My most difficult cases as a consultant and the lessons I have learned

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Starting Consultant

- I misjudged the case
- My trainee made a mistake
- My boss already made a plan
- We did everything right but it didn’t work

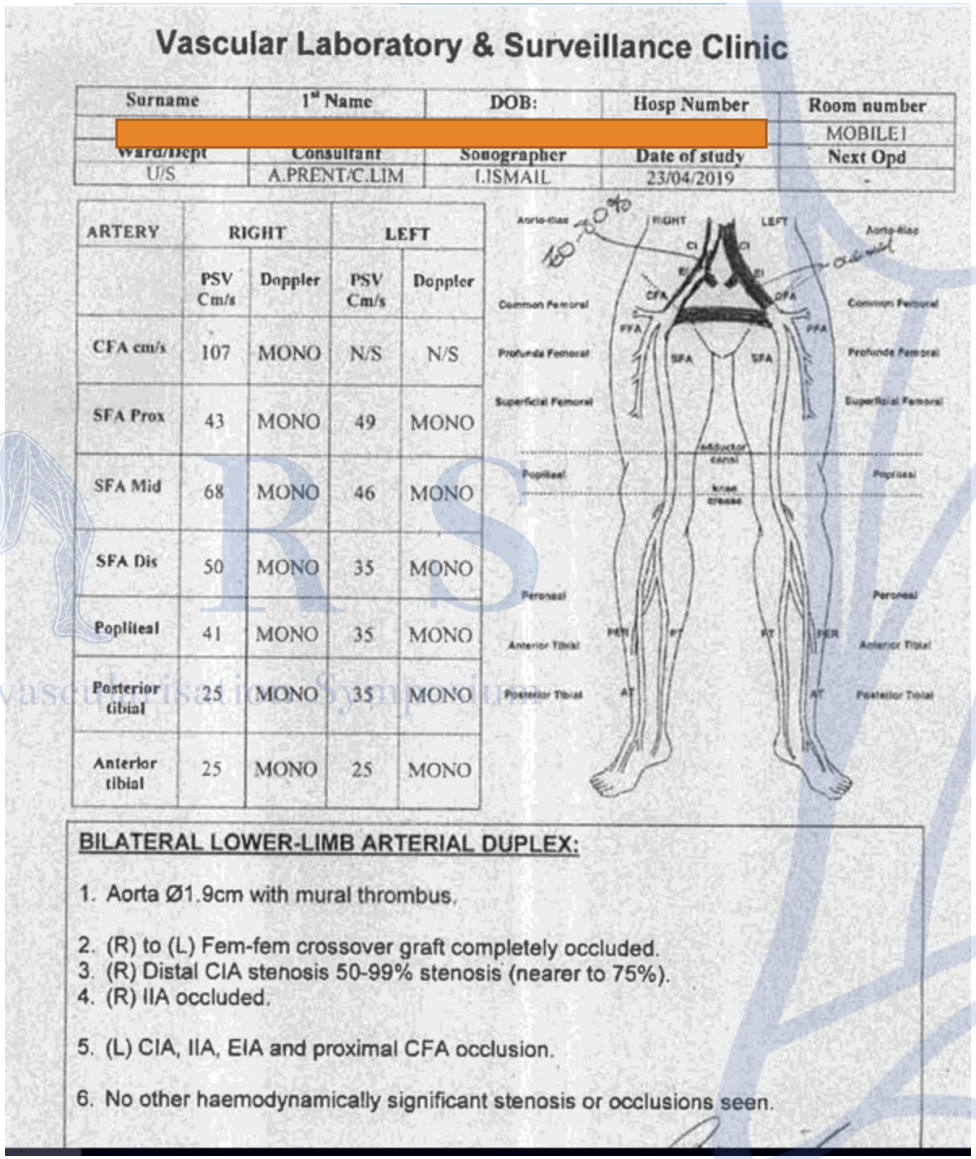
Case KP Royal Free 2019

- Mr KP
- 62 years old
- MH:
  - ST depressions on ECG → cardiac review
  - Previous fem-fem crossover R → L
  - HTN
  - Rheumatoid arthritis

CASE KP

- Returned with increase of IC
- Walking distance 50 yards
- Quit smoking

- No pulses in the groin
- EAI 0.50 right and 0.24 left
- Duplex



Vascular Laboratory & Surveillance Clinic

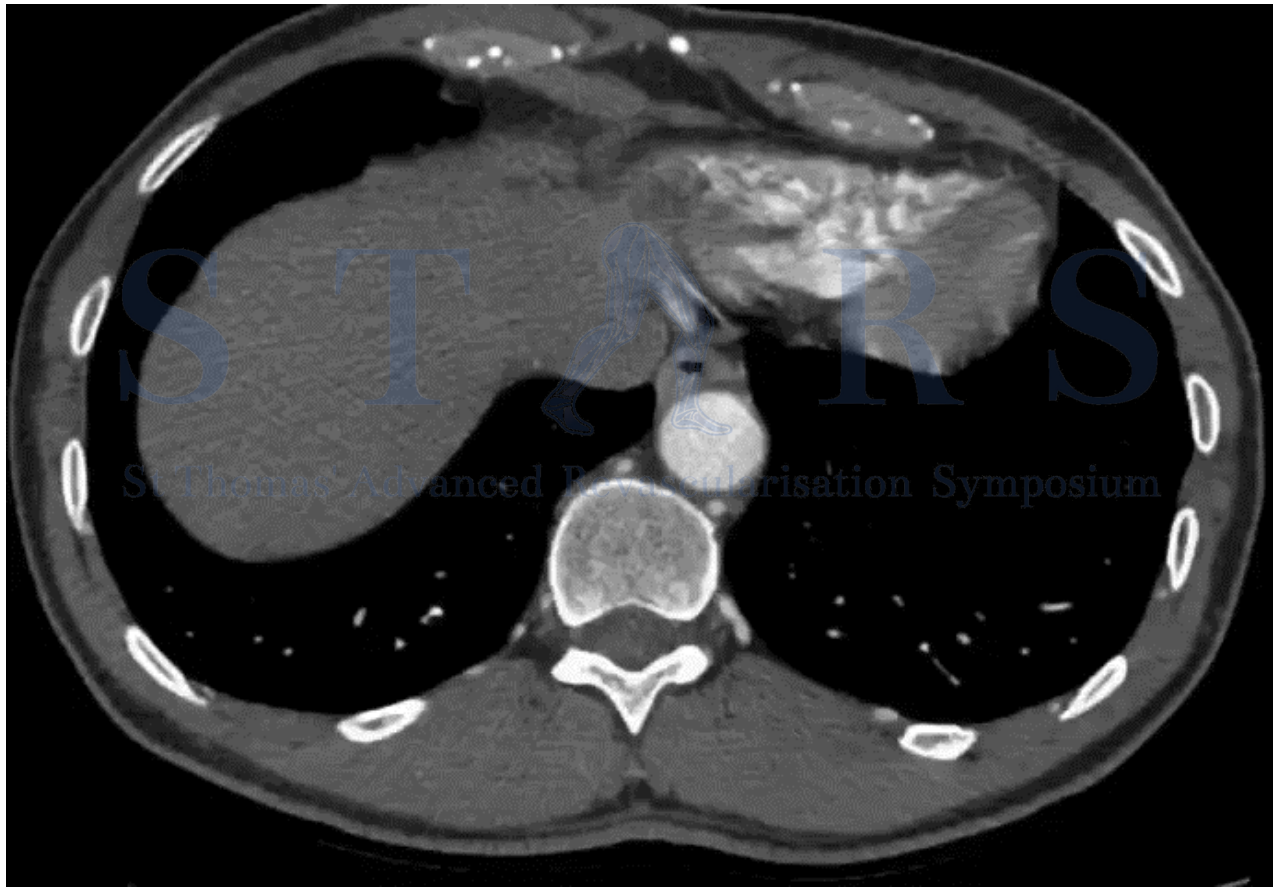
Surname	1st Name	DOB:	Hosp Number	Room number
[redacted]				MOBILE1
Ward/Dept	Consultant	Sonographer	Date of study	Next Opd
U/S	A.PRENT/C.LIM	I.ISMAIL	23/04/2019	-

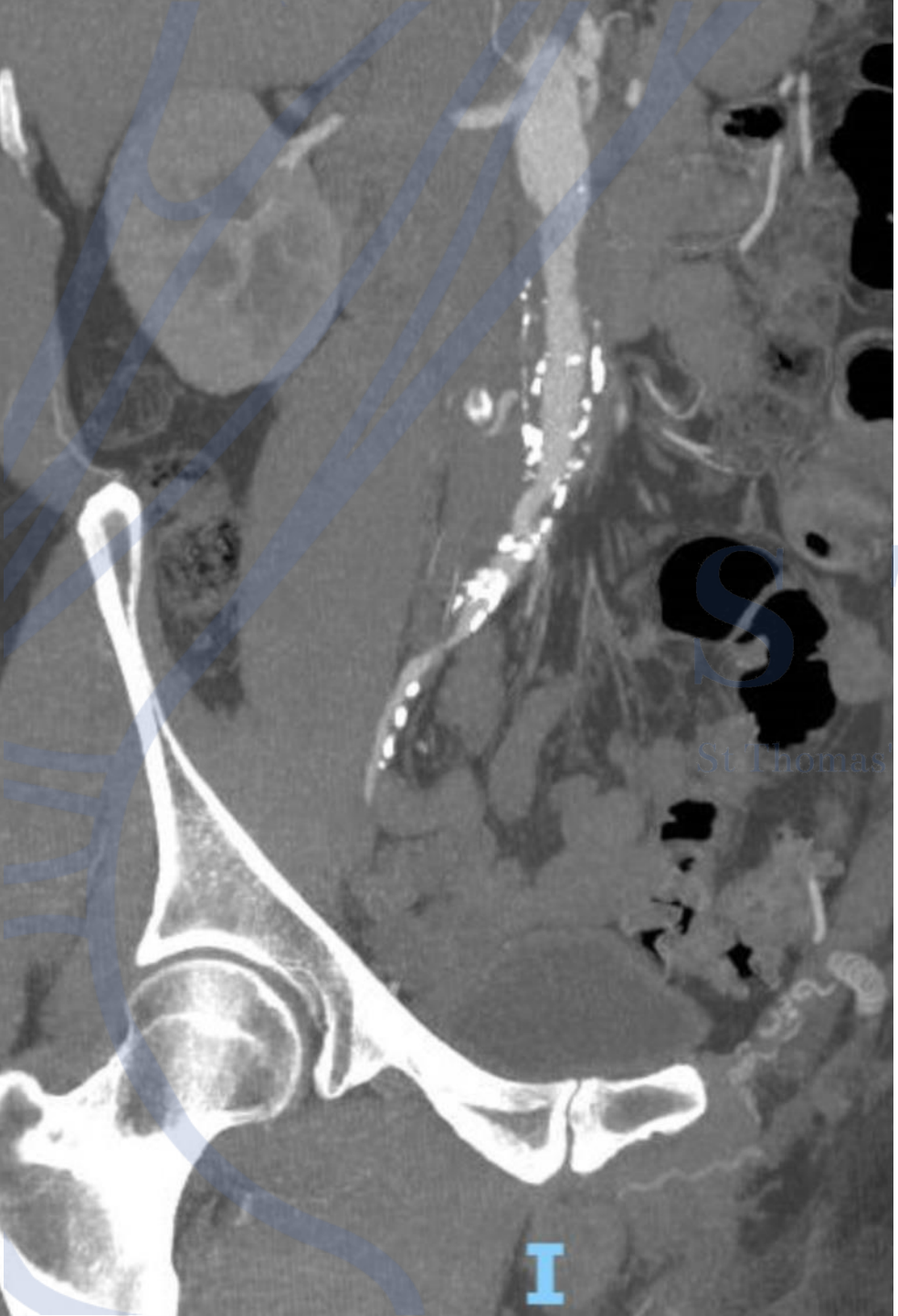
ARTERY	RIGHT		LEFT	
	PSV Cm/s	Doppler	PSV Cm/s	Doppler
CFA cm/s	107	MONO	N/S	N/S
SFA Prox	43	MONO	49	MONO
SFA Mid	68	MONO	46	MONO
SFA Dis	50	MONO	35	MONO
Popliteal	41	MONO	35	MONO
Posterior tibial	25	MONO	35	MONO
Anterior tibial	25	MONO	25	MONO

BILATERAL LOWER-LIMB ARTERIAL DUPLEX:

1. Aorta Ø1.9cm with mural thrombus.
2. (R) to (L) Fem-fem crossover graft completely occluded.
3. (R) Distal CIA stenosis 50-99% stenosis (nearer to 75%).
4. (R) IIA occluded.
5. (L) CIA, IIA, EIA and proximal CFA occlusion.
6. No other haemodynamically significant stenosis or occlusions seen.

CTA





CTA

- 1 cm below renal arteries circular thrombus
- Narrow lumen
- Occlusion L CIA/ EIA
- Sign stenosis R CIA, EIA, IIA occluded
- Occluded fem-fem X-over
- Good outflow

MDT

- Fontaine IIb bilat

- Plan:
  - Bilateral TEA of AFC
  - Take out fem-fem crossover
  - Endo reconstruction

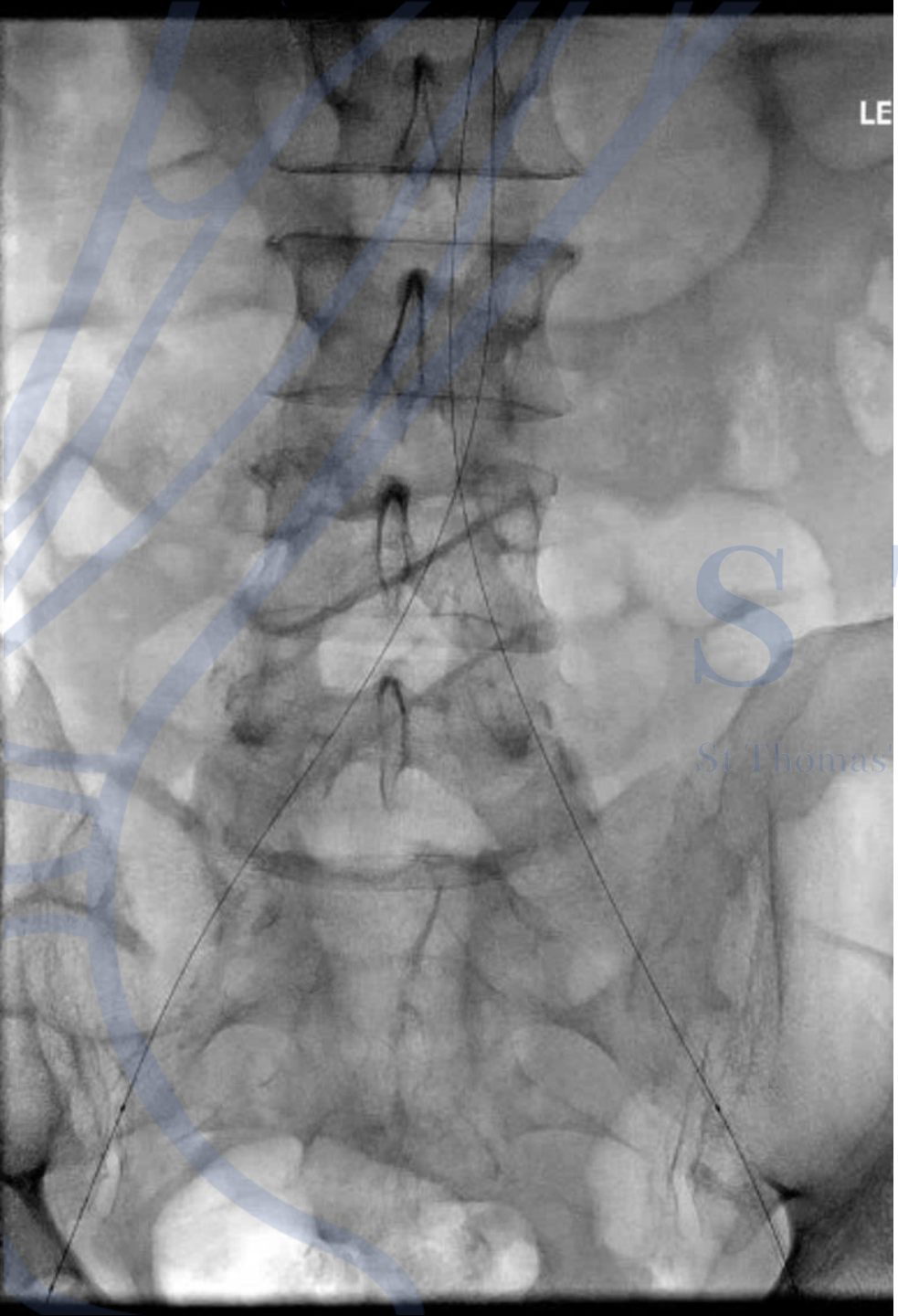
PeripheralVascular MDT

Royal Free London NHS
NHS Foundation Trust

Date of MDT:	03/10/2019	**Site:**	RFH	**Ref Trust**	
Name:	Planner, Keith 11/8/1957			**Responsible Clinician:**	Davis
Hospital number or NHS Number:	50126746 4567537084			**Referring Consultant:**	saucedo
Clinical Details:	pain after walking 40 paces bilaterally previous fem [redacted] ccluded Quit smoking 2 weeks ago BMT -yes ?Offer aortobifem...(no assessment of cardiac status)				
Lab Results:	C Reactive Protein 03/10/19 1 Creatinine 03/10/19 67 eGFR (MDRD) 03/10/19 >90 Hb 03/10/19 149 Neutrophils 03/10/19 6.29 WBC 03/10/19 9.46				
Imaging Reviewed:	CT and Duplex 17/02/2019				
Outcome of MDT:	Findings: CT (Feb 19) aorta extensive atheroma, LCIA occluded, RCIA some stenosis, Occluded F-F cross over, SFA patent, 3 vessel run offSuggestion: Cardiology review (as ST depression on rest ECG) ExABPIRe discuss before surgery				
Actioned By:	meryldavis@nhs.net on behalf of Davis				
'If you have any queries or concerns re above please contact: r.vascularadmin@nhs.net or +44 (0) 2078302163'					

OP 16-12-2019

- Bilateral 5fr sheaths through the patch
- On the right: 0.035 glidewire (Terumo) and a ber catheter into aorta
- Pigtail
- Angio



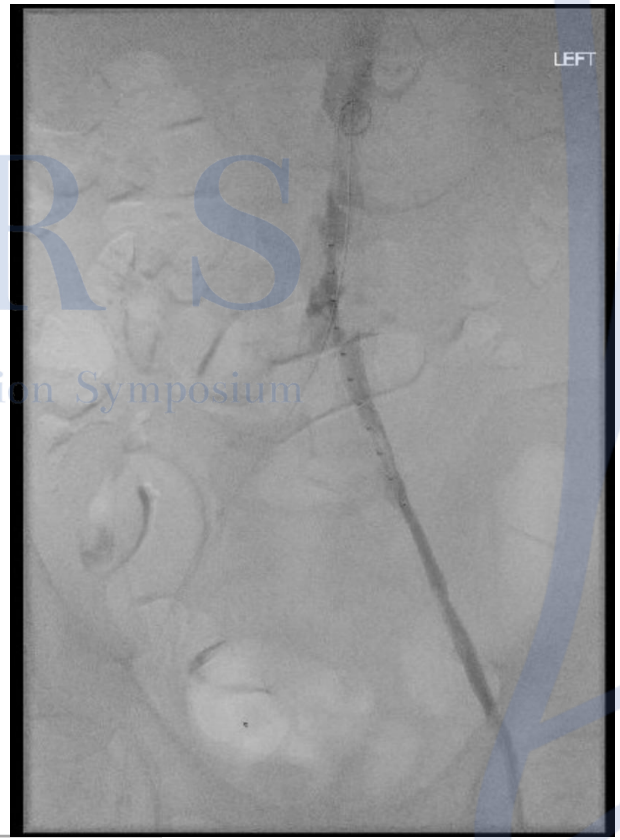
Recanalization

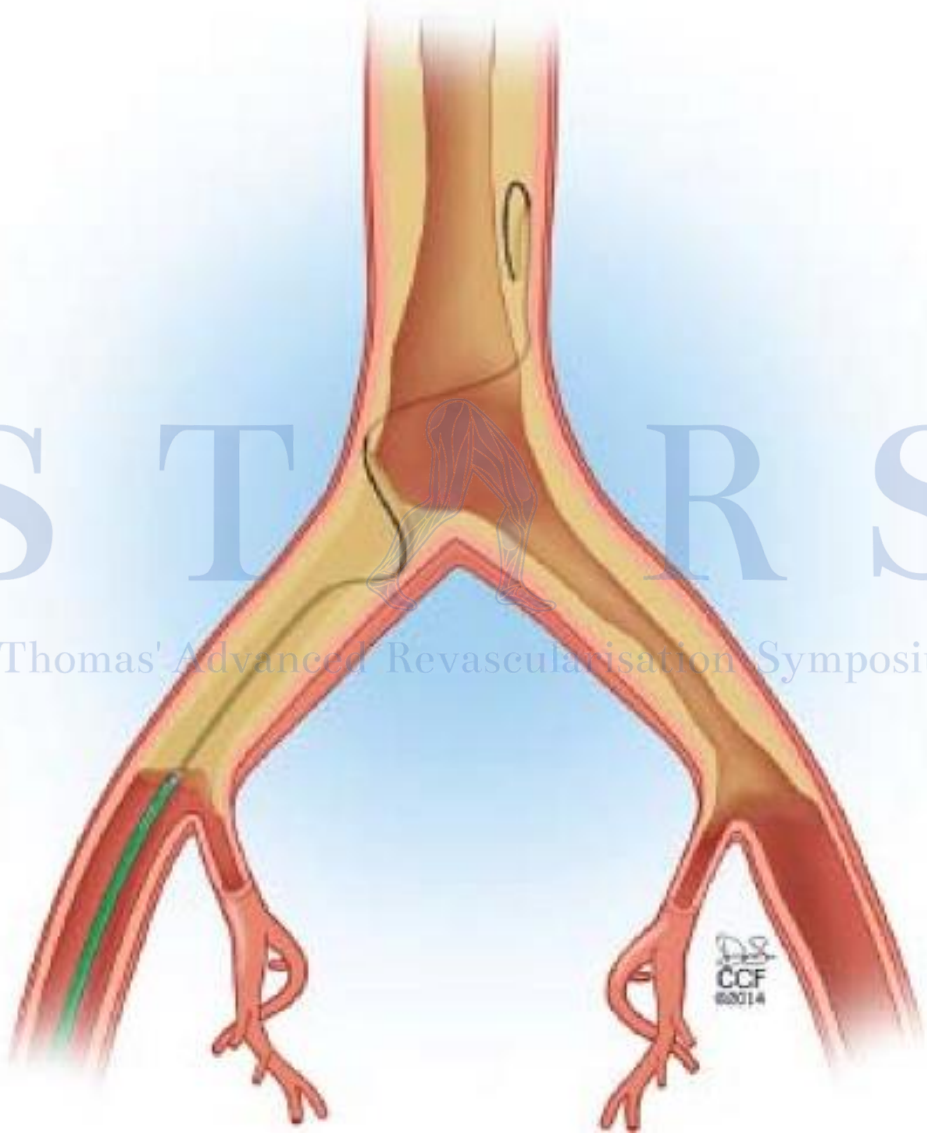
- On the left
- Ipsilateral retrograde recanalization
- Subintimal
- Vert + angled terumo 0.035

- SUCCES

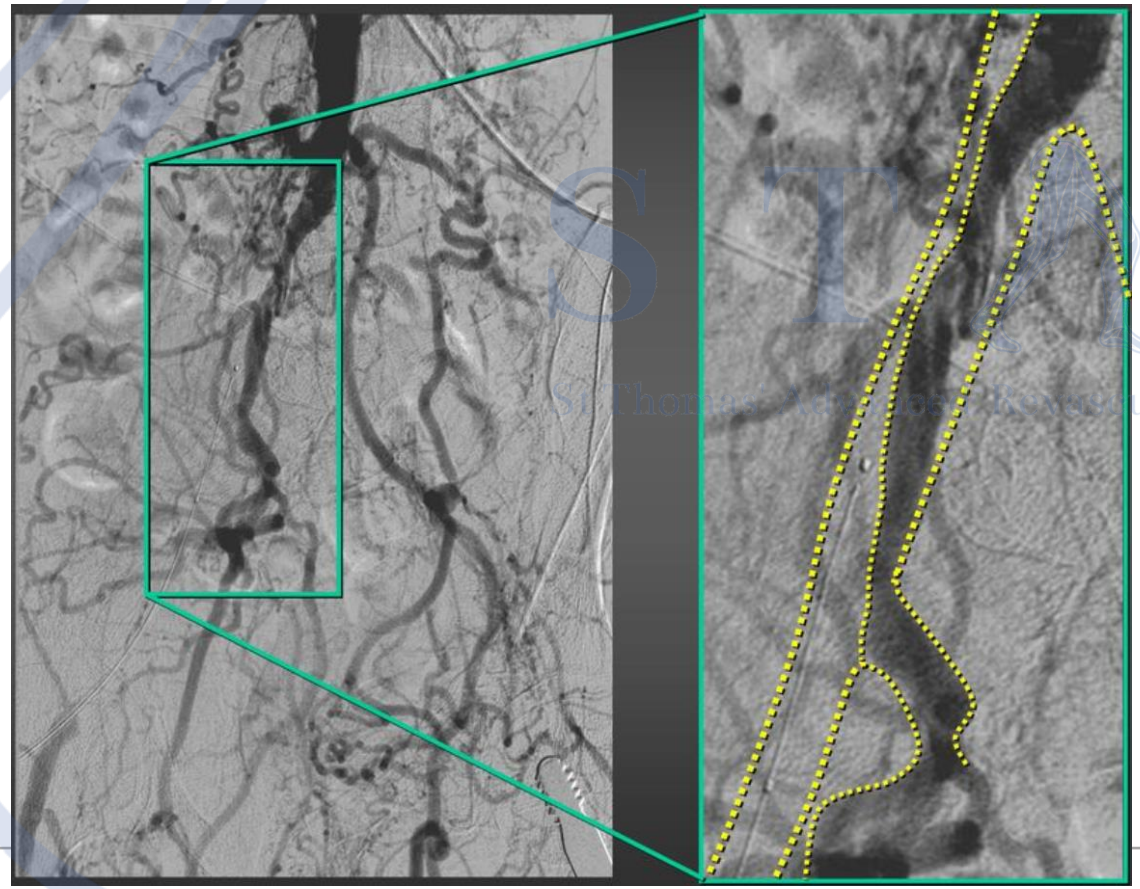
- Difficulty to determine back in true lumen

Angio: Difficulty to determine which point we enter true lumen





Difficulty to re-enter true lumen



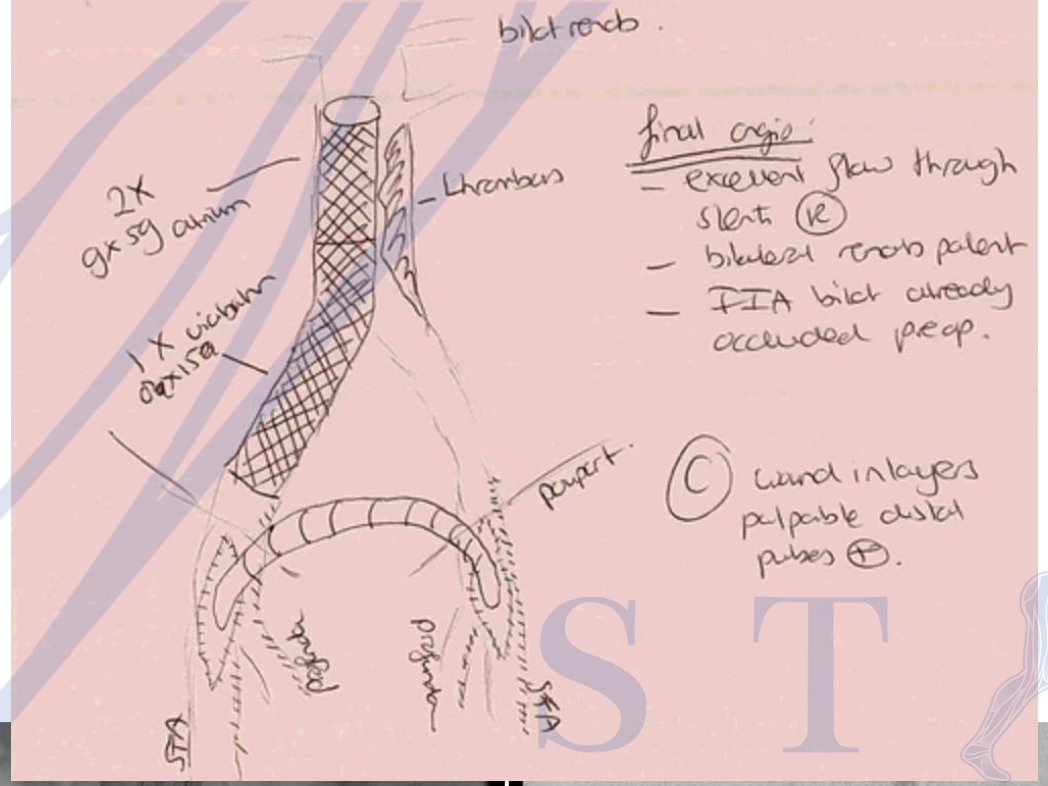
Retrograde approach Challenges

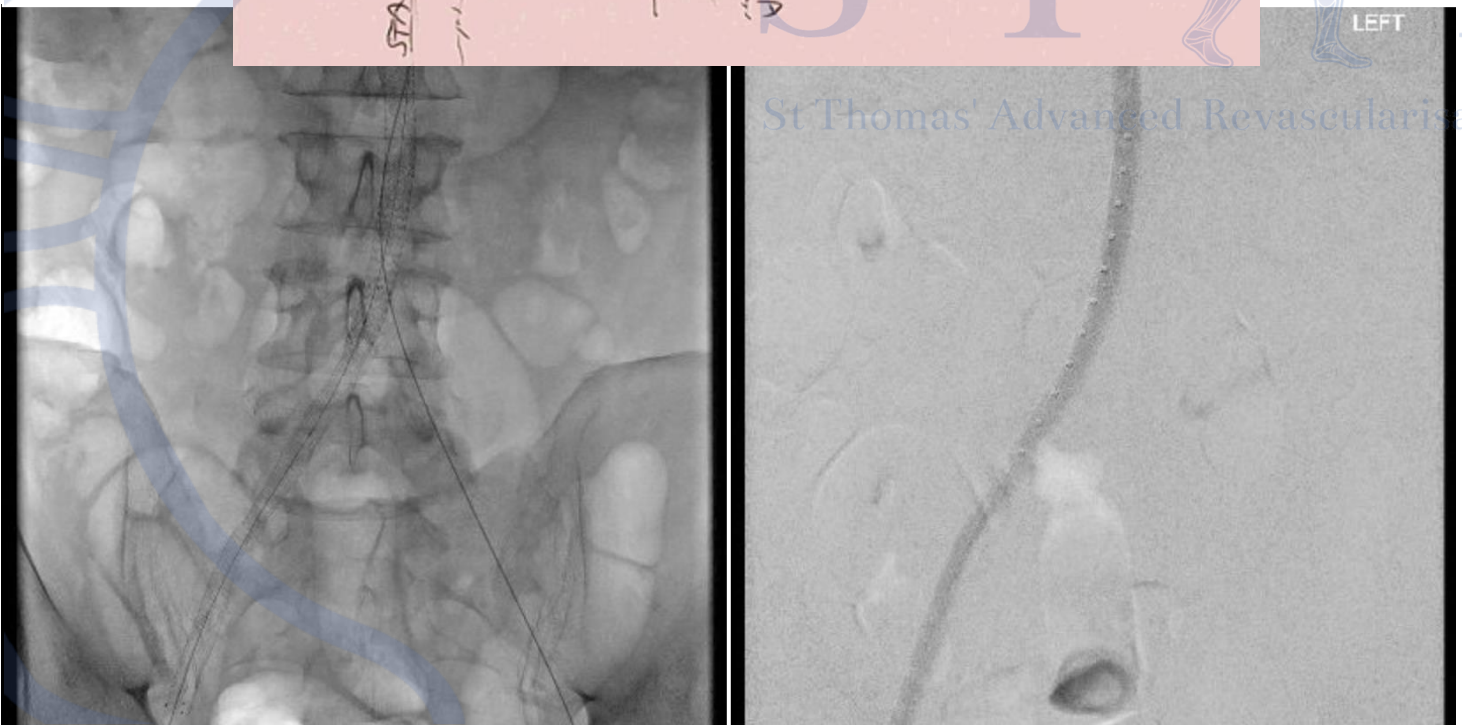
More difficult arterial puncture it is distal to the occluded segment

It can be difficult or impossible to navigate the guidewire intraluminally with consequent dissection

The region of the aortic bifurcation can be extremely difficult to reenter from the subintimal space into the true lumen

This has been described as one of the most common reason for failure of an iliac revascularisation





What I did

- New angio to confirm the right side
- Ask another consultant what to do

- Plan:
  - Stent the right from renal down
  - New fem-fem crossover

FU duplex

- Feb 2020

Exam date: **Feb 20 2020 10:28** Accession no: **RAP00031221511**

31221511 20/02/2020 US Doppler Both Leg Arteries

Examination: Arterial duplex ultrasound

Comments:

Aorto (R) iliac stent is patent throughout with good tri/biphasic Doppler waveforms.
(R) to (L) FEM-FEM cr
triphasic Doppler wave
(L) SFA patent through
systolic velocity of 113
seen in the ATA, PTA

Ibrahim Ismail

- Feb 2021

Exam date: **Feb 08 2021 11:43** Accession no: **RAP00031327888**

31327888 08/02/2021 US Doppler Both Leg Arteries

Examination: Arterial duplex ultrasound

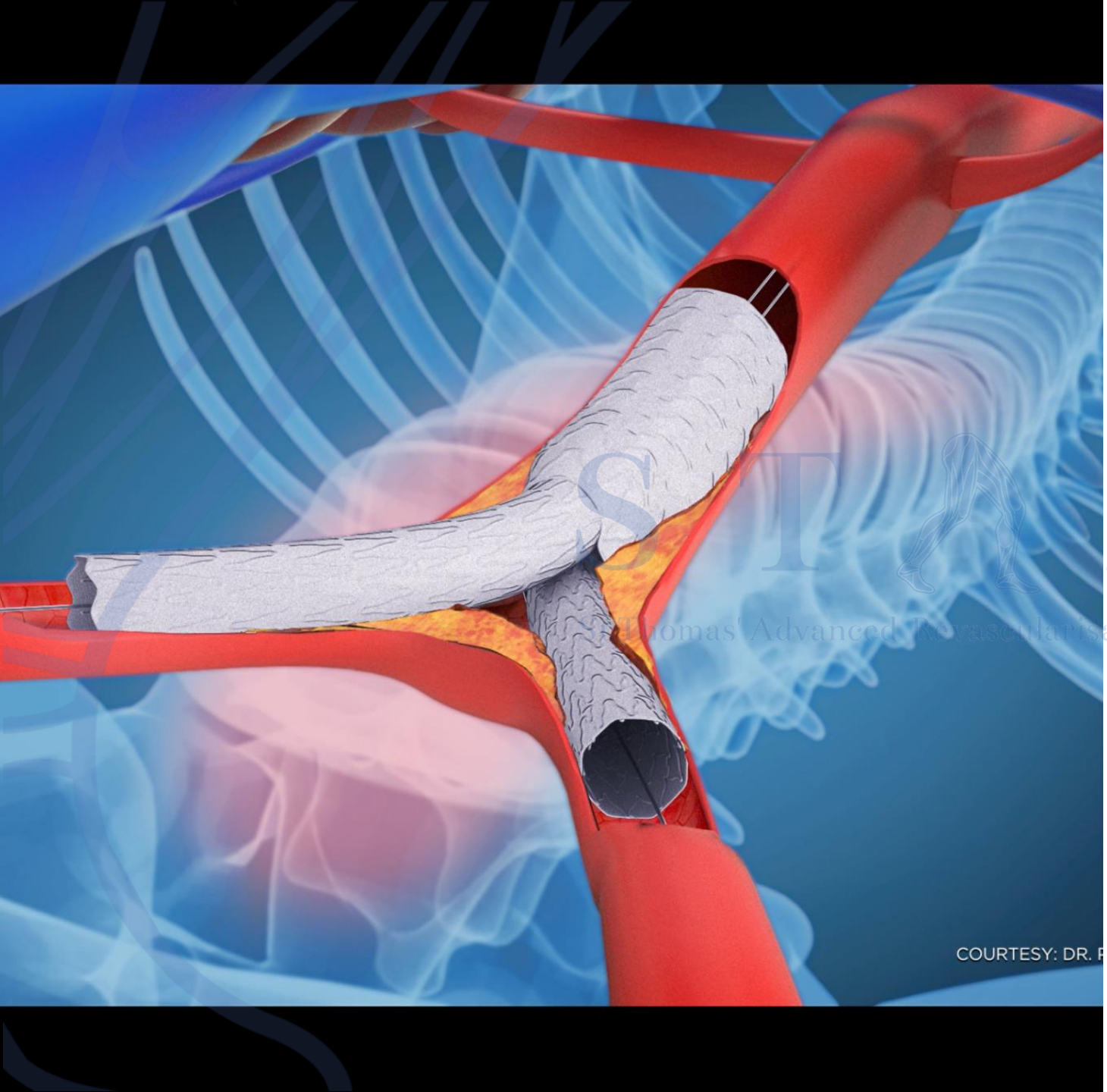
Comments:

Duplex ultrasound surveillance scan consistent with duplex ultrasound scan(20/02/2020.

Aorto (R) iliac stent is patent throughout with good biphasic Doppler waveforms.
(R) to (L) FEM-FEM cross-over bypass graft also appears patent with mid graft triphasic Doppler waveforms and a PSV of 139 cm/sec.
(L) SFA patent throughout with mild disease. (L) distal SFA demonstrate a peak systolic velocity of 81 cm/sec with biphasic Doppler waveforms. Good arterial flow seen in the ATA, PTA and PERO A bilaterally.

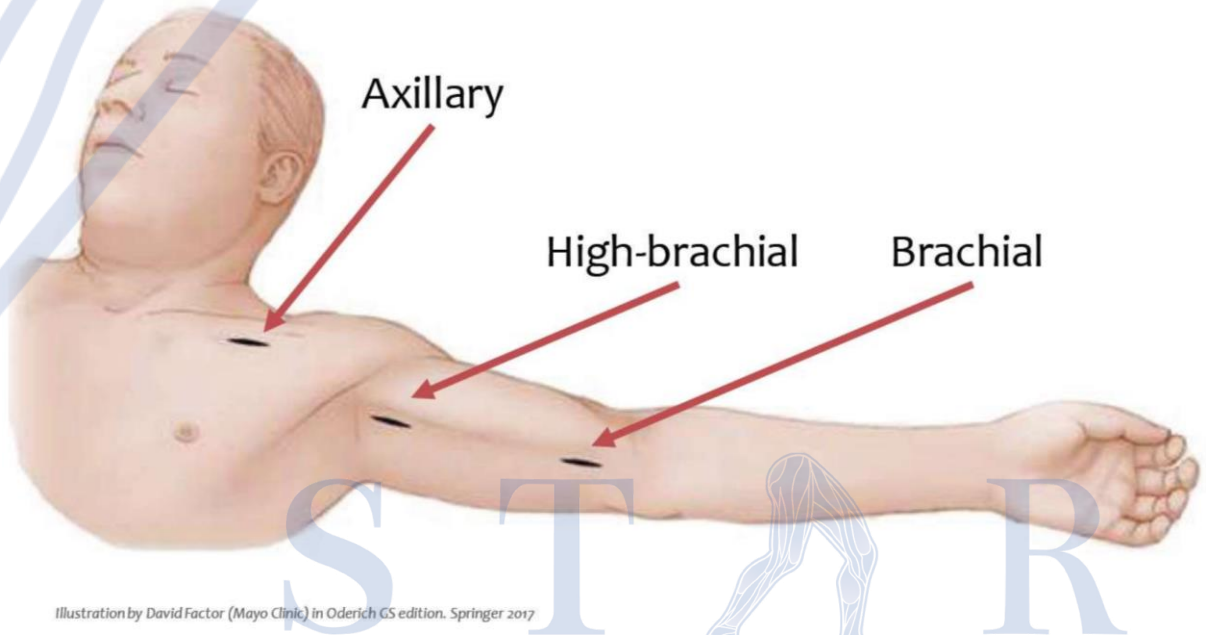
Ibrahim Ismail
Vascular Technologist

What I should have done



What I should have done 1

- Change Original plan
- CERAB



What I should have done 2

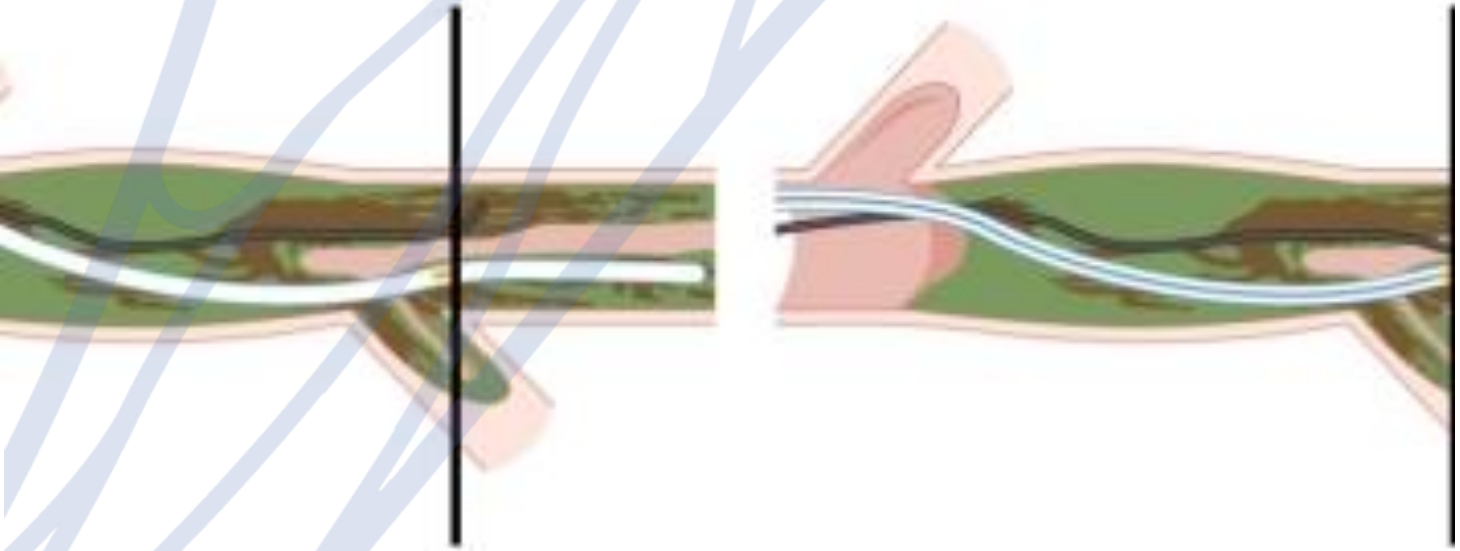
- Change Access Point
- Brachial approach

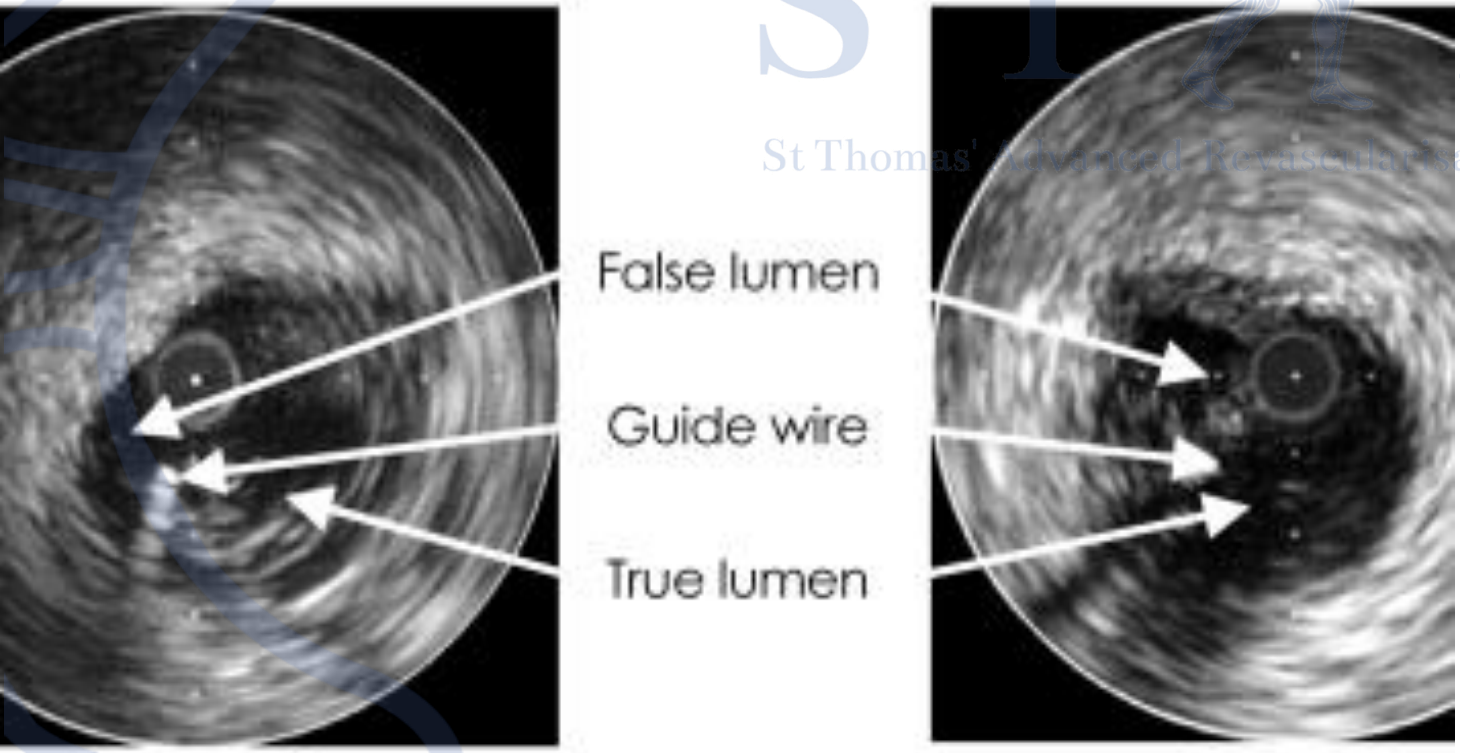
Trans-brachial approach technique

- Left to avoid crossing of the aortic arch to have more direct access to the descending aorta
- Percutaneous puncture of the brachial artery with a 4-Fr micopuncture
- Place 5fr sheath
- Navigation the wire into the descending aorta with support of a 5-Fr pig-tail
- A 90cm long 6-Fr sheath is placed over a rosen wire with the tip directly engaging the stump of the occlusion
- 0.035-inch Glidewire (Terumo) and diagnostic catheter (Ber, MP, Vert etc)

Brachial access

- Reduces the risk of creating or extending an aortic dissection
- Provides high support and pushability
- Often easier break through distal true lumen





What I should have done 3

- Technology
- IVUS
- Re-entry devices

Case GV MUMC 2022

- MR GV
- 68 years old
- MH:
  - TIA
  - Hypercholesteremia
  - Osteomyelitis after femur fracture
  - 2015 PTA +stent AFS left
  - Alcoholic

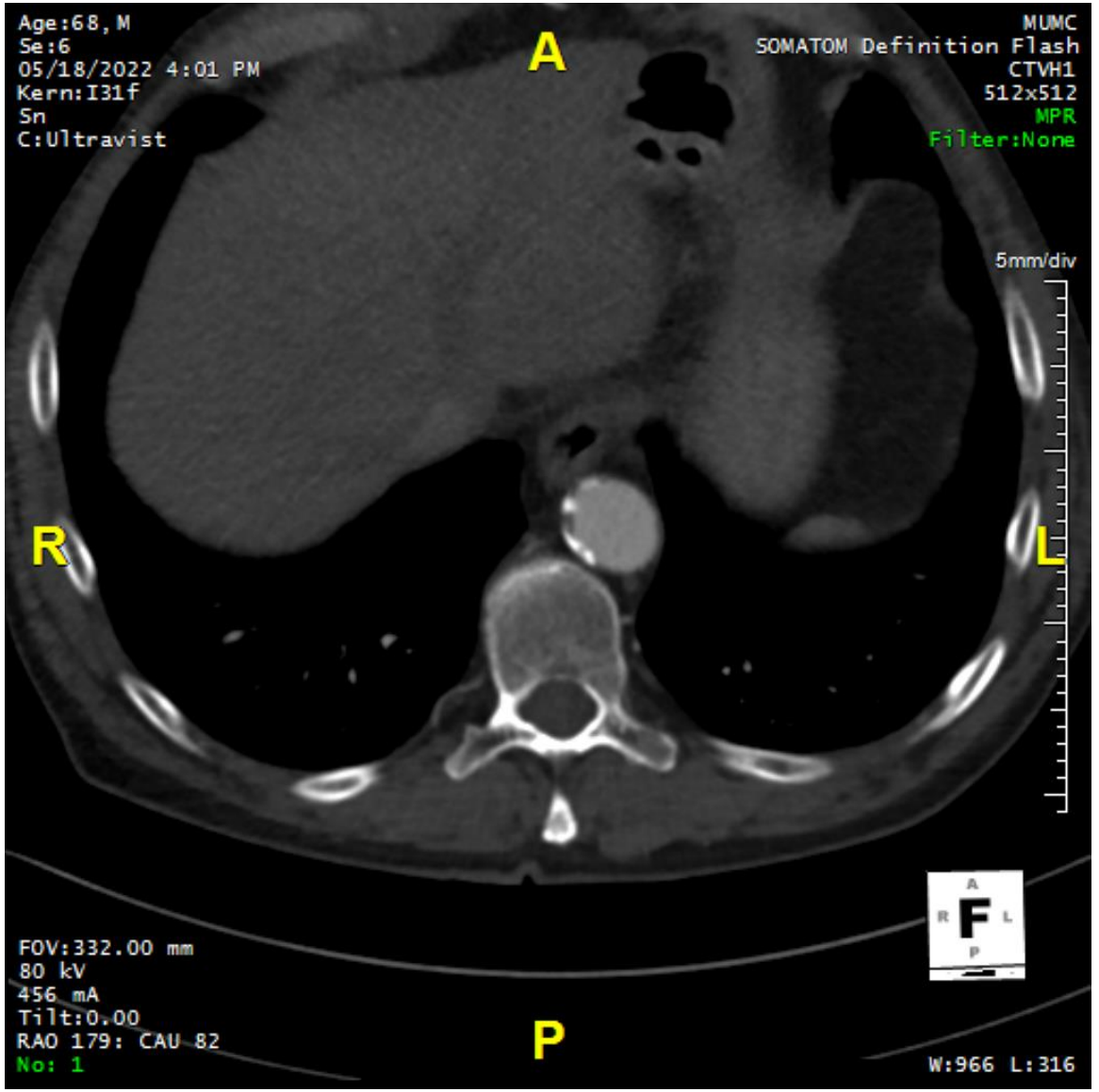
Case GV

- Seen in OP in May 2022
- Pain right leg
- Wounds of the hallux and calf

- No distal palpable pulses
- EAI: 0.16 right 0.63 left
- X-ray no signs of osteomyelitis

CTA

- Left
  - Stenosis AIC/ AIE
  - Stenosis AFS stent occlusion
- Right
  - AIC occlusion
  - AIE sign stenoses
  - AFC near occlusion
  - AFS occlusion



MDT

- Fontaine IV right
- Left no symptoms

- Plan:
  - TEA AFC bdz
  - CERAB
  - fem- tib post bypass R

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VAATBESPREKING
Daemen/Prent/Snoeijs/Mees/Peppelenbosch/Wouda/deHaan/Brans
Conclusie:
F4 rechts, links geen klachten

CTA:
Rechts:
origostenose/occlusie AIC, AIE stenosen, nearocclusion AFC, occlusie AFS
tot distale AP, uitgebreide crurale stenosen proximaal, occlusie distaal
ATA, ATP en Fib open distaal

Links:
origo stenose AIC, multiple stenose AIE, multiple stenose AFS/occlusie
stent, reinjectie distaal, AP stenosen, crurale vaten tot distaal

Advies:
TEA AFC bdz, CERAB, fem- tib post bypass R
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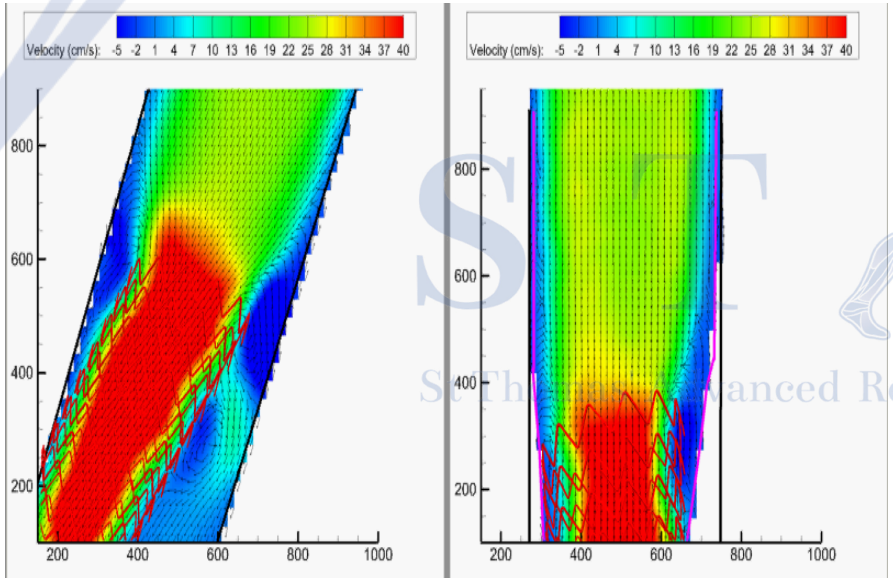
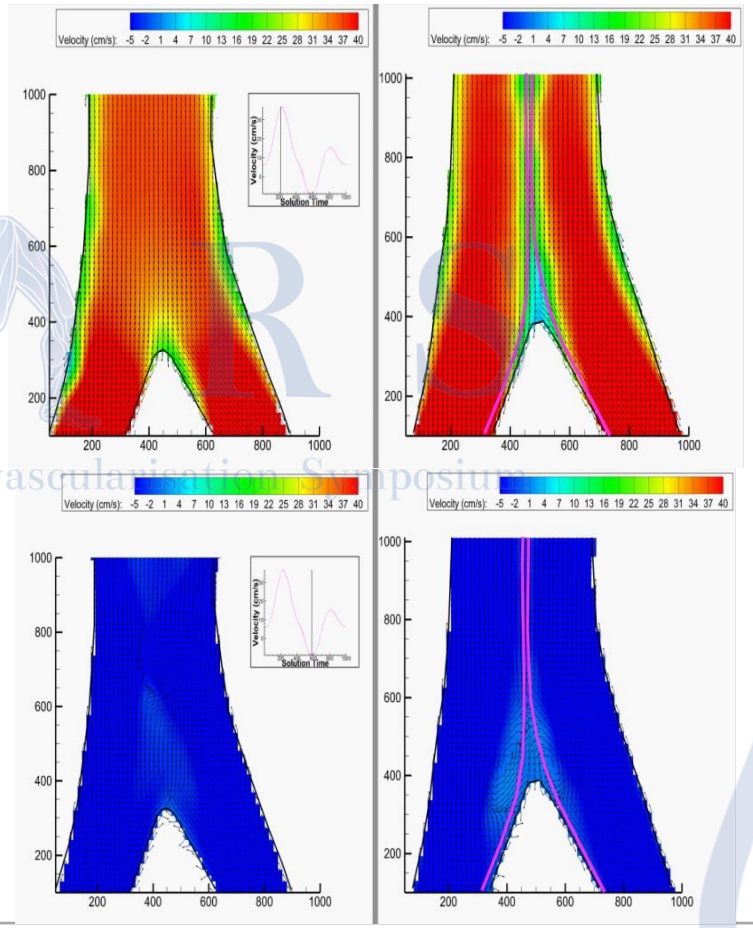
In vitro: the CERAB technique outperforms the kissing stent technique hemodynamically



Covered kissing stents mismatch induces large zone of recirculation during entire cardiac cycle



Continuous zone of low flow and no recirculation between anatomic bifurcation and neobifurcation

J Vasc Surg 2017;66:251-60

The ideal reconstruction

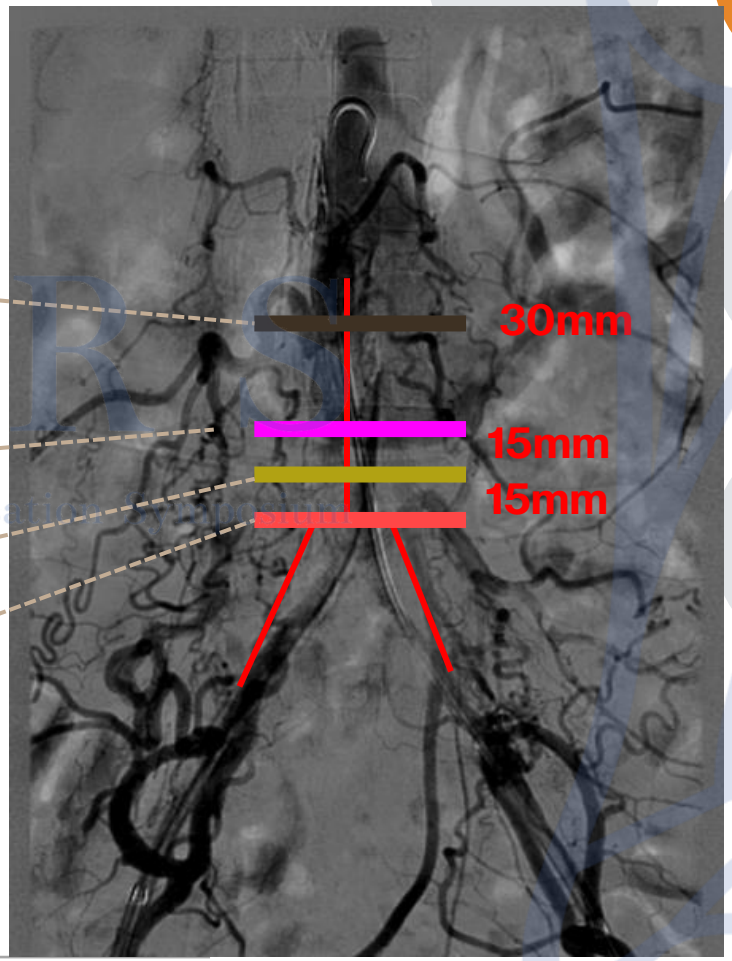
15 + 15 + 30(?) RULE

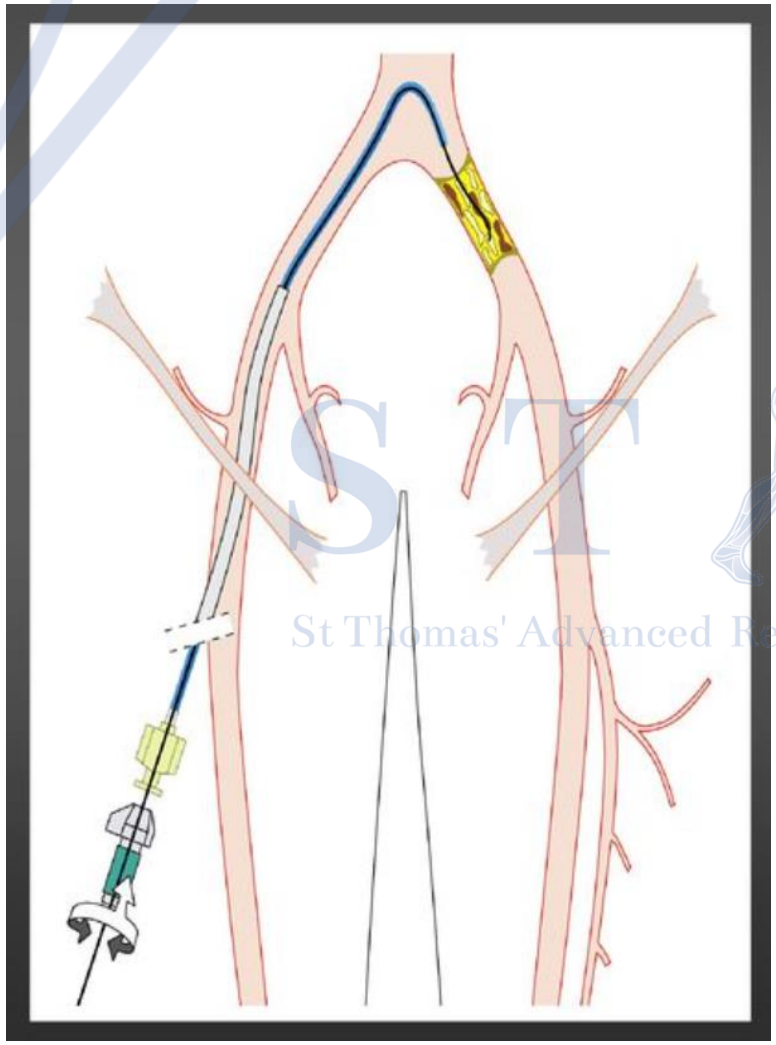
Proximal end aortic stent

Overlap limbs in aortic stent

Distal end aortic stent

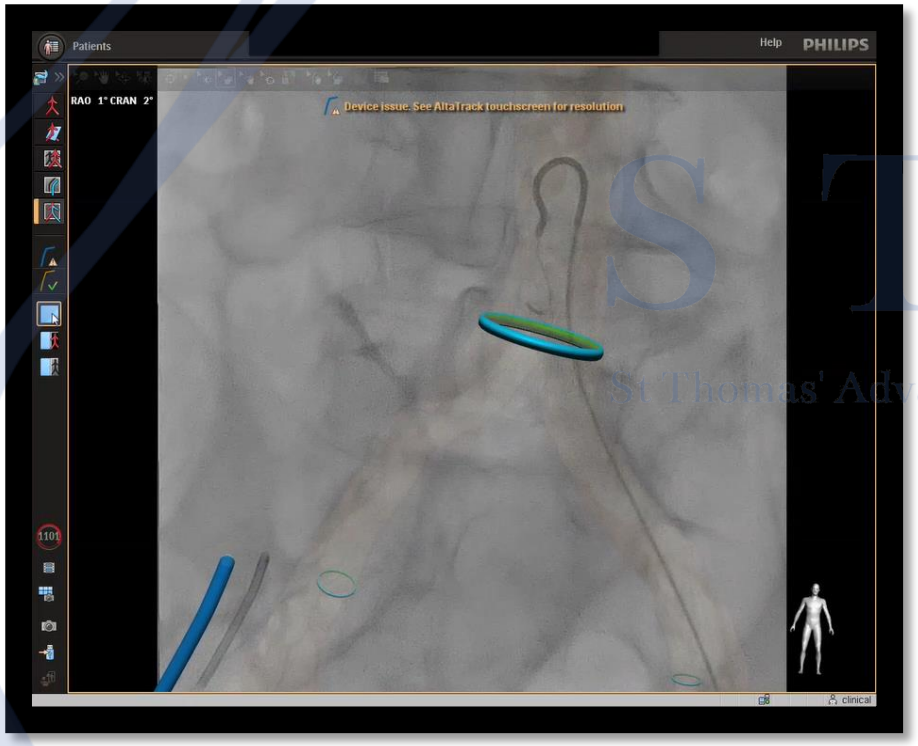
Aortic bifurcation





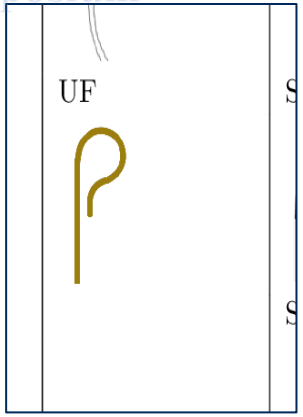
Controlateral antegrade approach

Recanalization



Recanalization right

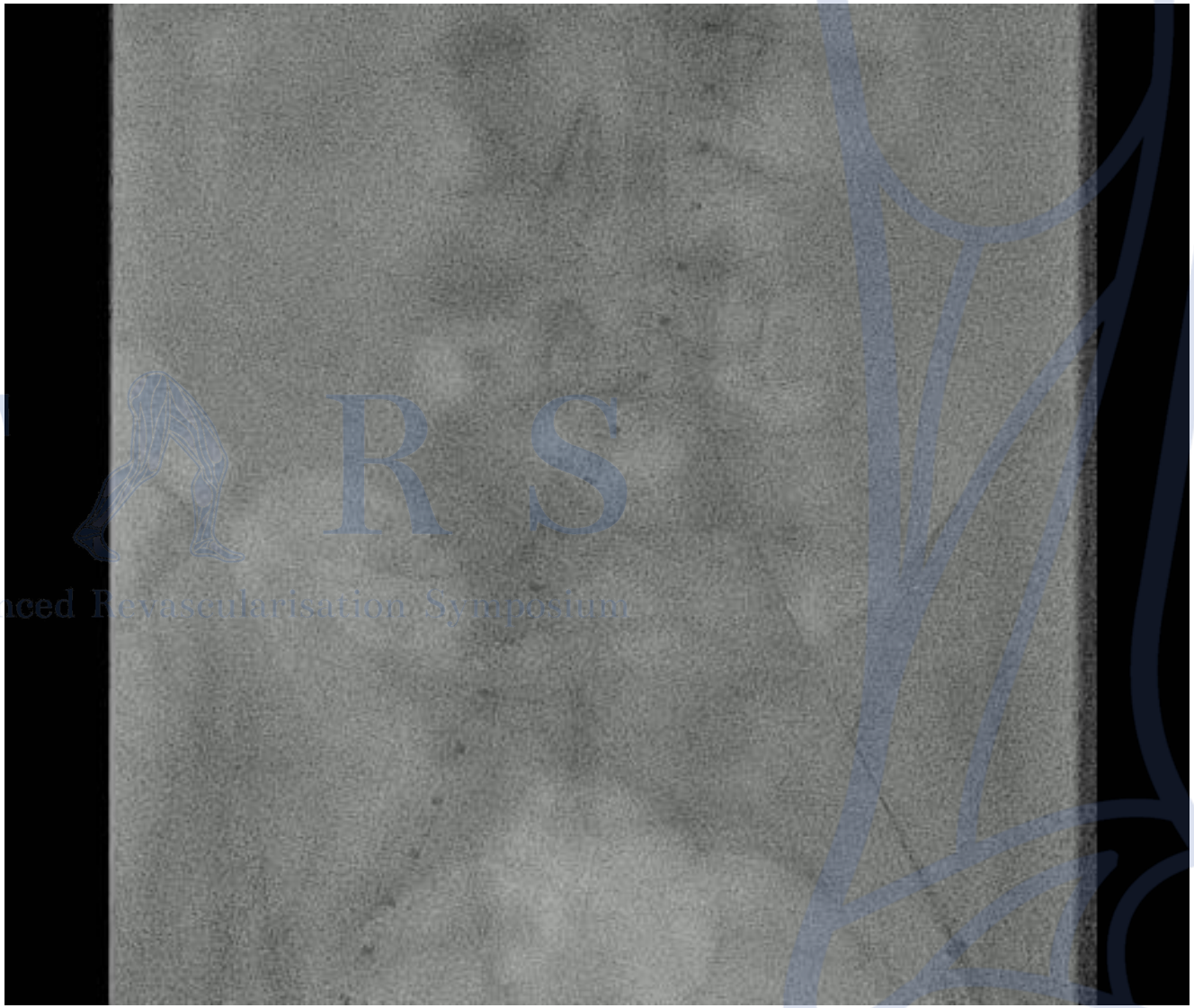
UF
angulated
hydrophilic 0.035-
Glidewire (Terumo)



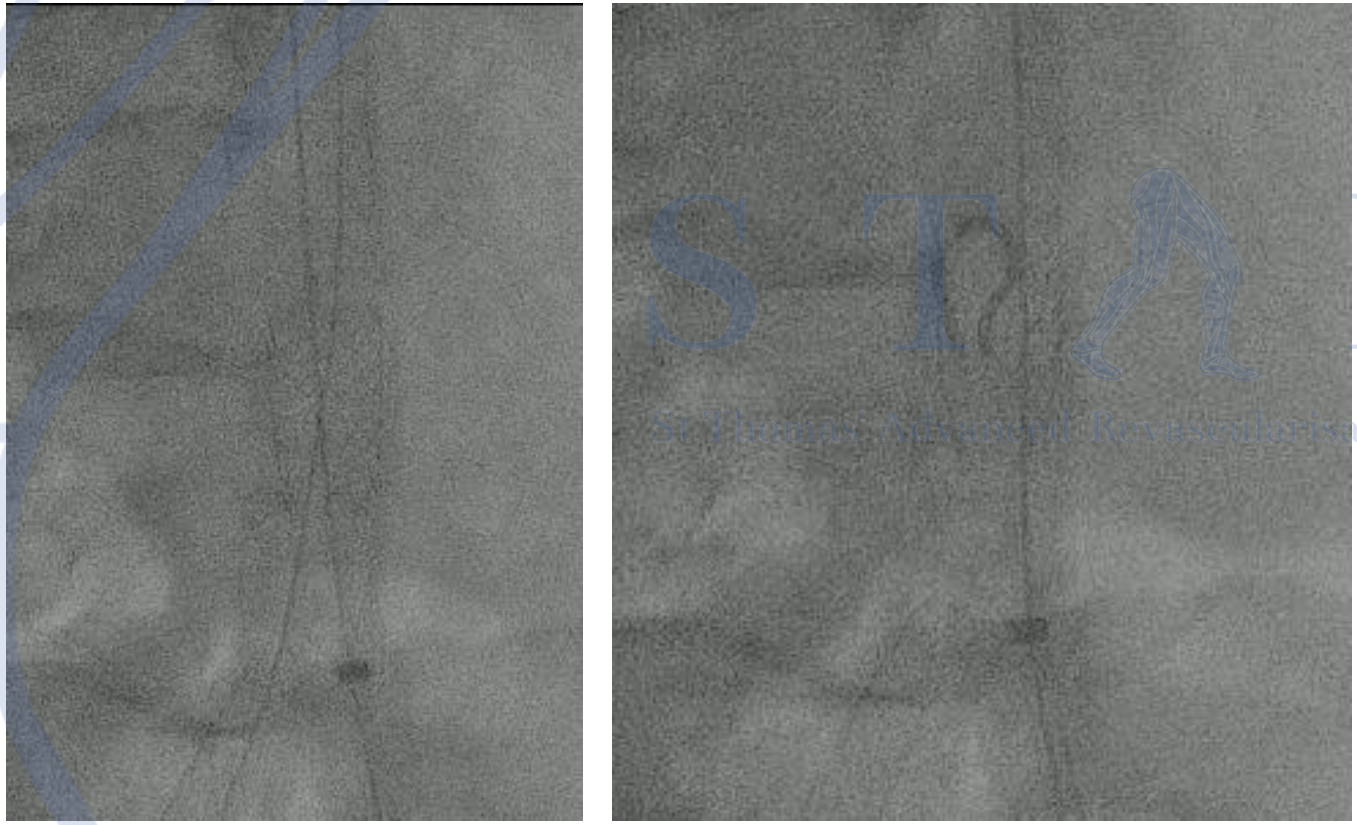
6fr
sheath

8fr
sheath

Protective sheath



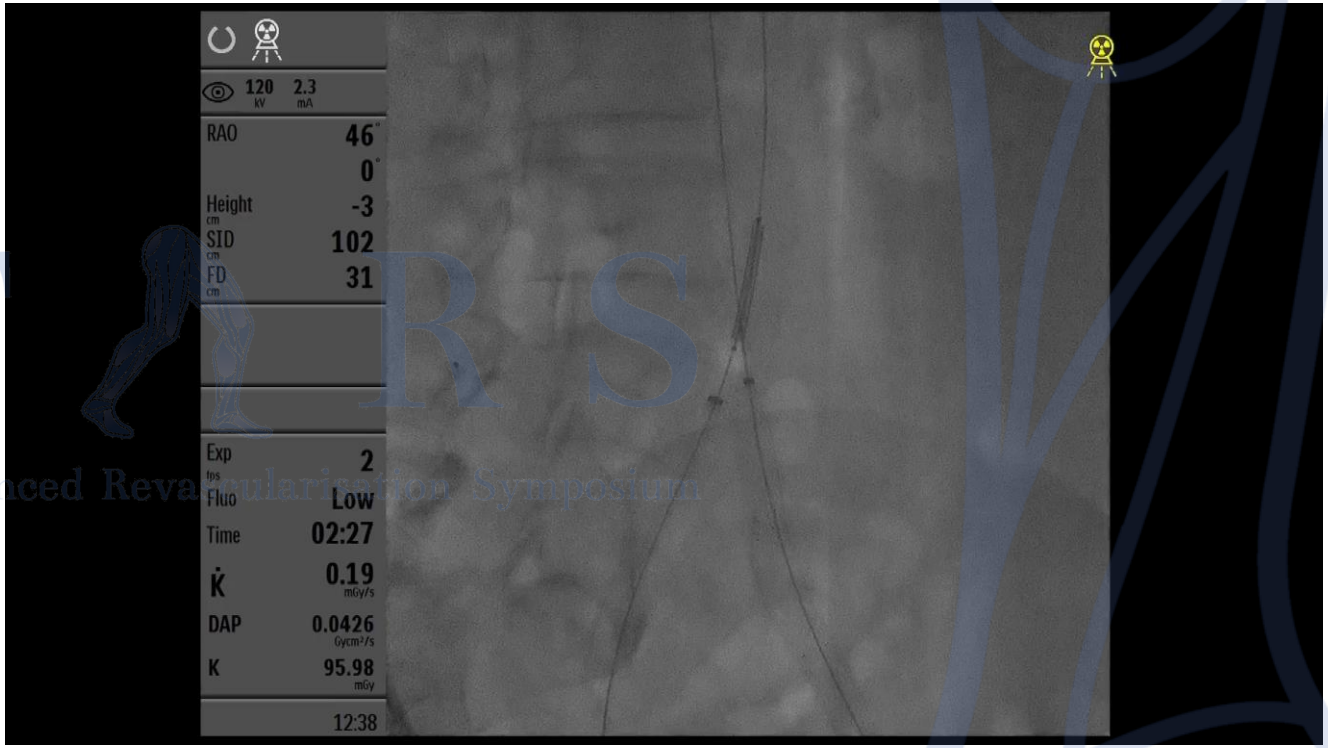
Aortic Stent Graft



- Distal landing 10-15 mm above "bifurcation”
- Preserve IMA
- Proximal flare to at least inner diameter healthy aorta
- Verify after recannulation

Aortic stent graft

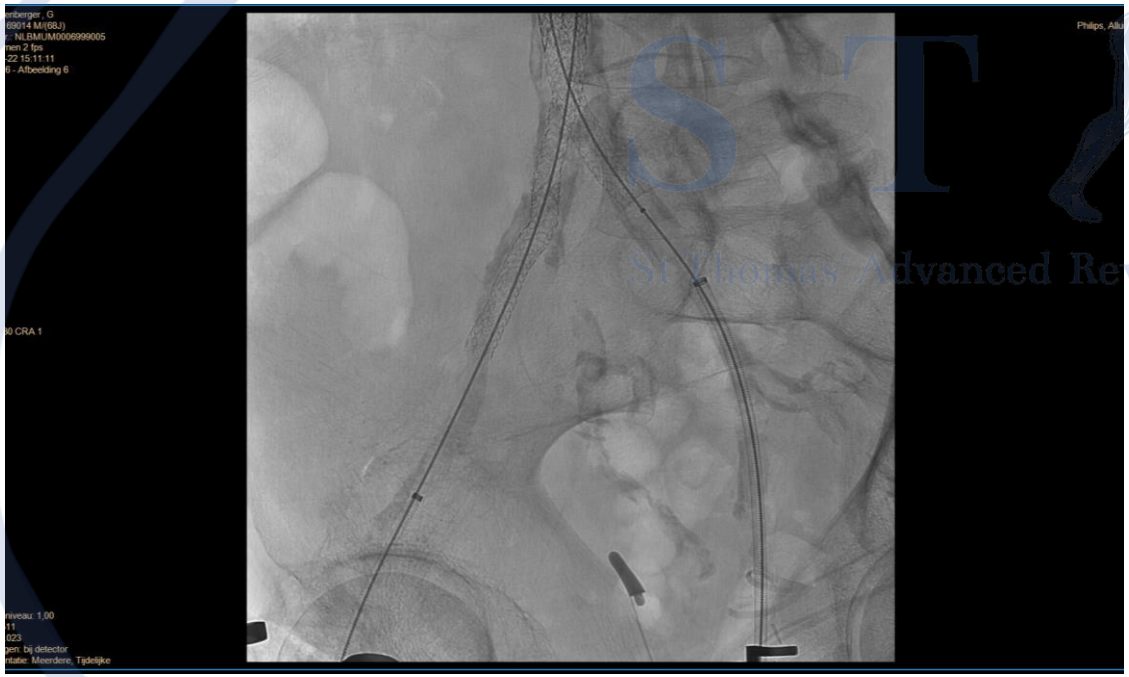
(floating...)

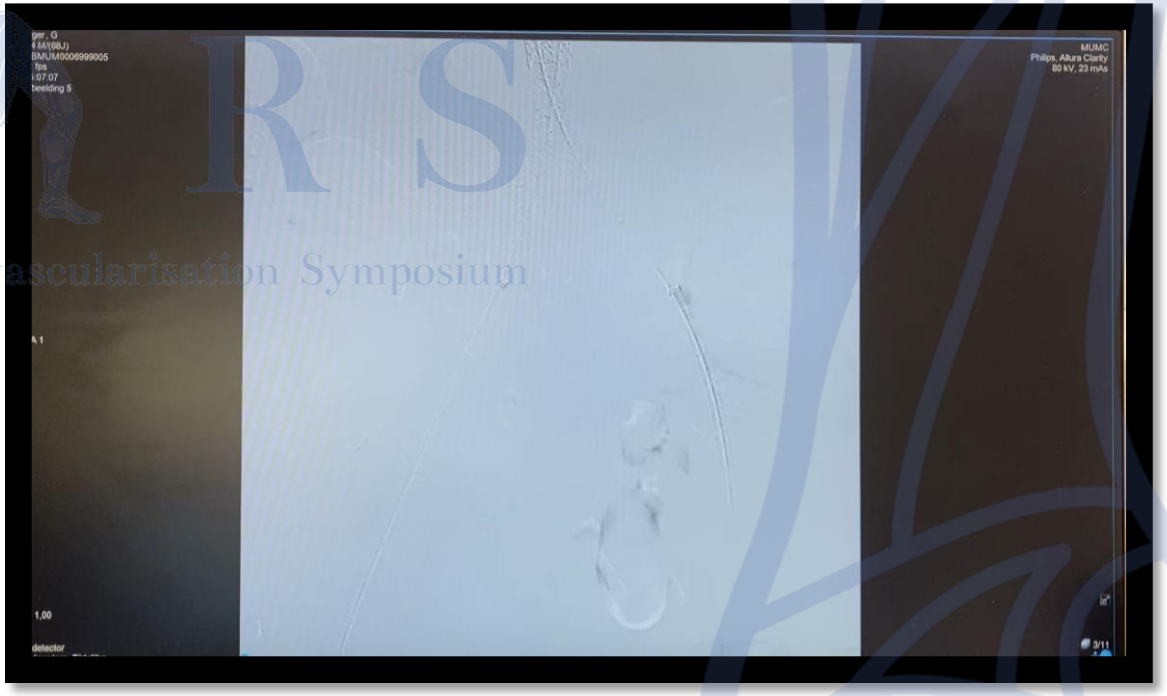


Proximal flaring
= solution for floating stent

CERAB

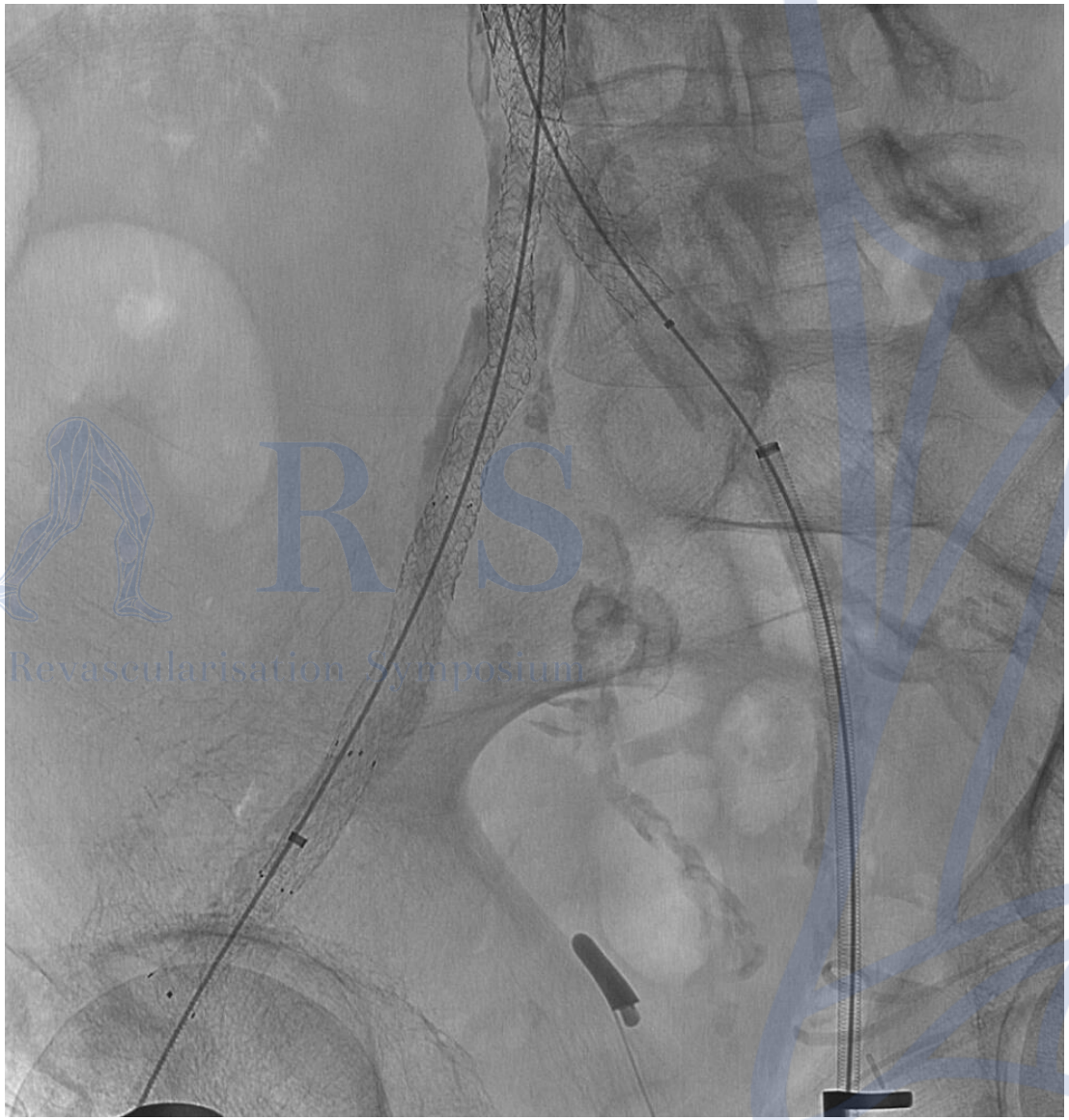
- 12x39 aortic stent (Bentley)
- Proximal flair with 14mm balloon
- Kissing stents
- 5x57 Bentley peripheral + right extension





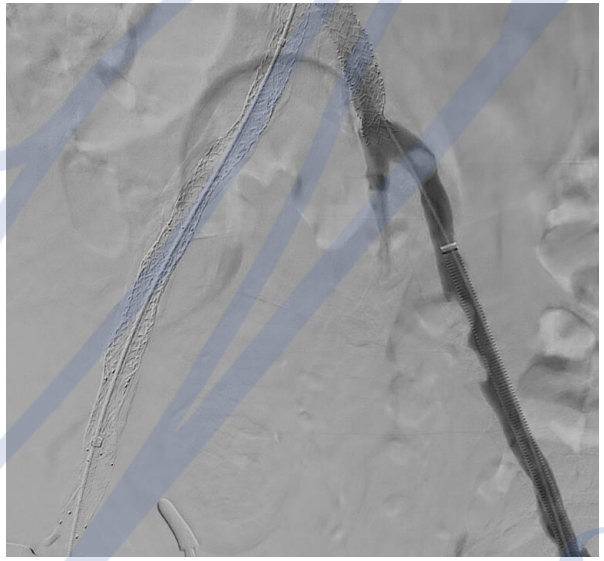
To the right

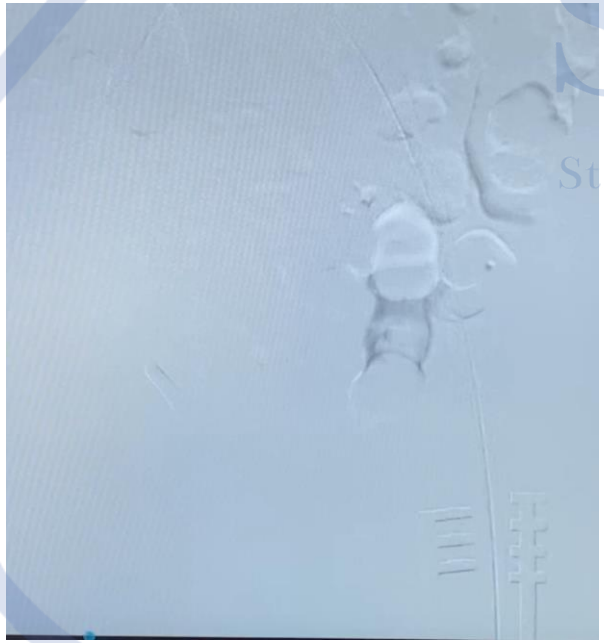
- Extension AIE
- Uncovered self expandable stents
- 8x60 and 8x40



Angio

- Ruptured AIE right
- 8*37 Bentley





To the left

- AIC 8x27mm Bentley
- IIA spared
- AIE stented to the patch
- 8x60 and 8x40 SES

Final Angio

- Good flow
- No bleeding
- Patent IIA left
- AFC patches no complications
- AFP good outflow

Tips and tricks

Attention should be paid using the post dilatation process not to oversize balloons but rather increase the balloon size with moderate dilatation pressure

Covered stent (self expanding as Viabahn (gore) or balloon expandable BeGraft (Bentley) should always be available as backup devices to manage a potential vessel perforation

Attention should be paid to re-enter the patent vessel directly at the point of reconstitution to avoid propagation of dissection into the aorta and rupture

In case of subintimal crossing the use of a bent-tip catheter can be helpful to re-enter the true lumen

Alternatively the use of a re-entery system should be considered (Outback LTD, Cordis)

Conclusion

- Recanalization of chronic occlusions in the aorto-iliac segment is most of the time feasible and safe
- Careful planning of the procedure is important
- The interventional approach to be tailored to the specific anatomy
- Combination of different access strategies
- Implementation of re-entry devices into the interventional armentarium

Kissing stent grafts

Re-entry wires and catheters

- CTO- subintimal recanalization
- Re-entry devices:
  - Back end of guidewire
  - Needle tip guidewires
  - Dedicated CTO re-entry devices:
    - Outback catheter
    - Pioneer catheter (uses IVUS)