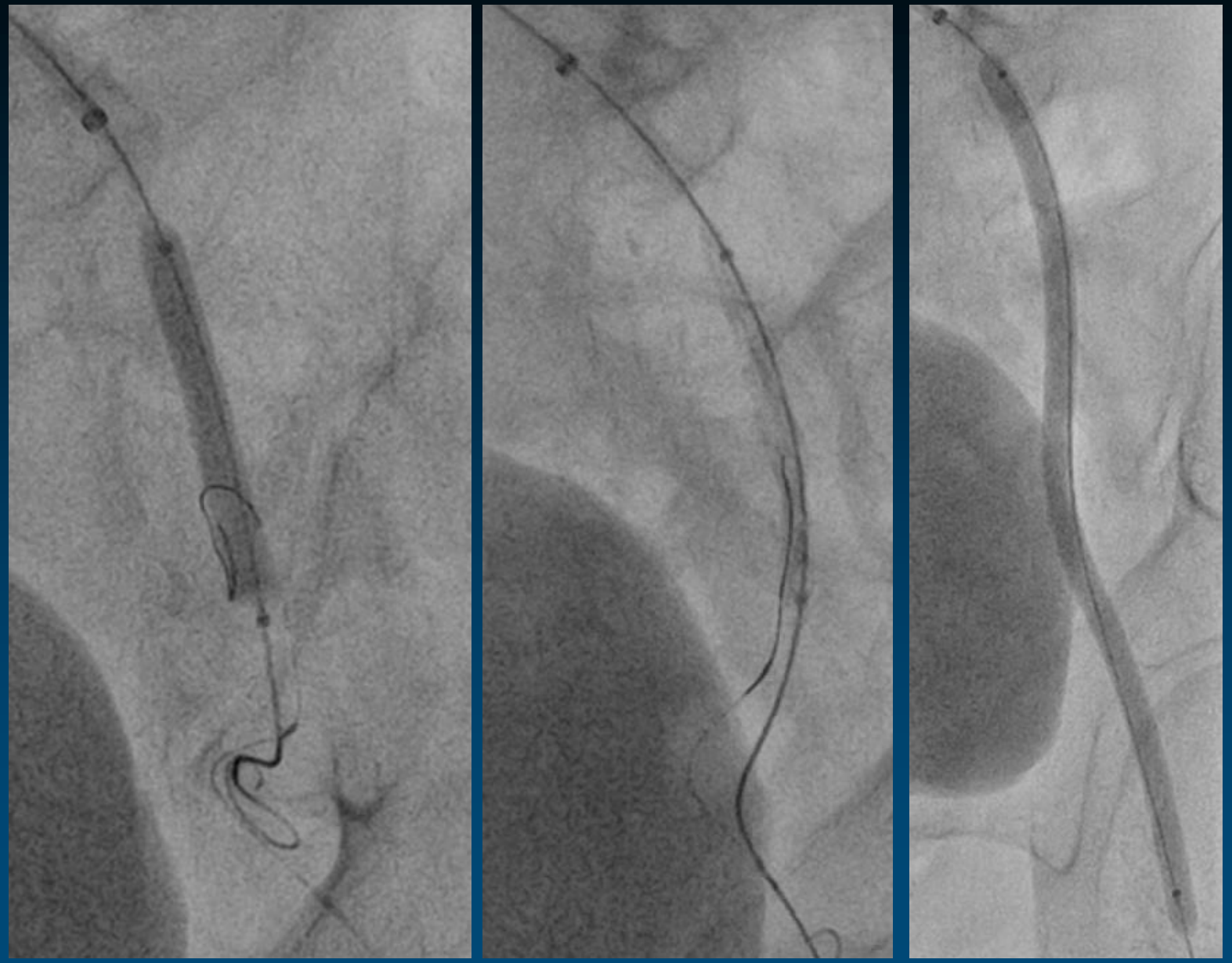


PTA → Debridement → Skin graft

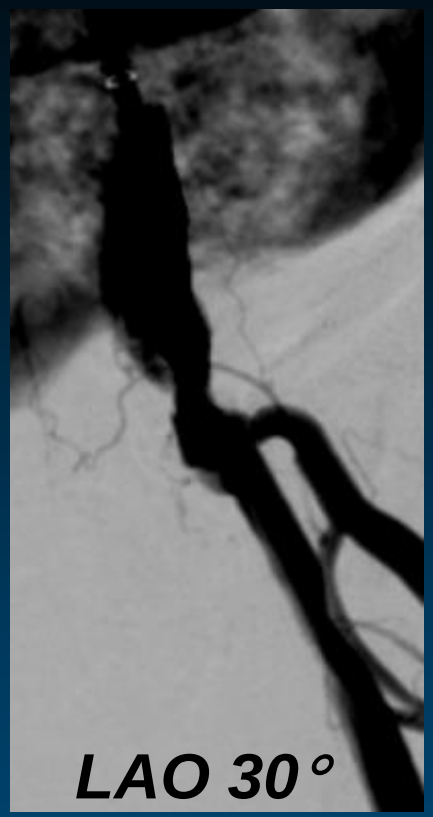
Ilio-SFA CTO, M/71, Rutherford IV claudication

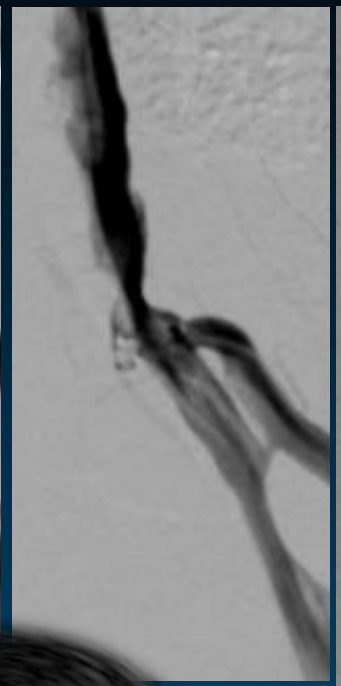


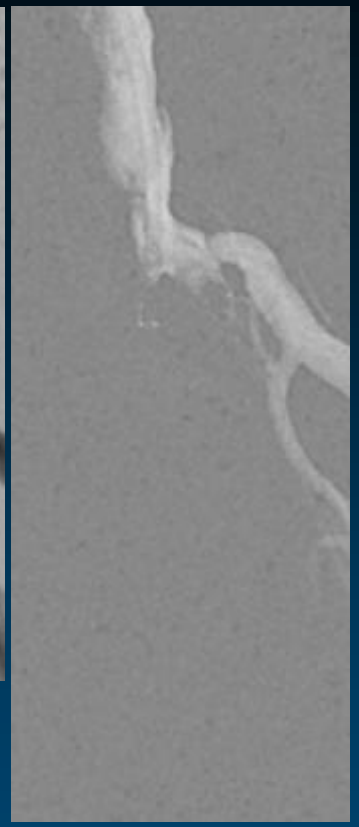
Ilio – CFA CTO recanalization

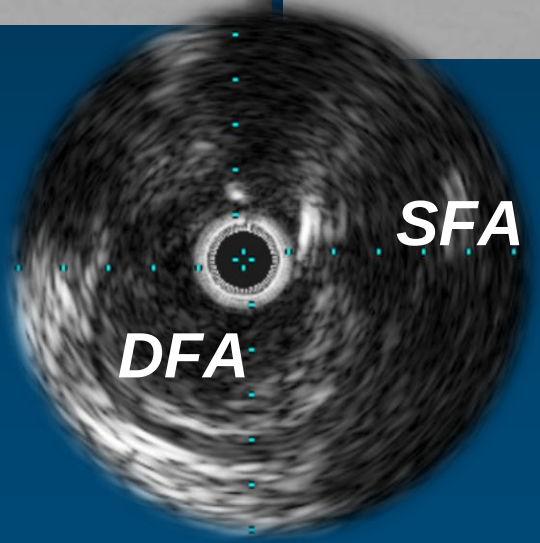


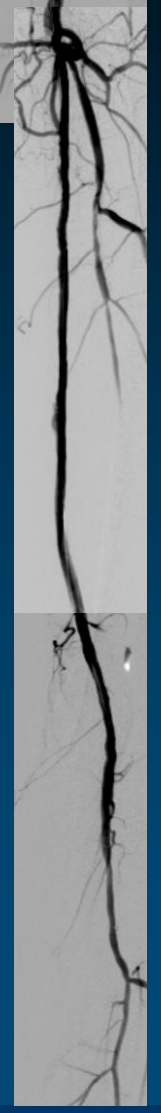
Ilio – SFA CTO

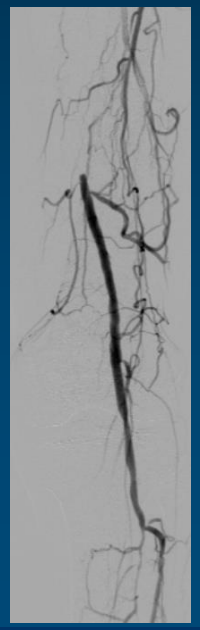






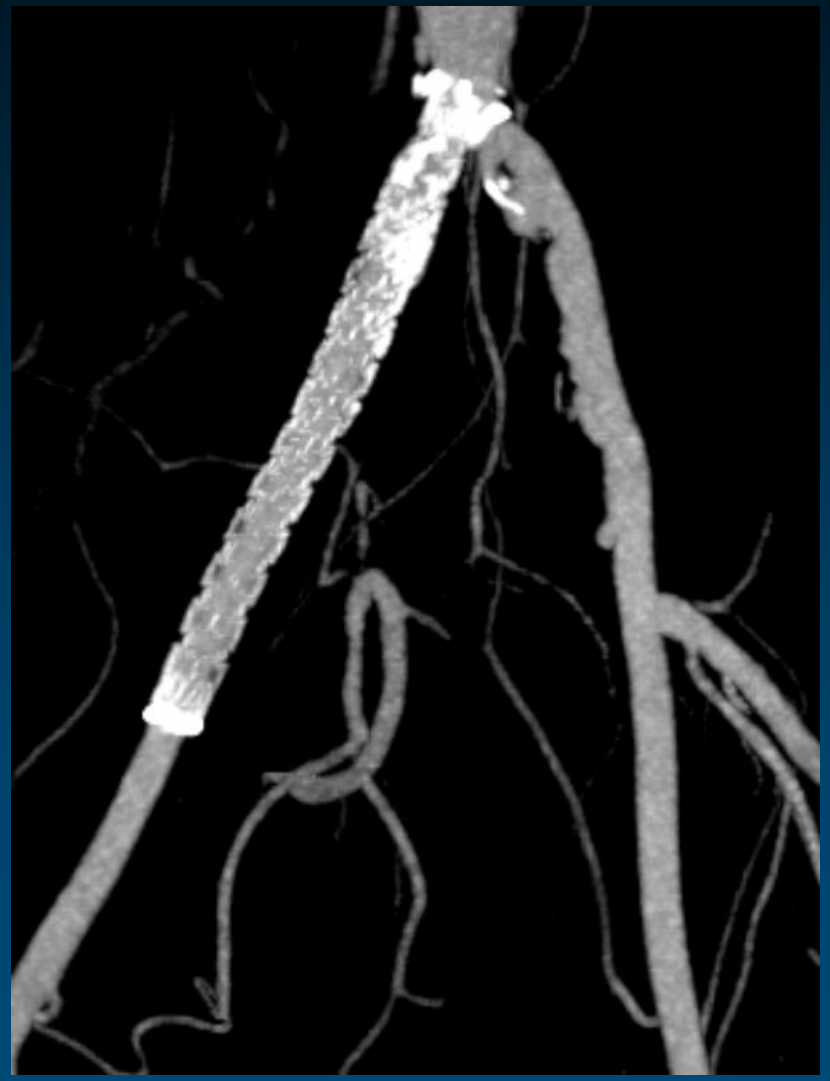




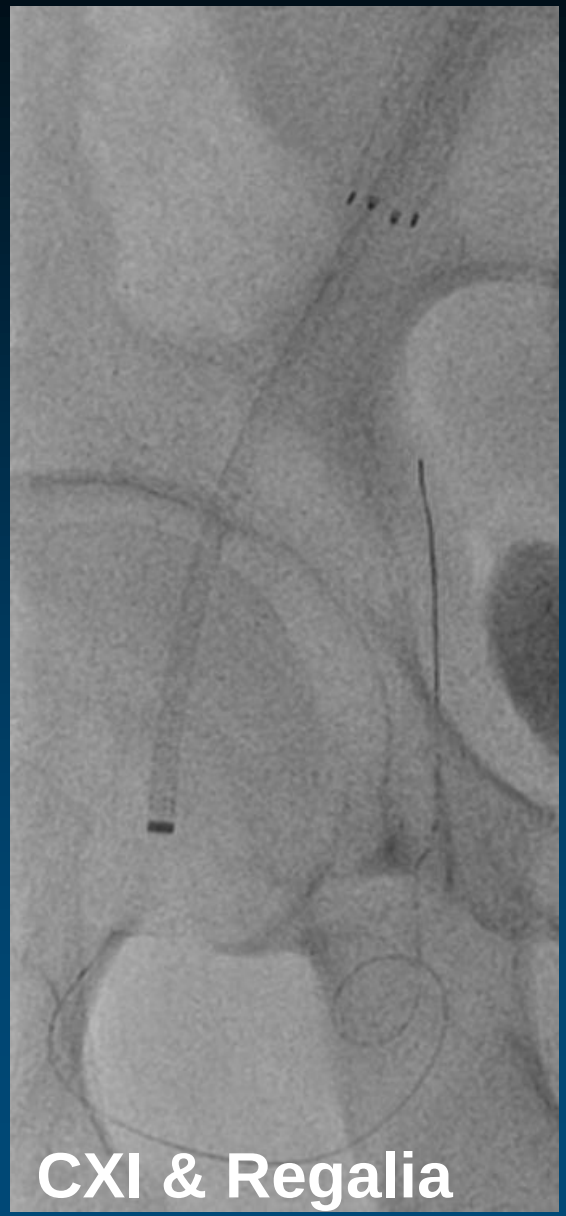


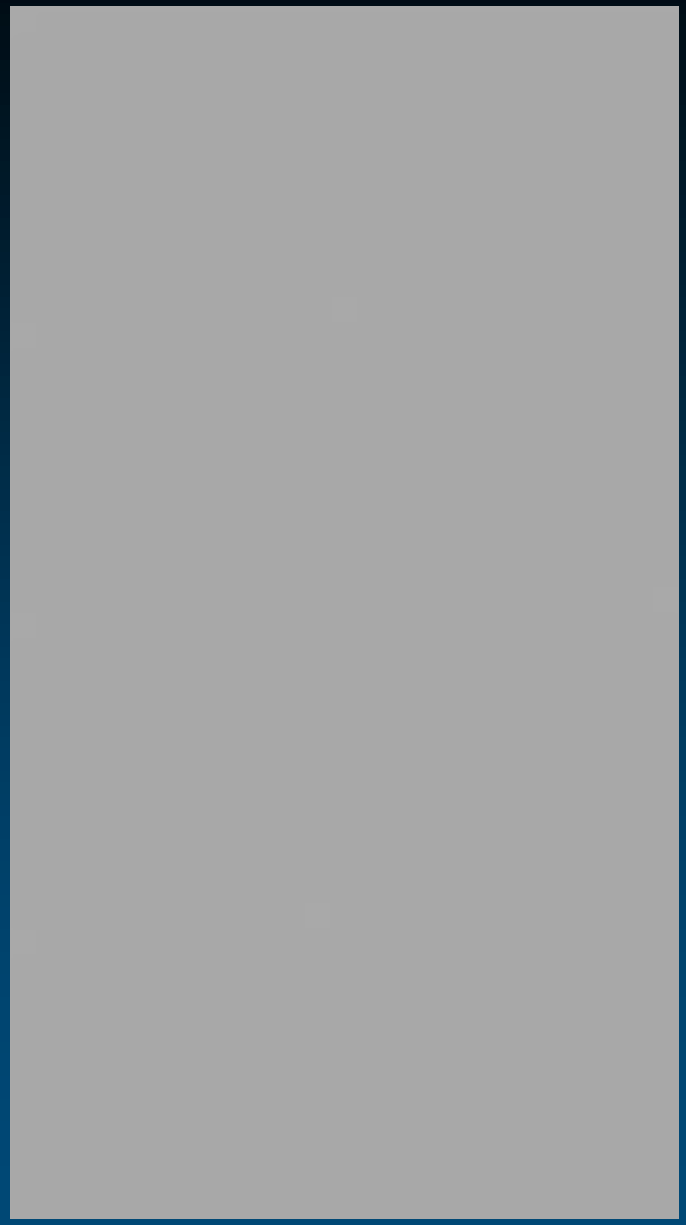
Occlusion of Internal Iliac Ostium

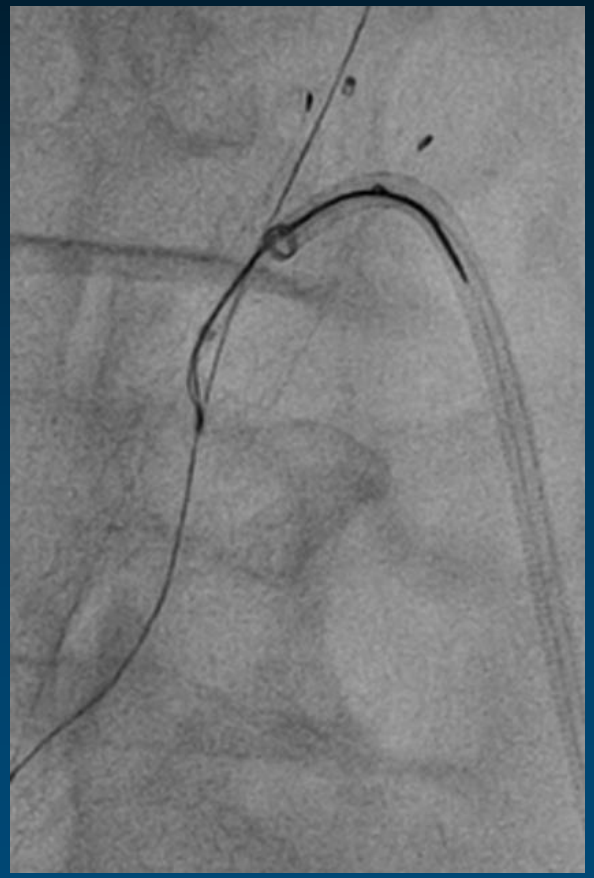
M/56 S/O Right CIA-EIA stenting, 2YA
→ Recurred buttock claudication, Rutherford 2, R>L

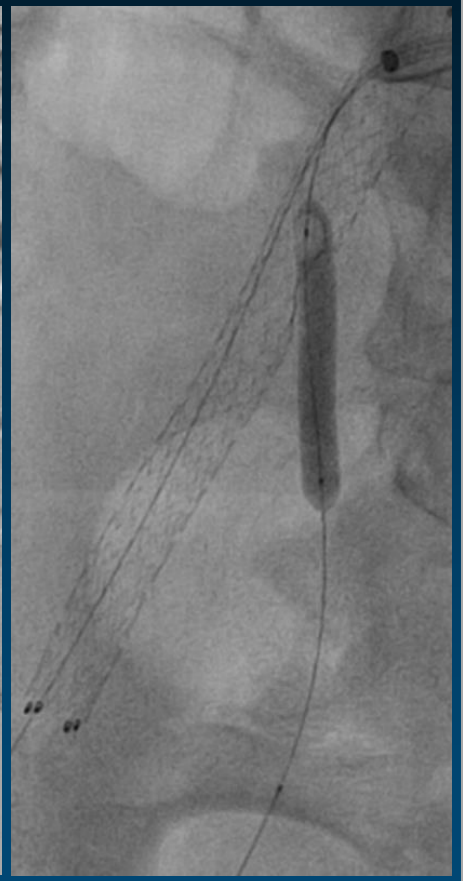


Contralateral approach, 7 Fr Ansel sheath









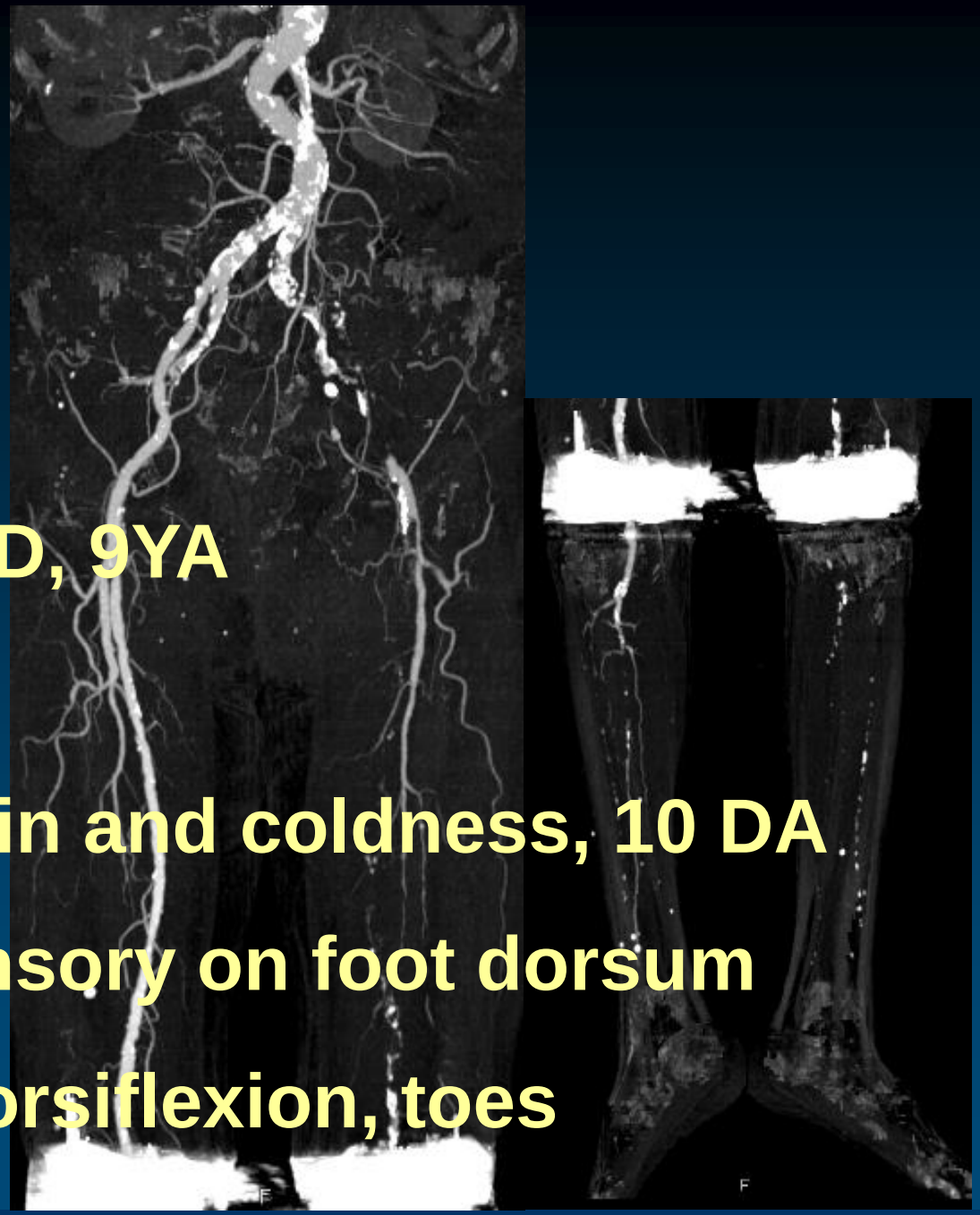
ALI of Iliac Artery

89/F

HTN

S/P TKRA, both

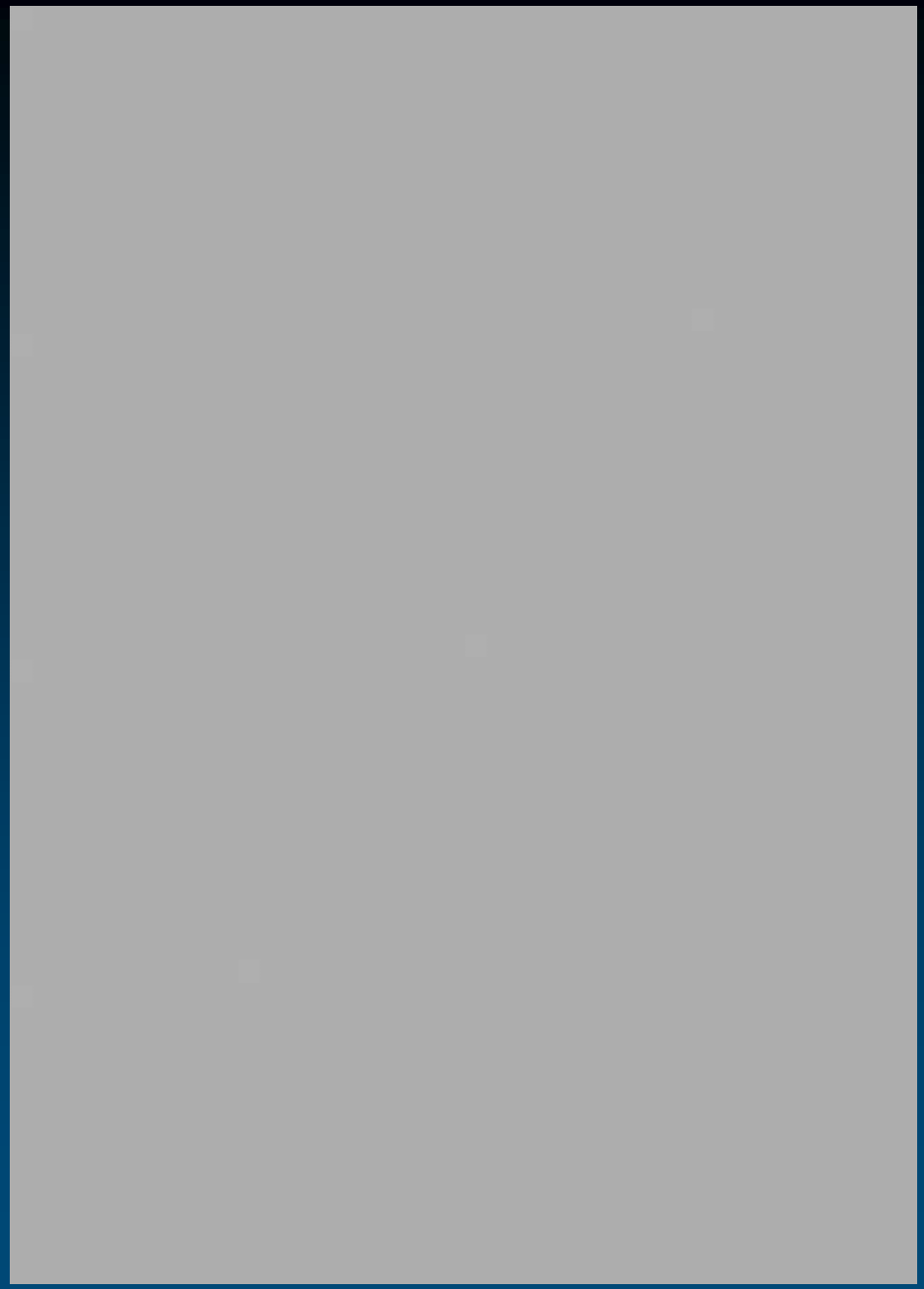
Old inferior MI, 2VD, 9YA



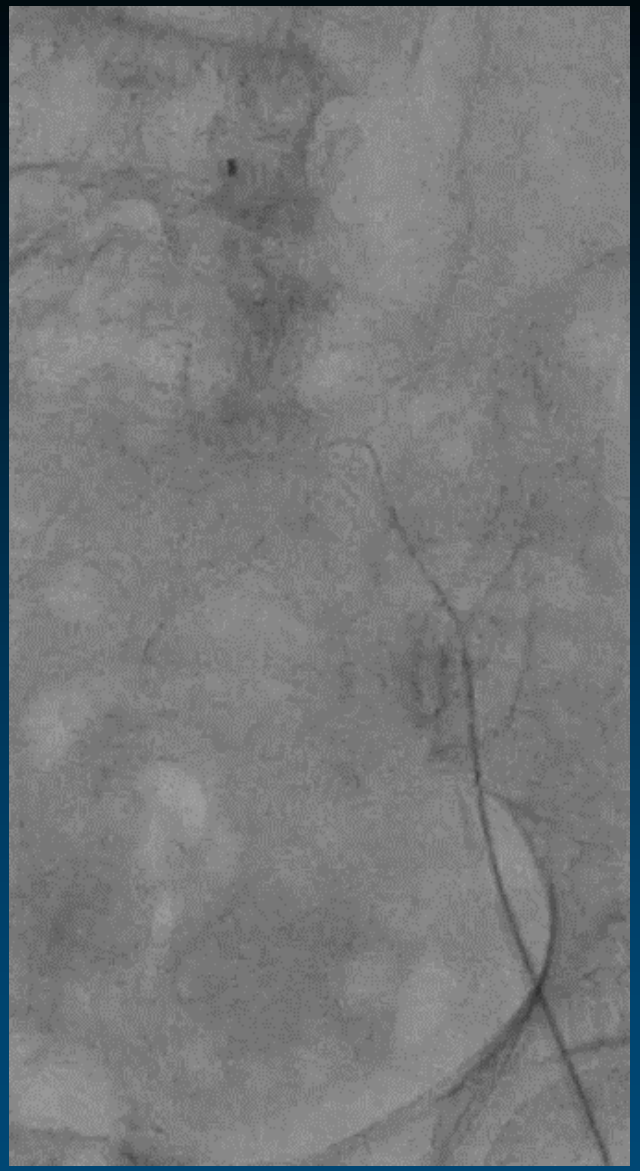
Resting left leg pain and coldness, 10 DA

→ Decreased sensory on foot dorsum

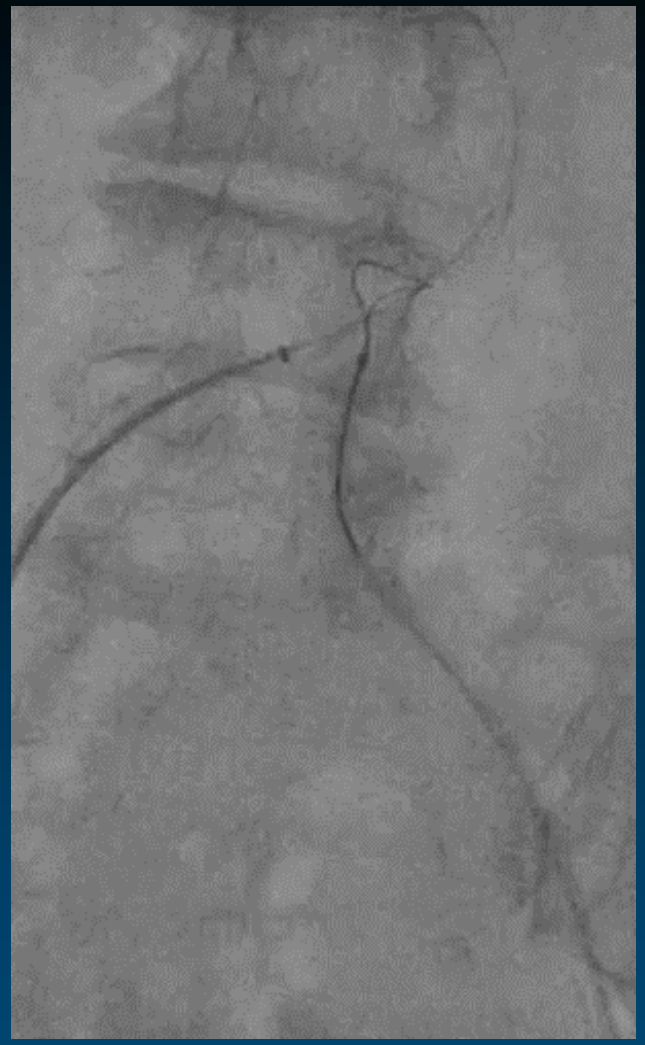
Difficulty of dorsiflexion, toes



Hostile aortoiliac angle



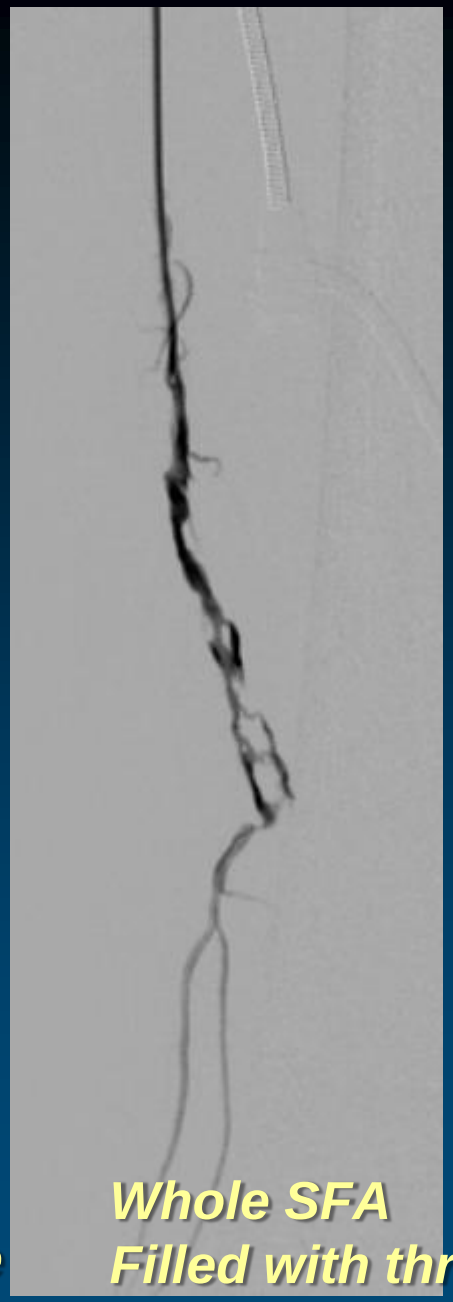
Easy GW passage
(0.035” Terumo)



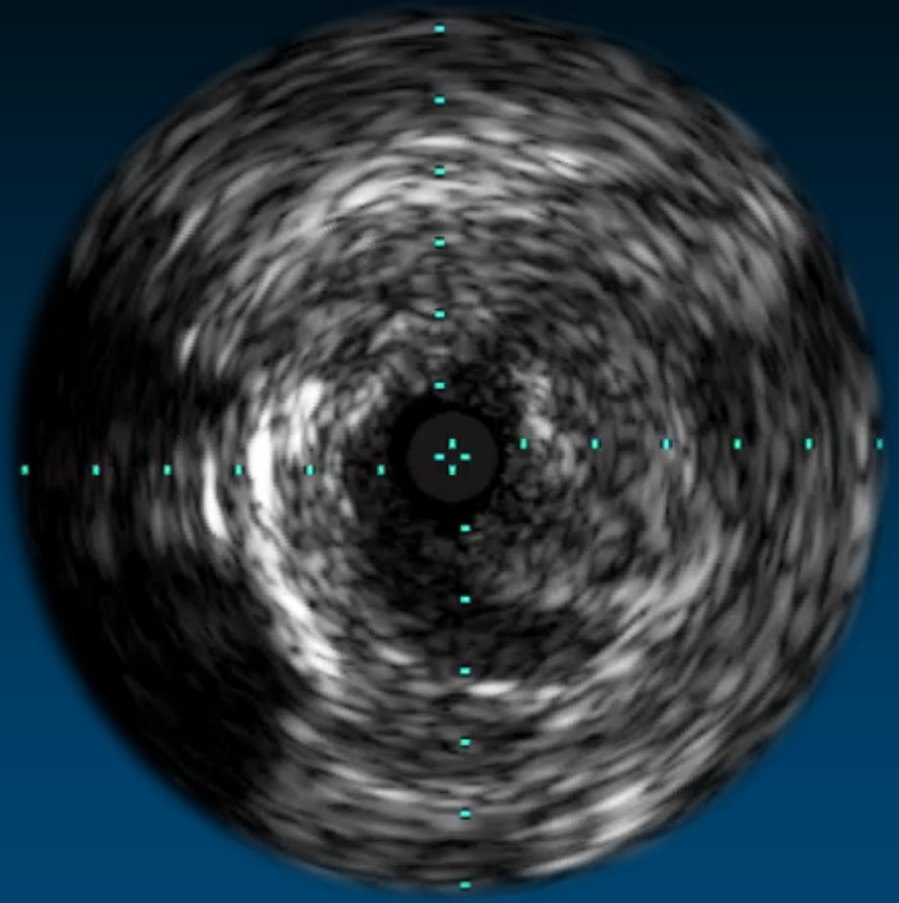
Snare the contra. wire
→ 7 Fr Ansel from Rt. CFA

SFA occlusion

Easy GW passage
(0.014” Command)

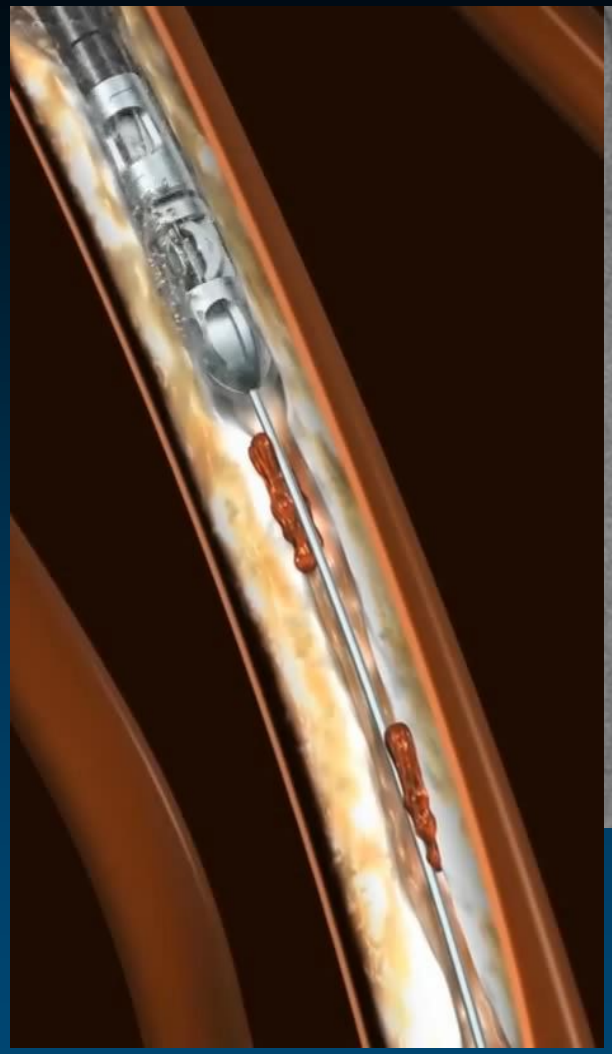


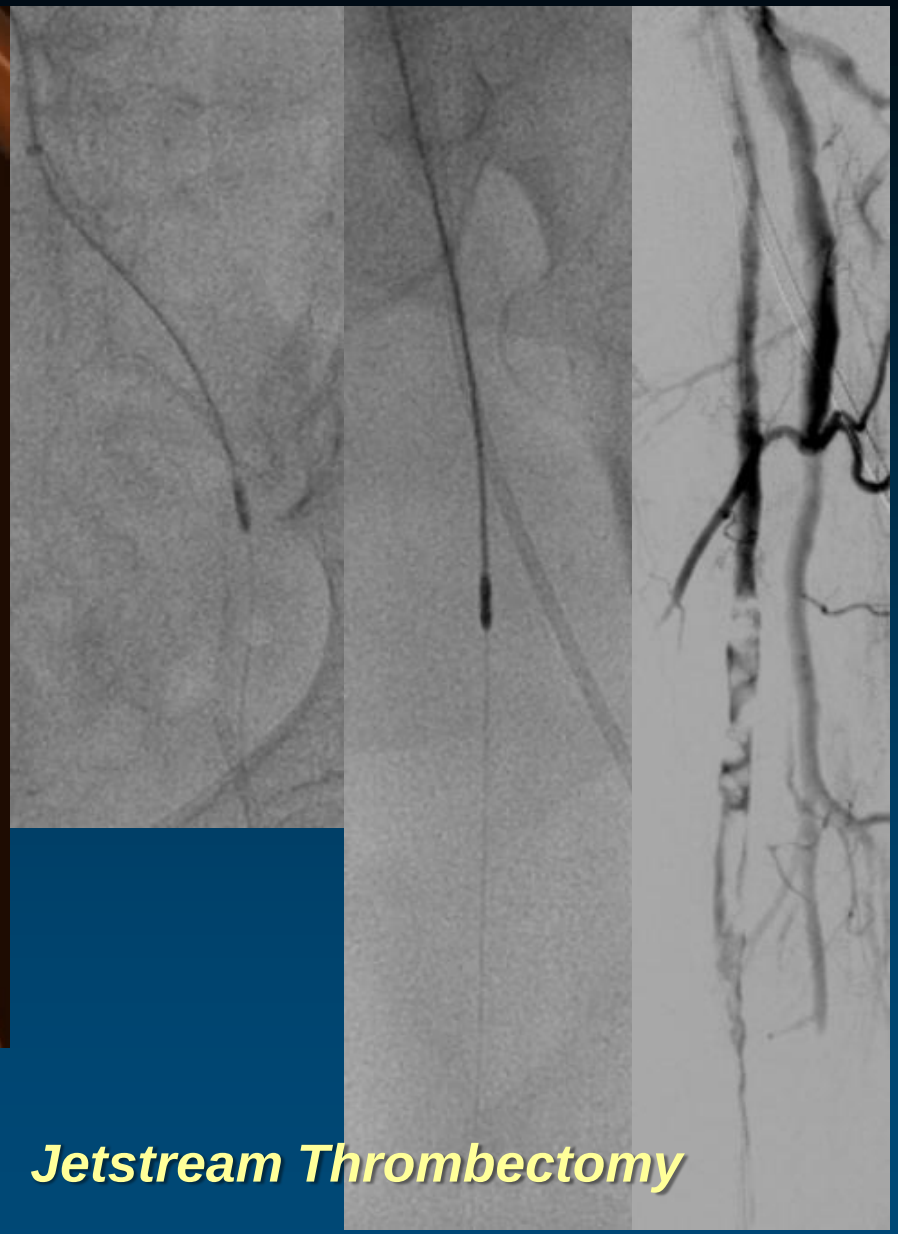
Whole SFA
Filled with thrombi



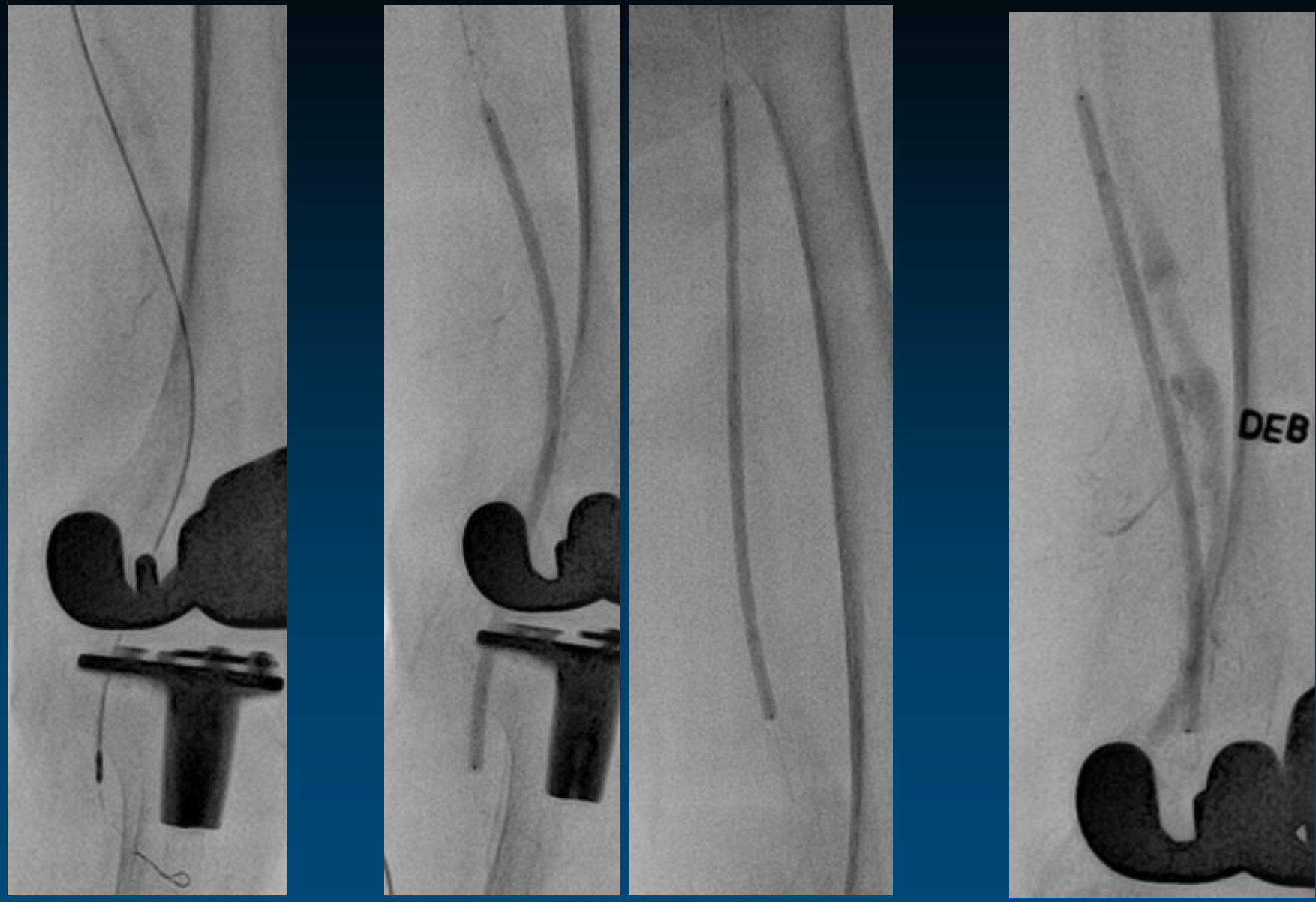
IVUS
- Intraluminal GW passage
- Filled with thrombi

GW passage to pATA



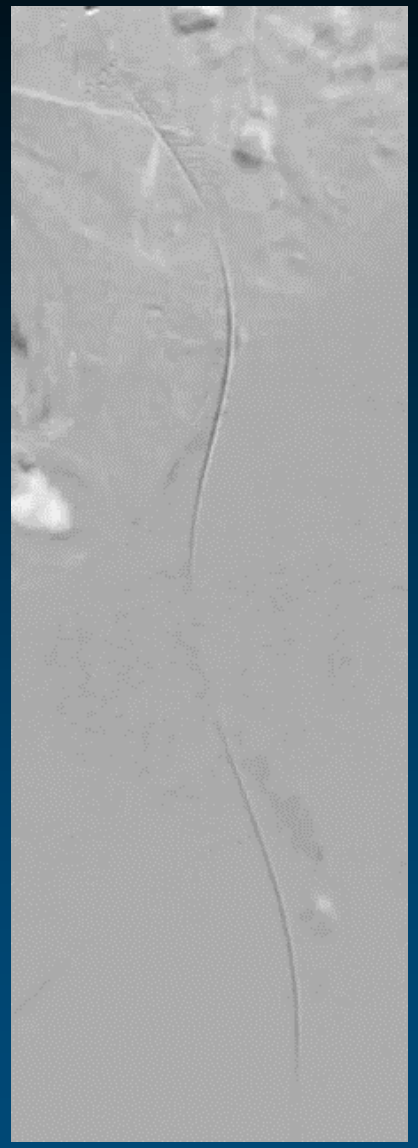


Jetstream Thrombectomy



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

Final Angiogram

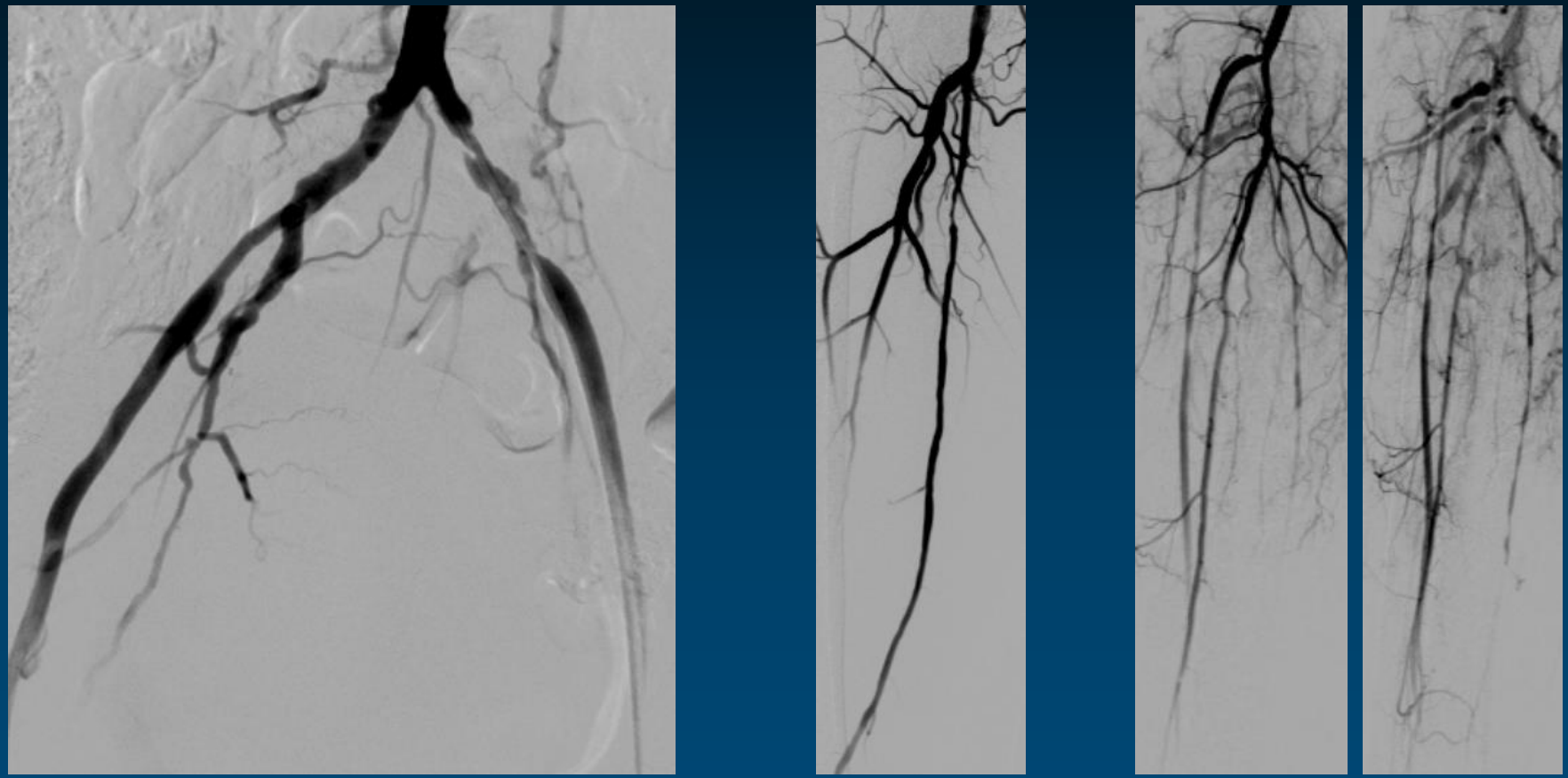


EIA; 10x100mm SE stent

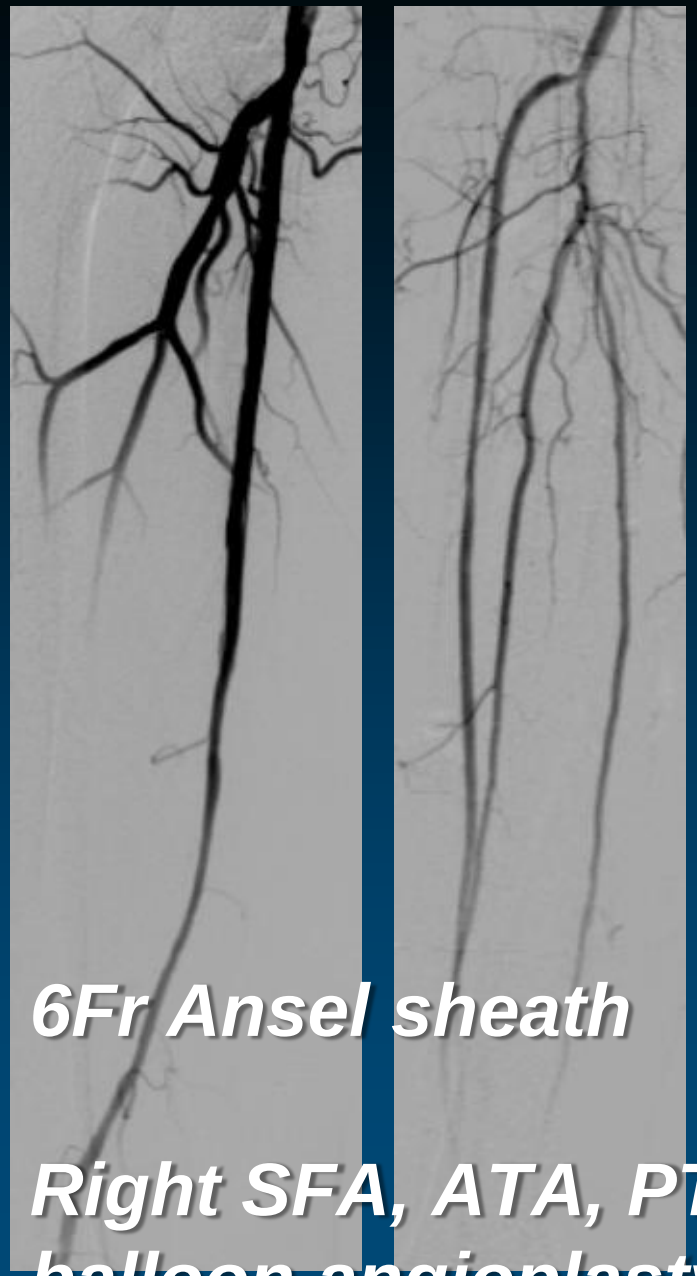
Femoropopliteal; No stent remained
Single straight line to the foot

Management of Complication

F/63, DM, Rutherford 3 claudication, R > L
ABI 0.77/0.85

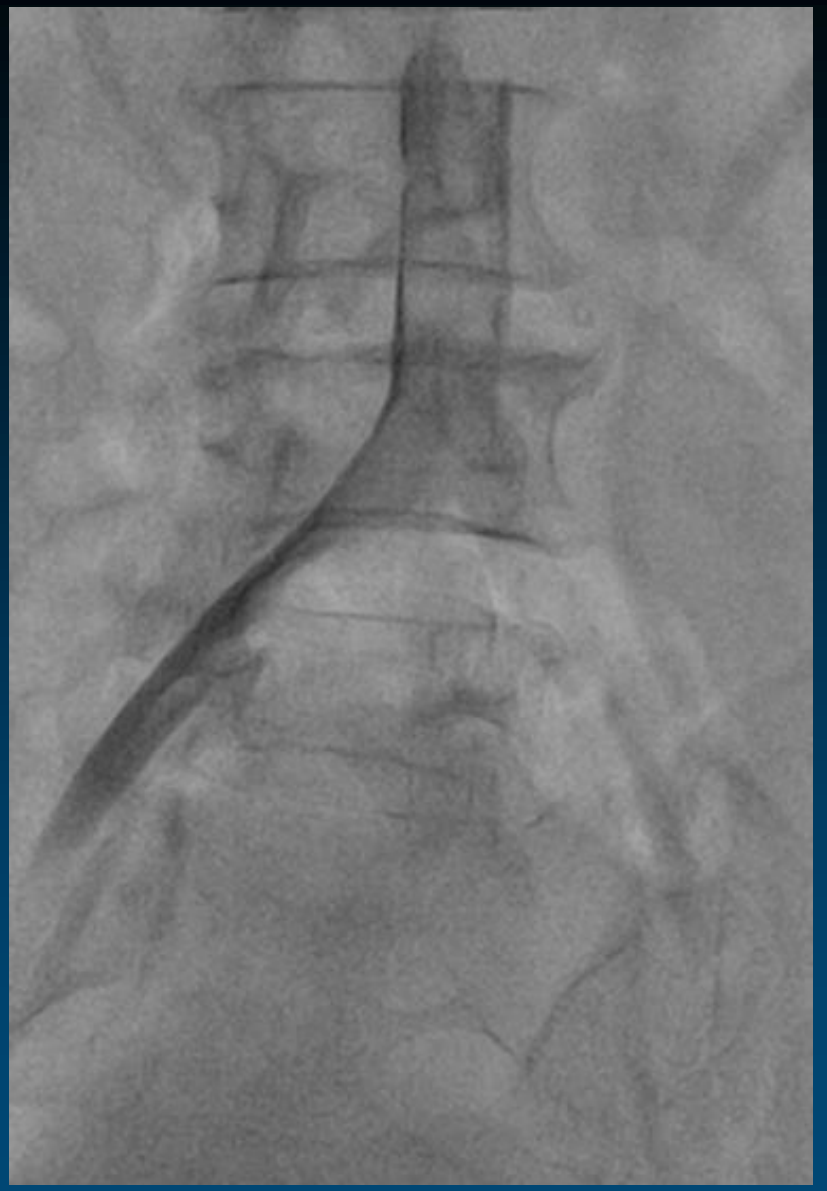


6.0x40mm

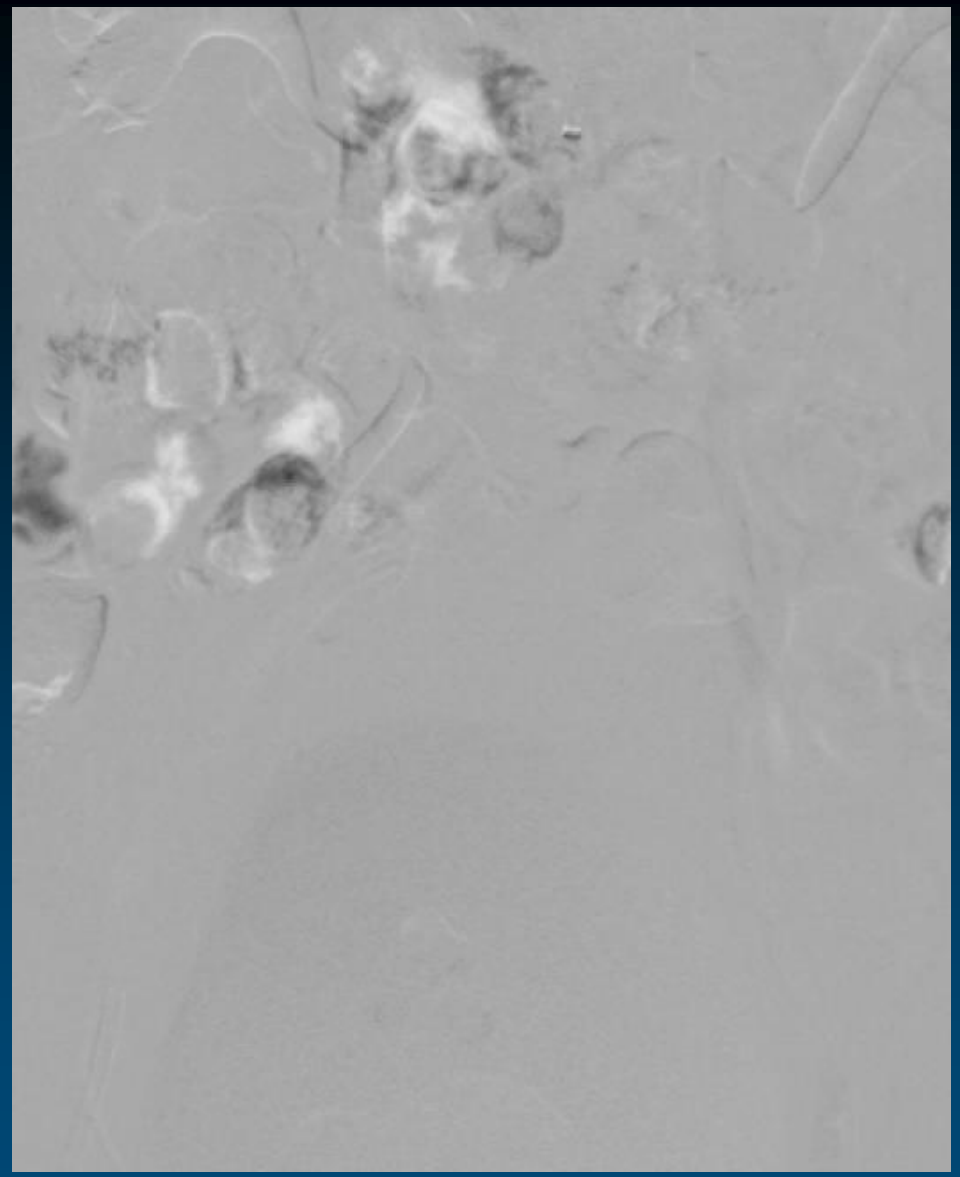


6Fr Ansel sheath

Right SFA, ATA, PTA balloon angioplasty



Oops



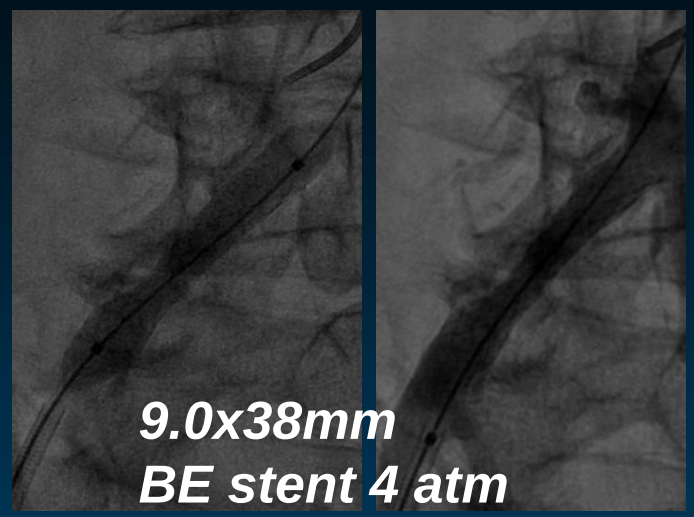
Transradial 5 Fr 110cm shuttle
Right femoral 7 Fr long sheath

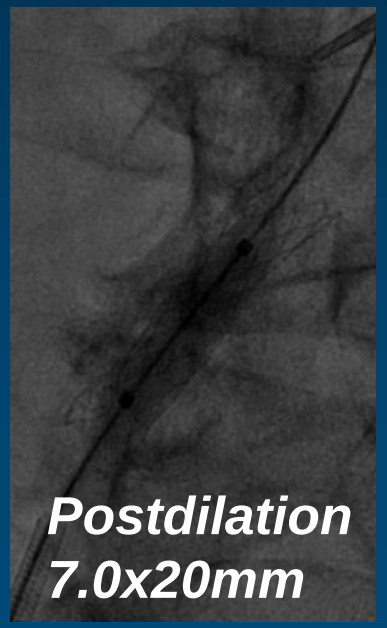
Antegrade wiring for left iliac

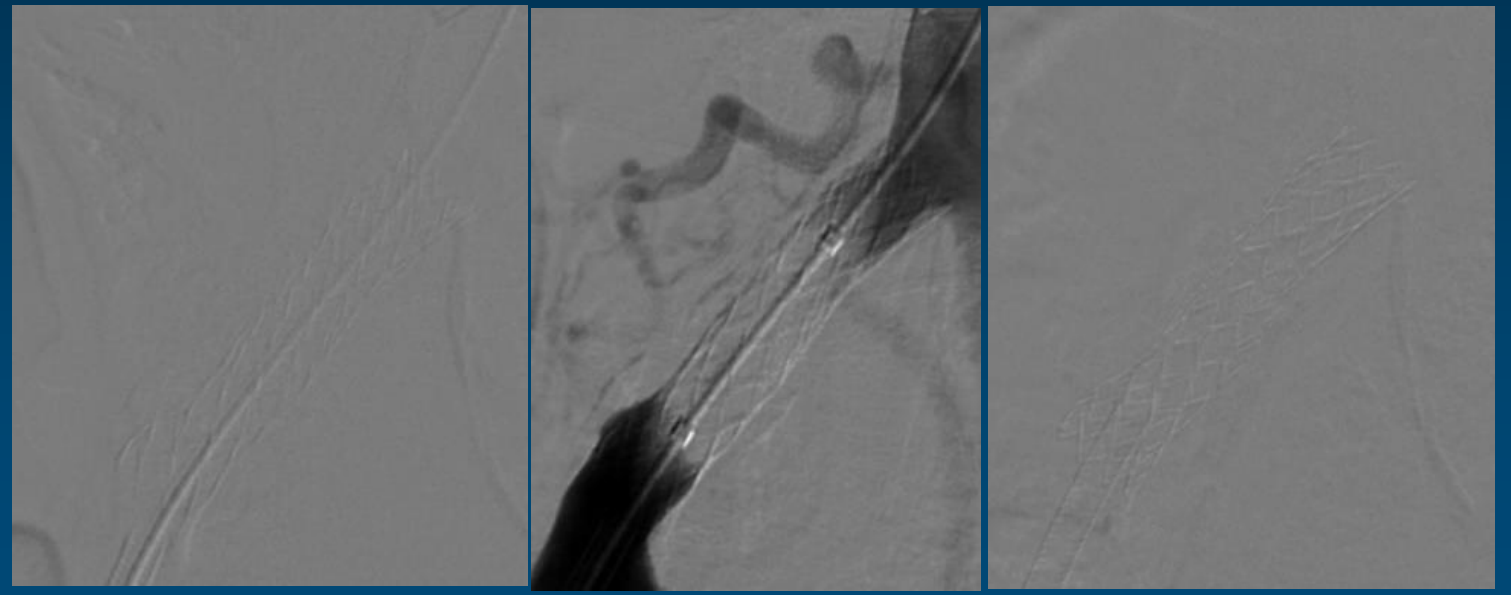
Kissing balloon

Kissing stenting with Two Smart; 8.0x150 mm & 8.0x120 mm

M/82, HTN, 50m claudication

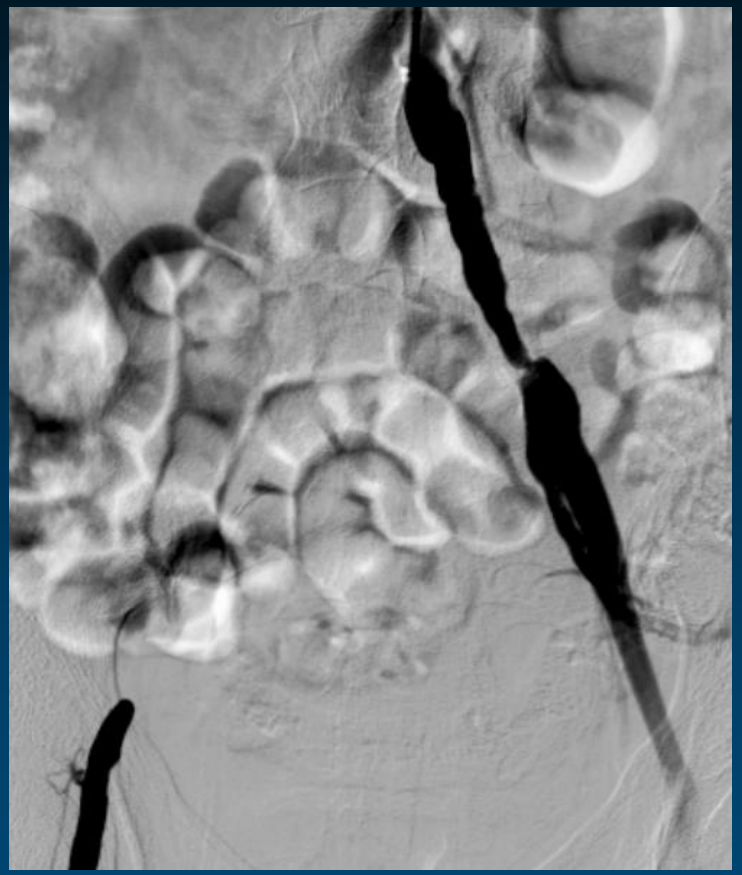


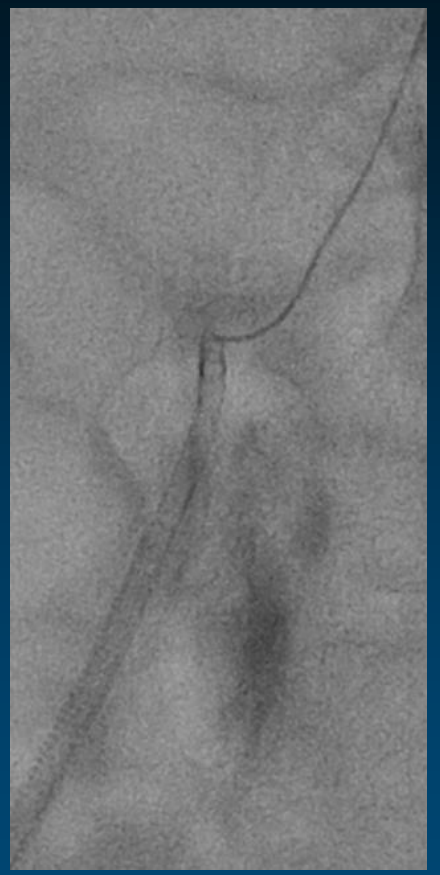




Confined rupture → prolonged ballooning → sealed

M/65, HTN, S/P Lung ca op
Both Fontaine IIb claudication, ABI 0.52/0.57





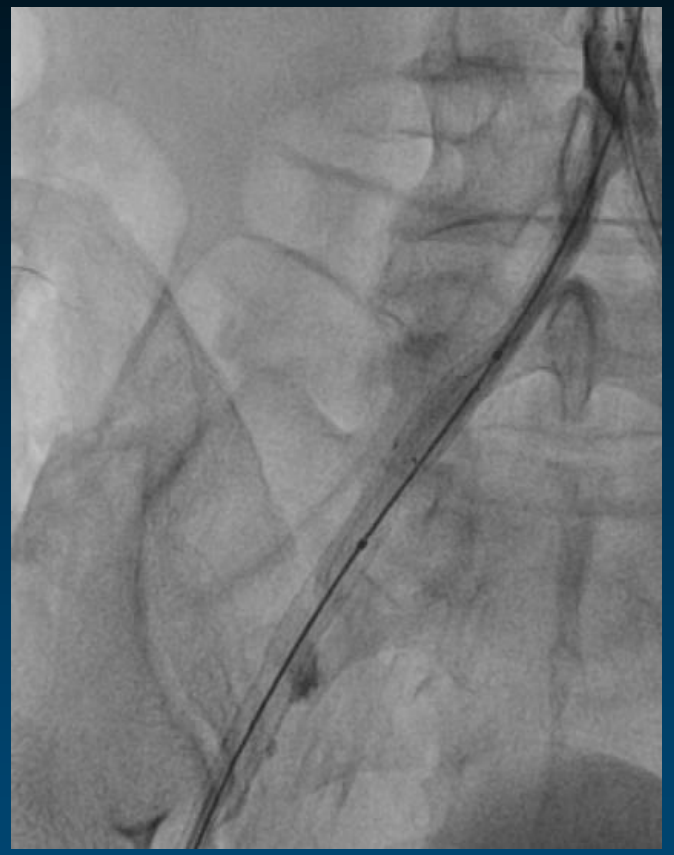
Transradial 5 Fr shuttle
Transfemoral 7 Fr long sheath

SAFARI (CART)
antegrade wire externalization

M/65, HTN, Lung ca op
Both Fontaine IIb claudication, ABI 0.52/0.57

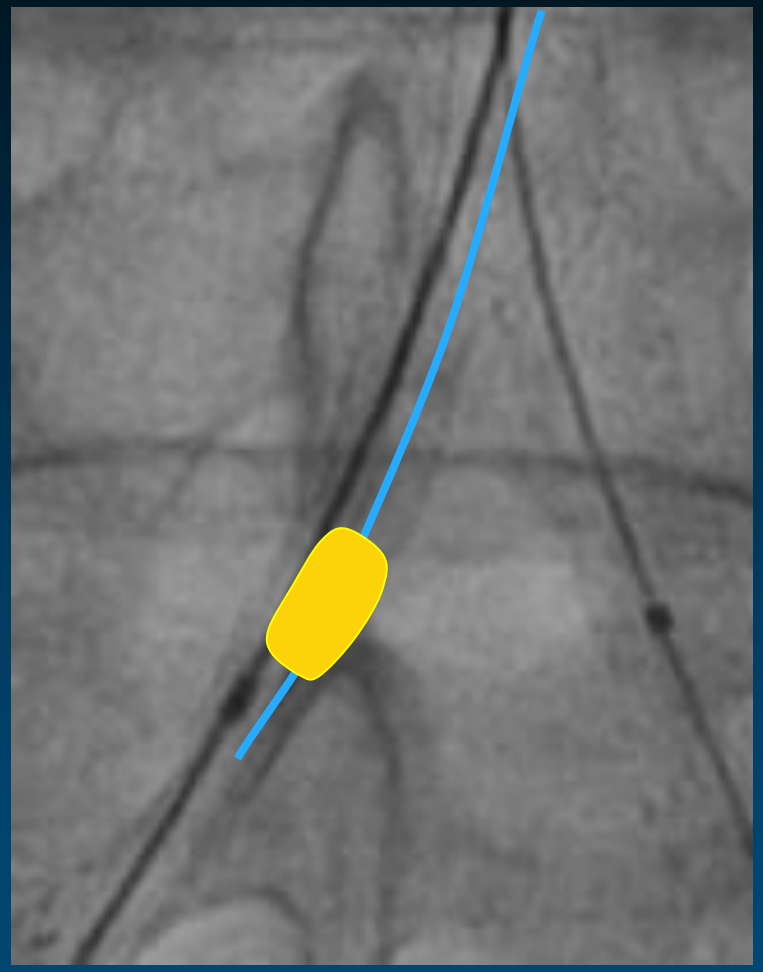
Kissing with SE Smart
Right; 9.0x80 mm & 7.0x100 mm
Left; 10.0x80mm

Kissing with two 7.0x40mm



Right EIA Rupture

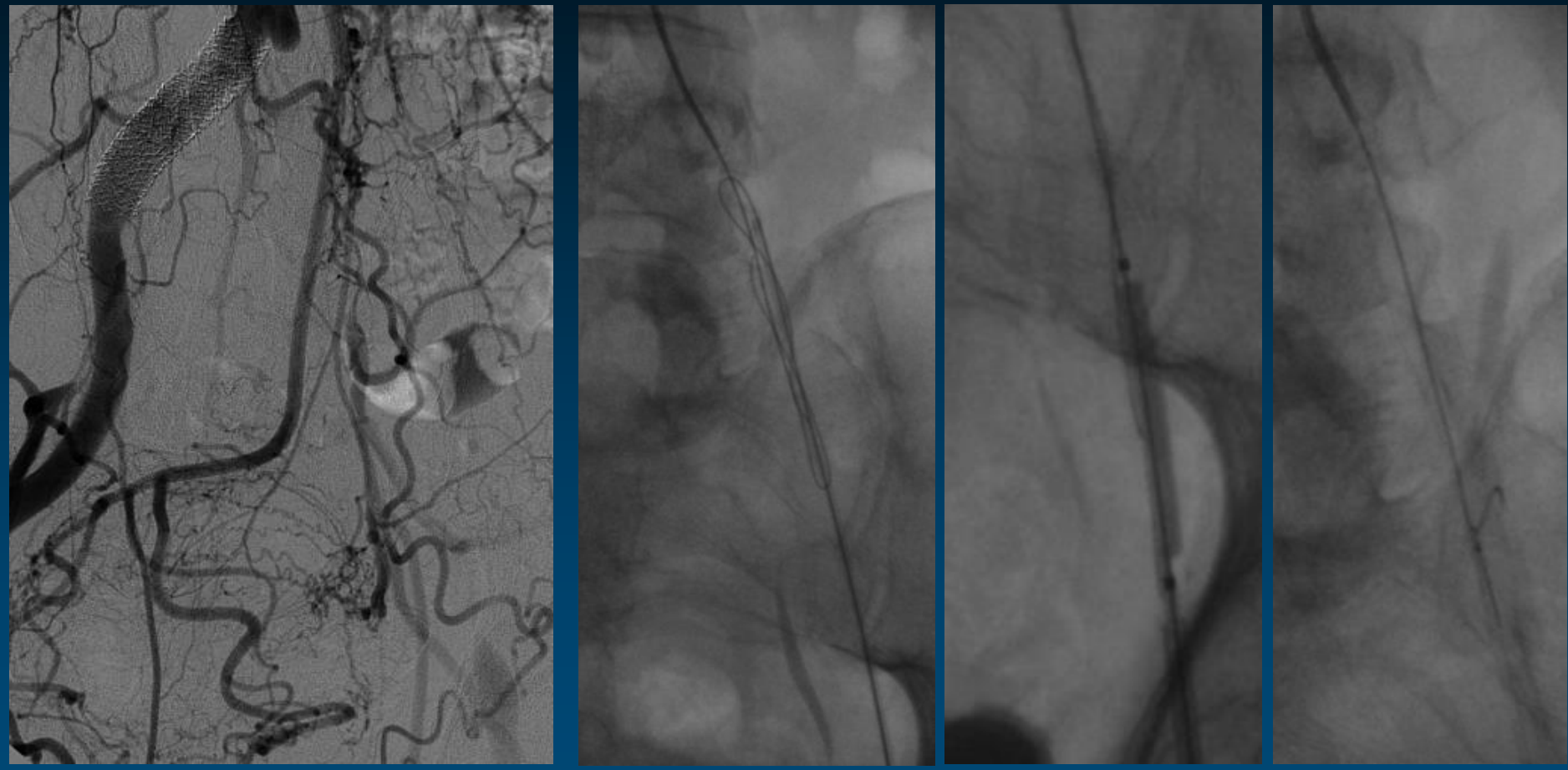
8 Fr sheath required for graft stenting
→ bleeding will continue while exchanging sheath



Transradial proximal occlusion during sheath exchange

S&G graft, 8.0x70 mm

M/51, DM, Fontaine IIb claudication
S/P Rt. CIA stenting, Left hip surgery



Transradial + Transfemoral
SAFARI & Snaring

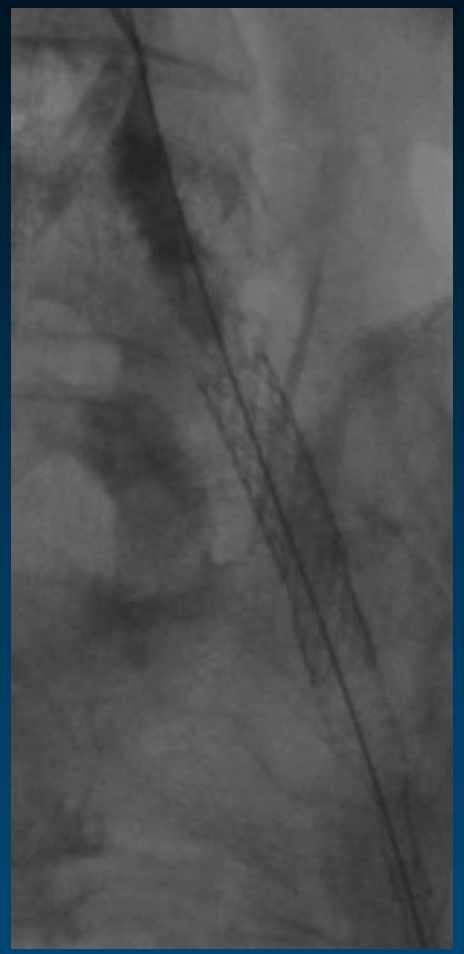
Left iliac CTO intervention

Predilation
6.0x80mm

Stenting
10.0x80mm

Postdilatation
10.0x40 mm, 6 atm
→ Too Big !!

Severe pain during postdilatation



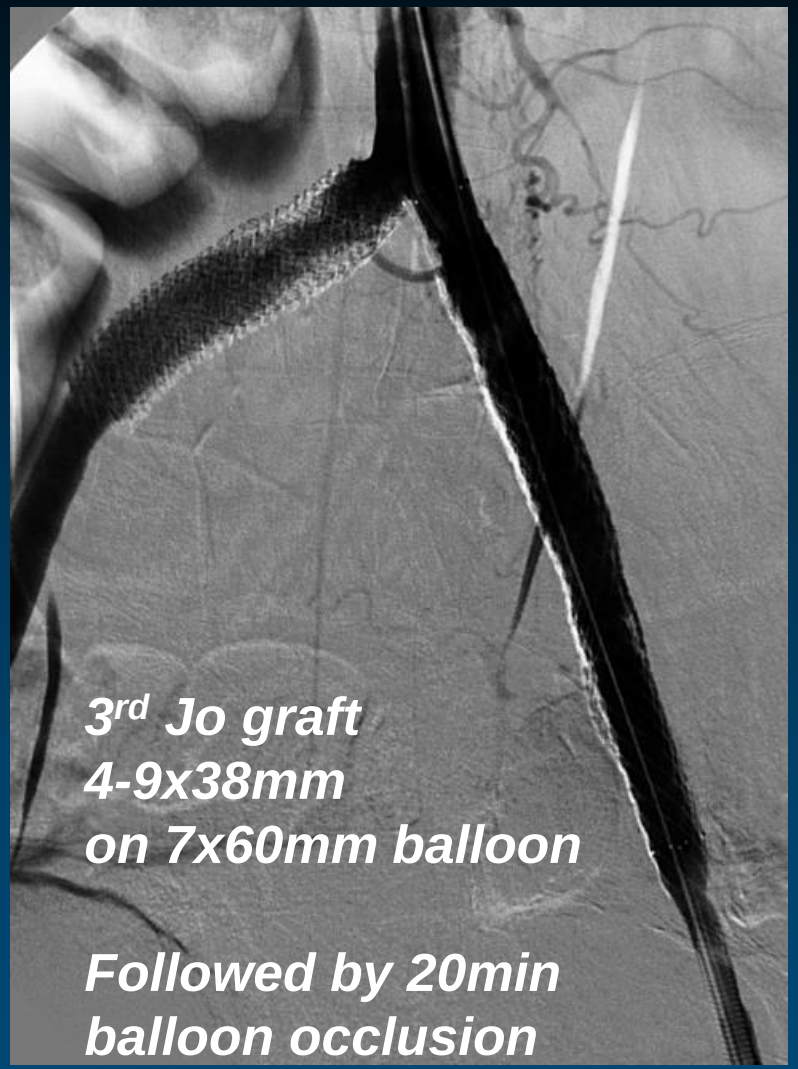
Perforation

Jo Graft
6-12x48mm
on the 8x60mm balloon

10x40mm

Severe pain during postdilatation

2nd Jo graft
6-12x38mm
on the 10x40mm balloon



Transradial Approach

for Aortoiliac CTO

Conventional routes for iliac CTO

Drawback

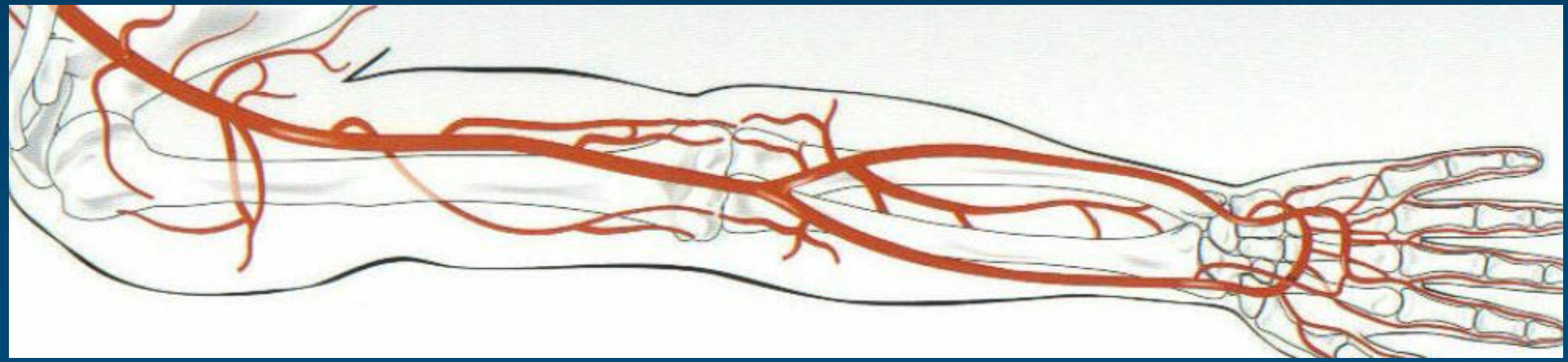
Brachial approach for iliac CTO

- **Single route for hand**

  → potentially lethal ischemic complication

- **Difficult for hemostasis**

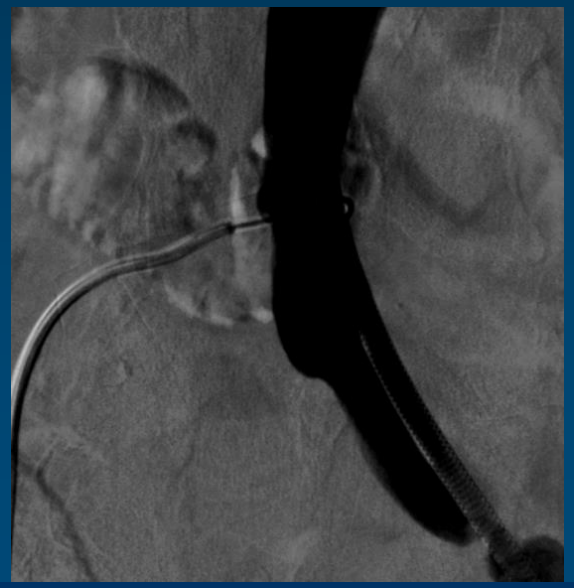
  → more bleeding complication

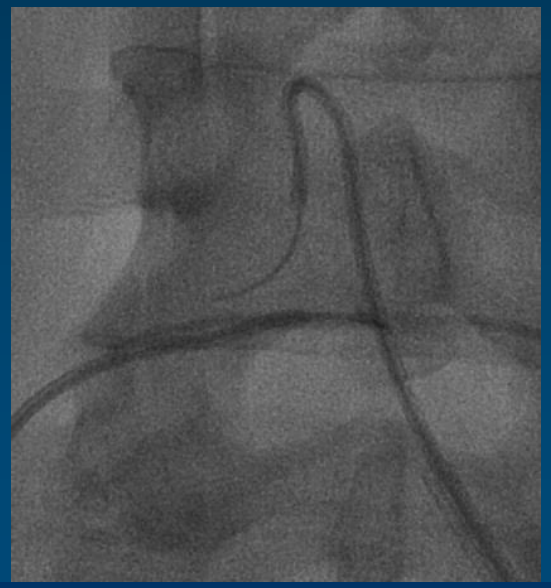


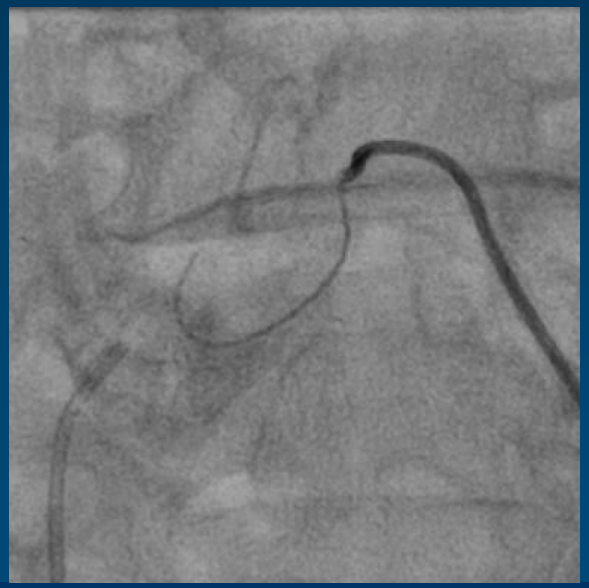
Drawback

Both femoral approach for iliac CTO

- More bleeding complication
- Less back up support, especially
  - stumpless CTO or hostile aortoiliac angle
- Difficult for angulated or calcified iliac arteries
- Hemostasis → perfusion disturbance or thrombosis







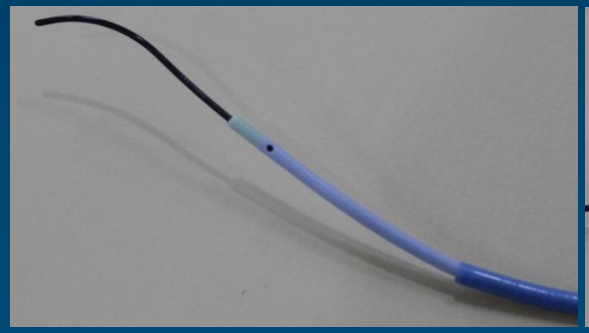
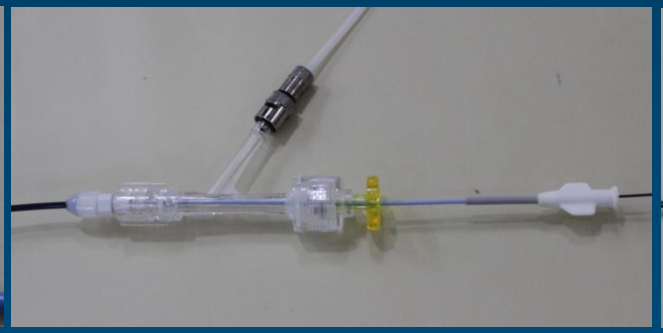
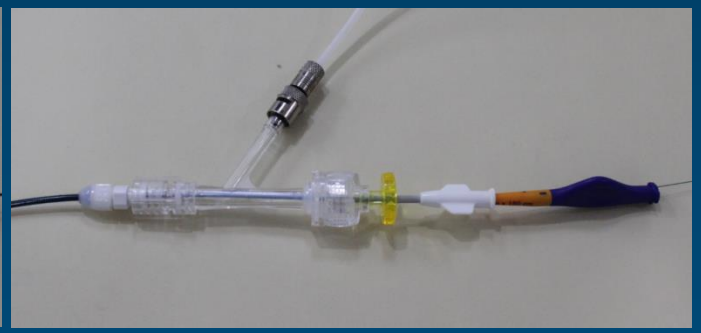
Transradial approach for iliac CTO

Pros & Cons

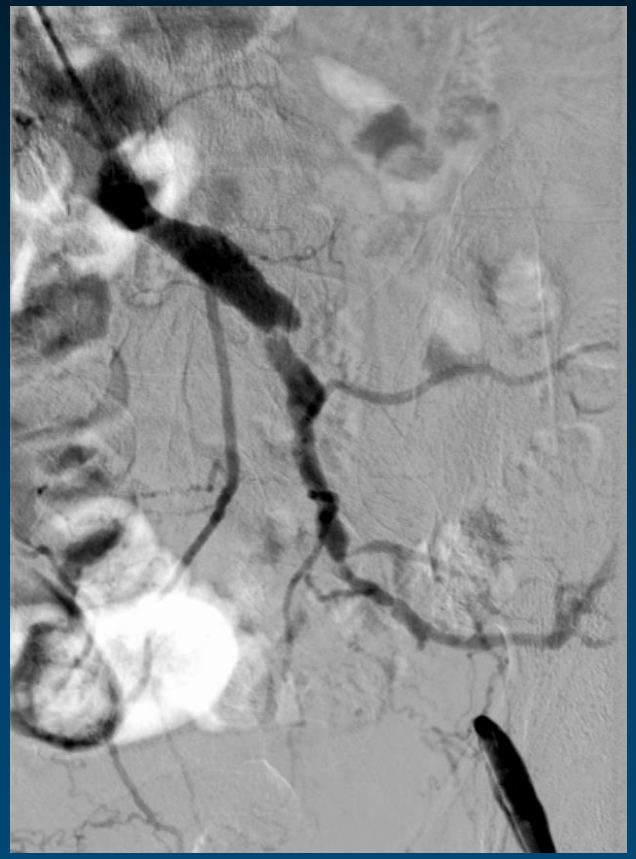
- **Disadvantages**
  - **Smaller arterial caliver → smaller sheath**
  - **Too long to reach**
  - **Subclavian or aortic tortuosity**
  - **More radiation hazard to operator**
- **Advantages**
  - **Less bleeding complication**
  - **Longer and slender devices available**
  - **Powerful perpendicular back up support**

Advance of TR approach for iliac CTO

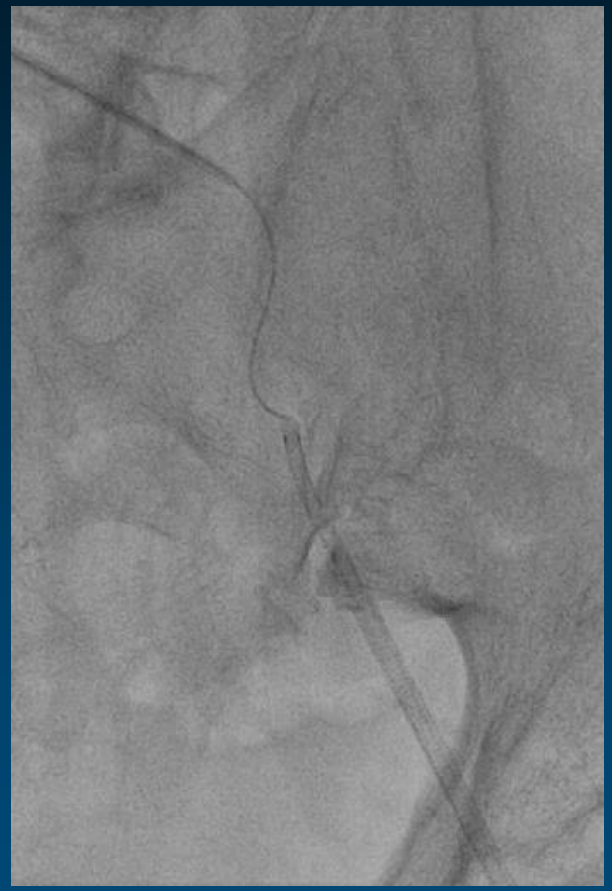
- **Longer and slender devices**
  - **Sheath; 110 long long shuttle, 5 Fr**
  - **Catheter; 150 cm MP 4 Fr or 125 cm Headhunter**
  - **Microcatheter; 150 length**
  - **Guidewire; 0.035” Terumo / 0.014” GW**

Transradial approach for iliac CTO

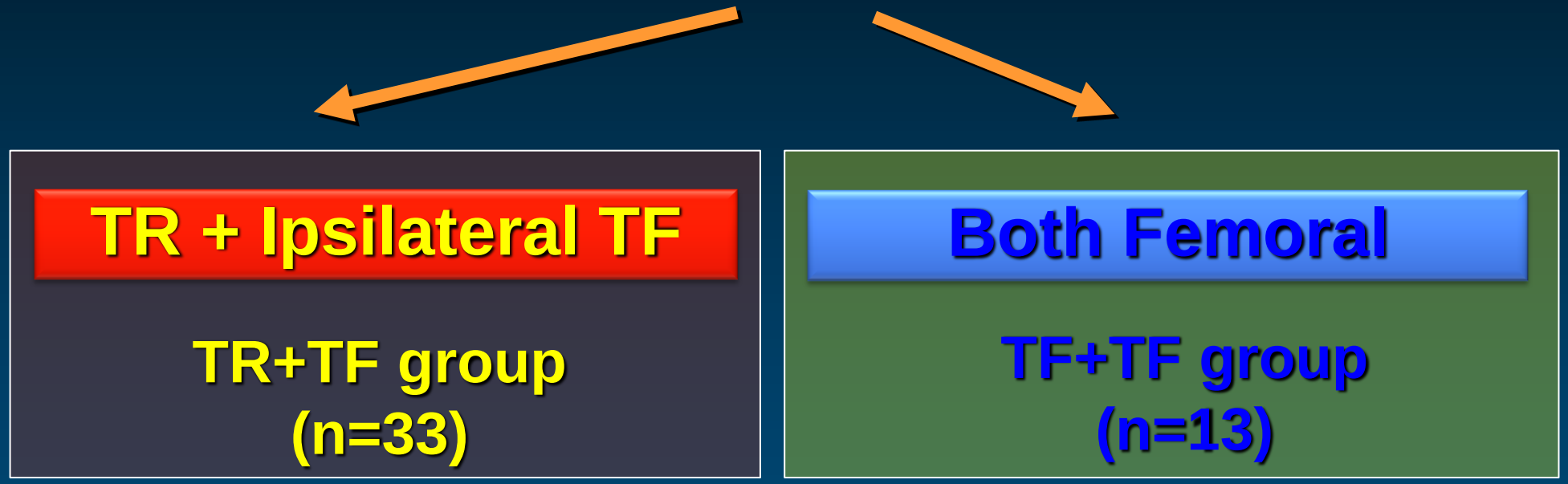


TR 5 Fr with 125cm MP
TF 7 Fr long sheath



SAFARI (CART)
Antegrade wire externalization

Aortoiliac CTO intervention (n=46 CTO lesions)



Complete procedural and clinical data at 1 month

Baseline Clinical Characteristics

	TR+TF (n=33)	TF+TF (n=13)	*P-value*
Male	30 (91%)	12 (92%)	1.00
Age	69±8	69±8	0.83
DM	13 (39%)	6 (46%)	0.75
HTN	16 (49%)	9 (69%)	0.33
Current Smoking	15 (46%)	8 (61%)	0.53
Dyslipidemia	16 (49%)	8 (61%)	0.52
S-Cr >2.0mg/dL	1 (3%)	2 (15%)	0.14
Atrial fibrillation	3 (9%)	0	0.55

Rutherford Category

	TR+TF (n=33)	TF+TF (n=13)	*P-value*
1	2 (6%)	0 (0%)	
2	5 (15%)	1 (8%)	
3	24 (73%)	6 (46%)	
4	1 (3%)	3 (23%)	
5	1 (3%)	3 (23%)	
CLI	2 (6%)	6 (46%)	0.004

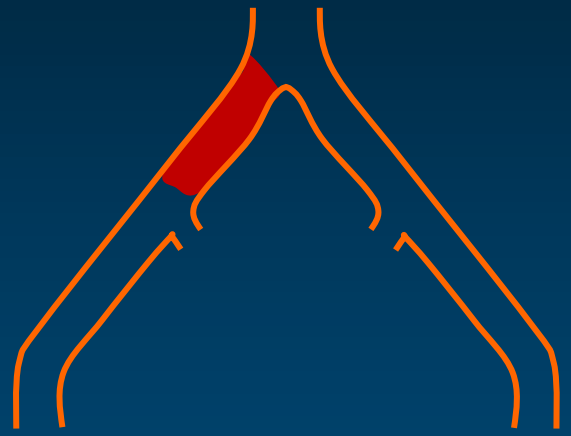
CTO Location

TR+TF group (n=33)	20(61%)	6(18%)	7(21%)
			
TF+TF group (n=13)	4(31%)	7(54%)	2 (15%)
P-value	0.10	0.03	1.0

CIA Ostial Stump <5 mm

TR+TF group (n=33)

12(36%)



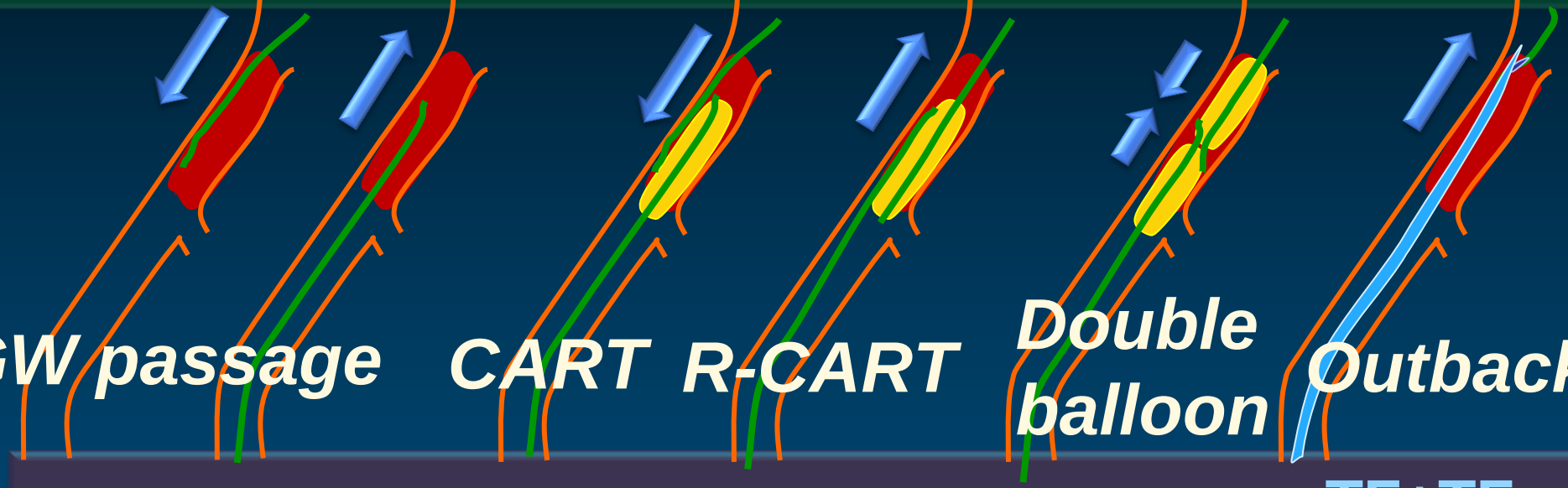
P=0.03

TF+TF group (n=13)

1 (8%)

Techniques for GW Passage

	GW passage	CART	R-CART	Double balloon	Outback
TR+TF group (n=33)	18(55%)	12(36%)	0	1(3%)	2(6%)
TF+TF group (n=13)	8(62%)	2(15%)	1(8%)	2(15%)	0
P-value	0.75	0.29	0.28	0.19	1.00



Procedural result

	TR+TF (n=33)	TF+TF (n=13)
Procedural success	100%	100%
Access route change	1 (3%)	0
Iliac perforation*	2 (6%)	1 (8%)
Distal embolization	0	1 (8%)
Puncture site bleeding#	0	1 (8%)
Admission duration, days	6±11	15±21
1-month mortality	0	0

**** One of each group treated with graft stent implantation***

 # Surgery required retroperitoneal bleeding

TR + TF Aortoiliac CTO intervention

Advantages

- Less bleeding complication
- High success rate
- Does not increase procedural time
- Longer and slender devices available
- Powerful perpendicular back up support for stumpless iliac CTO or hostile aortoiliac angle
- Rapid return to life

Complex Aortoiliac Intervention

- ***To obtain good results***
  - **Knowledge of arterial anatomy**
  - **Knowledge of new access and techniques**
    - ***; Appropriate selection of access site***
    - ***; Both TR and ipsilateral TF access for iliac CTO***
    - ***; Retrograde access from DFA, dSFA, & Pedal arteries***
  - **Appropriate selection of devices**

Try to avoid fatal complication at any time !!

- ***Thrombosis & Perforation***
- ***Don't select bigger stent and HP dilatation***
- ***Graft stents should be prepared in your cath lab (S&G, Lifestream)***

Good Results from
Good Treatment Strategy!!

Thanks for the Time