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TCTAP 2014

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Difficult Iliac Total Occlusion-Options when You Don't Have an Outback Catheter

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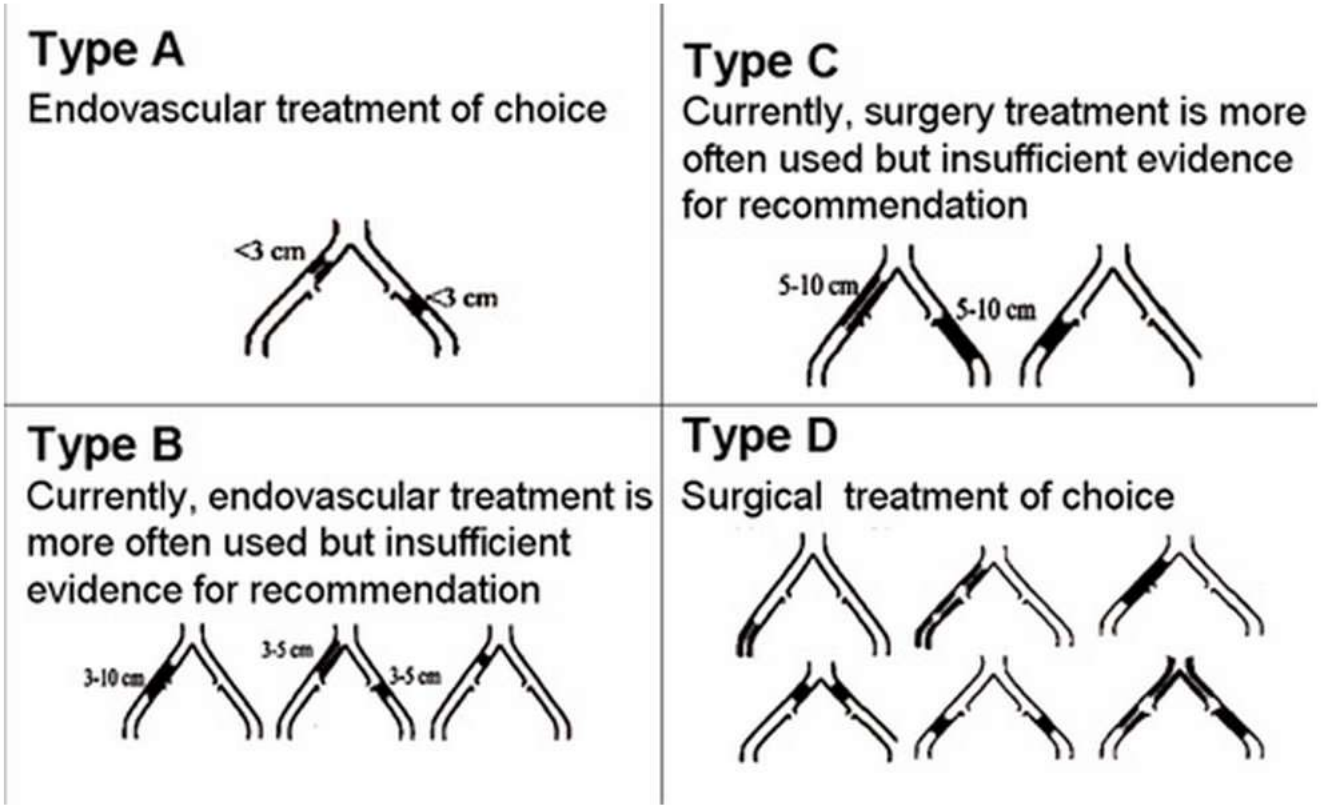
Iliac Artery Total Occlusion



- TASC B, endovascular interventions: a reasonable first attempt

Case Presentation

- Mr. Huang
- 45-year-old man
- Claudication of left lower limb for 1 year, progressive
- Walked only 100 meters
- Rutherford stage 3
- Ankle-brachial index: Rt/Lt 0.8/0.6
- Vascular Duplex:
  - Bilateral iliac arteries stenosis or occlusion
  - Bilateral CFA to infra-popliteal arteries patent

Diagnostic angiogram

Severe stenosis of Lt EIA

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Retrograde RFA puncture

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Total occlusion from Lt CIA ostium
Stenosis of Rt CIA
JR4 6 Fr retrograde from RFA

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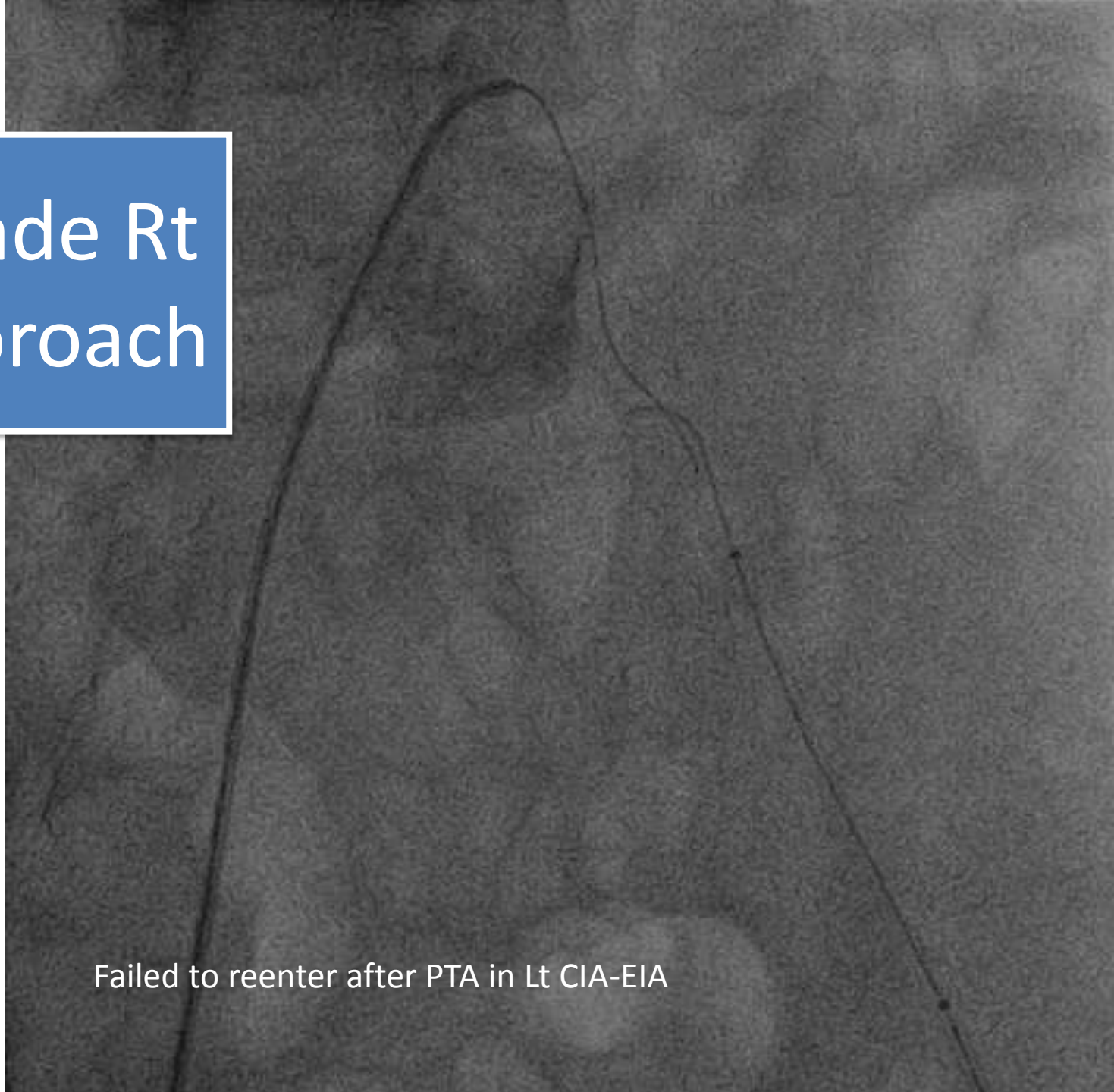
Retrograde Rt Side Approach



Failed to reenter after PTA in Lt CIA-EIA

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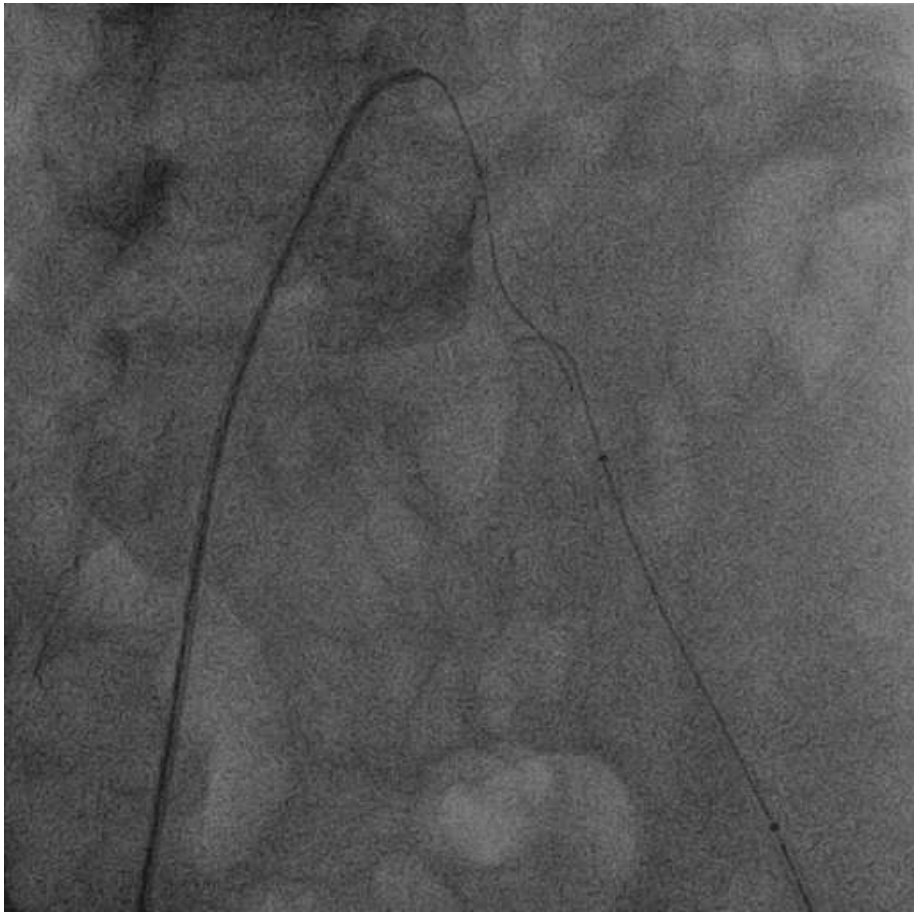
Failed?

- Cross-over sheath inserted
- Double balloon technique tried, but failed…



Failed to reenter after PTA in Lt CIA-EIA

Failed Iliac Interventions

- Failure rate for iliac CTOs
  - 20-40%, varied widely

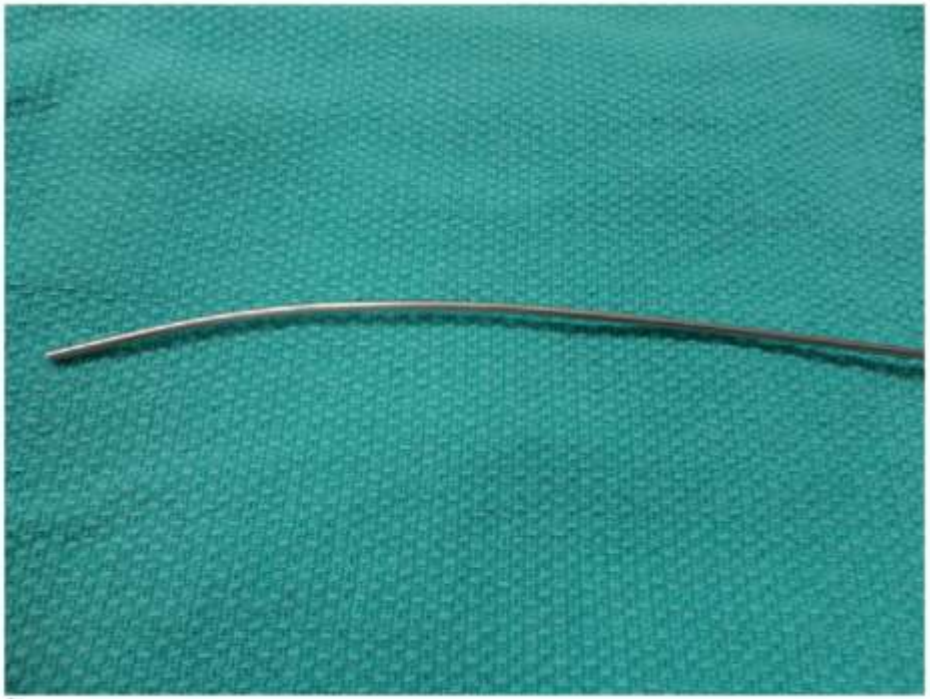
- Most common causes of iliac occlusion intervention failure
  - The reentry into true lumen may be very difficult
  - The reentry level into aorta may be unpredictable
  - The sub-intimal dissection may be extensive

- Surgical management:
  - Fix Rt CIA first then refer for femoro-femoral bypass surgery

- Sharafuddin MJ, Hoballah JJ, Kresowik TF, Nicholson RM, Sharp WJ. Impact of aggressive endovascular recanalization techniques on success rate in chronic total arterial occlusions (CTOs). Vascular and endovascular surgery 2010; 44:460-467.
- Murphy TP, Marks MJ, Webb MS. Use of a curved needle for true lumen re-entry during subintimal iliac artery revascularization. J Vasc Interv Radiol 1997; 8:633-636.

Options for Re-entry 1

a.



b.

- The metal stiffener from an 8-F universal pigtail drainage catheter (Bard). Close-up view of manually shaped tip.

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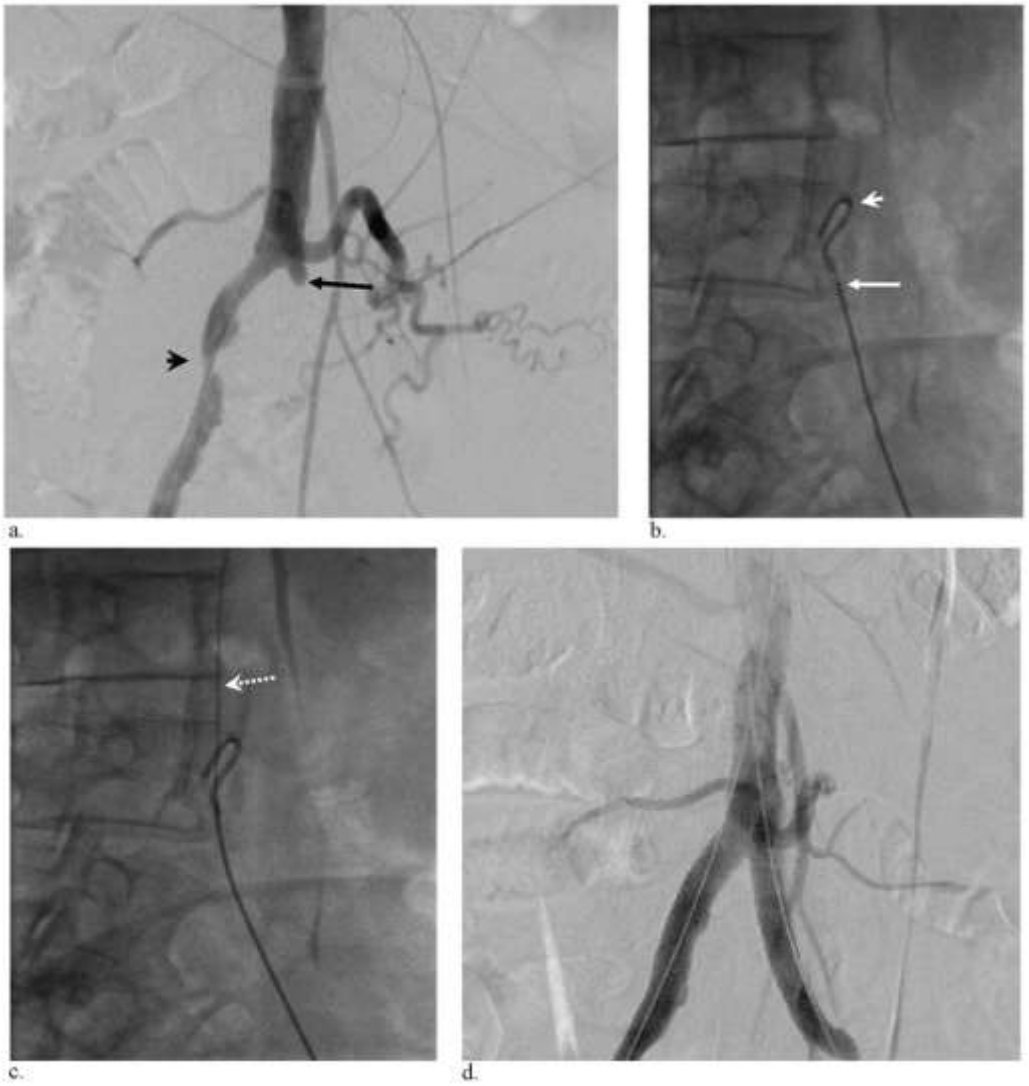
Smyth KR, Hadziomerovic A. Chronic total occlusion of the iliac artery: endoluminal reentry using a metal stiffening cannula. J Vasc Interv Radiol 2013; 24:1043-1047.

Options for Re-entry 2



- Reentry technique with the use of the metal stiffener.

Options for Re-entry 3

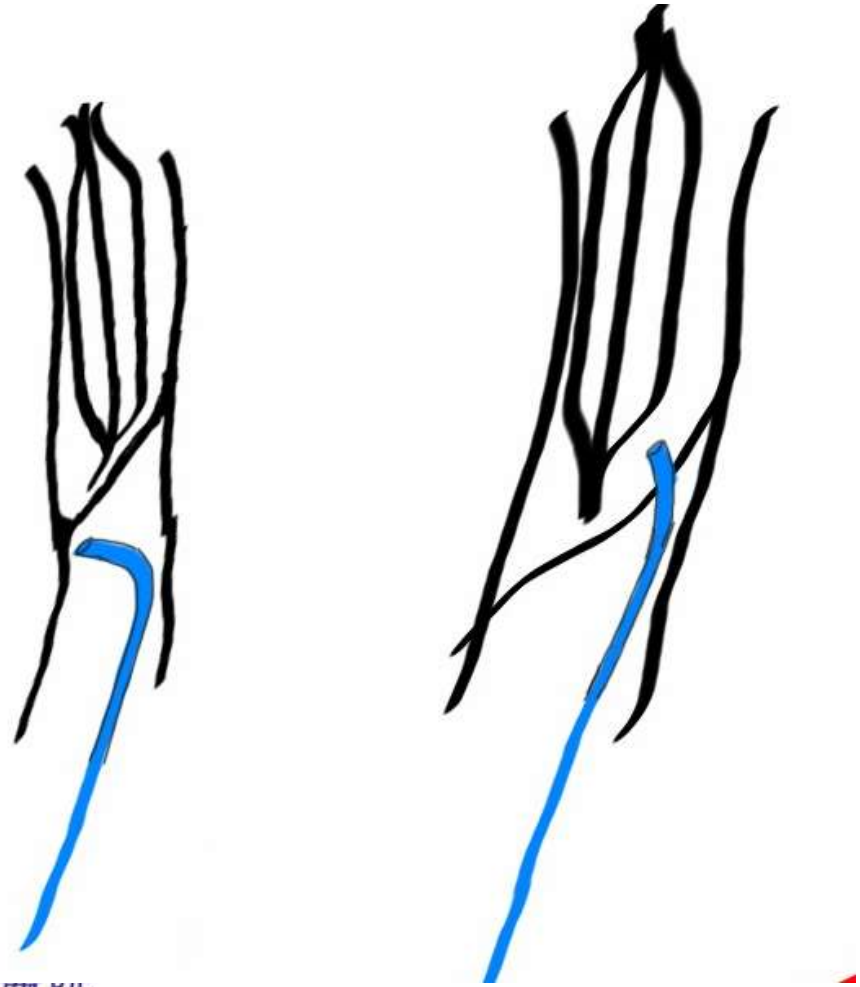
- The metal stiffening cannula
- The curved needle method
- The Outback catheter (Cordis)

- Murphy TP, Marks MJ, Webb MS. Use of a curved needle for true lumen re-entry during subintimal iliac artery revascularization. J Vasc Interv Radiol 1997; 8:633-636.
- Vorwerk D, Guenther RW, Schurmann K, Wendt G, Peters I. Primary stent placement for chronic iliac artery occlusions: follow-up results in 103 patients. Radiology 1995; 194:745-749.

Options when you don't have an Outback Catheter

1. Use a scissor to shorten the JR4 catheter tip, in order to obtain a better angled tip.
2. Then combine it with a high tip-load CTO coronary wire (Provia 12).
3. Combine 1 & 2 by reverse CART technique.

Adjust the puncture angle…



- With shortened tip, the JR catheter has a different angle of attack.
- JR4 also becomes easier to be rotated in the sub-intimal space.

Adjust the puncture angle…

JR tip rotating

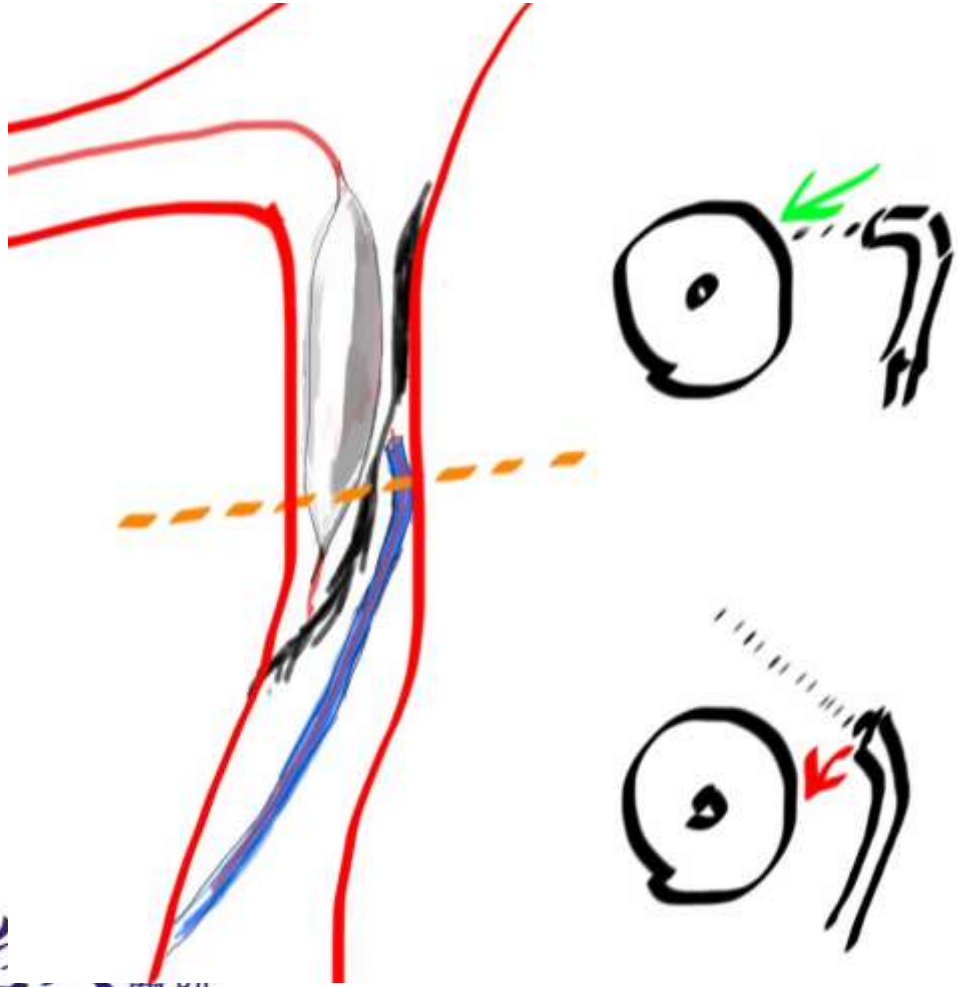
Balloon

- We then rotate the tube to obtain a good view to adjust the attack angle.
- By rotating the JR4, we directed the CTO wire to the balloon.

JR tip rotating

Balloon

Adjust the puncture angle…



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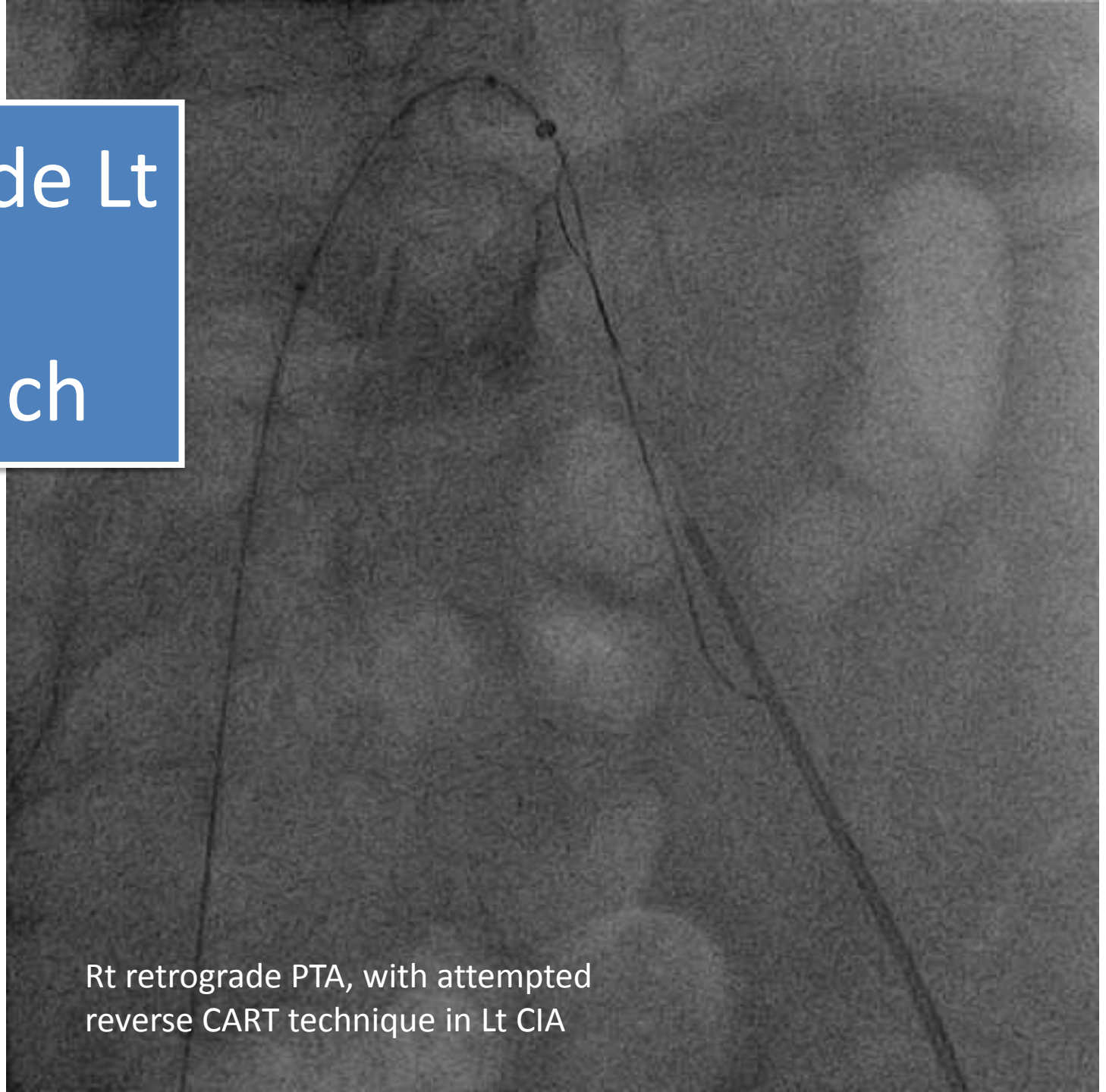
Retrograde Lt Side Approach



Rt retrograde PTA, with attempted reverse CART technique in Lt CIA

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Retrograde Lt Side Approach

Successfully reentered true lumen into aorta

After PTA

Two stents at iliac bifurcation

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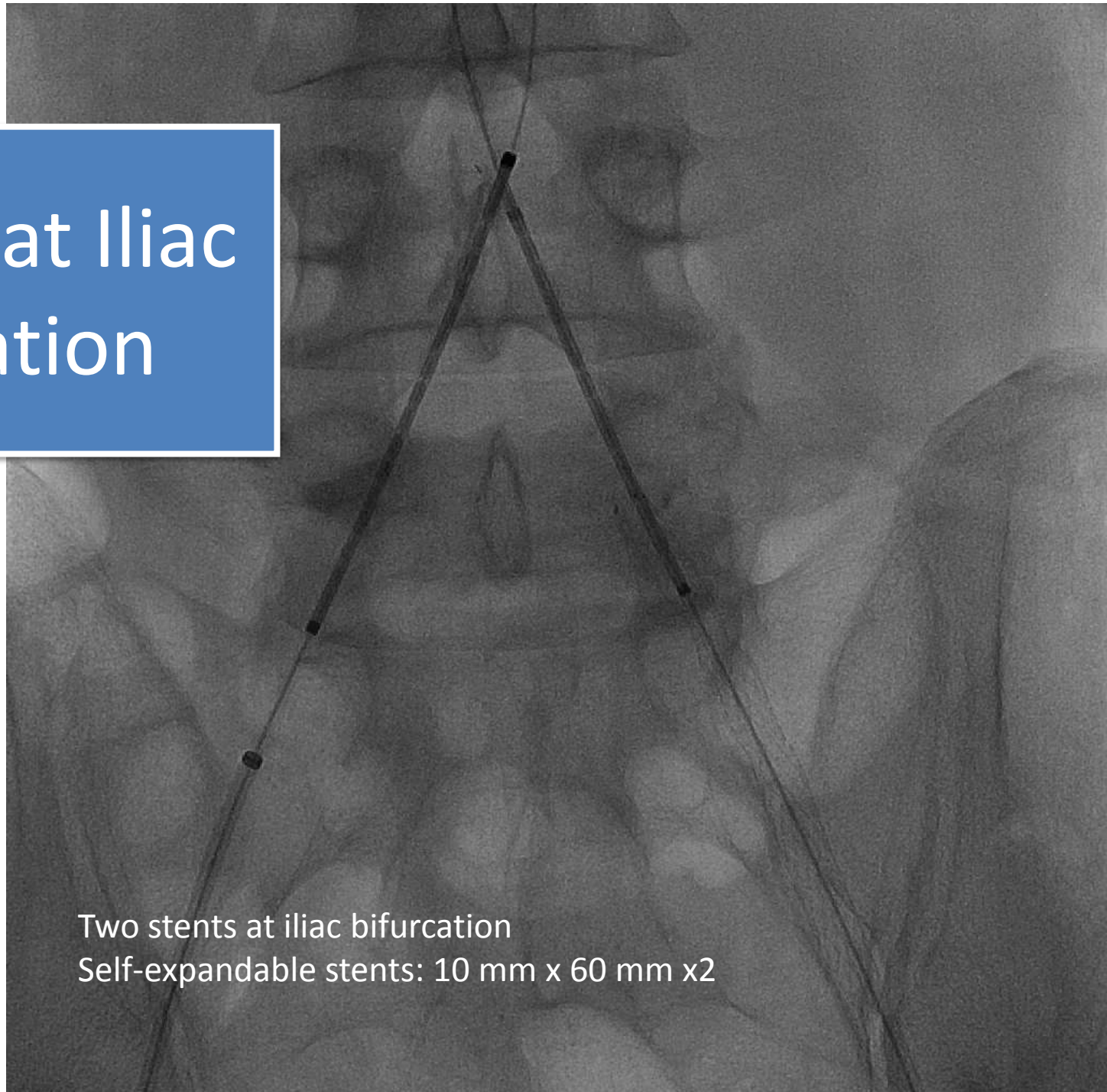
Stenting at Iliac Bifurcation



Two stents at iliac bifurcation
Self-expandable stents: 10 mm x 60 mm x2

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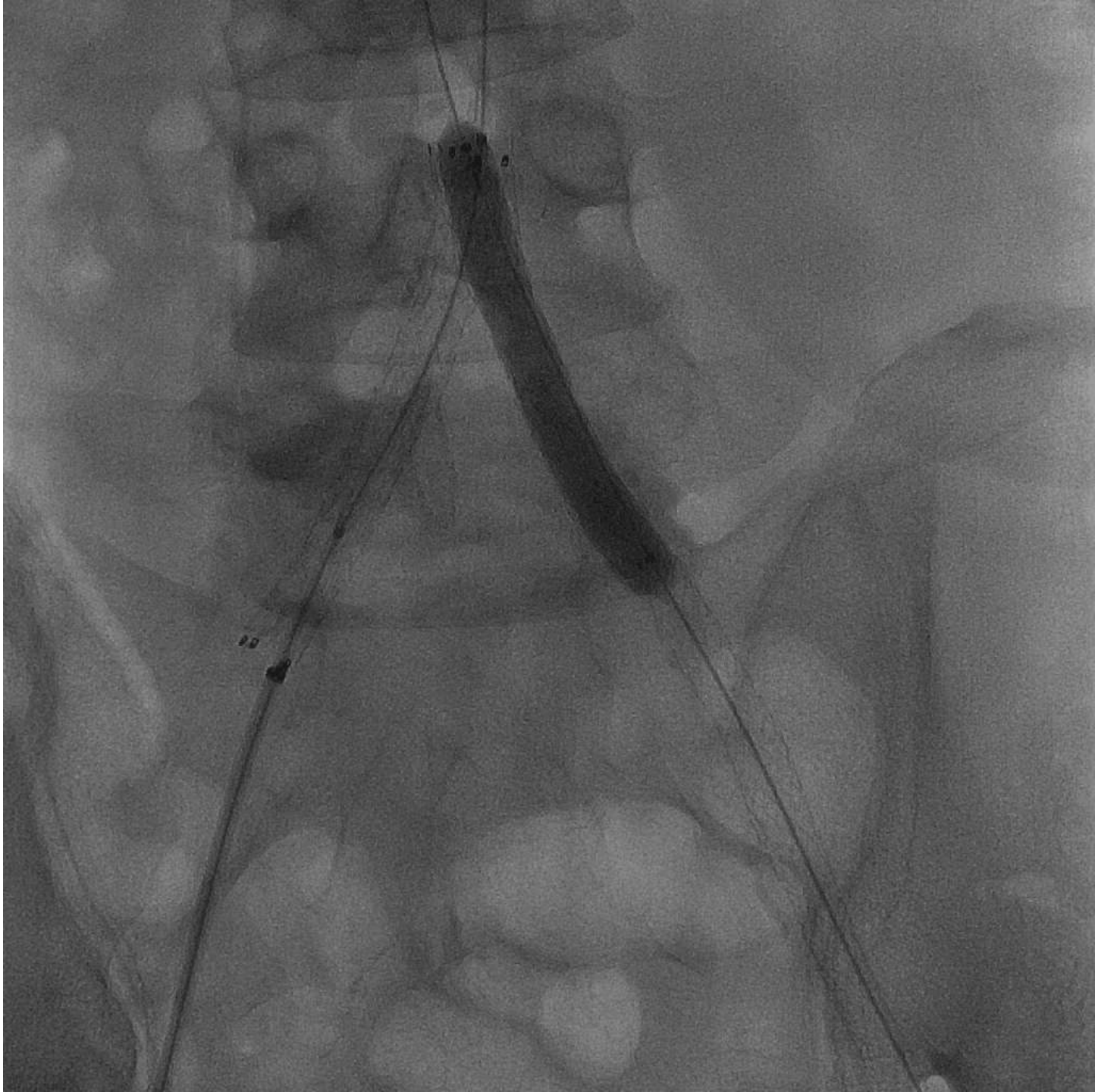


Final

Results of Self-Expandable Stents

Table 1 Patient characteristics

Parameter	$n = 82$ patients
Age, (years)	74.5 ± 10.0
Men, *n* (%)	63 (76.8)
Hypertension, *n* (%)	53 (64.6)
Dyslipidemia, *n* (%)	37 (45.1)
Diabetes mellitus, *n* (%)	50 (61.0)
Cerebrovascular disease, *n* (%)	5 (6.1)
Coronary artery disease, *n* (%)	33 (40.2)
Hemodialysis, *n* (%)	8 (9.8)
History of smoking, *n* (%)	29 (35.4)
Current smoker, *n* (%)	13 (15.9)
Preoperative ABI	0.56 ± 0.21

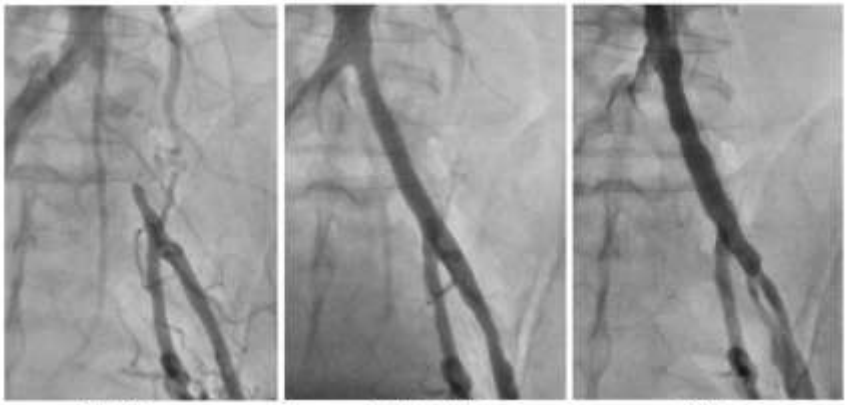


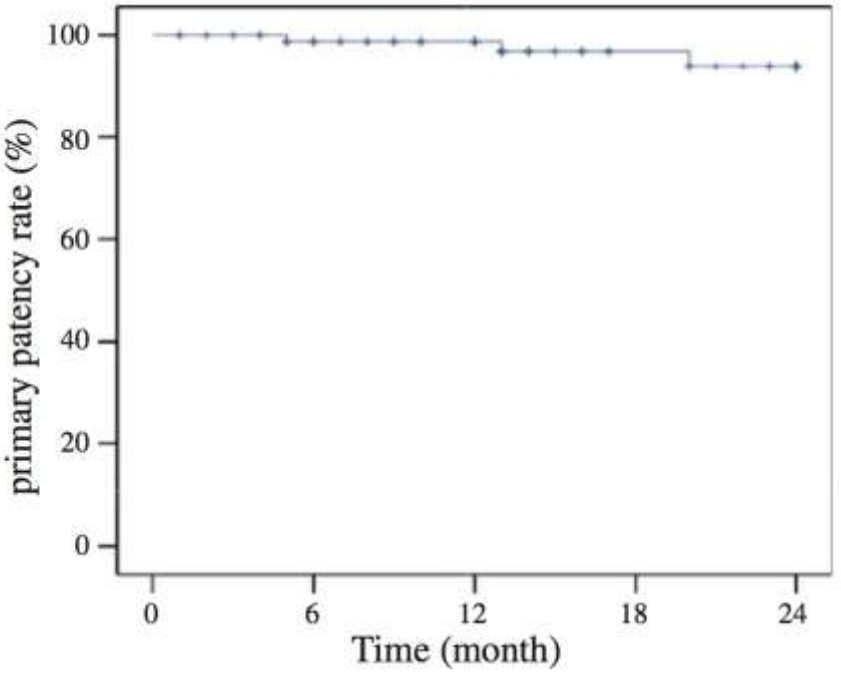
Table 2 Lesion characteristics

Parameter	$n = 86$ limbs
Lesion location	
CIA[a], *n* (%)	51 (59.3)
EIA[b], *n* (%)	19 (23.1)
CIA and EIA, *n* (%)	16 (18.6)
Fontaine classification	
2 (intermittent claudication), *n* (%)	47 (54.7)
3 (rest pain), *n* (%)	16 (18.6)
4 (critical limb ischemia), *n* (%)	23 (26.7)
TASC II classification (%)	
Type B, *n* (%)	34 (39.5)
Type C, *n* (%)	22 (25.6)
Type D, *n* (%)	30 (34.9)
IVUS findings	
Heavy calcification, *n* (%)	27 (31.3)
Mean reference diameter, (mm ± SD)	7.2 ± 0.8
Proximal reference diameter, (mm ± SD)	8.5 ± 1.2
Distal reference diameter, (mm ± SD)	5.8 ± 0.7

Araki M, Hirano K, Nakano M, et al.
Two-year outcome of the self-expandable stent for chronic total occlusion of the iliac artery.
Cardiovascular intervention and therapeutics 2013.

Results of Self-Expandable Stents

- Iliac total occlusions treated with self-expandable stents:
  - Good long term results
  - Primary patency rates: 96.5% at 2 years
  - No rupture or complications among 86 cases



Patients At risk	82	71	58	33	25
%	100	98.7	98.7	97.5	96.5

Fig. 3 Cumulative primary patency rate with self-expandable stent. (Kaplan–Meier analysis)

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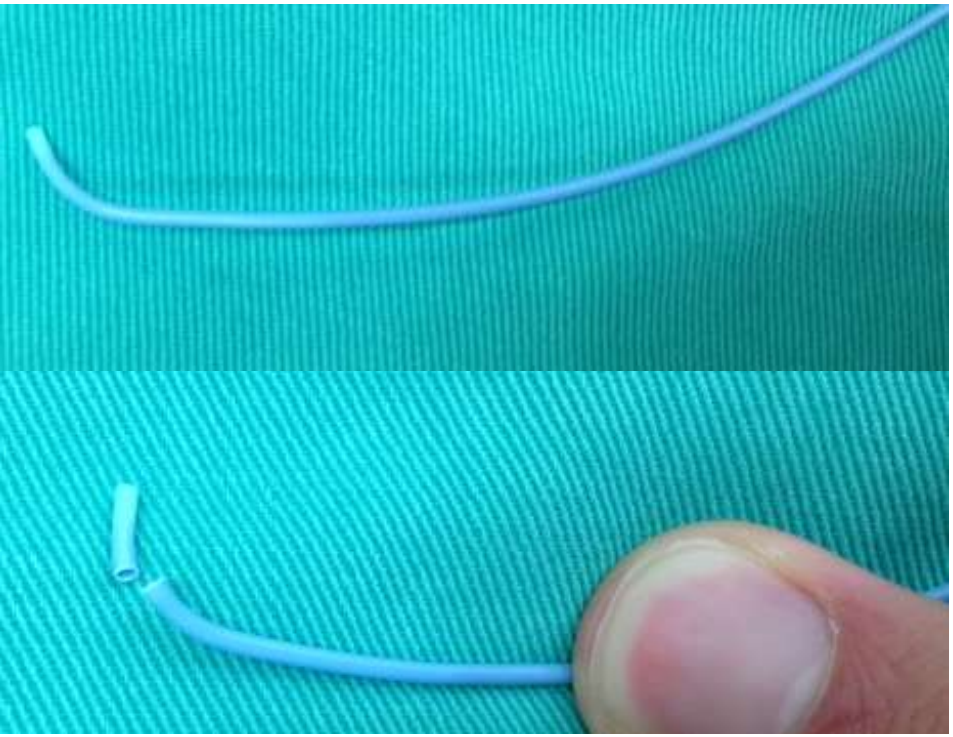
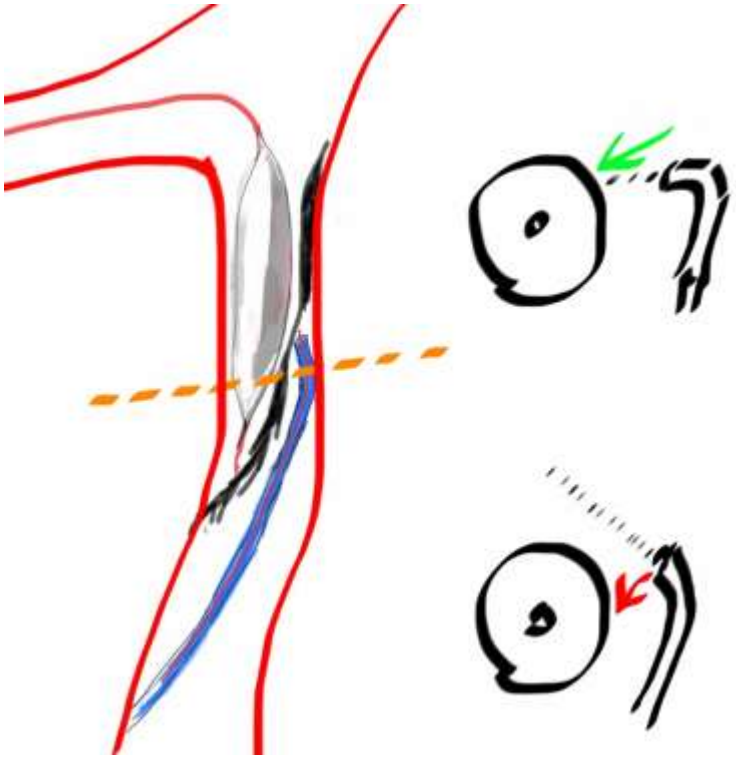
Discussion





- When you don’t have an Outback catheter…
- Try another method:
  modified JR tip and reverse CART…
- Or try puncture with a long stiffened needle.