

Exclusive distal access for peripheral angioplasty

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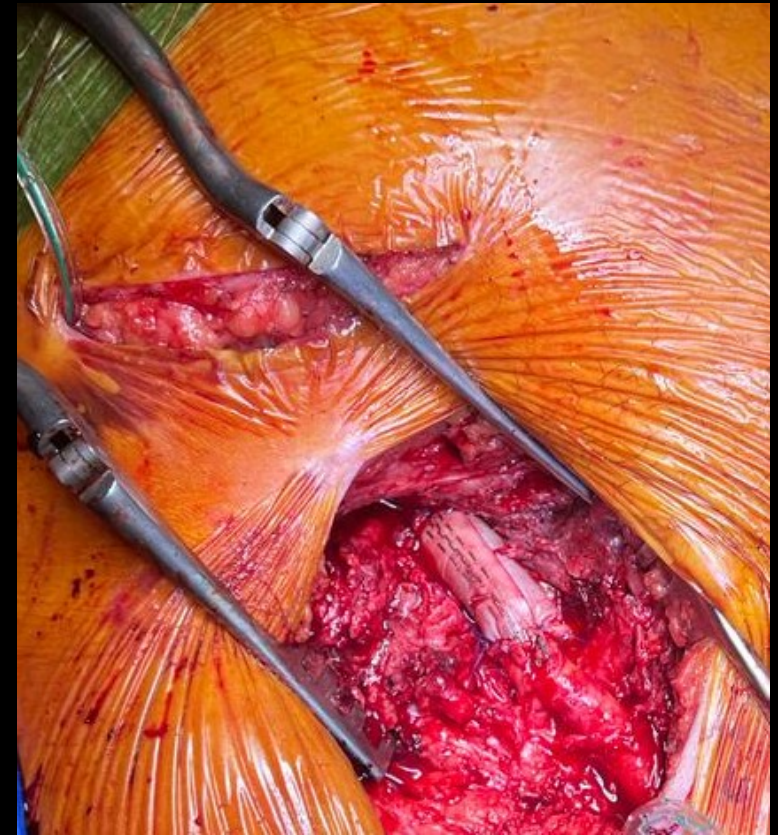
Paris-Saclay and Versailles-Saint Quentin Universities

Boulogne-Billancourt and Paris, France

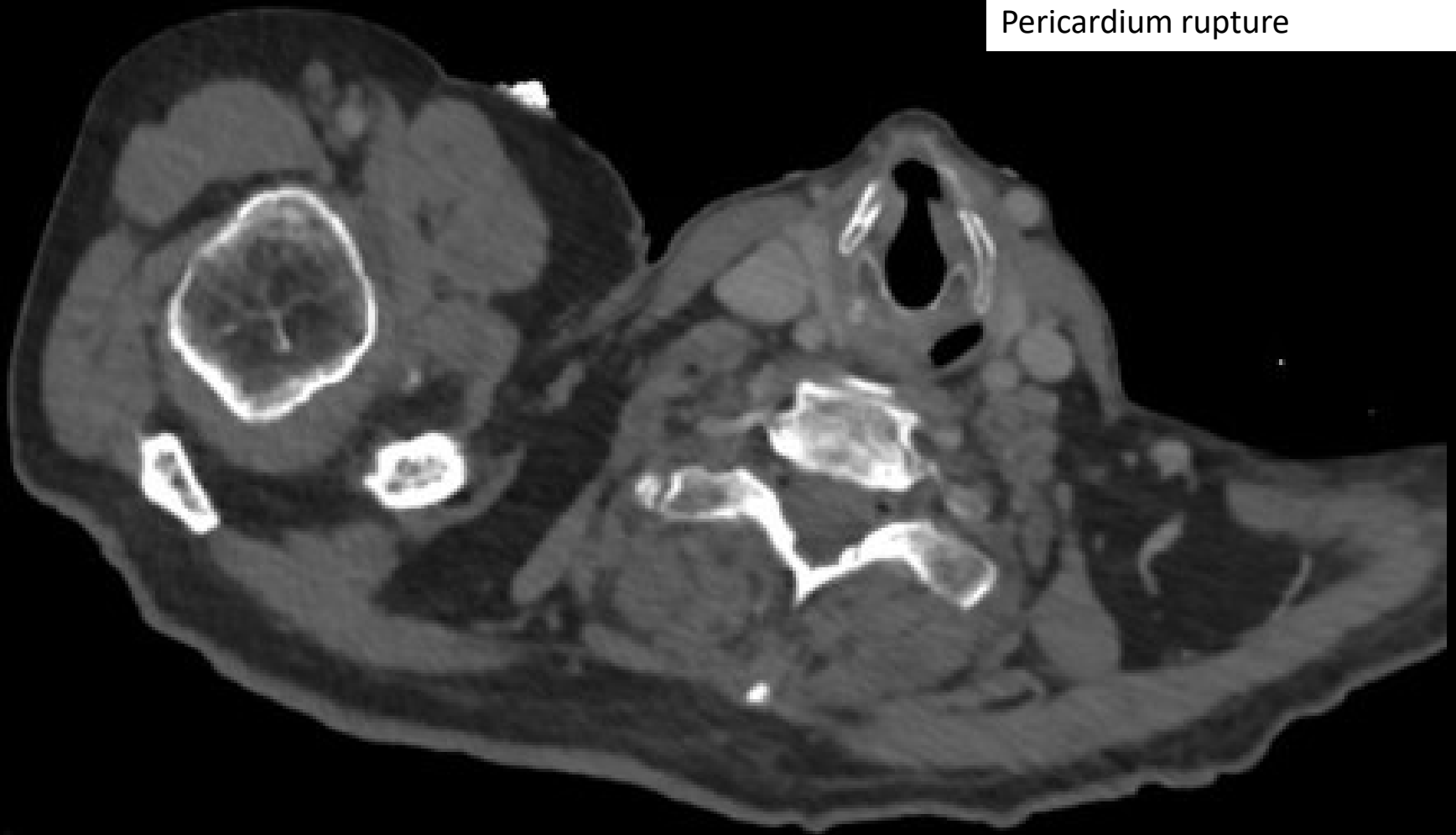


74 yo male
CKD eGFR 21 ml/min
Righ CLTI with BTK disease
Popliteal angioplasty 15 days ago
Anterograde puncture + Angioseal
Fever + groin hematoma

CFA replacement with pericardium tube + sartorius flap + VAC therapy + Antibiotics (Pseudomonas)



Comes back 42 days later
Pericardium rupture



Complications of the femoral puncture

Haematoma	6.1 %
Open conversion	0.7 %
Distal ischaemia	0.6 %
Pseudoaneurysm	0.5 %
Others	0.3 %
TOTAL	8.2 %

10-20% crossing failure via antegrade approach

Bailout retrograde puncture is useful

Rare complications of the retrograde puncture

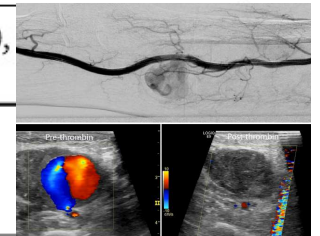
Das et al. Cardiovasc Intervent Radiol 2010
Scheinert D et al. J Endovasc Ther. 2001
Schmidt A et al. J Endovasc Ther 2012
Walker CM et al. J Endovasc Ther. 2016

Main alternative approaches: brachial and radial

The brachial artery: A critical access for endovascular procedures

Javier A. Alvarez-Tostado, MD,^a Mireille A. Moise, MD,^a James F. Bena, MS,^b Mircea L. Pavkov, MD,^a Roy K. Greenberg, MD,^a Daniel G. Clair, MD,^a and Vikram S. Kashyap, MD,^a *Cleveland, Ohio*

Complication	Patients (n = 21), No. (%)
Pseudoaneurysm	11 (52)
Brachial artery thrombosis	7 (33)
Hematoma	3 (14)



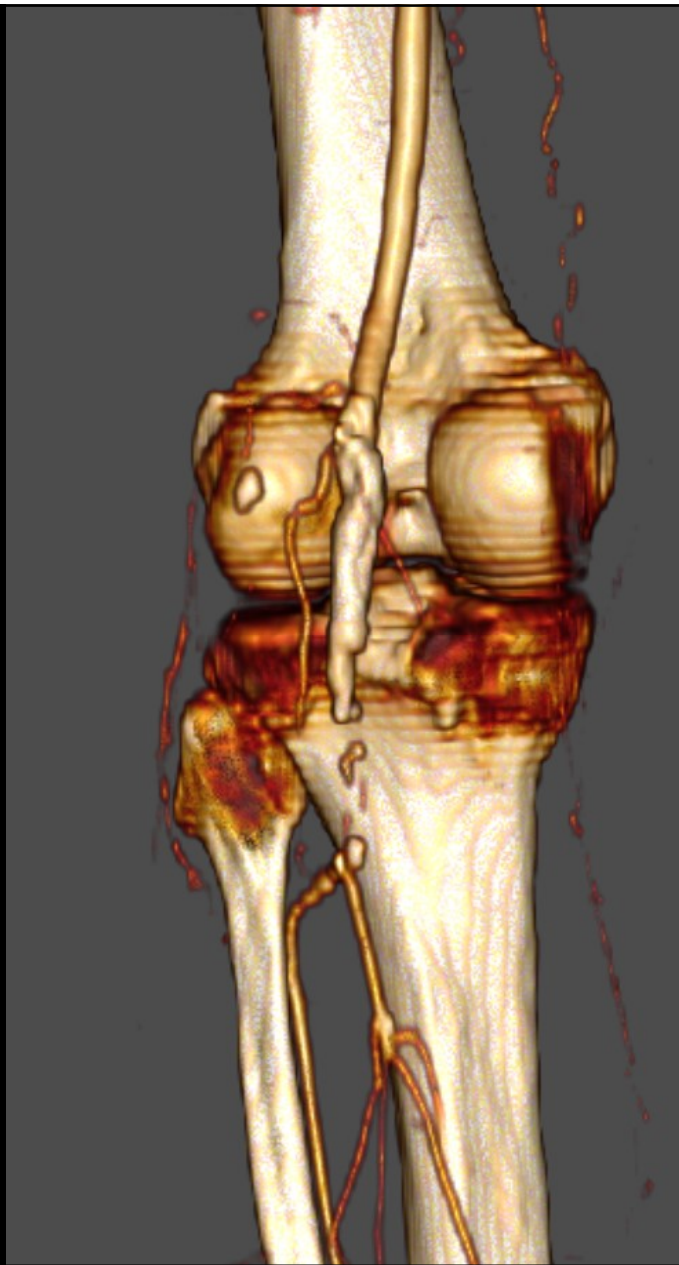
Percutaneous radial access for peripheral transluminal angioplasty

Raphaël Coscas, MD, Romain de Blic, MD, Clément Capdevila, MD, Isabelle Javerliat, MD, Olivier Goëau-Brissonniere, MD, PhD, and Marc Coggia, MD, *Boulogne-Billancourt and Montigny-le-Bretonneux, France*

Arch navigation
 Radial rupture
 Pseudoaneurysm
 Radial occlusion

Alvarez et al. J Vasc Surg 2008
Coscas et al. J Vasc Surg 2015





Technique of primarily distal retrograde approach without femoral access (TAMI - Tibiopedal Arterial Minimally Invasive retrograde revascularization)

Same-day discharge and local anesthesia

US guided puncture 21 G 7cm (Cook®)

Posterior tibial artery as first choice

No spasmolytic cocktail

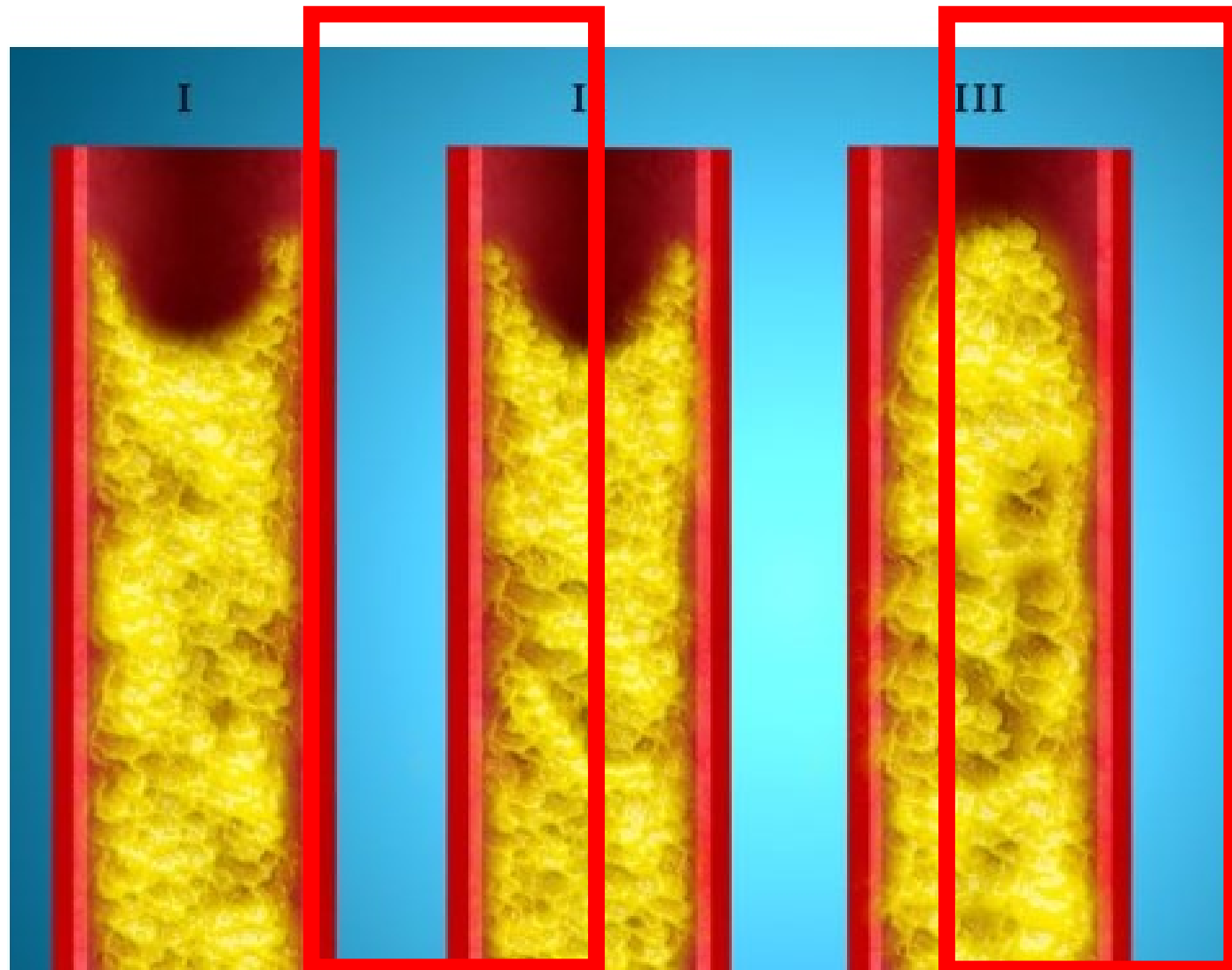
V18 wire (Boston Scientific®) over support catheter

4F 45/70 cm sheath (Cook®)

Passeo-18 balloons et Pulsar T3 stents (Biotronik®)

Light manual compression





Tibiopedal arterial minimally invasive retrograde revascularization (TAMI) in patients with peripheral arterial disease and critical limb ischemia. On behalf of the Peripheral Registry of Endovascular Clinical Outcomes (PRIME)

Jihad A. Mustapha MD¹ | Fadi Saab MD¹ | Theresa N. McGoff BSN² | George Adams MD³ | John R. Mullins MD⁴ | Ashraf Al-Dadah MD⁵ | Michael R. Jaff DO⁶ | Philip P. Goodney MD⁷ | Farhan Khawaja MD⁸ | Larry J. Diaz-Sandoval MD²

TABLE 2 Procedure and recovery data by access type

Characteristic	Access type			Significance ^a	
	TAMI (101 procedures)	Femoral (840 procedures)	Dual access (254 procedures)	Omnibus p-value	Bonferroni Post hoc
Total heparin dose, 1,000 IU	9.0 (7.0–10.0)	7.4 (6.0–10.0)	10.0 (8.0–12.0)	<.001	b,c,d
Peak ACT, s	205 (183–239)	210 (188–242)	223 (202–246)	<.001	b,d
Contrast volume, ml	50 (30–75)	160 (118–216)	160 (115–220)	<.001	c,d
Fluoroscopy time, min	14 (10–22)	18 (13–28)	40 (28–55)	<.001	b,c,d
Procedure time, min	64 (47–86)	74 (53–99)	124 (95–156)	<.001	b,c,d
Hospital stay, d	0 (0–1)	1 (1–1)	1 (1–1)	<.001	b,c,d
Hospital stay ≥2 d	7.9% (8/101)	13.1% (110/840)	16.9% (43/254)	.07	

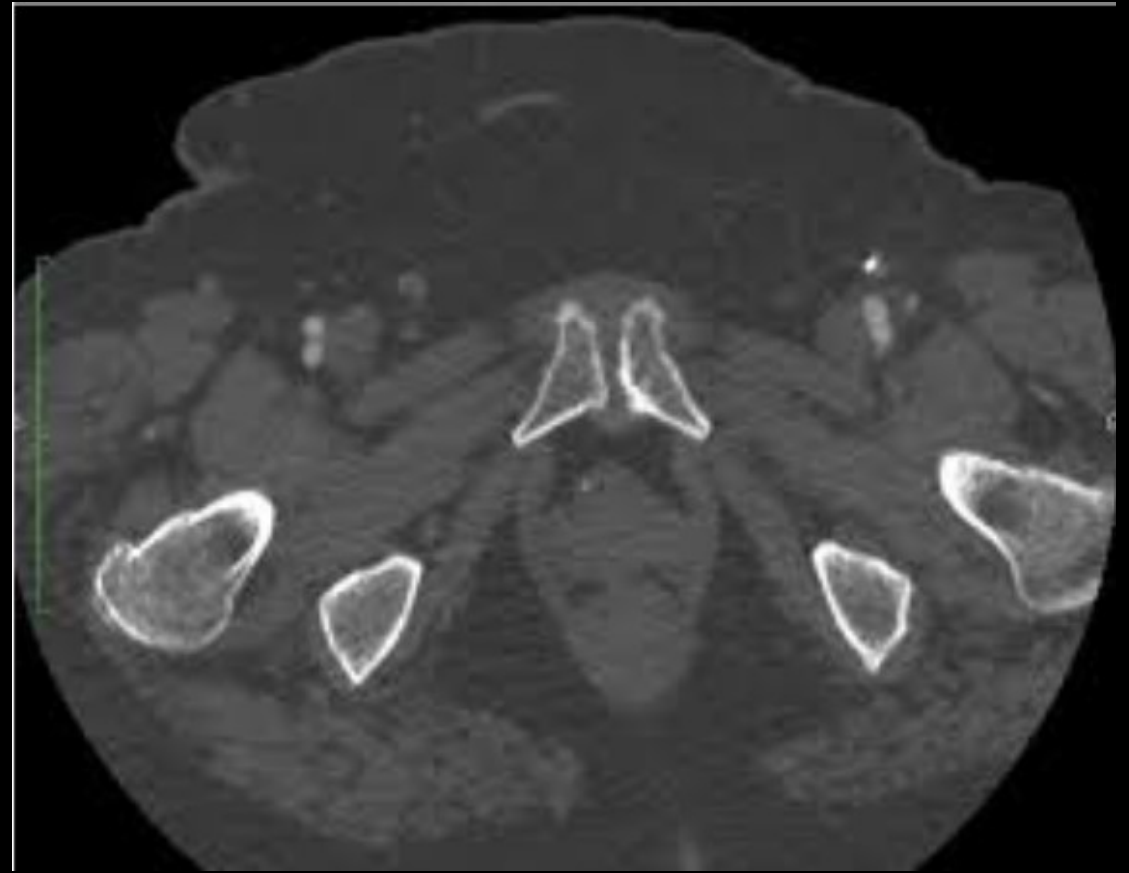
TABLE 3 Vascular access data by access type

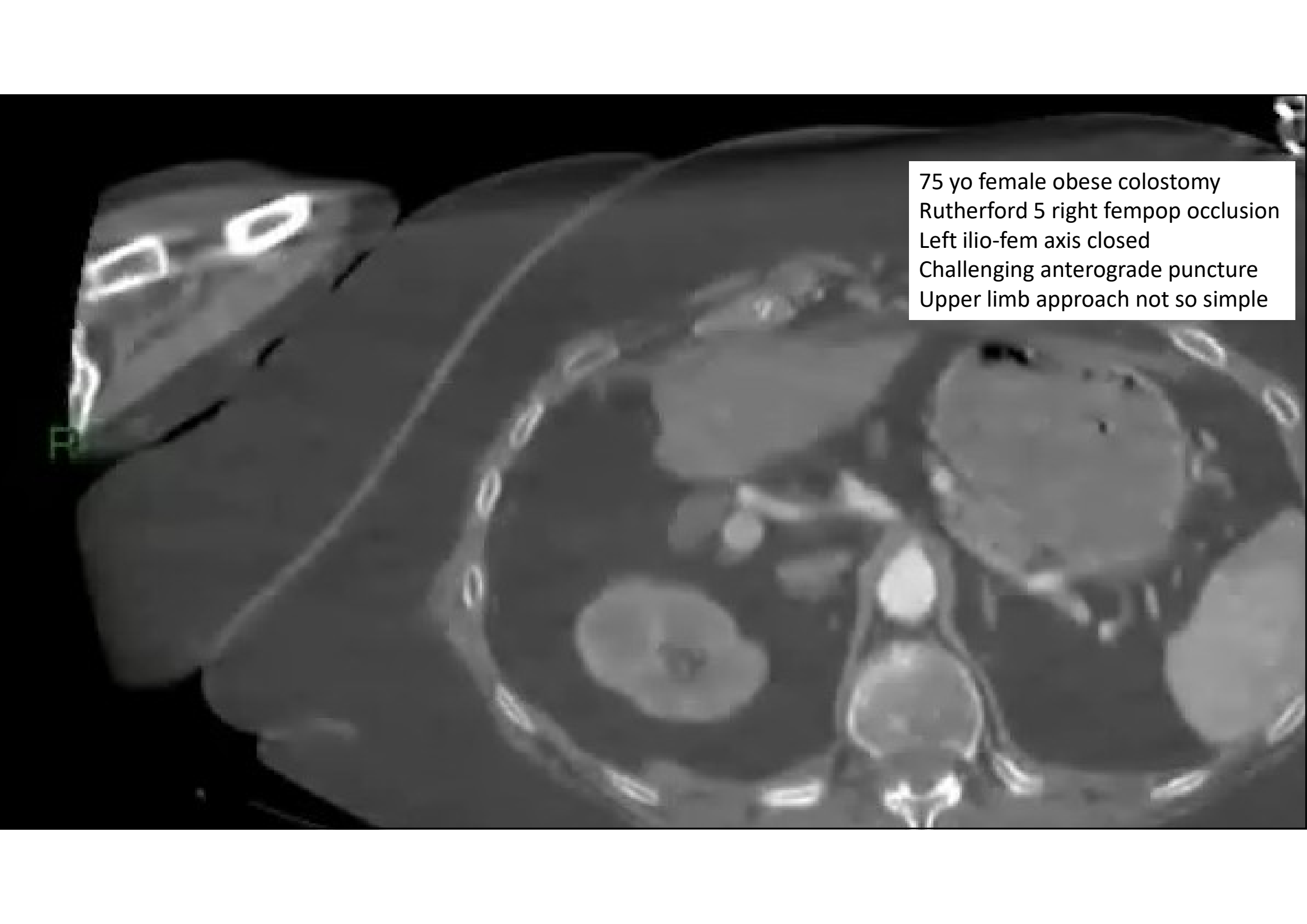
Characteristic	Access type			Significance ^a	
	TAMI (107 access sites)	Femoral (954 access sites)	Dual access (538 access sites)	Omnibus p-value	Bonferroni Post hoc
Sheath size				<.001	b,c,d
4Fr	100% (106/106)	8.6% (81/941)	52.3% (274/524)		
5Fr	0.0% (0/106)	81.3% (765/941)	42.0% (220/524)		
6Fr	0.0% (0/106)	6.5% (61/941)	5.3% (28/524)		
7Fr	0.0% (0/106)	3.6% (34/941)	0.4% (2/524)		
Ultrasound guidance	99.1% (106/107)	87.7% (835/952)	97.2% (523/538)	<.001	b,c
Access success	100% (107/107)	99.1% (943/952)	100% (538/538)	.06	
Access success on first attempt	77.6% (83/107)	84.4% (786/931)	76.8% (411/535)	<.001	b
Time to access, s	42 (15–98)	40 (15–99)	51 (17–126)	.01	b

TABLE 5 Complications by access type

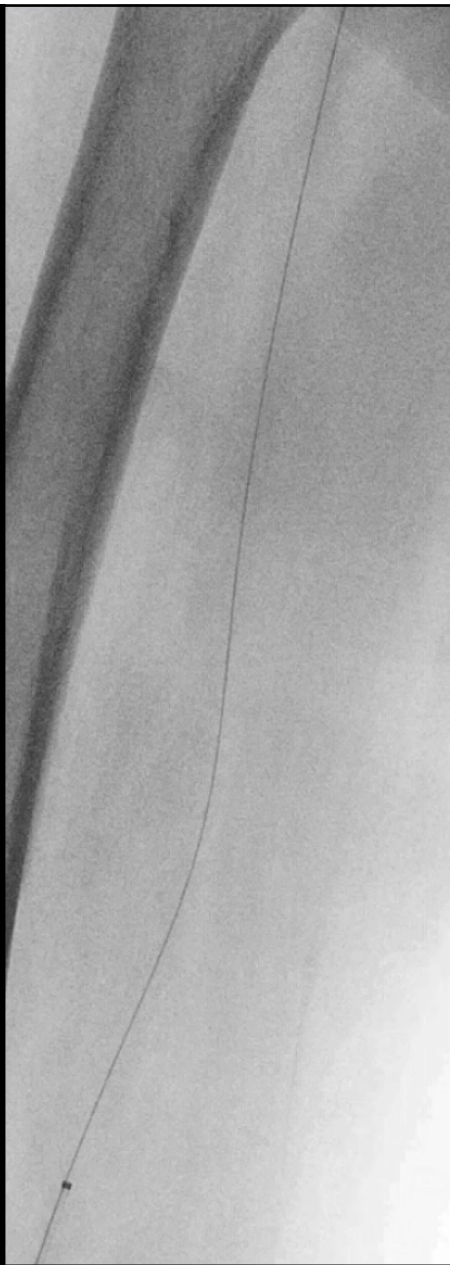
Characteristic	Access type			Significance ^a	
	TAMI (101 procedures)	Femoral (840 procedures)	Dual access (254 procedures)	Omnibus p-value	Bonferroni Post hoc
Treatment success and complication-free	69.3% (70/101)	64.3% (540/840)	55.5% (141/254)	.02	b,c
Any complication	22.8% (23/101)	26.8% (225/840)	33.9% (86/254)	<.05	d
AV fistula	1.0% (1/101)	1.2% (10/840)	1.2% (3/253)	>.99	
At access site	0	0	0		
Thrombus	0.0% (0/101)	1.3% (11/840)	1.6% (4/254)	.63	
At access site	0	0	0		
Aneurysm	0.0% (0/101)	0.0% (0/840)	0.4% (1/254)	.30	
At access site	0	0	0		
Pseudoaneurysm	1.0% (1/101)	1.0% (8/840)	2.8% (7/1254)	.10	
At access site	0	6	7		
Hematoma	2.0% (2/101)	4.9% (41/840)	5.9% (15/254)	.32	
At access site	2	40	14		
Infection	0.0% (0/101)	0.0% (0/837)	0.0% (0/253)	>.99	
Retroperitoneal bleed	0.0% (0/101)	0.4% (3/835)	0.0% (0/254)	>.99	
Compartment syndrome	0.0% (0/101)	0.0% (0/838)	0.0% (0/254)	>.99	
Transfusion	0.0% (0/101)	2.0% (17/837)	2.8% (7/254)	.25	
Amputation	1.0% (1/101)	0.5% (4/838)	1.2% (3/254)	.26	
Embolization	0.0% (0/101)	1.5% (13/839)	1.2% (3/254)	.71	
At access site	0	0	0		
Dissection	15.8% (16/101)	16.8% (141/839)	15.4% (39/254)	.87	
At access site	0	0	1		
Flow-limiting	1.0% (1/101)	3.7% (31/839)	5.1% (13/254)	.17	
Perforation	1.0% (1/101)	2.1% (18/839)	7.9% (20/254)	<.001	b,c
At access site	0	0	0		
Mild	0	12	10		
Moderate	0	1	6		
Severe	1	5	4		
Rupture	0.0% (0/101)	0.2% (2/839)	0.0% (0/254)	>.99	
At access site	0	1	0		
Spasm	1.0% (1/101)	1.2% (10/838)	1.6% (4/254)	.91	
At access site	0	1	0		

Complex cases with usual approaches

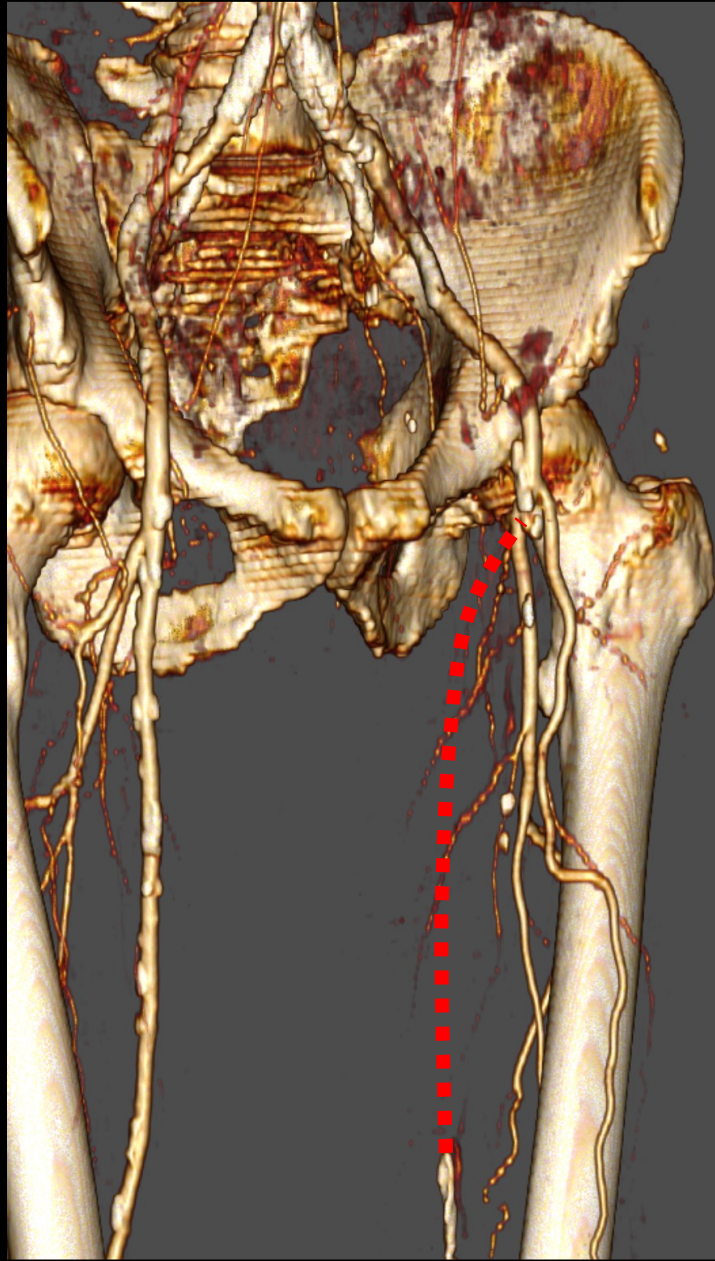
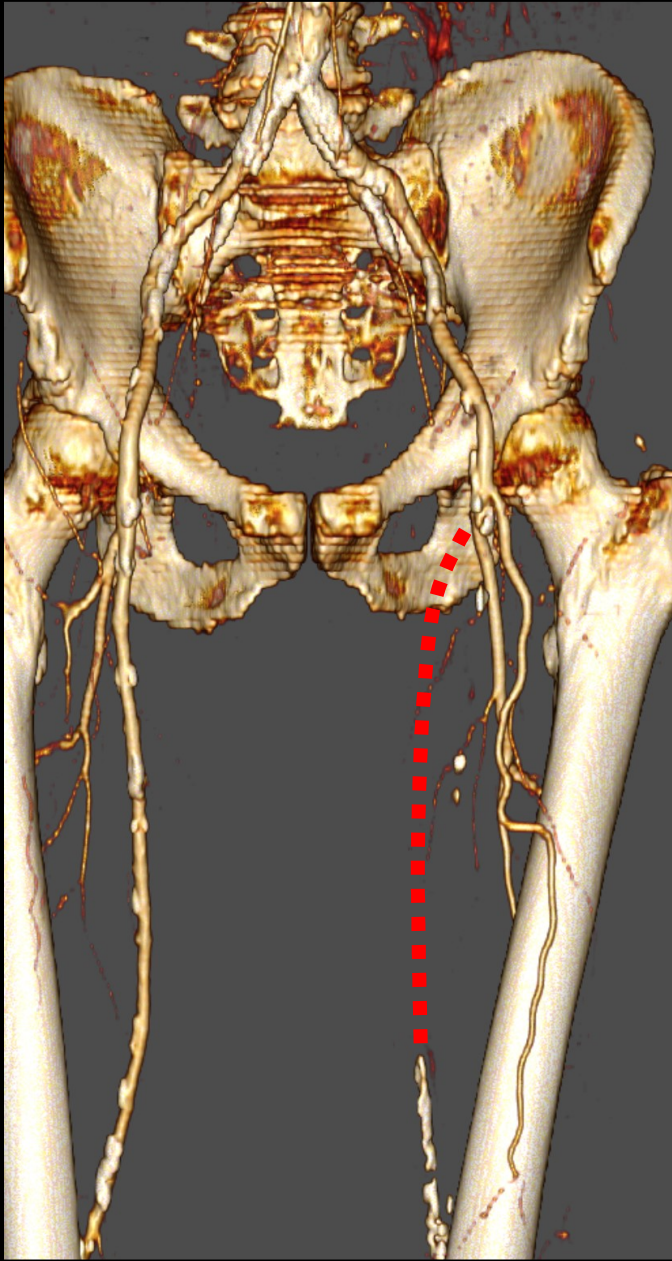


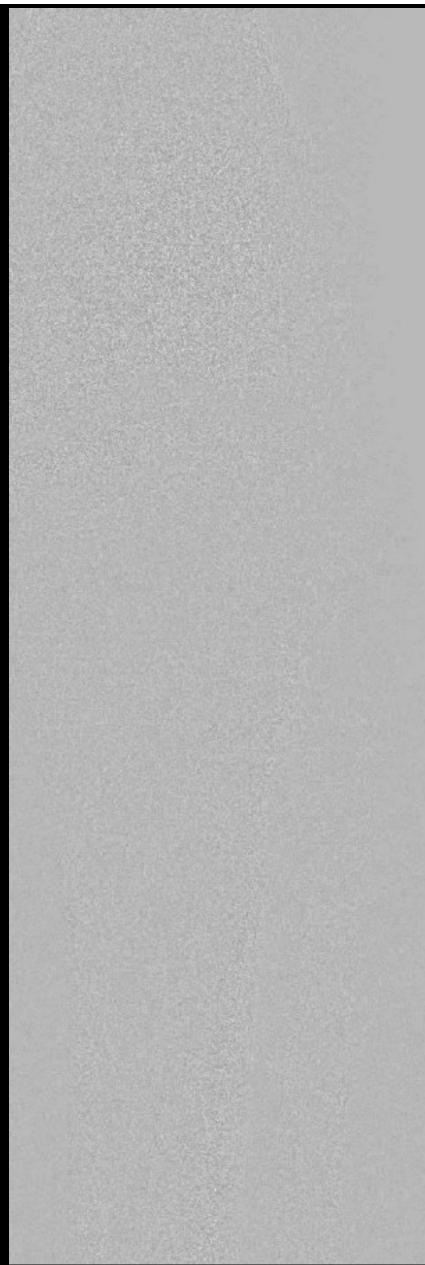
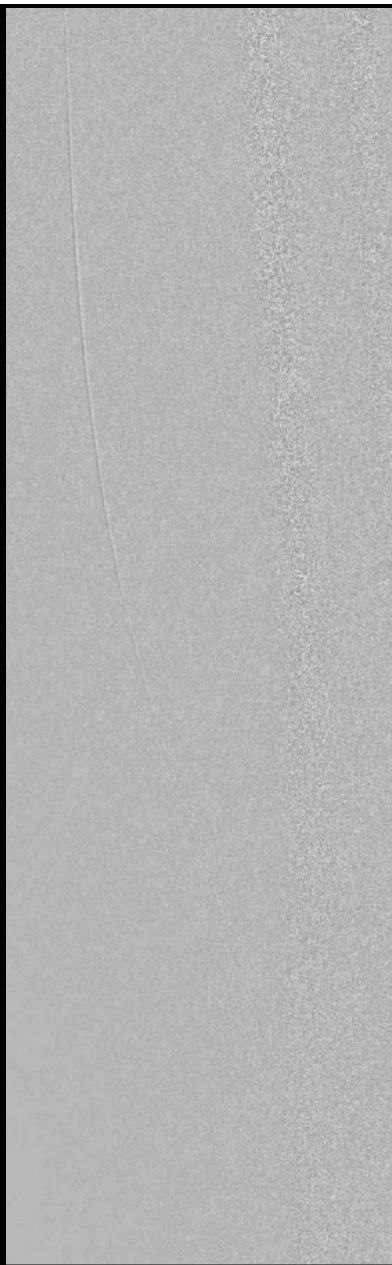
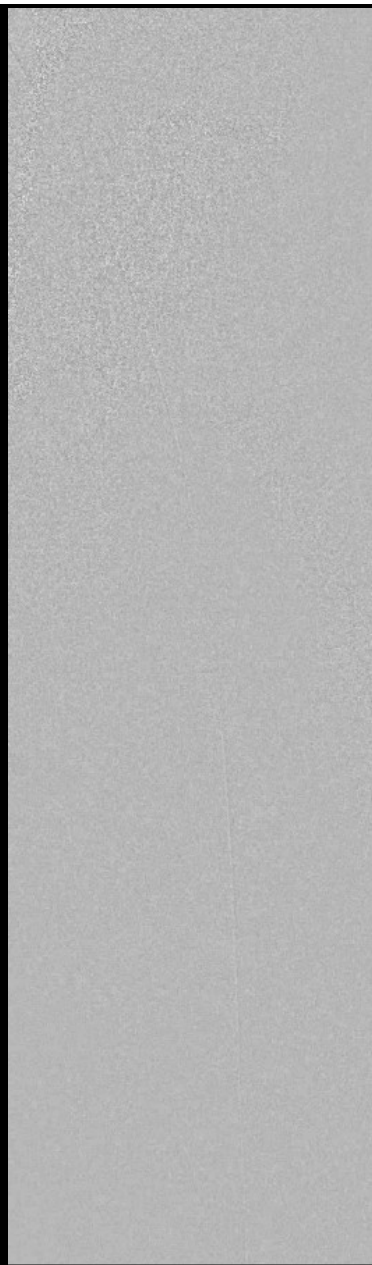


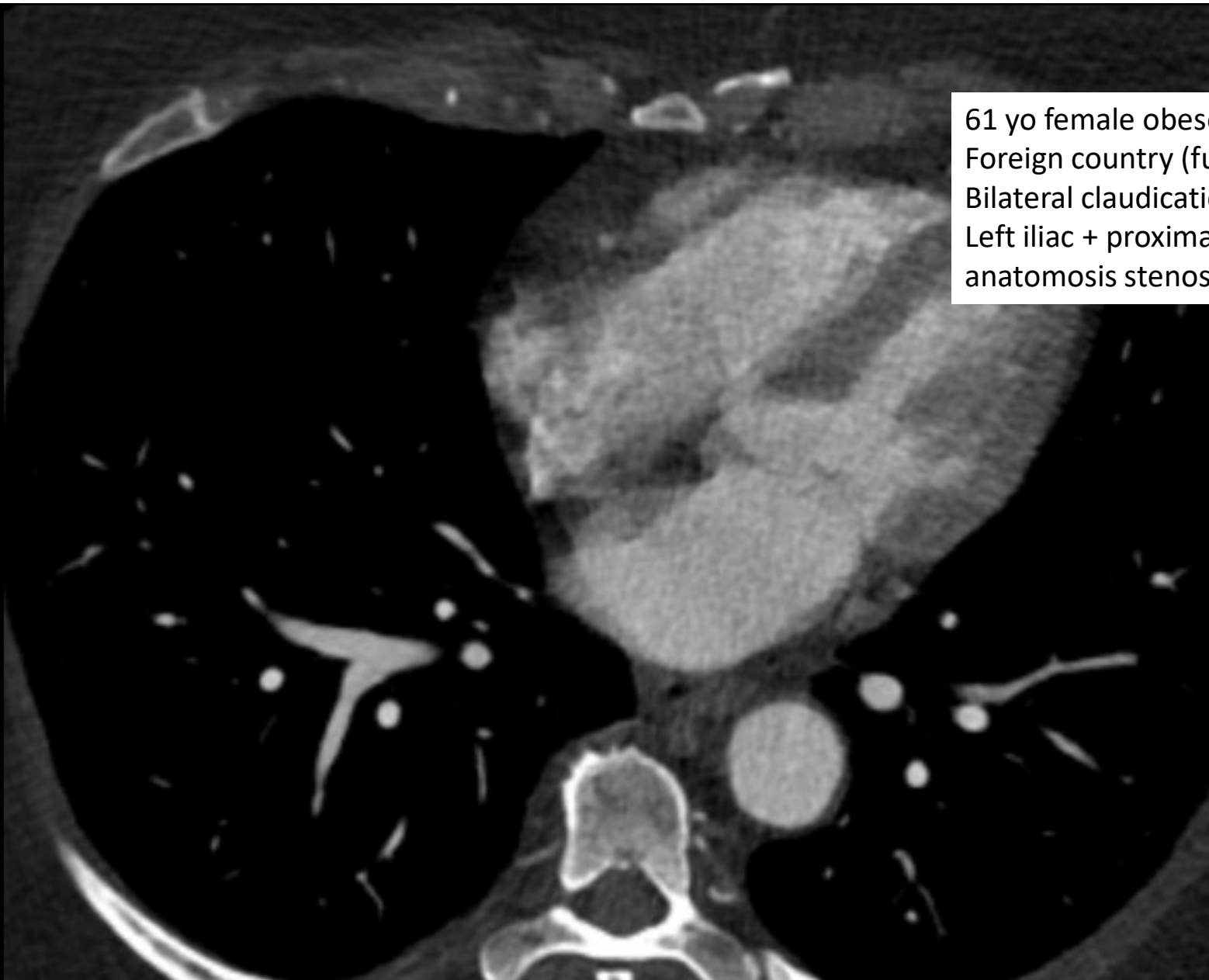
75 yo female obese colostomy
Rutherford 5 right fempop occlusion
Left ilio-fem axis closed
Challenging anterograde puncture
Upper limb approach not so simple



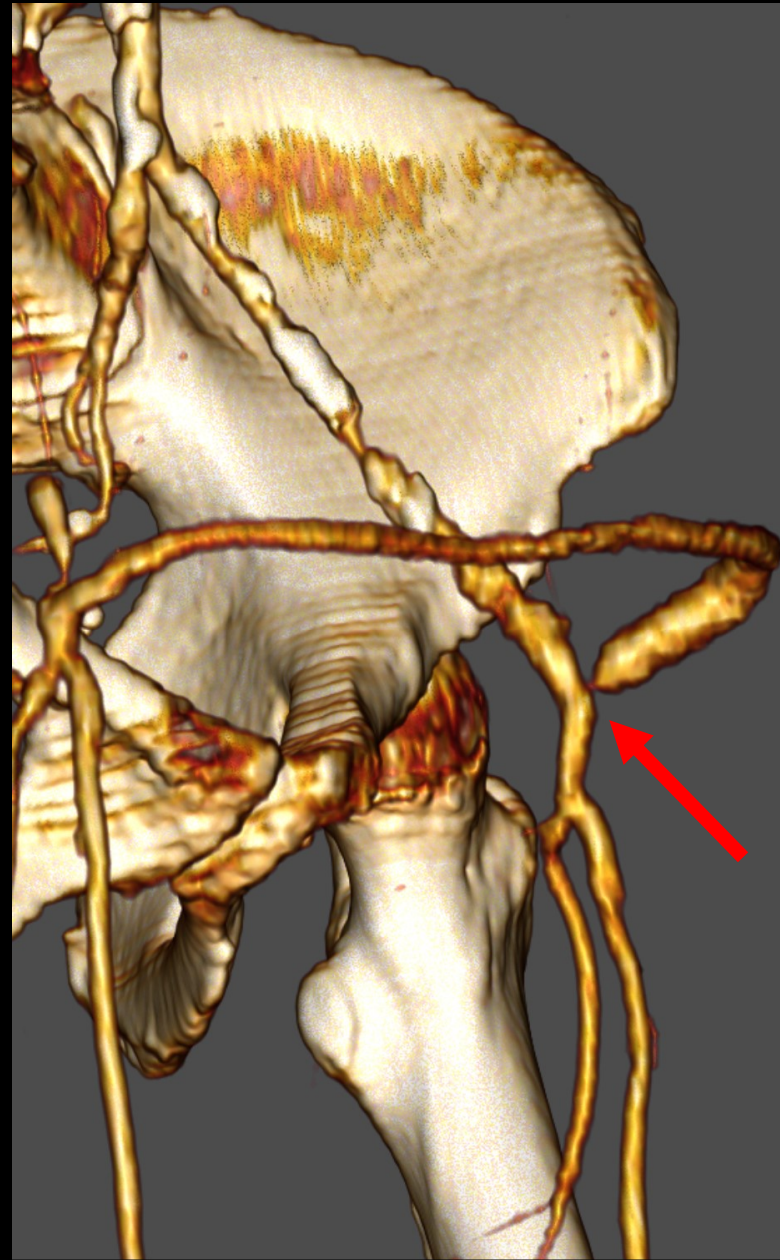
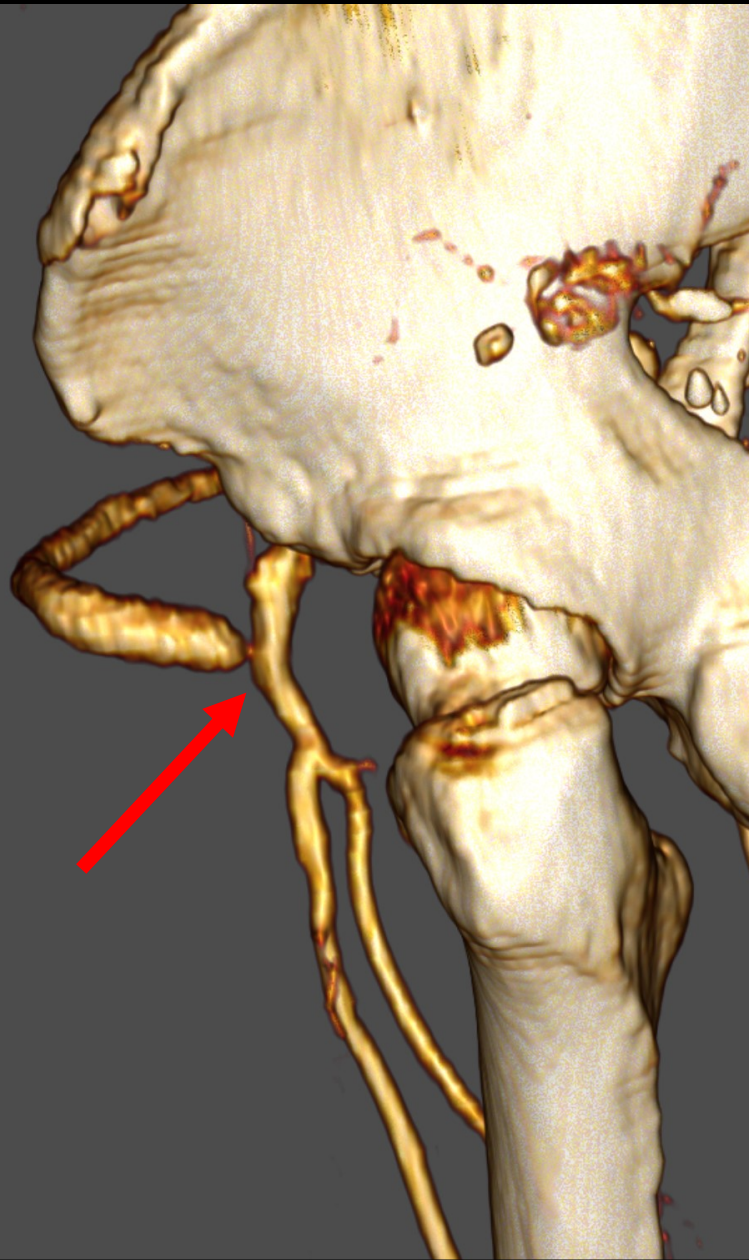








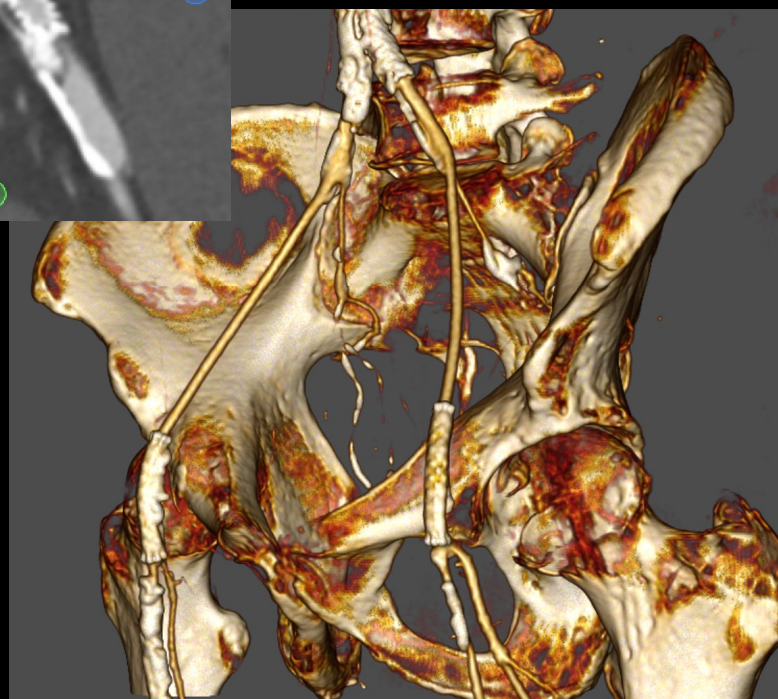
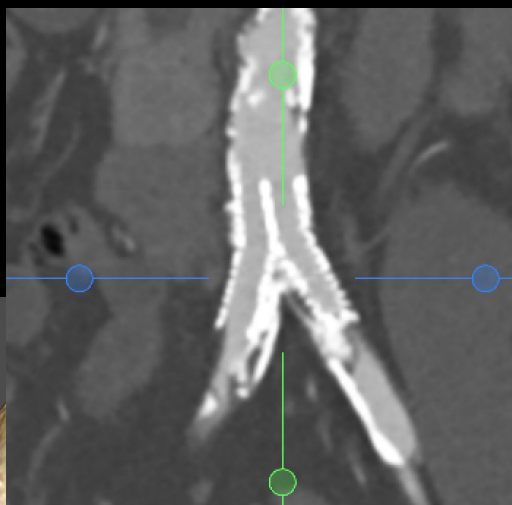
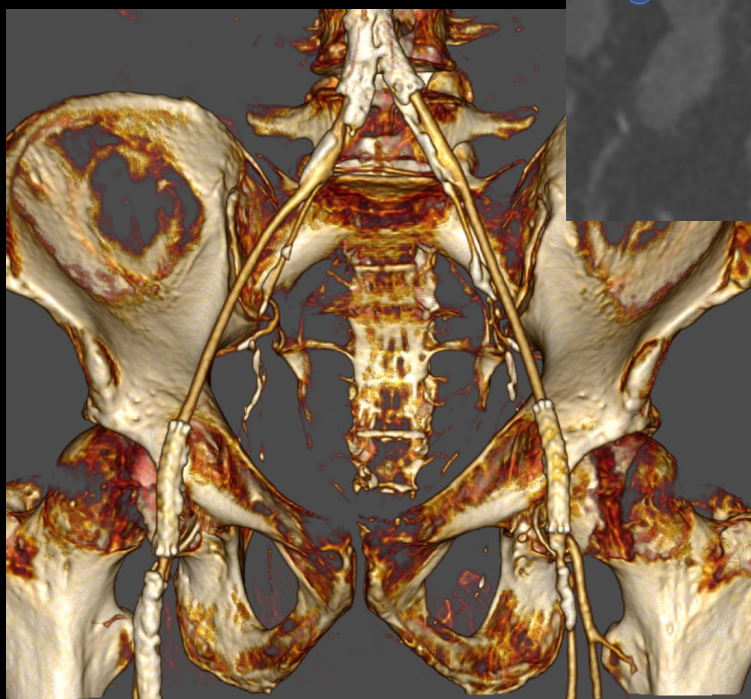
61 yo female obese
Foreign country (full payer)
Bilateral claudication few meters
Left iliac + proximal femfem bypass
anatomosis stenosis





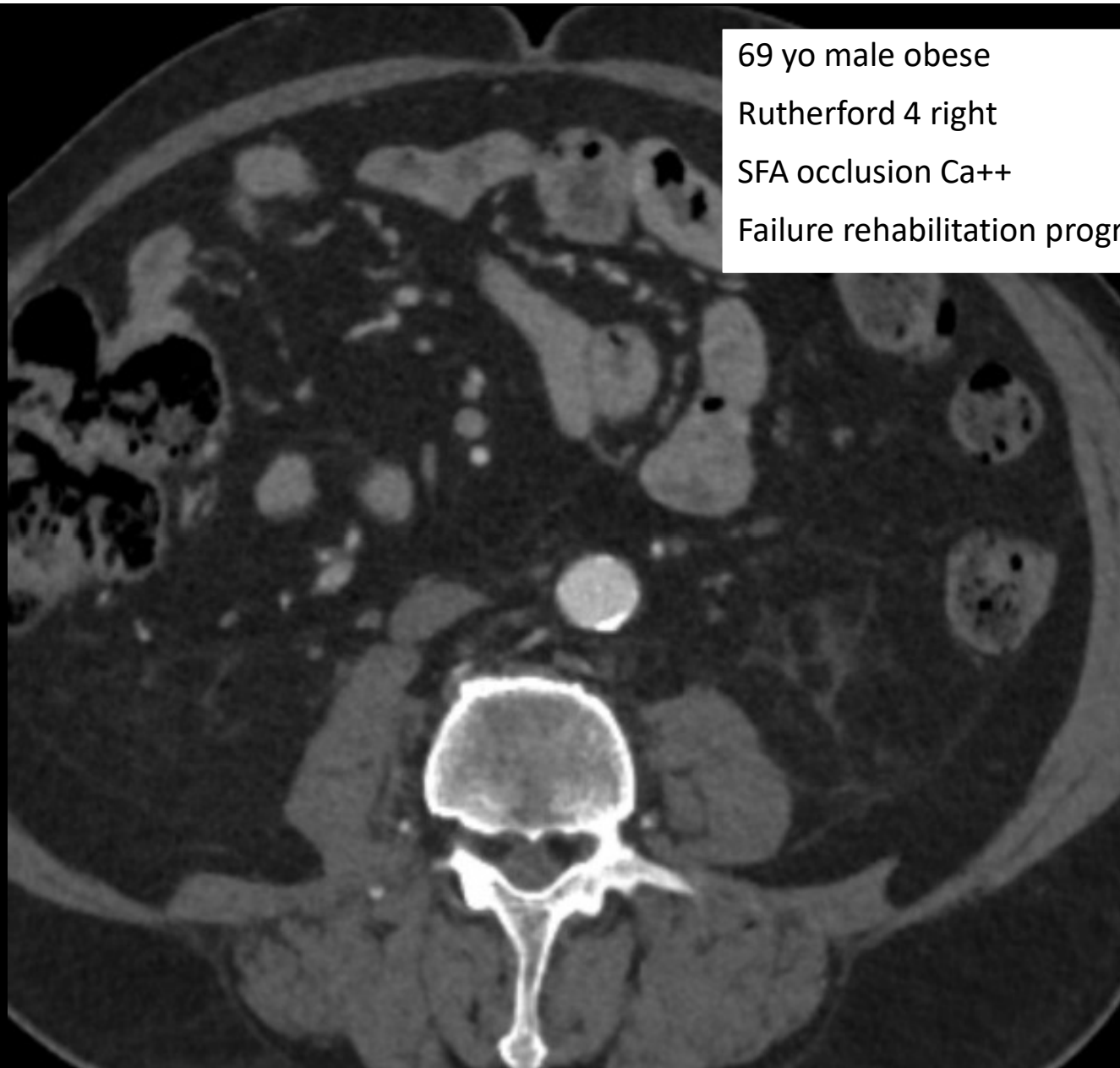
62 yo male dialysis anticoagulation
Kissing stents iliacs, Stents both CFA
Left CLTI
Calcified popliteal occlusion



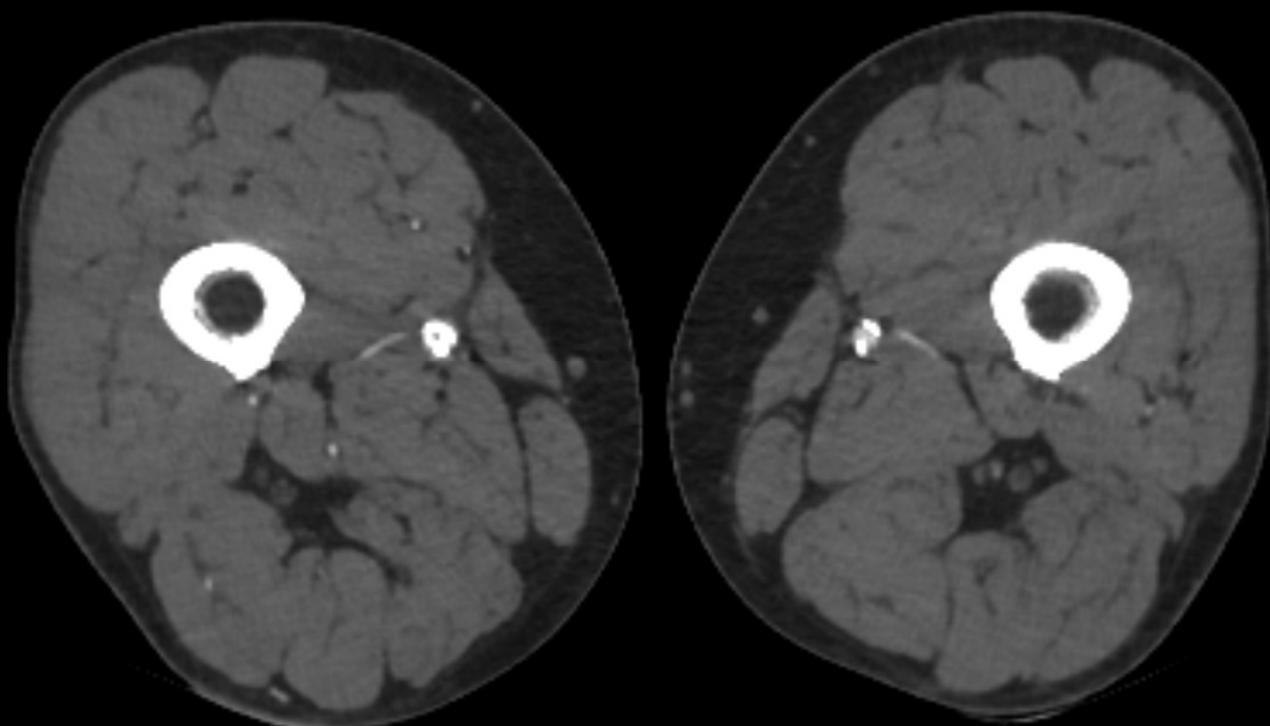


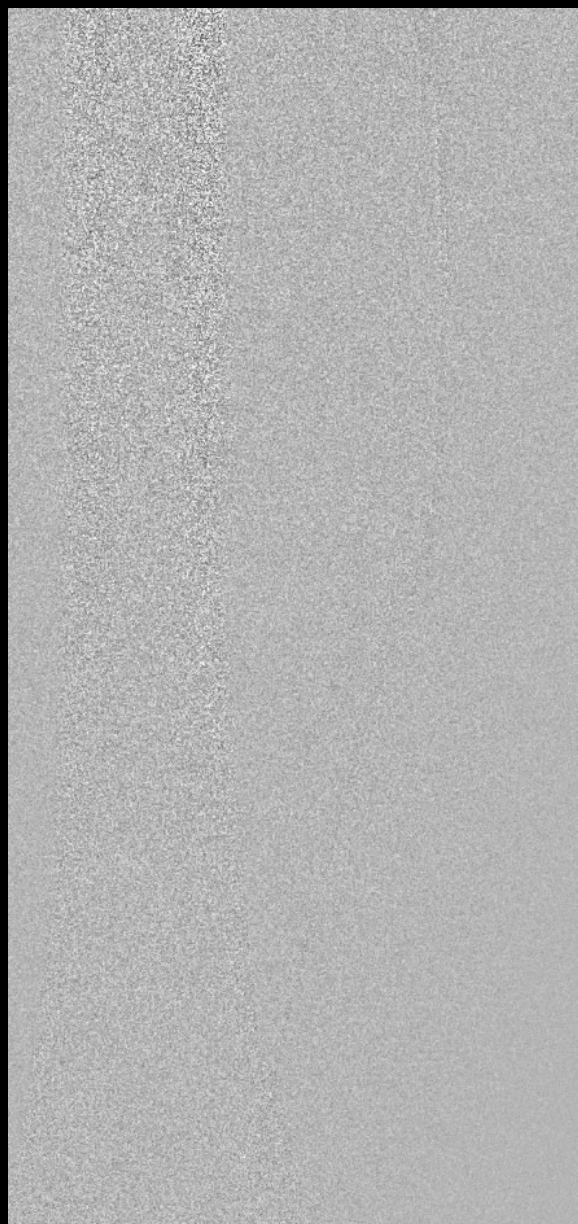






69 yo male obese
Rutherford 4 right
SFA occlusion Ca++
Failure rehabilitation program











70 yo male
Small AAA
Right claudication
Short right SFA occlusion
Failure of the rehabilitation program





67 year old male

Cardiac arrhythmia under long-term anticoagulation therapy

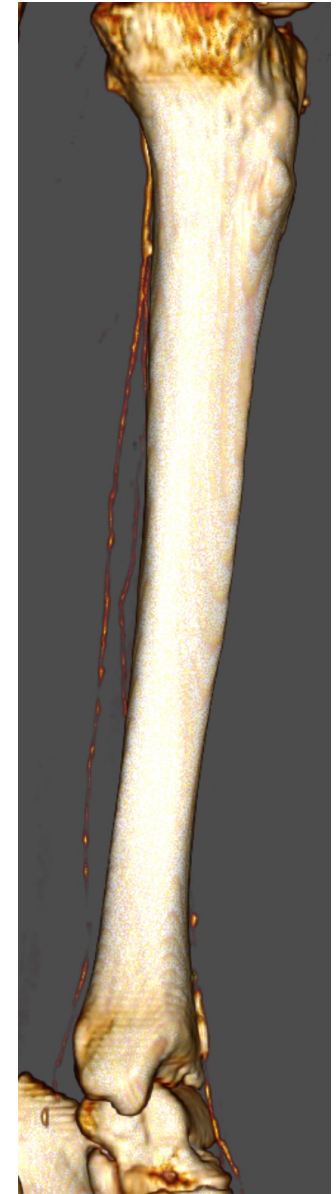
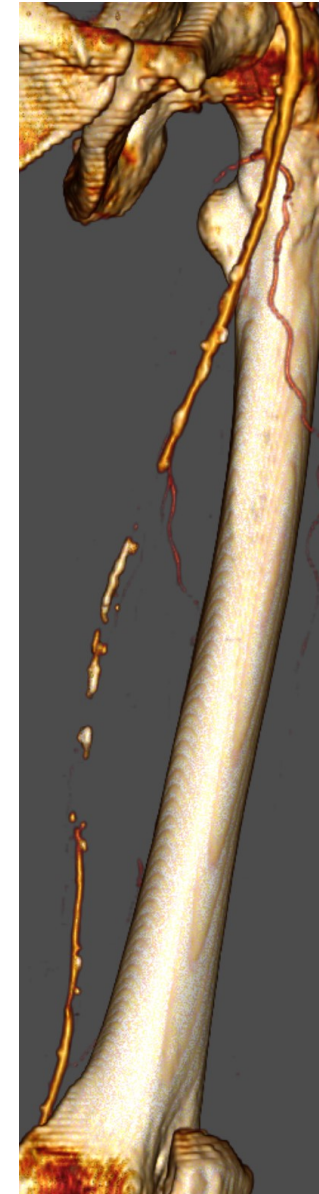
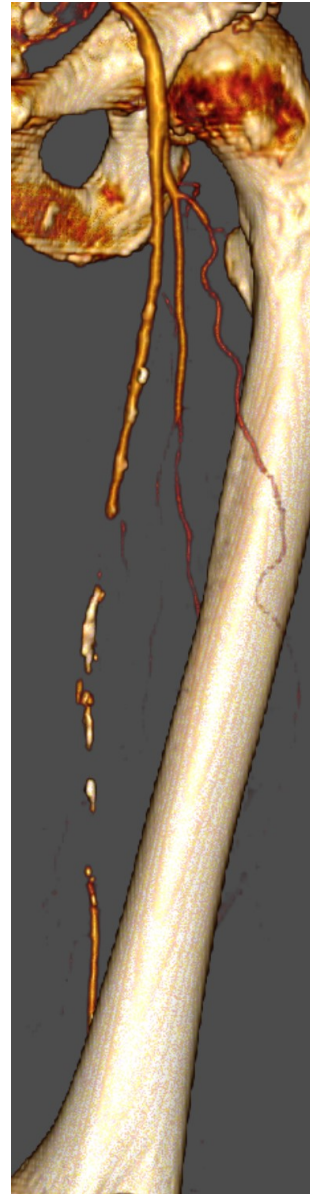
Coronary stenting

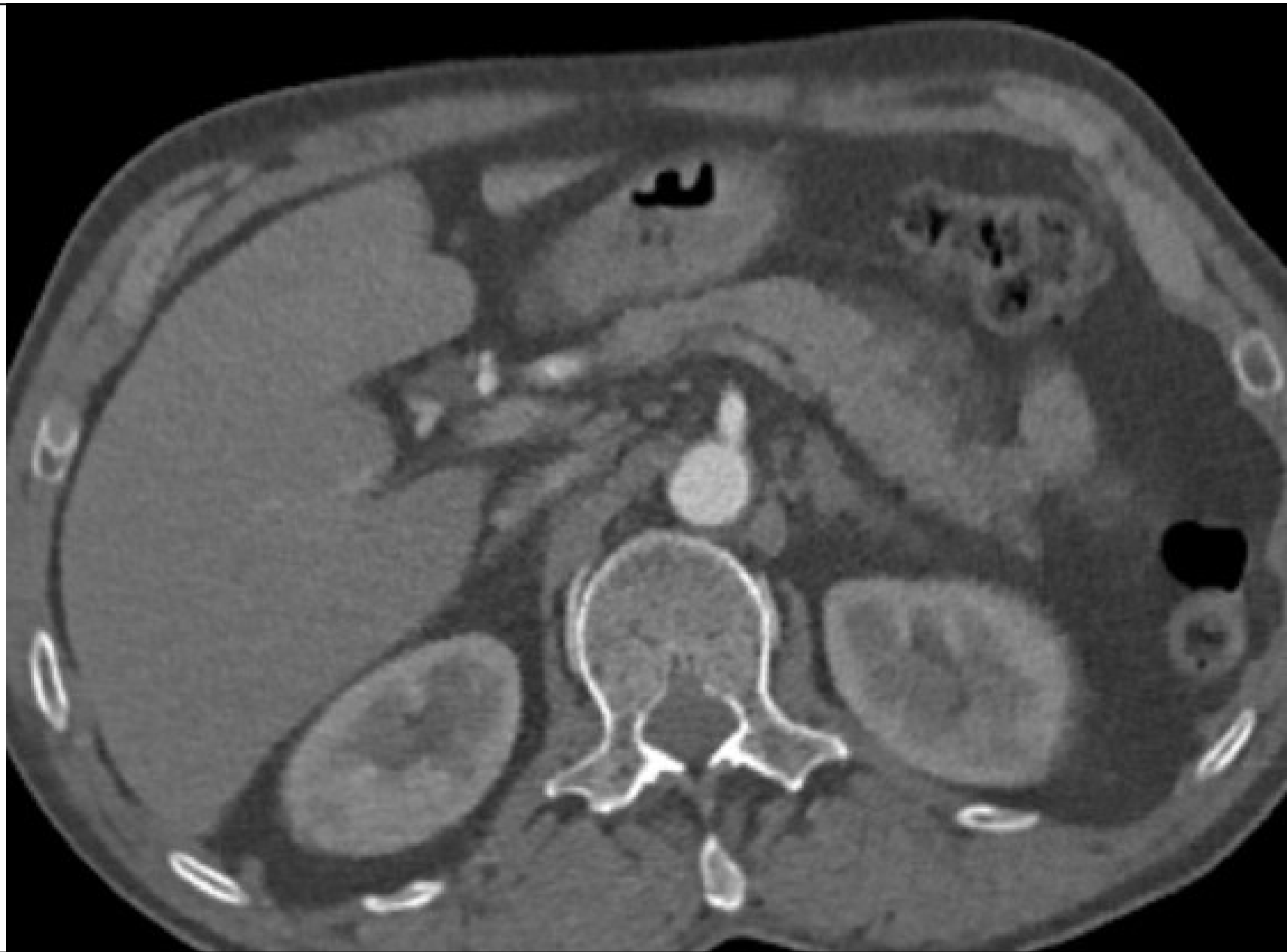
Residual disabling claudication and rest pain on the left side

He had the treatment of the right side 1.5 months ago:

right SFA recanalisation + stenting through contralateral femoral puncture and crossover

Postoperative pain at the puncture







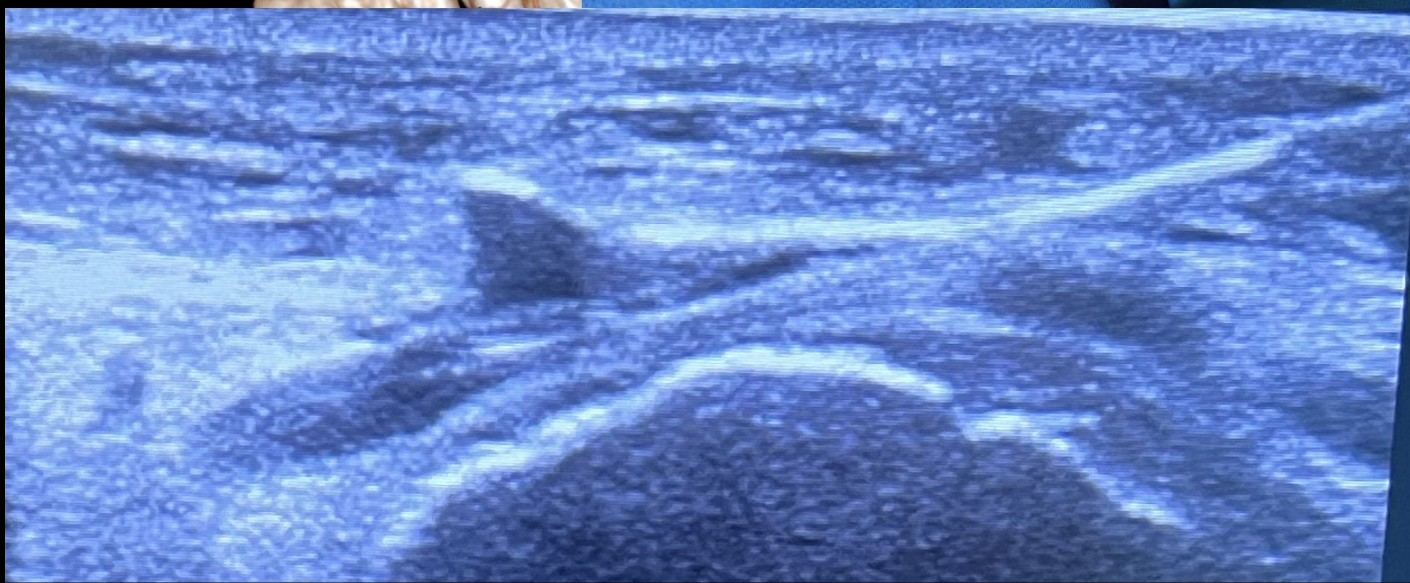
50 limbs / 42 patients

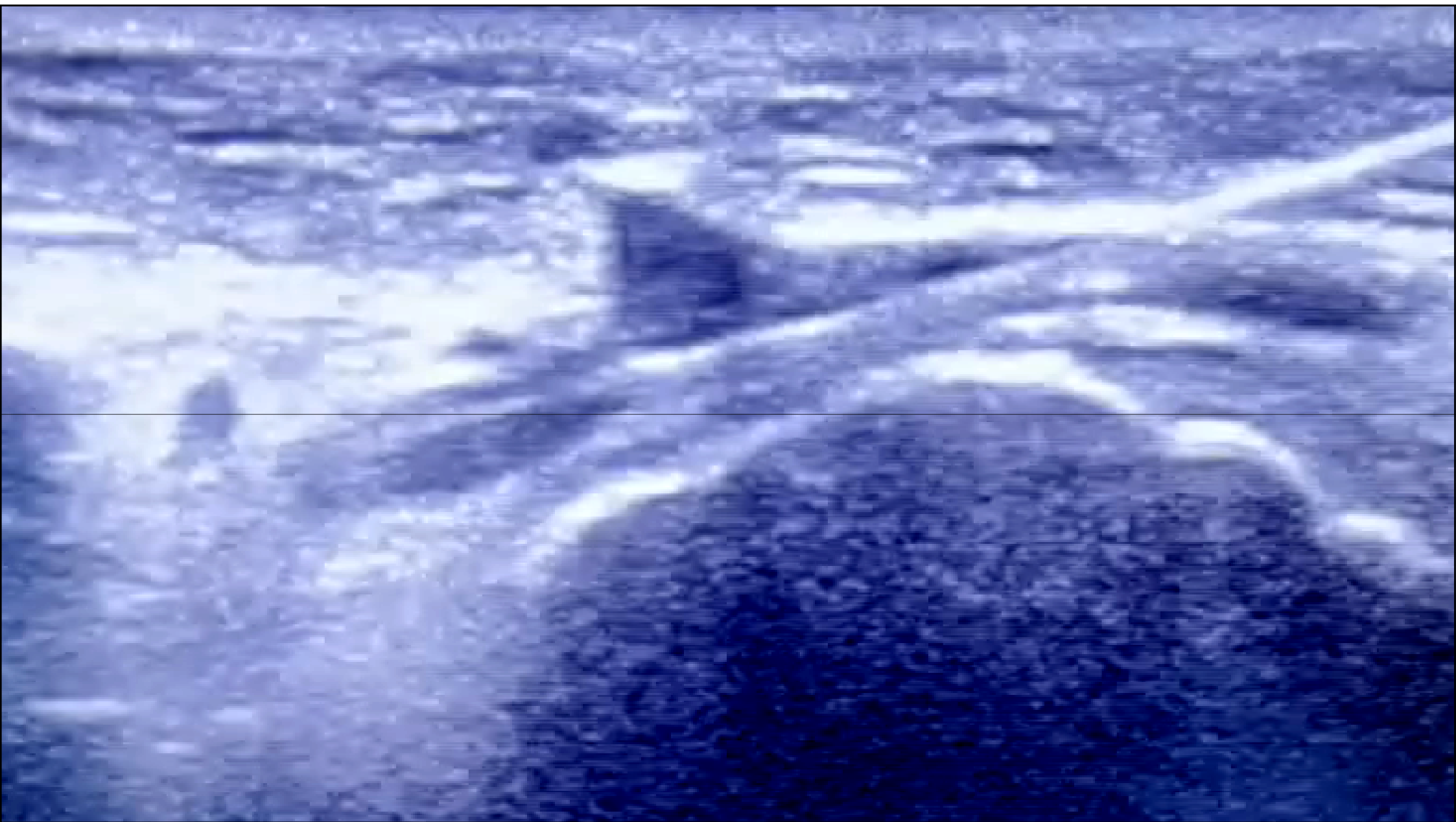
(Aug 2019 – Aug 2022)

AGE (YEAR)	70.5
BMI (KG.M ²)	24.9
MALE (%)	27 (64)
HYPERTENSION (%)	30 (71)
DIABETES (%)	14 (33)
DYSLIPIDEMIA (%)	24 (57)
KIDNEY INSUFFICIENCY (GFR < 60 ML/MIN) (%)	6 (14)
CORONARY ARTERY DISEASE (%)	14 (33)
SMOKING (%)	29 (69)
OUTPATIENT (%)	23 (55)
RUTHERFORD	
3 (%)	26 (52)
4 (%)	11 (22)
5 (%)	13 (26)

HISTORY OF CFA SURGERY (%)	14 (28)
OBESITY (%)	12 (24)
CFA STENT IN PLACE (%)	2 (4)
HISTORY OF KISSING STENT (%)	4 (8)
ELECTIVE (%)	18 (36)

PUNCTURED ARTERY	N (%)
PEDAL ARTERY (%)	15 (30)
POSTERIOR TIBIAL ARTERY (%)	35 (70)
DEVICES	
BARE METAL STENT	40 (80)
DRUG COATED BALLOON	10 (20)
SHEATHS	
4 FR (%)	43 (86)
5 FR (%)	3 (6)
6 FR (%)	4 (8)
MEAN LENGTH (MM)	101.3
CHRONIC TOTAL OCCLUSION	31 (62)
PROCEDURE DATA	
PROCEDURE (TIME MIN)	65.9
FLUOROSCOPY DURATION (MIN)	10.4
IODINATED CONTRAST VOLUME (ML)	39.7
RADIATION DOSE (MGY)	26.3





50 limbs / 42 patients

(Aug 2019 – Aug 2022)

Technical success 100%

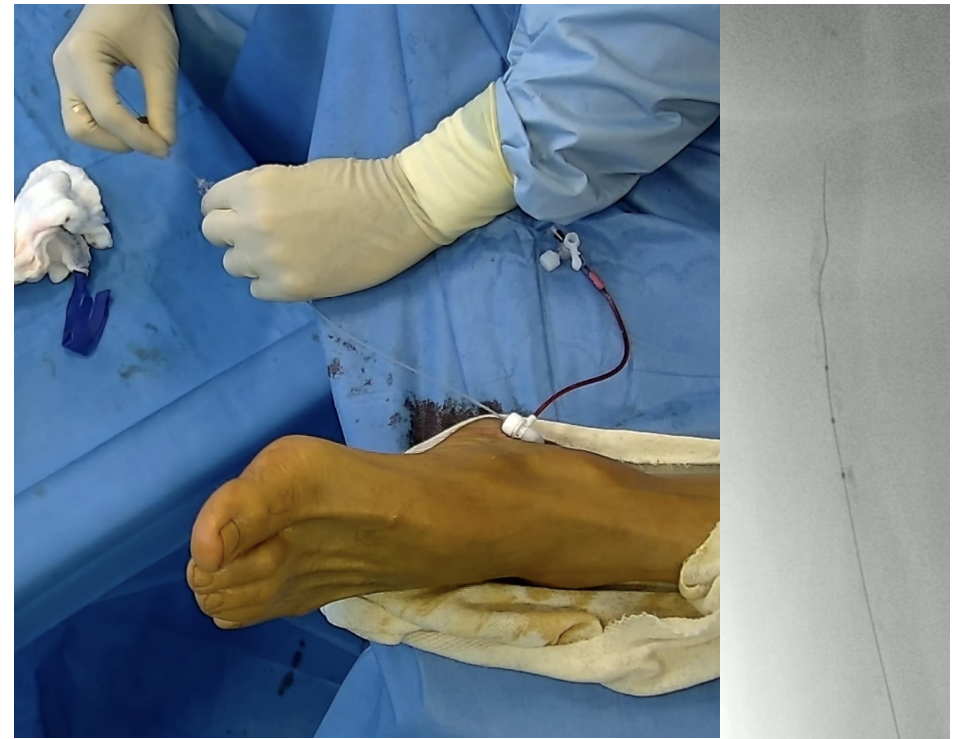
Ambulation possible after 3-6 hours

At 30 days

No complication

Freedom from TLR 98%

Patency of the punctured artery 100%



Single Primary Retrograde Access to Treat Femoro-Popliteal Occlusive Lesions

Maxime Dubosq, MD¹, Régis Renard, MD², Jérémie Jayet, MD, PhD¹, Lucie Mercier, MD¹, Isabelle Javerliat, MD¹, Yves Castier, MD, PhD², Marc Coggia, MD¹, and Raphael Coscas, MD, PhD¹

Abstract
Introduction: The retrograde puncture of a distal artery is considered a bailout procedure in case of anterograde approach failure for peripheral artery disease (PAD) treatment. A single primary retrograde access has been suggested as an efficient and safe option. As scant data are available, we present our results using this approach. **Material and Methods:** Between August 2019 and October 2022, we performed this technique in selected patients with femoro-popliteal PAD. Chronic total occlusions (CTOs) were selected on the basis of the CTOP classification. An ultrasound-guided retrograde puncture of a tibial artery at the ankle level was performed, followed by the preferential use of 4F materials. Hemostasis of the puncture site was obtained using manual compression. Postoperative duplex scan examination systematically included an evaluation of the punctured artery. Demographics, intraoperative, and follow-up data were collected retrospectively. The results are expressed as means with standard deviations and numbers with percentages when appropriate. **Results:** In total, 55 procedures were performed in 46 patients (9 bilateral). Of these, 57% (N=26) were considered at risk for femoral puncture (obesity, history of groin surgery, challenging crossover approach) and 54% (N=25) presented with critical limb-threatening ischemia (CLTI). The TASC-II femoro-popliteal classification was generally B (60%) and also C (33%) or D (7%). Mean lesion length was 105.6±49.4 mm and 65% were CTOs. Most patients were operated in an outpatient setting (N=25; 54%) under potentialized local anesthesia (N=41, 89%). The punctured site was the posterior tibial artery in 73% (N=40). The procedure time was 65.1±25.7 minutes, and the fluoroscopy time was 10.7±8.5 minutes. The technical success rate was 100%. There were no intraoperative complications. All patients could walk the same day. One CLTI patient presented an erysipelas related to the puncture in postoperative period. At 30 days, the primary patency of the treated and the punctured arteries were 98% and 100%, respectively. **Conclusion:** A single primary retrograde access can be used safely to treat femoro-popliteal PAD. It represents a valuable alternative to the femoral puncture and allows fast ambulation. Prospective and long-term studies on larger populations are necessary to confirm our results.

Clinical Impact
This study demonstrates that a single primary retrograde access can be used safely without damaging the punctured artery to treat femoro-popliteal lesions, especially in claudicant patients. Chronic total occlusions can be treated successfully using this technique. This approach represents a valuable alternative to the femoral puncture and allows fast ambulation without risk of major bleeding.

Table 1. Preoperative Demographics and Comorbidities of the 46 Patients (55 Lesions) Treated for Femoro-popliteal Peripheral Artery Disease Using a Single Primary Retrograde Access.

Preoperative data	N=46 patients
Age (years±SD)	70.5 (±10.1)
BMI (kg/m ² ±SD)	25 (±4.5)
Male (N, %)	27 (59)
Hypertension (N, %)	34 (74)
Diabetes (N, %)	15 (33)
Dyslipidemia (N, %)	27 (59)
Kidney insufficiency (GFR <60 mL/min) (N, %)	6 (13)
Coronary artery disease (N, %)	16 (35)
Smoking (N, %)	32 (70)
Outpatient (N, %)	25 (54)
Indication for single primary retrograde access	
Obesity (%)	12 (26)
History of groin surgery (%)	10 (22)
History of kissing iliac stents (%)	3 (7)
Stent in place in the common femoral artery (%)	1 (2)
Elective (%)	20 (43)
Rutherford category	
3 (N, %)	30 (55)
4 (N, %)	11 (20)
5 (N, %)	14 (25)
CTOP classification ^a	
C-TOP II	56 (20)
C-TOP III	8 (3)
C-TOP IV	36 (13)

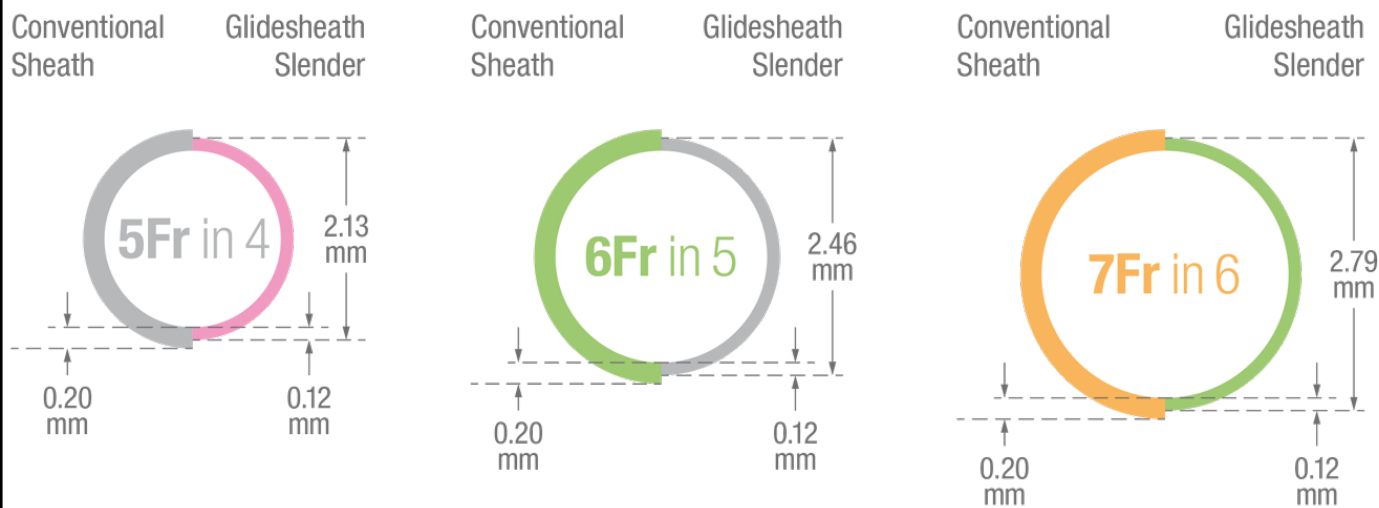
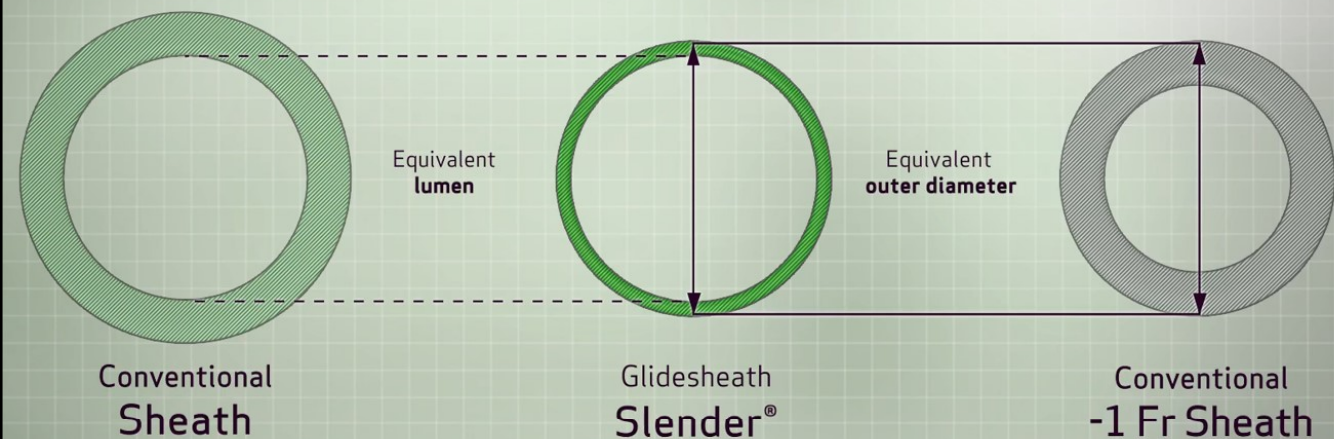
Abbreviations: BMI, body mass index; GFR, glomerular filtration rate; N, numbers; SD, standard deviation.
^aCTOP classification rates calculated on the basis of 36 chronic total occlusions among the 55 lesions treated.

Table 2. Procedural Data of the 46 Patients (55 Lesions) Treated for Femoro-popliteal Peripheral Artery Disease Using a Single Primary Retrograde Access.

Procedural data	N=55 treated limbs
Mean length (mm±SD)	105.6 (±49.4)
Chronic total occlusion (N, %)	36 (65)
Punctured artery	
Posterior tibial artery (N, %)	40 (73)
Pedal artery (N, %)	15 (27)
Sheaths	
4F (N, %)	48 (87)
5F (N, %)	3 (5)
6F (N, %)	4(8)
Anti-restenotic devices	
Bare metal stent (N, %)	48 (87)
Drug-coated balloon (N, %)	5 (9)
Covered stent (N, %)	2 (4)
Procedure data	
Procedure duration (min±SD)	65.1 (±25.7)
Fluoroscopy time (min±SD)	10.7 (±8.5)
Iodinated contrast volume (mL±SD)	41.3 (±30)
Radiation dose (mGy±SD)	21.6 (±29)

Abbreviations: N, numbers; SD, standard deviation.

Thin-wall technology



Take Home Messages

The primarily distal retrograde approach is safe and efficient to treat selected fempop lesions in patients at risk (or not) for femoral puncture

Can be used in a same-day discharge strategy

Improves patient comfort (no compression bandage, no strict supine position) without vascular closure device

This approach should be always discussed as the possible main puncture site when planning a peripheral procedure

