Angioplasty First Strategy

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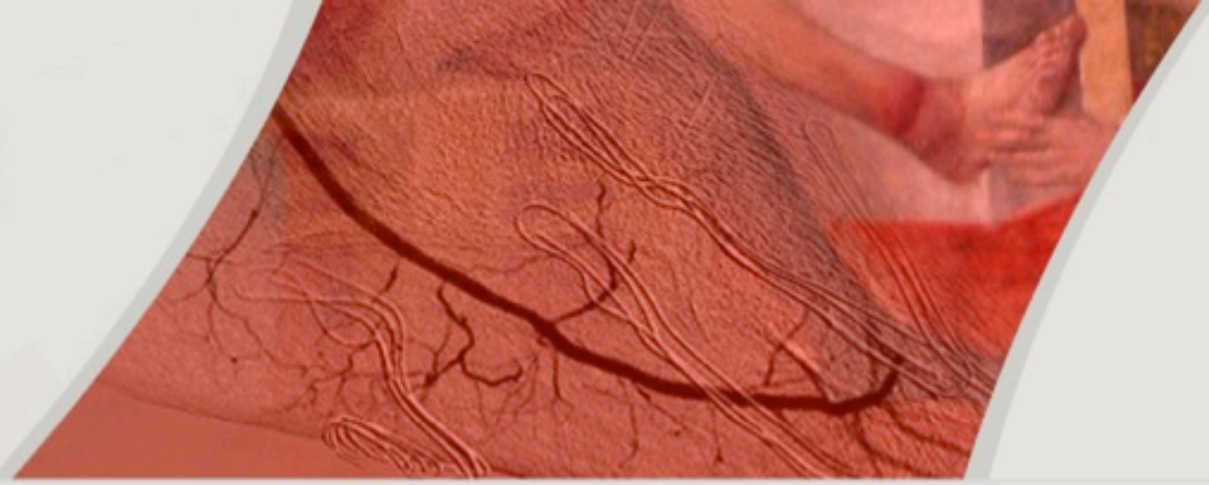
Angioplasty First Strategy



Angioplasty or Bypass in CLI?

4-steps analysis to approach CLI treatment

Why Angioplasty?

Limits for Bypass Surgery

The must of Endovascular approach

Angioplasty first strategy

Italian consensus document on PAD treatment in diabetics

- Italian Societies of Diabetologists
- Italian Society of Vascular Surgeons
- Italian Society of Vascular and Interventional Radiology

Submitted for publication

Angioplasty first strategy

CLI

?

angioplasty

bypass

Angioplasty first strategy

CLI

?

Many studies have demonstrated that PT Angioplasty in diabetic CLI is feasible, has a low rate of complications and achieves a high limb-salvage rate

Angioplasty first strategy

1. Dorros G *et al*. The acute outcome of tibioperoneal vessel angioplasty in 417 cases with claudication and critical limb ischemia. Cathet Cardiovasc Diagn 1998;45:251-6
2. Soder HK *et al*. Prospective trial of infrapopliteal artery balloon angioplasty for critical limb ischemia: angiographic and clinical results. J Vasc Interv Radiol 2000;11:1021-31
3. Boyer L *et al*. Infrapopliteal percutaneous transluminal angioplasty for limb salvage. Acta Radiol 2000;41:73-7
4. Dorros G *et al*. Tibioperoneal (outflow lesion) angioplasty can be used as primary treatment in 235 patients with critical limb ischemia: five-year follow-up. Circulation 2001;104:2057-62.
5. Brillu C *et al*. Percutaneous transluminal angioplasty for management of critical ischemia in arteries below the knee. Ann Vasc Surg 2001;15:175-81
6. Faglia E *et al*. Extensive use of peripheral angioplasty, particularly infrapopliteal, in the treatment of ischaemic diabetic foot ulcers: clinical results of a multicentric study of 221 consecutive diabetic subjects. J Intern Med 2002; 252 : 225-232
7. Jämsén T *et al*. The final outcome of primary infrainguinal percutaneous transluminal angioplasty in 100 consecutive patients with chronic critical limb ischemia. J Vasc Interv Radiol 2002;13(5):455–63

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8. Faglia E *et al.* Peripheral angioplasty as the first-choice revascularization procedure in diabetic patients with critical limb ischemia: prospective study of 993 consecutive patients hospitalized and followed between 1999 and 2003. Eur J Vasc Endovas Surg 2005;29:620-7
9. Sigala F *et al.* Transluminal angioplasty of isolated crural arterial lesions in diabetics with critical limb ischemia. VASA 2005;34:186-91
10. Jacqueminet S *et al.* Percutaneous transluminal angioplasty in severe diabetic foot ischemia: outcomes and prognostic factors. Diabetes Metab 2005;31:370–5
11. Bosiers M *et al.* Endovascular therapy as the primary approach for limb salvage in patients with critical limb ischemia: experience with 443 infrapopliteal procedures. Vascular 2006;14:63-9
12. Bargellini I *et al*. Primary infrainguinal subintimal angioplasty in diabetic patients. Cardiovasc Intervent Radiol 2008;31:713–22
13. Dosluoglu HH *et al.* Peroneal artery-only runoff following endovascular revascularizations is effective for limb salvage in patients with tissue loss. J Vasc Surg 2008;48:137–43

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14. Ferraresi R *et al.* Long-term outcomes after angioplasty of isolated, below-the-knee arteries in diabetic patients with critical limb ischaemia. Eur J Vasc Endovasc Surg. 2009;37:336-42

15. Alexandrescu V, Hubermont G, Philips Y, Guillaumie B, Ngongang Ch, Coessens V, Vandenbossche P, Coulon M, Ledent G, Donnay JC. Combined primary subintimal and endoluminal angioplasty for ischaemic inferior-limb ulcers in diabetic patients: 5-year practice in a multidisciplinary 'diabetic-foot' service. Eur J Vasc Endovasc Surg 2009;37:448–56

16. Uccioli L, Gandini R, Giurato L, Fabiano S, Pampana E, Spallone V, Vainieri E, Simonetti G. Long-term outcomes of diabetic patients with critical limb ischemia followed in a tertiary referral diabetic foot clinic. Diabetes Care. 2010;33:977-82

Angioplasty first strategy

CLI

?

Exception 1

Open surgery first strategy in case of common femoral artery (and its bifurcation) disease

- This type of localization is generally not correlated to DM
- Surgery is definitive with a low burden of trauma/anesthesia etc.
- Percutaneous approach needs more long-term data

Angioplasty first strategy

CLI

?

Exception 1

Open surgery first strategy in case of common femoral artery (and its bifurcation) disease

Exception 2

Open surgery first strategy in case of extremely long occlusions of FEM-POP-BTK vessels

PTA of multiple, extensive FEM-POP-BTK lesions leads to high restenosis rate and high TLR. In these type of lesion *autologous vein distal bypass is the golden standard*.

Incomplete agreement on treatment of this type of disease means the final choice between ENDO or OPEN can be driven *according to local expertise*.

Factors to consider before bypass in diabetic patient with CLI due to chronic extensive FEM-POP-BTK occlusions

1°

PATIENT CLINICAL STATUS

Is the patient a good candidate for bypass surgery? Consider:

- age/comorbidities/life expectancy
- type of anesthesia/type of bypass

Y

2°

FOOT EVALUATION

Are foot conditions suitable for bypass surgery? Consider:

- tissue lesion/infection (Rutherford , Texas)
- anastomosis site involvement
- planned foot surgical procedure

Y

3°

BY PASS CONDUIT

Has the patient a suitable vein? Consider:

- type of bypass
- vein availability: total body veins evaluation

Y

4°

OUTFLOW VESSEL

Has the patient an outflow vessel suitable for distal bypass anastomosis? Consider:

- target vessel diameter/disease/calcification
- small outflow arteries disease
- wound related artery concept

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Open surgery

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Factors to consider before bypass in diabetic patient with CLI due to chronic extensive FEM-POP-BTK occlusions

4°

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Y → **Open surgery**

3°

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Factors to consider before bypass in diabetic patient with CLI due to chronic extensive

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Y → **Open surgery**

Y

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4Y → BYPASS

Factors to consider before bypass in diabetic patient with CLI due to chronic extensive FEM-POP-BTK occlusions

4°

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- wound related artery concept

→ **Open surgery**

N

3°

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- vein availability: total body veins evaluation

N

2°

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Are foot conditions suitable for bypass surgery? Consider:

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- planned foot surgical procedure

N

1°

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N

1N → PTA

Factors to consider before bypass in diabetic patient with CLI due to chronic extensive FEM-POP-BTK occlusions

4°

OUTFLOW VESSEL

Has the patient an outflow vessel suitable for distal bypass anastomosis? Consider:

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- small outflow arteries disease
- wound related artery concept

→ **Open surgery**

N

3°

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Has the patient a suitable vein? Consider:

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N

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Are foot conditions suitable for bypass surgery? Consider:

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- planned foot surgical procedure

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Is the patient a good candidate for bypass surgery? Consider:

- age/comorbidities/life expectancy
- type of anesthesia/type of bypass

N

Endovascular first strategy can be used in pts unsuitable for open bypass surgery with extensive FEM-POP-BTK occlusions because:

1. ***PTA does not need general anesthesia and can be easily performed in high surgical-risk pts due to age, comorbidities, or reduced life expectancy. PTA procedures can be divided in multiple steps and can be repeated in case of restenosis.***

2. ***PTA can be done in foot lesions involving distal anastomosis sites***

3. ***PTA can be done in absence of adequate veins***

4. ***PTA can be done in foot vessels (absence of distal "landing zone" for a bypass)***

Angioplasty first strategy because:

Diabetic patients with CLI are very fragile!

Change our mind !!!

"… diabetes is a state of *premature cardiovascular death* which is associated with chronic hyperglycaemia …"

Fisher M. et Al, Practical Diabetes Int 2001; 18: 183

Angioplasty first strategy because:

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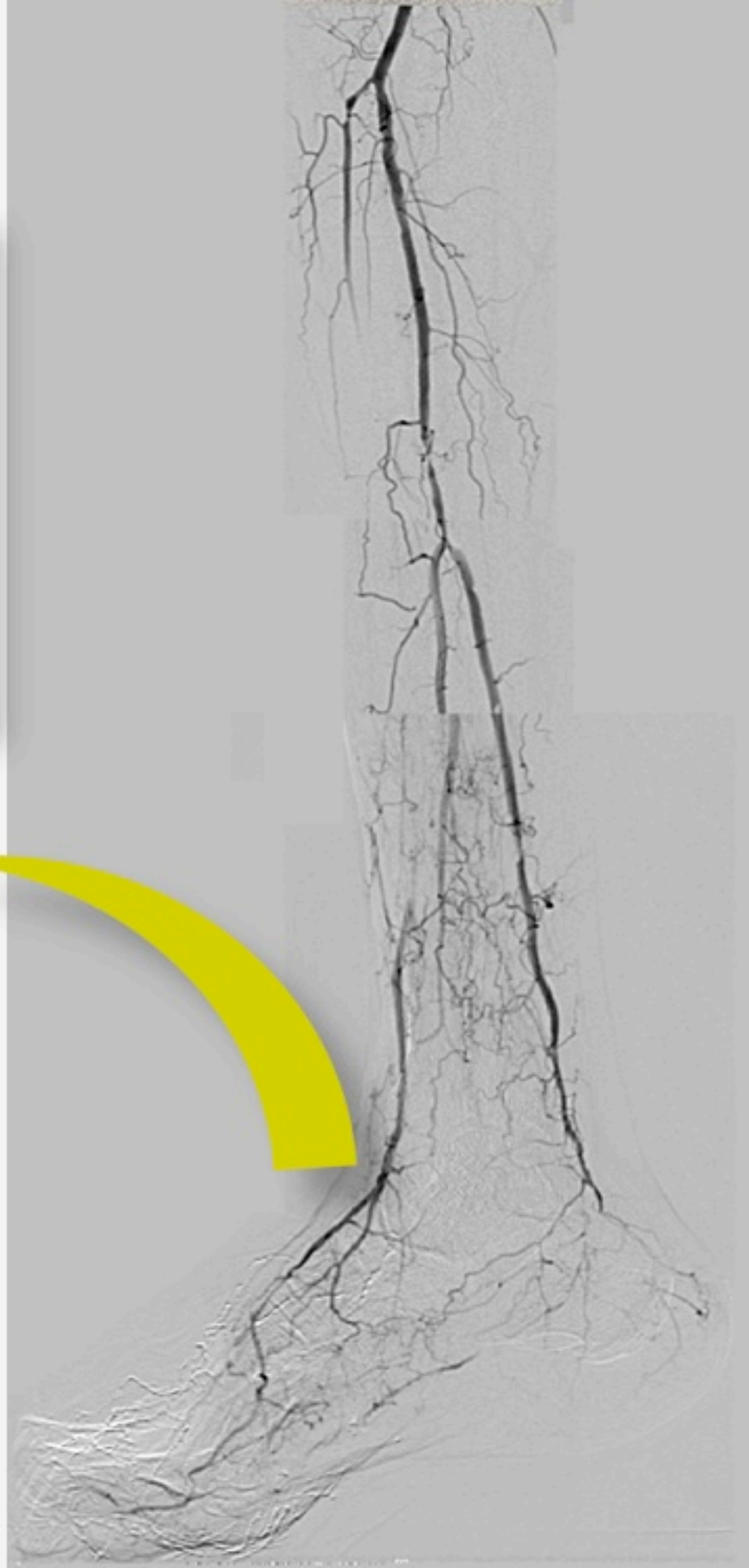
Rutherford 6/TUC 3-4 patients frequently present with involvement of the potential distal anastomosis site

Case 1

This patient had an ulcer with tendon exposure at the dorsum of the foot involving the potential anastomosis site for the only patent vessel of the foot.



Case 1

Result after angioplasty and healing

1. ***PTA does not need general anesthesia and can be easily performed in high surgical-risk pts due to age, comorbidities, or reduced life expectancy. PTA procedures can be divided in multiple steps and can be repeated in case of restenosis.***

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4. ***PTA can be done in foot vessels (absence of distal "landing zone" for a bypass)***

Angioplasty first strategy because:

>60% of the diabetic pts with CLI have an history of coronary artery disease and many of them had CABG with saphenous veins. Often in CLI pts there is a competition for veins between cardio surgeons and vascular surgeons

Peripheral Angioplasty as the First-choice Revascularization Procedure in Diabetic Patients with Critical Limb Ischemia: Prospective Study of 993 Consecutive Patients Hospitalized and Followed Between 1999 and 2003

E. Faglia,[1*] L. Dalla Paola,[2] G. Clerici,[1] J. Clerissi,[3] L. Graziani,[4] M. Fusaro,[4] L. Gabrielli,[5] S. Losa,[5] A. Stella,[6] M. Gargiulo,[6] M. Mantero,[1] M. Caminiti,[1] S. Ninkovic,[2] V. Curci[1] and A. Morabito[7]

1. *PTA does not need general anesthesia and can be easily performed in high surgical-risk pts due to age, comorbidities, or reduced life expectancy. PTA procedures can be divided in multiple steps and can be repeated in case of restenosis.*

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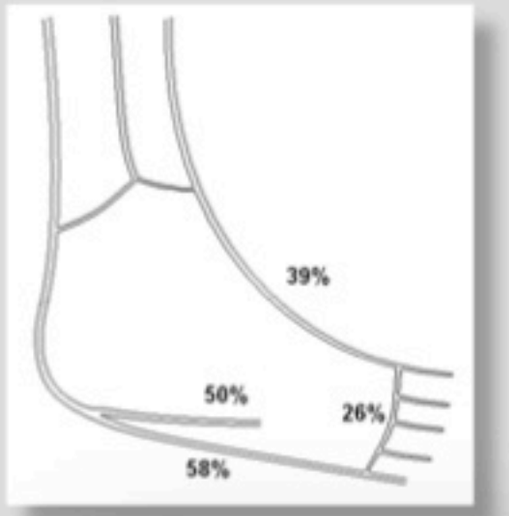
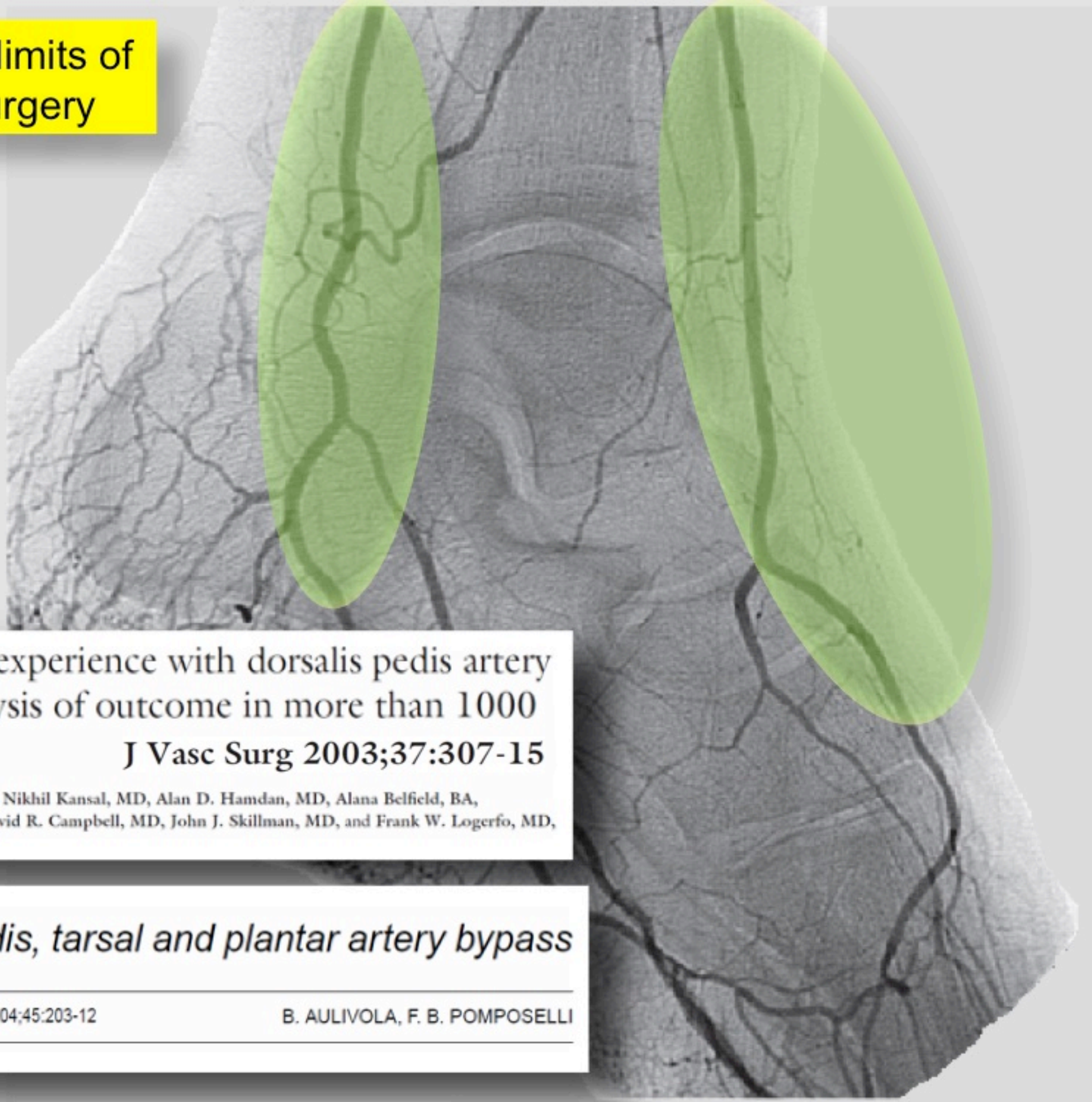


0 FOOT vessel	26%	
1 FOOT vessel	22%	
2 FOOT vessels	31%	52%
3 FOOT vessels	21%	
ARC	26%	

This sentence is particularly important in patients with the "desert foot" or "surgical unreconstructable disease"

Anatomical limits of bypass surgery

Anatomical limits of bypass surgery



A decade of experience with dorsalis pedis artery bypass: Analysis of outcome in more than 1000 cases

J Vasc Surg 2003;37:307-15

Frank B. Pomposelli, MD, Nikhil Kansal, MD, Alan D. Hamdan, MD, Alana Belfield, BA, Malachi Sheahan, MD, David R. Campbell, MD, John J. Skillman, MD, and Frank W. Logerfo, MD, *Boston, Mass*

Dorsalis pedis, tarsal and plantar artery bypass

J CARDIOVASC SURG 2004;45:203-12

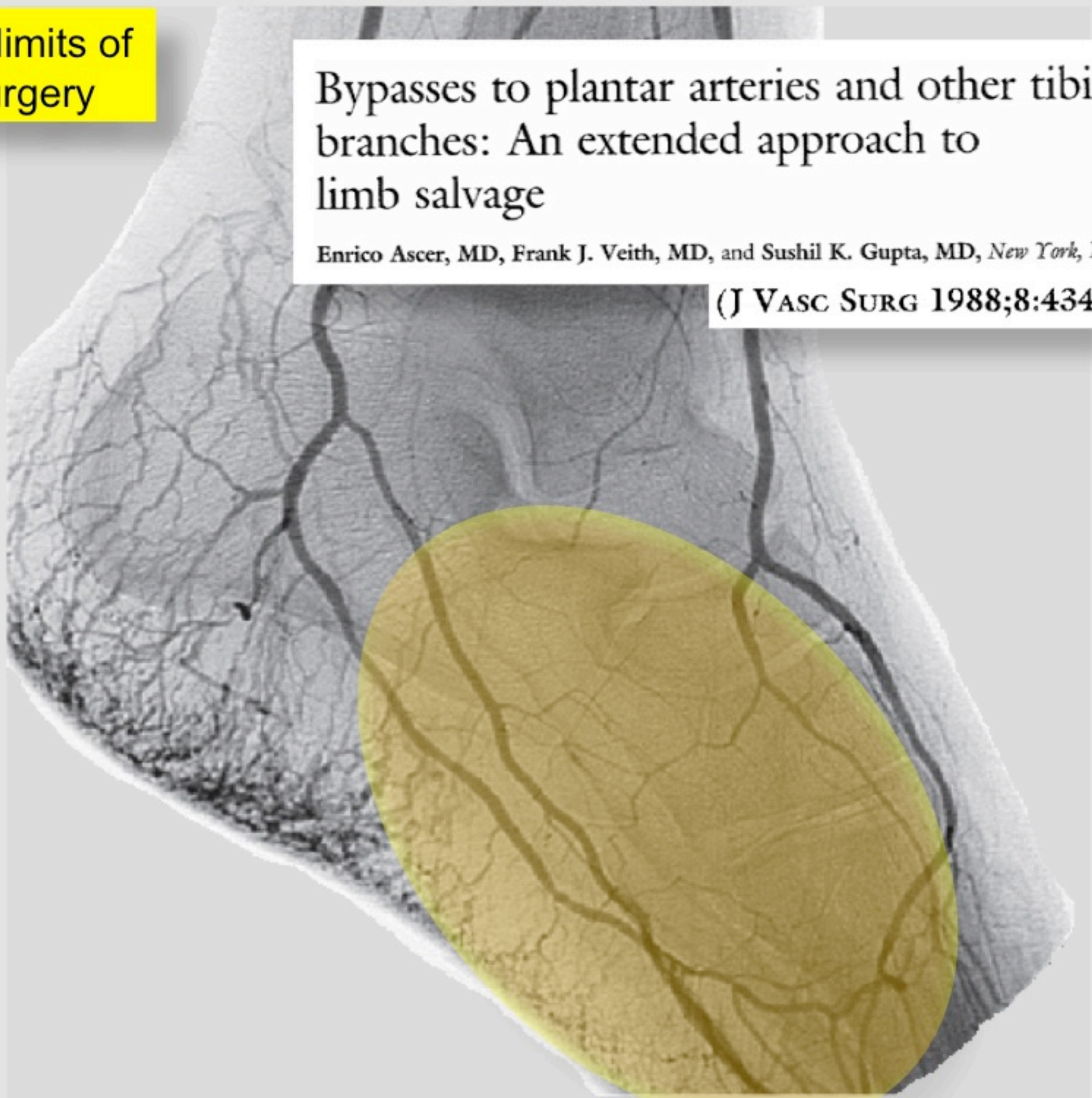
B. AULIVOLA, F. B. POMPOSELLI

Anatomical limits of bypass surgery

Bypasses to plantar arteries and other tibial branches: An extended approach to limb salvage

Enrico Ascer, MD, Frank J. Veith, MD, and Sushil K. Gupta, MD, *New York, N.Y.*

(J Vasc Surg 1988;8:434-41.)



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"... during the past 6 years, we have encountered 24 cases in which all major infrapopliteal arteries were occluded...."

Generally the distal pedal and plantar arteries and the arch are considered unattainable targets for bypass surgery

Anatomical limits of bypass surgery

Some examples of “surgically unreconstructable disease” before and after angioplasty

Case 2

Anatomical limits of bypass surgery

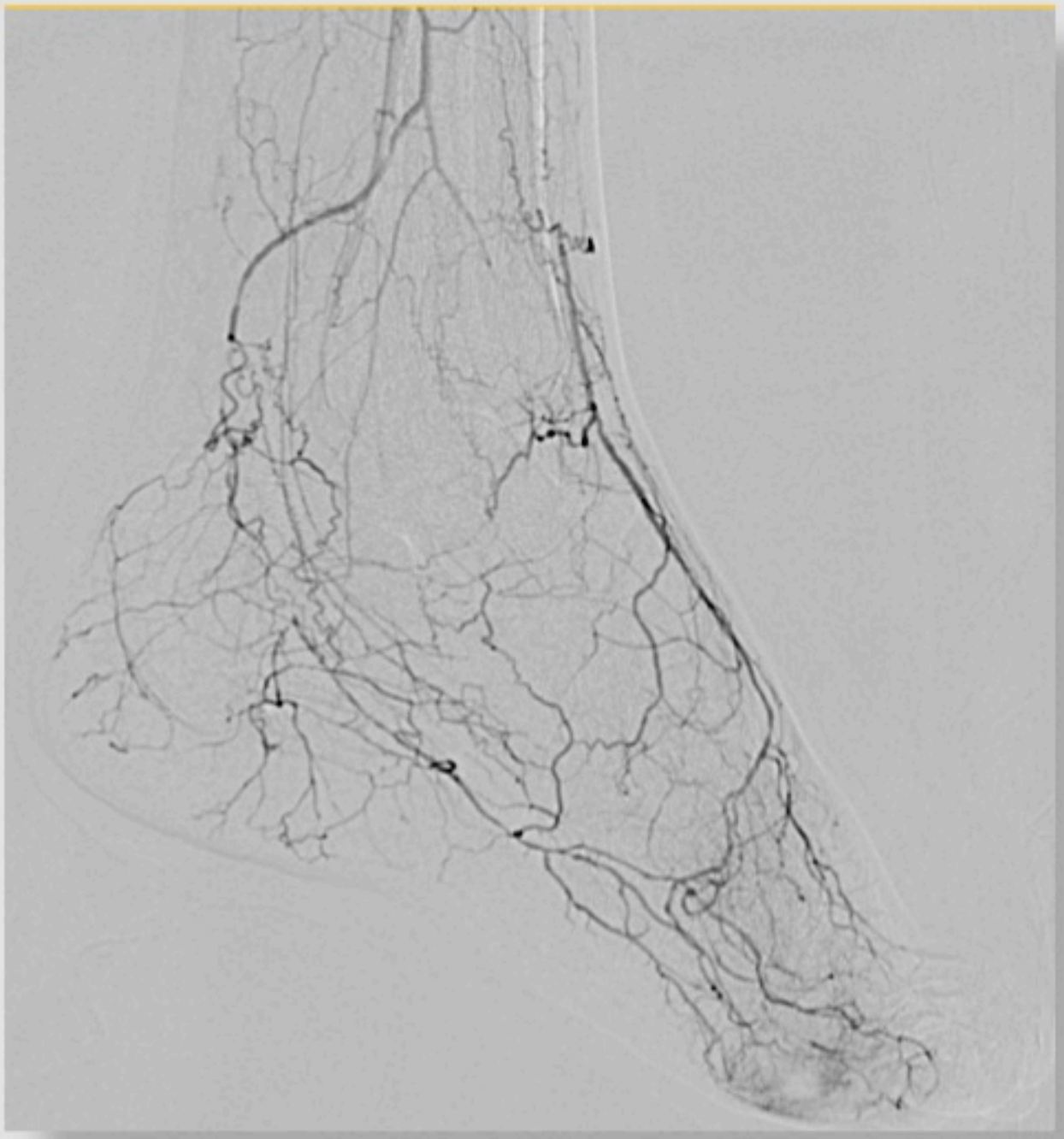
Some examples of “surgically unreconstructable disease” before and after angioplasty

Case 3

Anatomical limits of bypass surgery

Some examples of “surgically unreconstructable disease” before and after angioplasty

Case 4



If angioplasty-first fails, a bailout bypass can be the only solution

4°

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- type of anesthesia/type of bypass

Open surgery

PTA failure? Bailout bypass

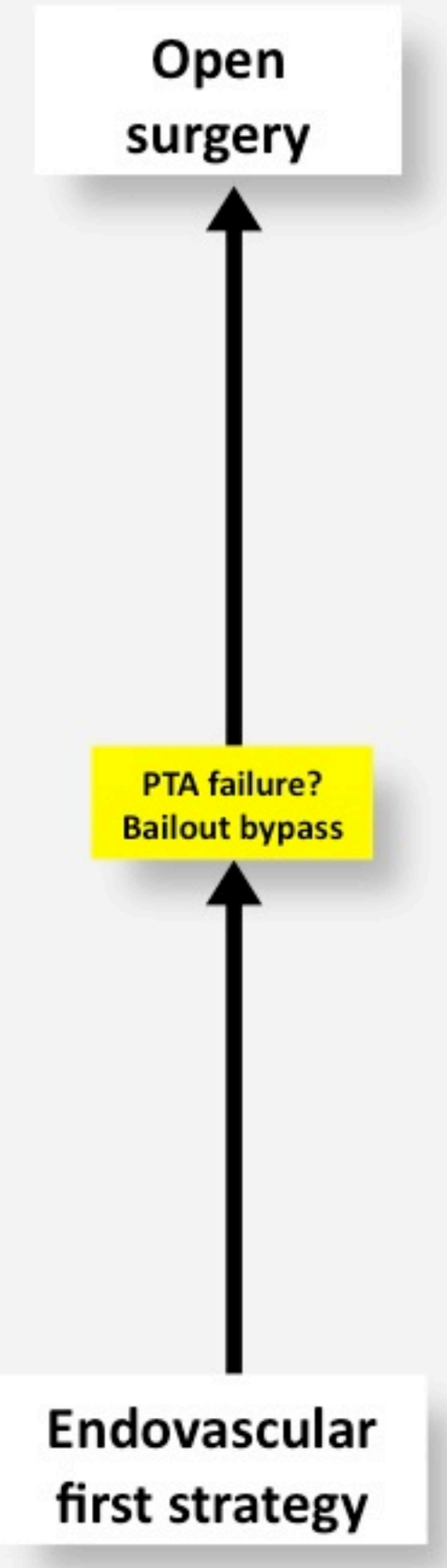
Endovascular first strategy

The must of the endovascular approach:

Preserve future options!!!

1. **Angioplasty first approach must respect the "landing zones" for distal bypass**

2. **Stenting must be considered with extreme attention, because in-stent restenosis/ occlusion is difficult to treat using ENDO or OPEN approach**



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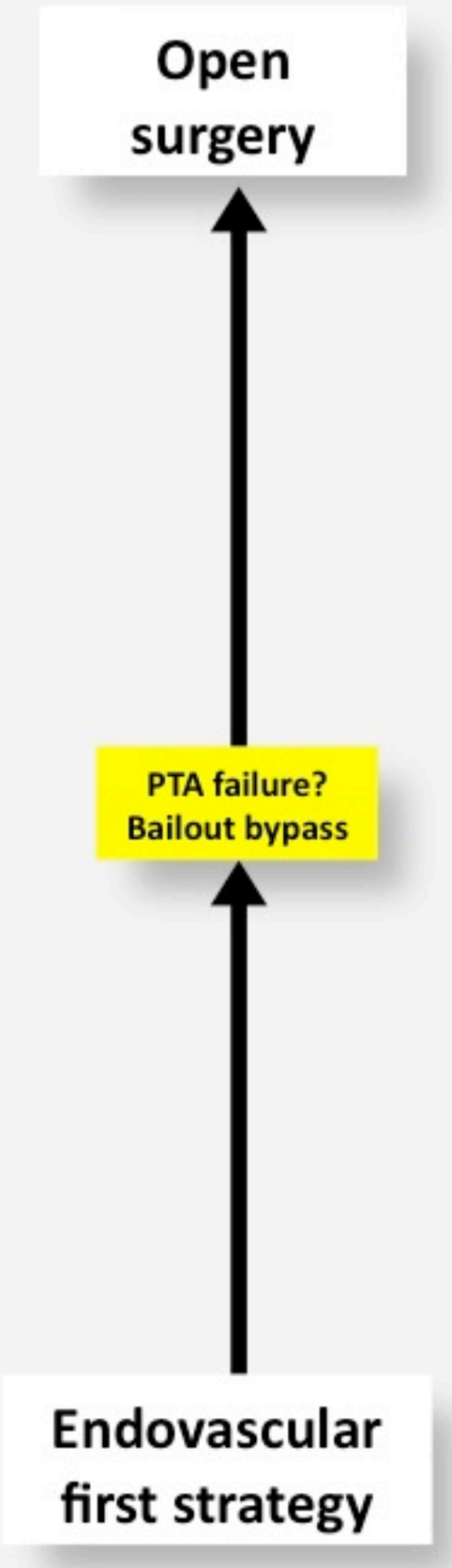
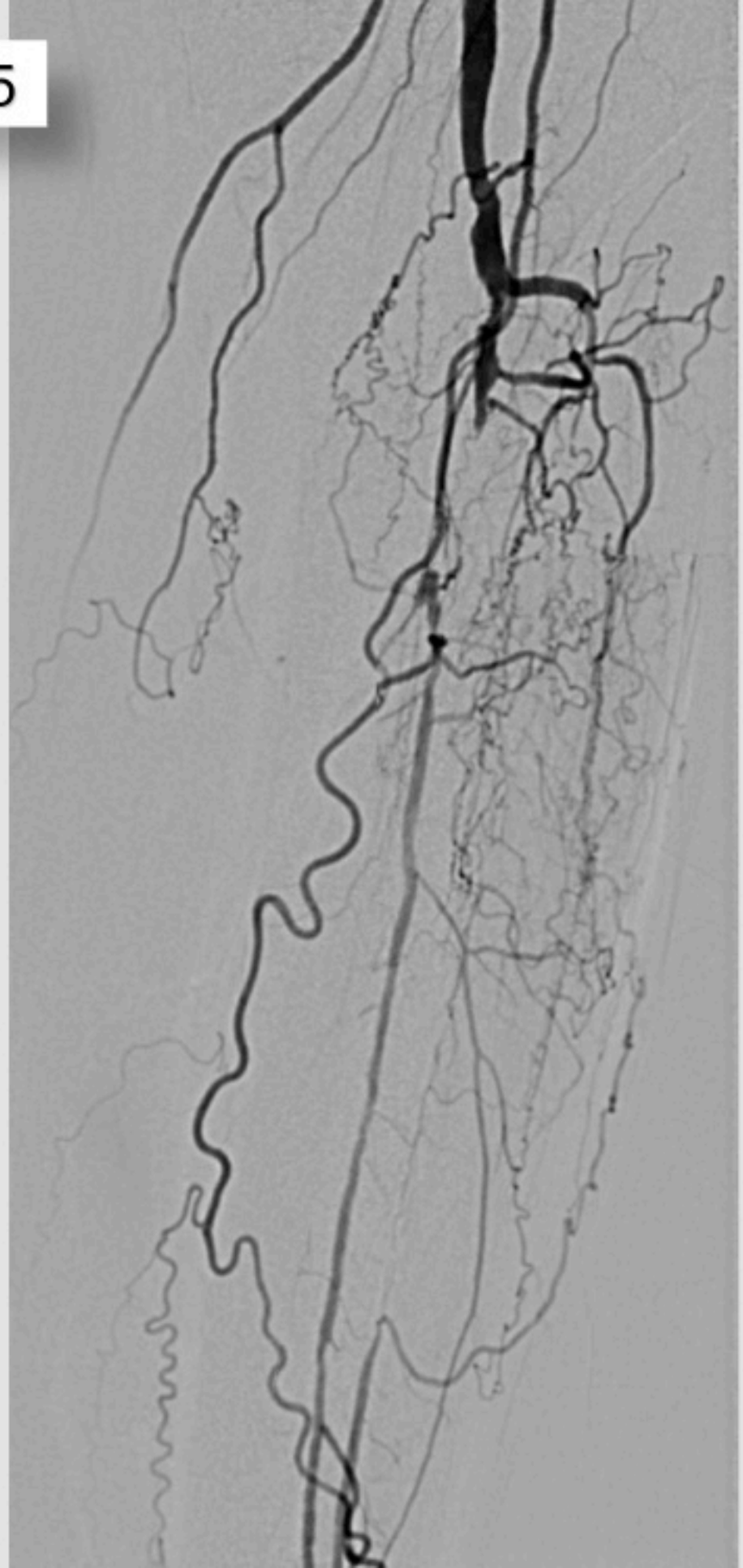


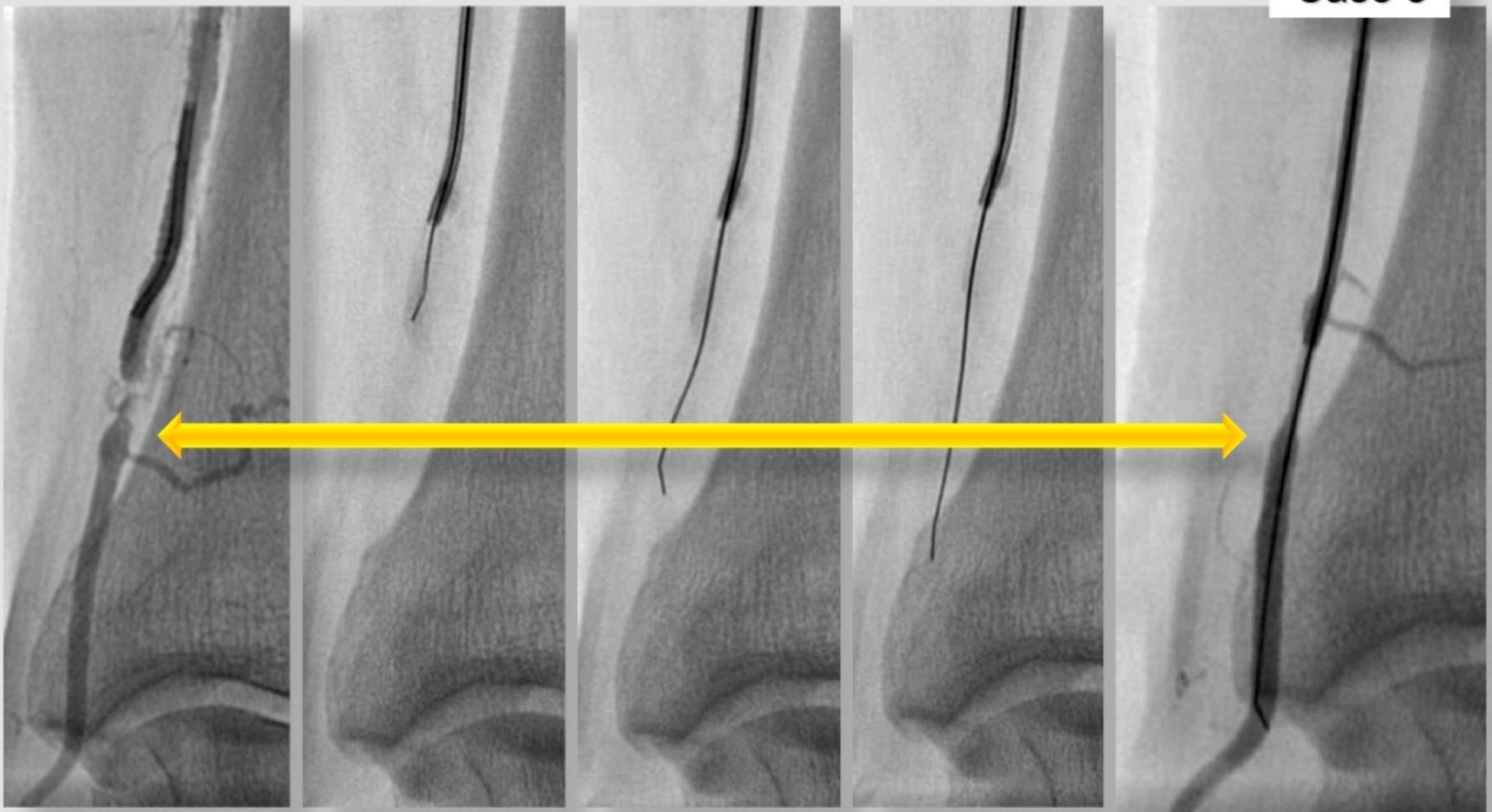
Case 5



Case 5

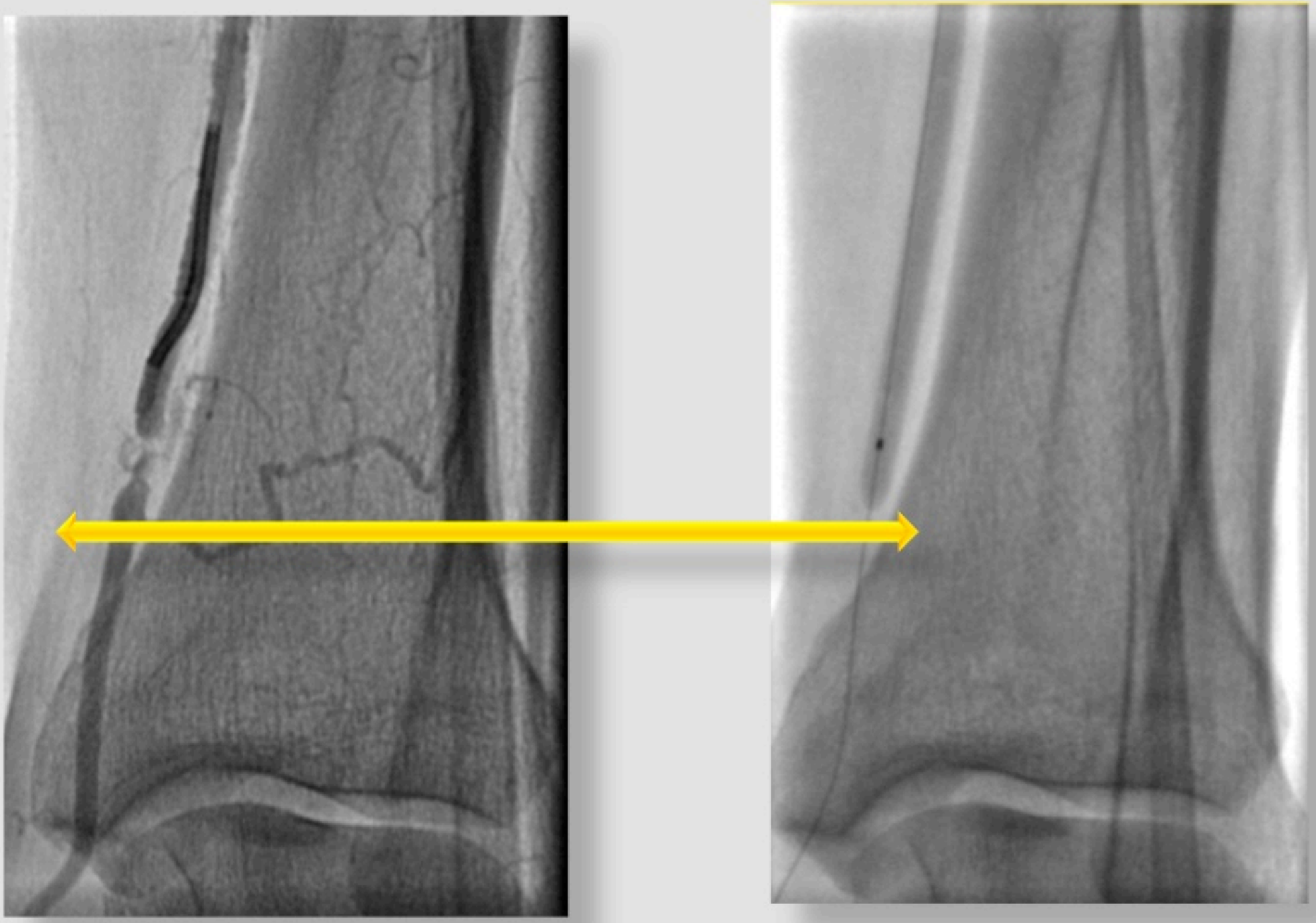
Subintimal approach in posterior tibial artery: the subintimal dissection was stopped at the reentry point

Case 5



0.014” CTO dedicated wire, 12-gauge tip load, able to find the true distal lumen without any damage to the artery

Case 5



2.5 mm balloon inflated at 14 atm: don’t touch healthy vessels!

Case 5

Final result

The distal open and healthy vessel was not touched by the operator!

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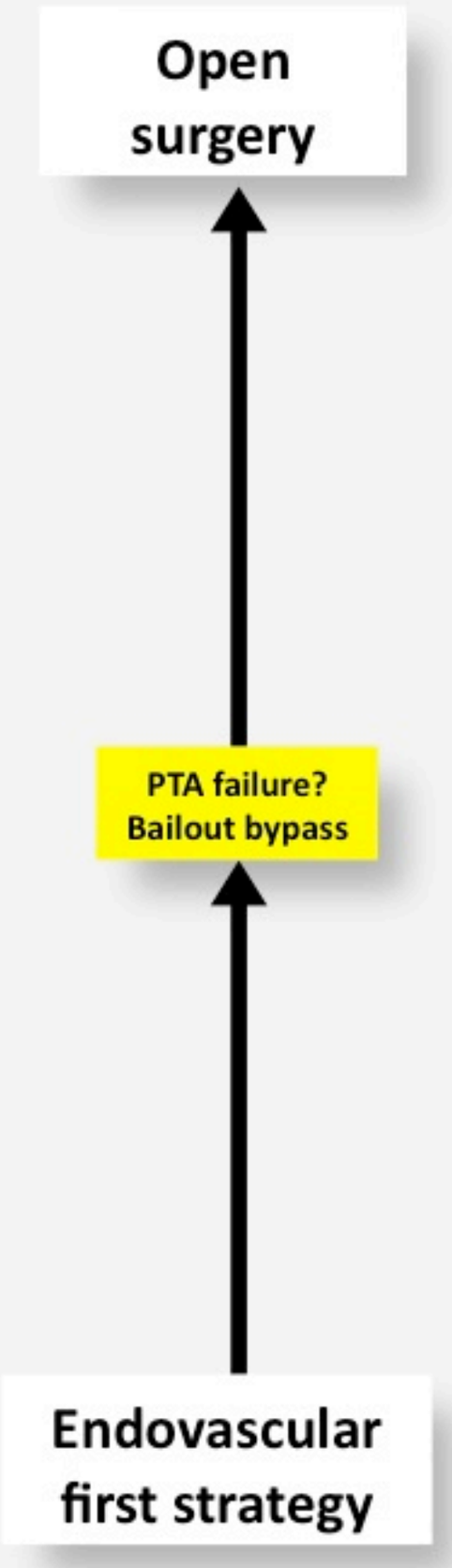

Restenosis is bad, ISR is worse

- Femoro-popliteal ISR incidence: 18~ 40% at 1 year [1]
- Treatment Modalities and ISR Recurrency:

PTA	up to 73% rest. rates at 6-m [2]; 49.9% to 84.8% [illegible] 2-m [3]
Cutting Balloon	65% rest. rates at 6-m [3]
Atherectomy	46% rest. rates at 12 [illegible]
Covered stents	62% [illegible] at 12-m [5,6]
Laser + PTA + hep- coat. covered sten	[illegible]ncy at 12-m [7]
PTA +	[illegible]% Primary Patency at 12-m [8]
DES	78% Freedom from TLR at 12-m [9]

ISR recurrency ~ higher than ISR

1. J.Laird et al. Ti[illegible]pliteal In-Stent Restenosis. JACC 2012
2. P.Dick et al. Co[illegible]sh Angioplasty versus Peripheral Cutting Balloon Angioplasty for Treatment of Femoropopliteal Artery In-Stent Restenosis: Initial Experience. Radiology 2008
3. A. Tosaka et al. Classification and Clinical Impact of Restenosis After Femoropopliteal Stenting. JACC 2012
4. T.Zeller et al. Long-term results after directional atherectomy of femoro-popliteal lesions. JACC 2006
5. TS. Monahan et al. **Effective Treatment of Femoropopliteal In-Stent Restenosis With Stent Grafts** Journal of VascularSurgery, 2011
6. P.Soukas Oral presentation LINC 2011
7. J.Laird et al. Excimer Laser with Adjunctive Balloon Angioplasty and Heparin-Coated Self-Expanding Stent Grafts for the Treatment of Femoropopliteal Artery In-Stent Restenosis: Twelve-Month Results From the SALVAGE Study. Catheterization and Cardiovascular Interventions 2012
8. M.Werner et al. Endovascular Brachytherapy Using Liquid Beta-Emitting Rhenium-188 for the Treatment of Long-Segment Femoropopliteal In-Stent Stenosis JEVT 2012
9. M.Dake LINC 2011 oral presentation