Endovascular Repair of Popliteal Aneurysms: Indications, Imaging, Tips, and Tricks

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Disclosures

- **Consultant – ev3, Rafael medical, Minnow, St. Jude, EKOS**
- **Speaker – Boston Scientific**
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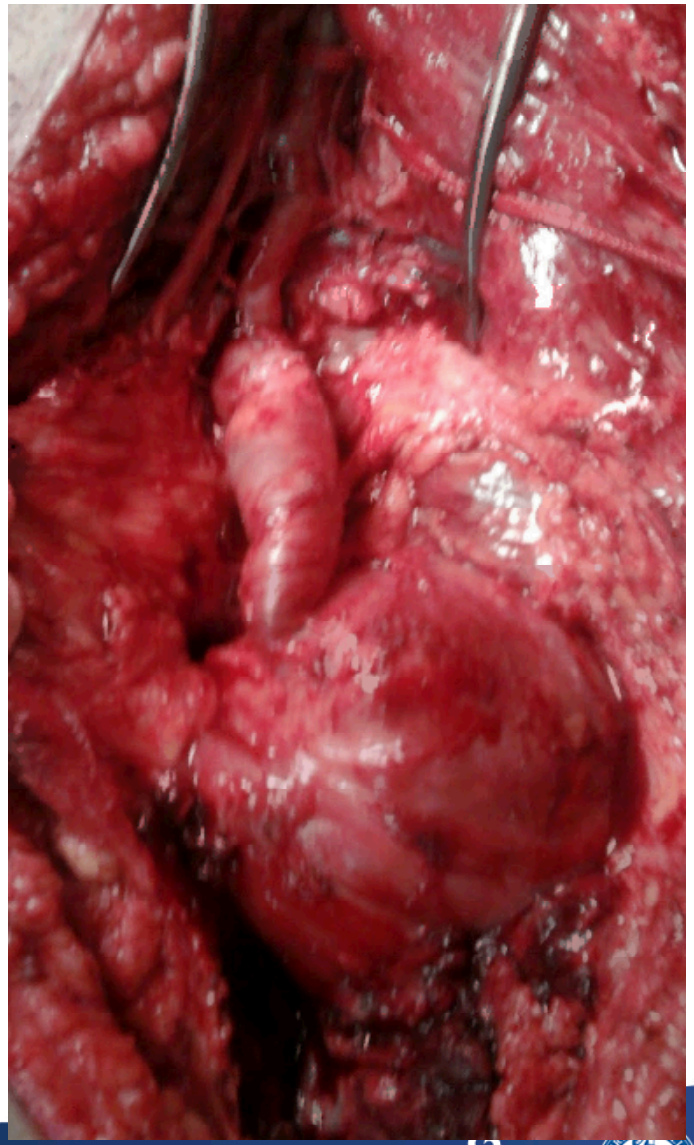
PAA's

- Most common peripheral aneurysm – 1% of population, mostly men, freq HTN
- 40-50% bilateral
- Associated with arteria magna (arteriomegaly)
  - Coexistent AAA, iliac aneurysms, CFA aneurysms
- High rate of symptoms with observation
  - Up to 40% risk of "trash foot"
  - Up to 14% risk of amputation



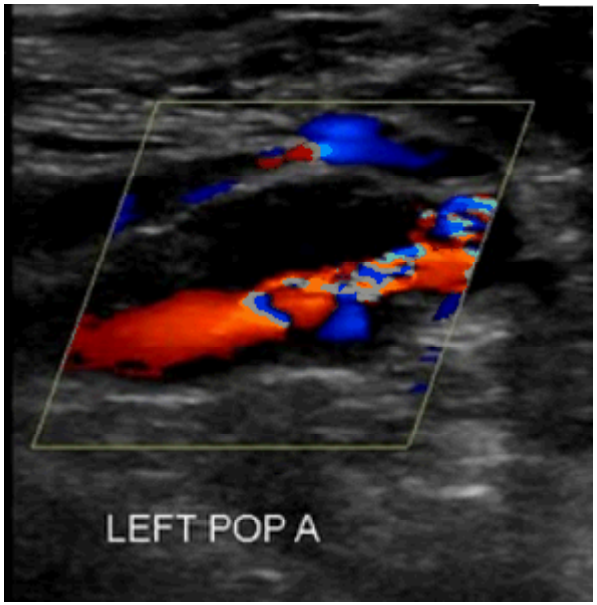
Nonoperative versus surgical management of small (less than 3 cm), asymptomatic popliteal artery aneurysms

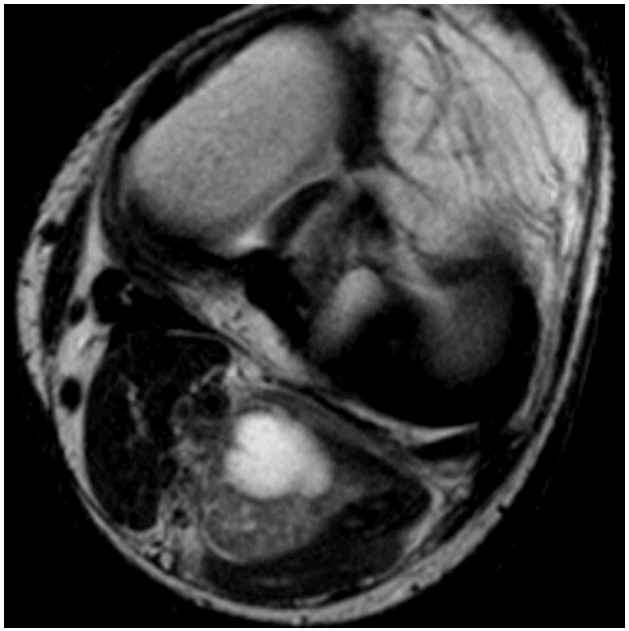
(J Vasc Surg 2011;53:1145-8.)

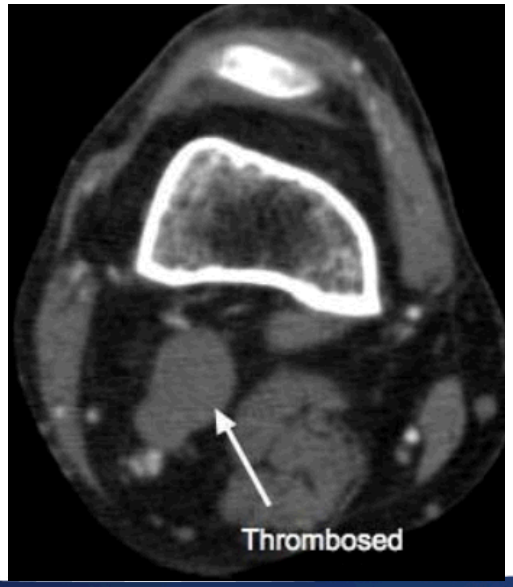
Jane E. Cross, MB, MRCS,[a] Robert B. Galland, MD, FRCS,[a] Anil Hingorani, MD,[b] and Enrico Ascher, MD,[b] *Berkshire, United Kingdom; and Brooklyn, NY*

- **40% of asymptomatic patients with popliteal aneurysms will have absent pedal pulses, which adversely affect the natural history with a likelihood of symptoms developing of 86% at 3 years compared with 34% in asymptomatic patients with intact pulses.**
- **Size not a reliable predictor of events – smaller aneurysms with intraluminal thrombus or aneurysm "distortion" at higher risk of events**

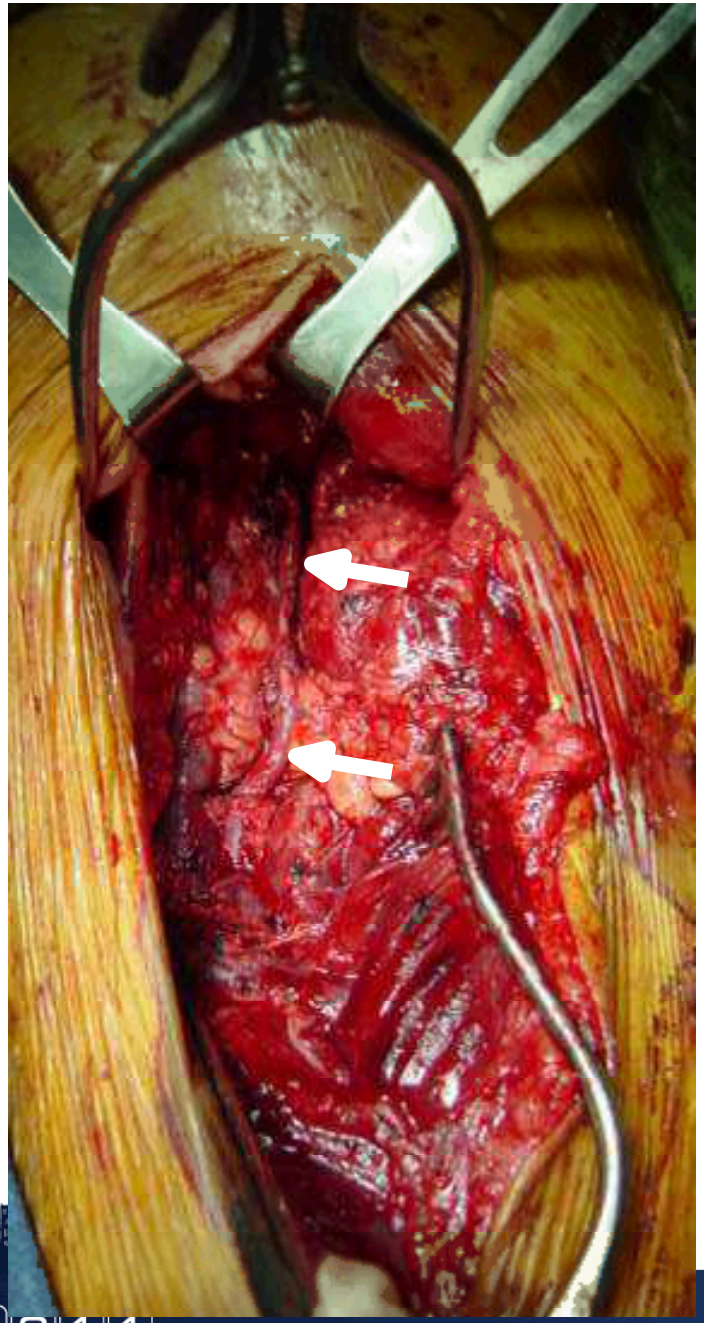
Imaging

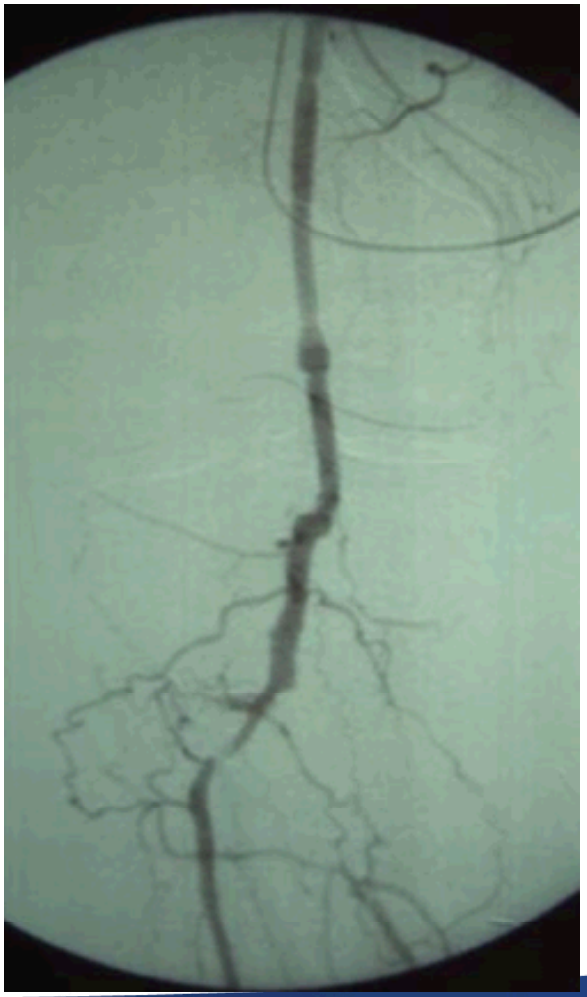






PAA's mgmt traditionally surgical





Criteria for endovascular therapy

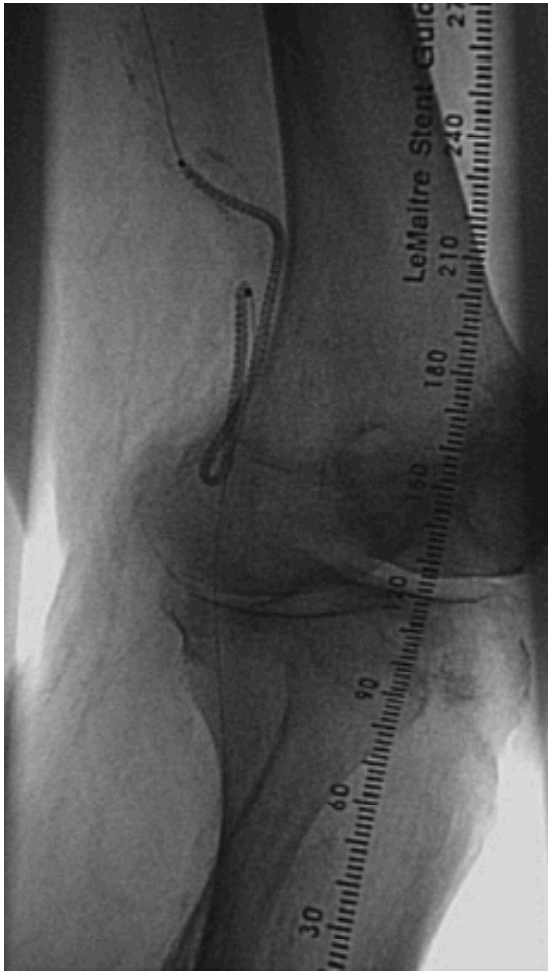
- Symptomatic → ♦♒❒□❍♌□♦♓♦🖃 ALLI, blue toe syndrome
- Asymptomatic □ > 2cm, < 2cm with thrombus
- NO nerve or vein compression
- >50 years old
- Appropriate anatomy
  - At least one cm of seal at prox and distal ends
  - Ability to place grafts sequentially

Endograft sizing

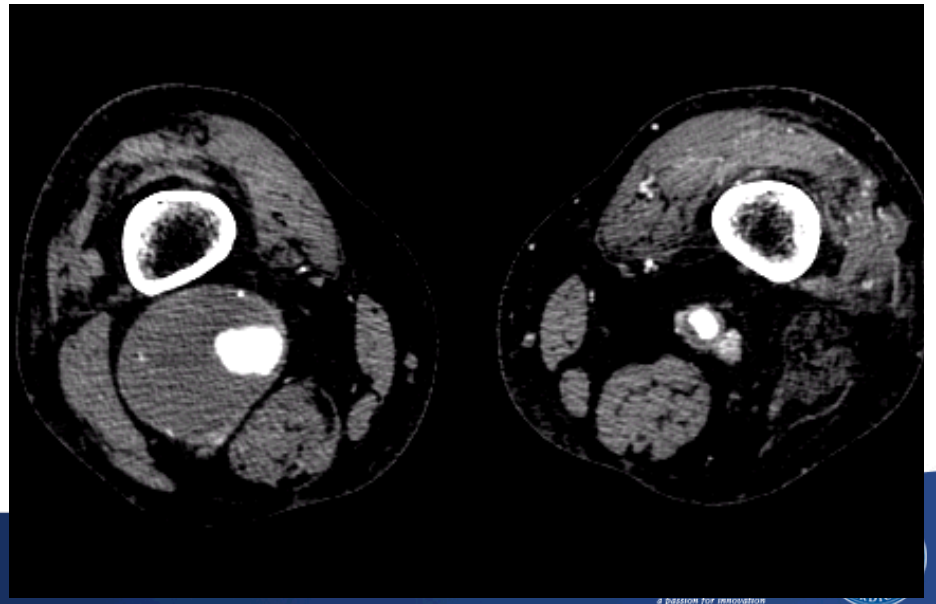
- Preop planning with CTA or Duplex
- Intraprocedural marker catheters in all cases
- IVUS potentially useful for measuring thrombus free landing zone diameters
- Overlap grafts 2-3 cm → ♍♋●♍◆●♋♦♏ ✂ devices
- 1-3 cm prox and distal landing zones
- Oversize by no more than 1 cm
  - Nested devices if large variation in size prox to distal
  - Size to larger diameter landing zone if single device
- Distal end at least one cm from ant tibial origin?

Important points

- Do not mismatch wire and graft
- Assure sufficient overlap as well as prox and distal landing lengths
- Account for “bowing” of graft in aneurysm



- 76 y.o. WM Ischemic Cardiomyopathy EF 35%
- Pulsatile right popliteal mass. No claudication, rest pain, tissue loss, blue toes.
- PMHx CRI, HTN, dyslipidemia, CAE.




BERT F, SNR
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2
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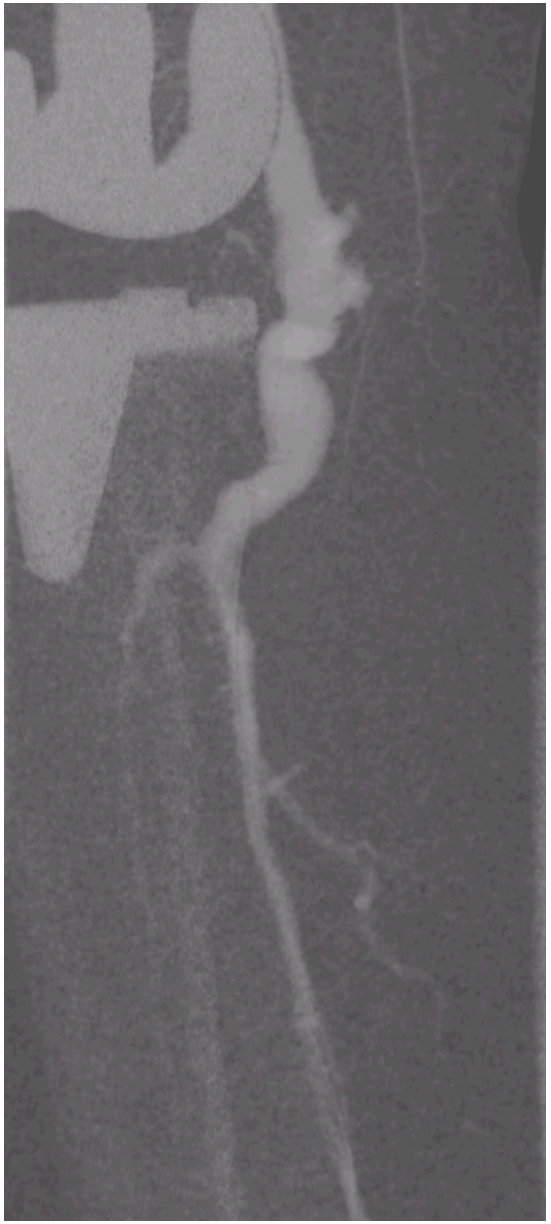
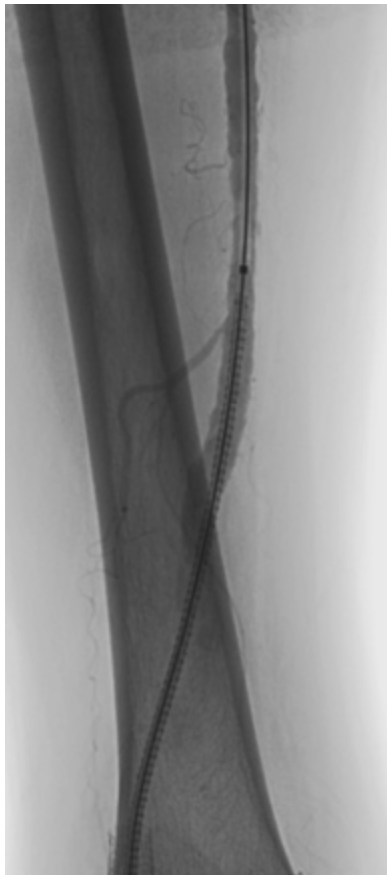
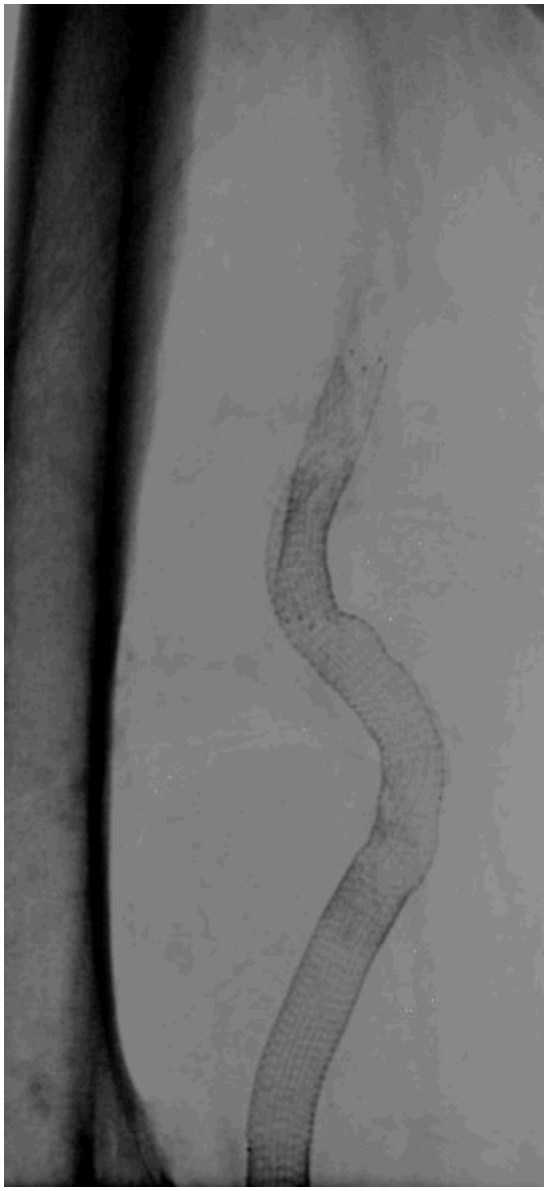
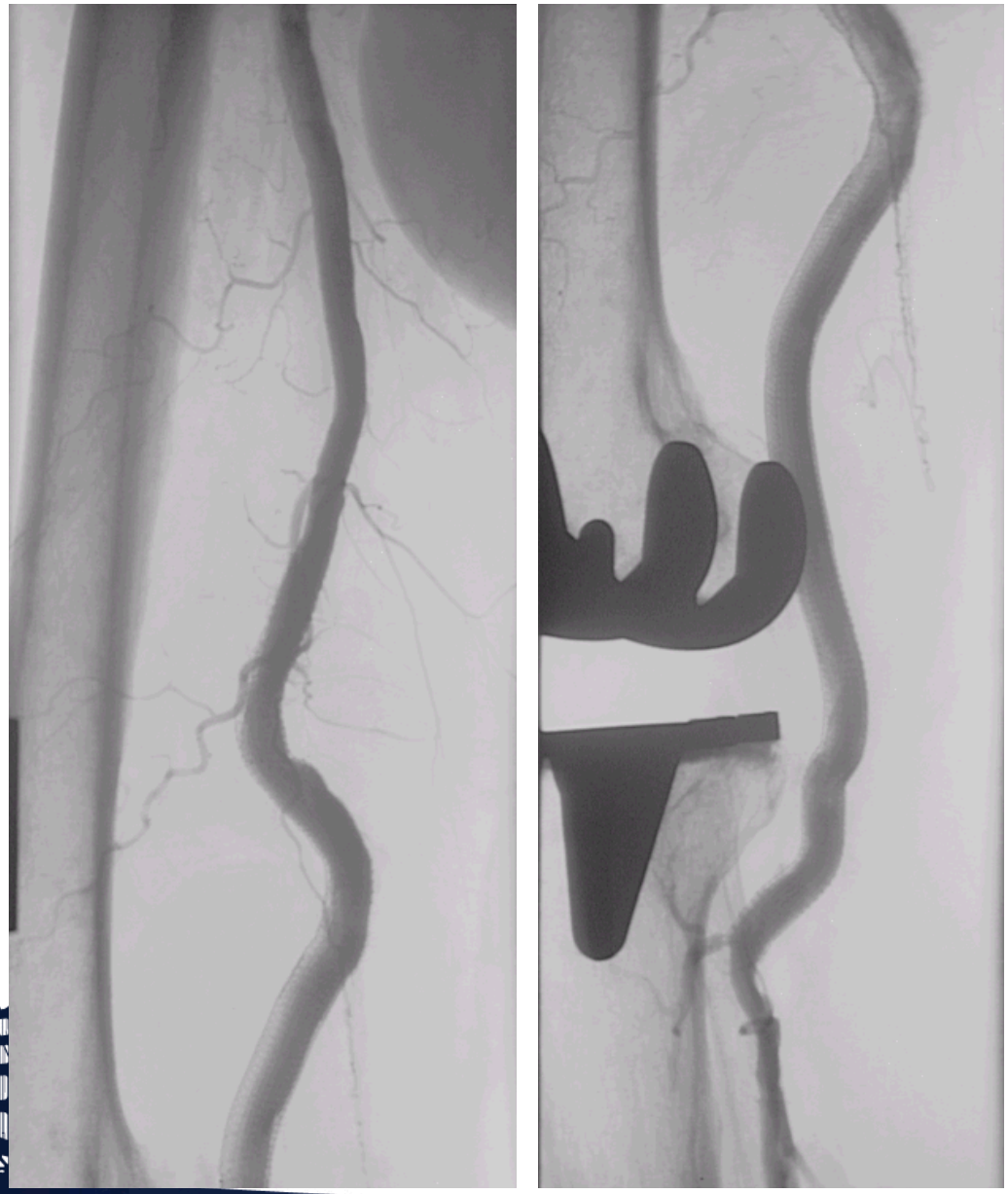
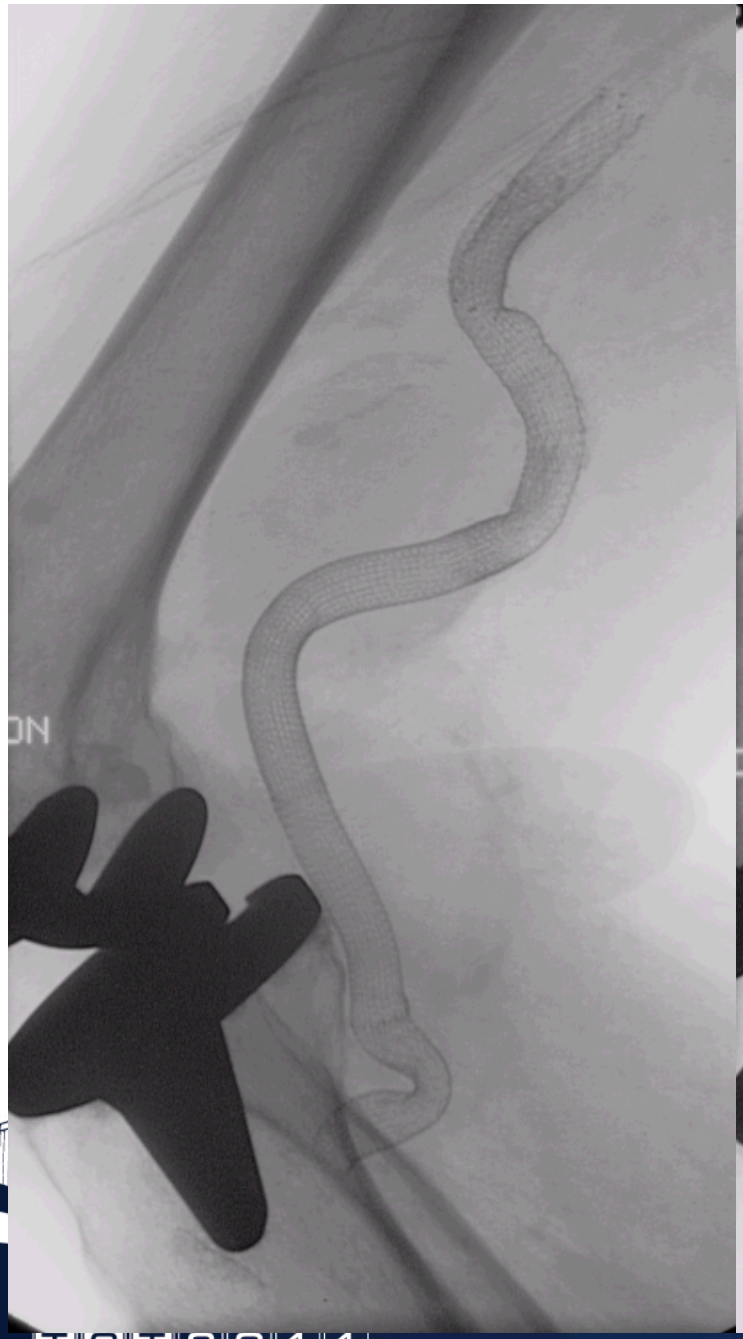


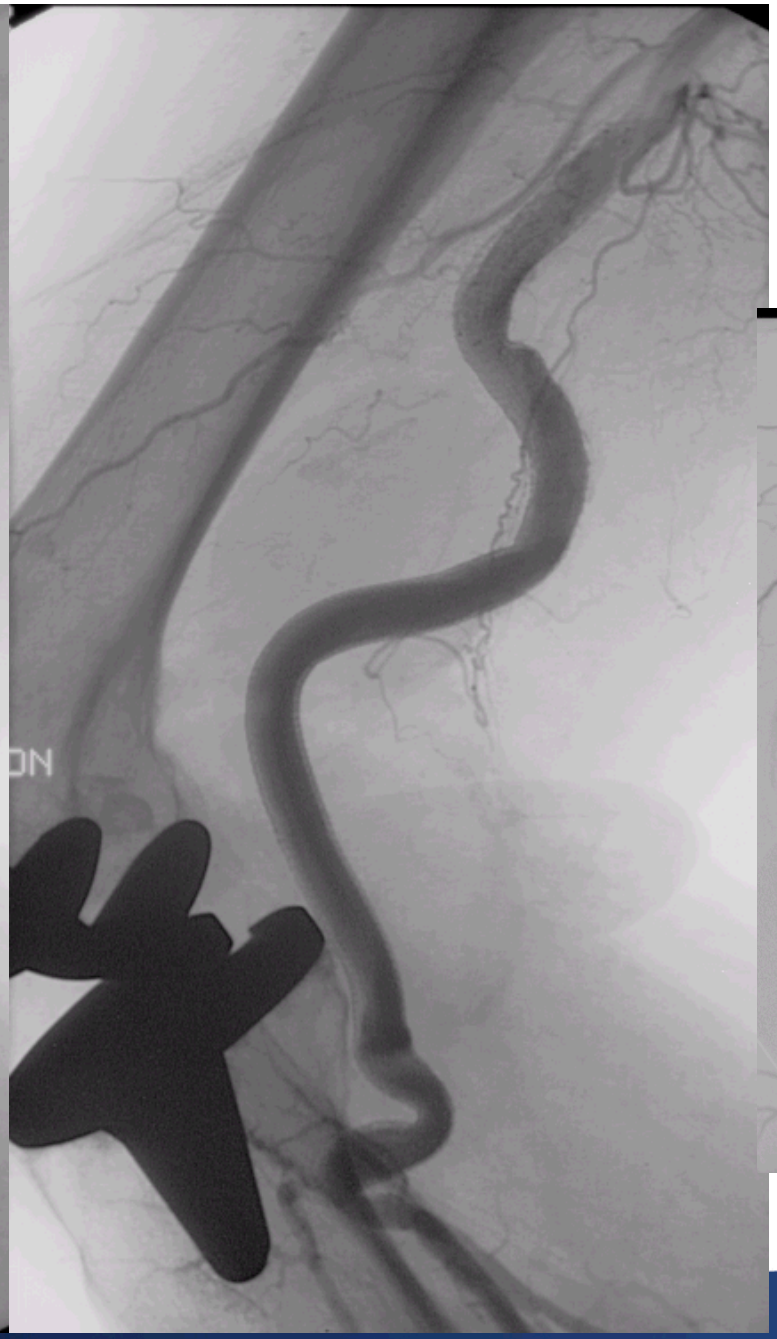




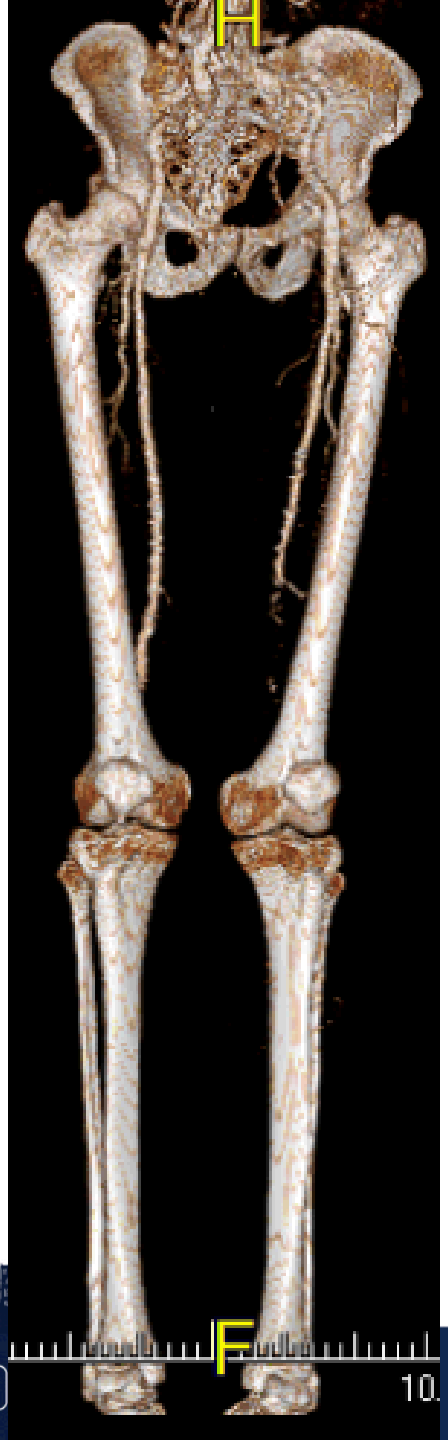



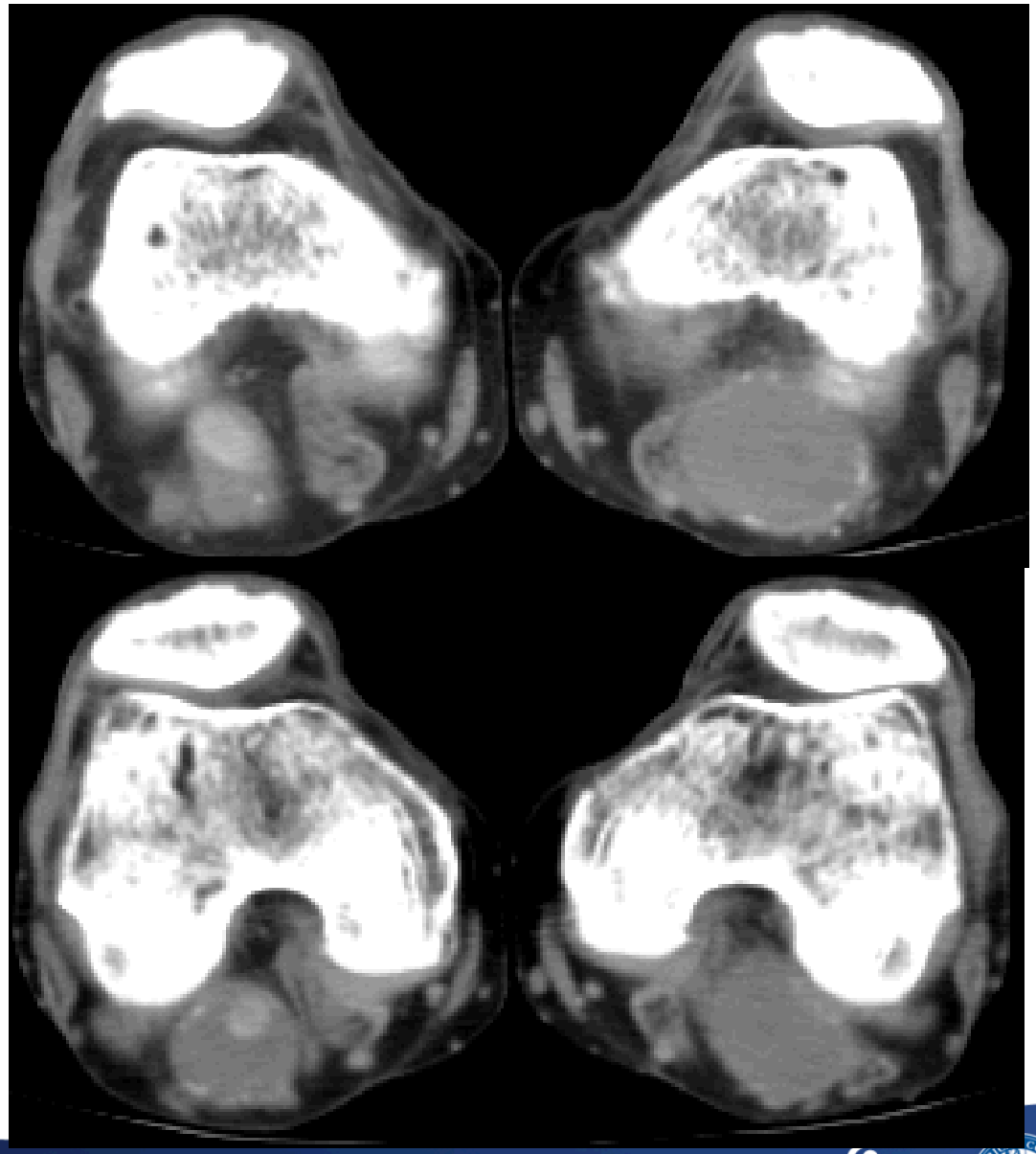


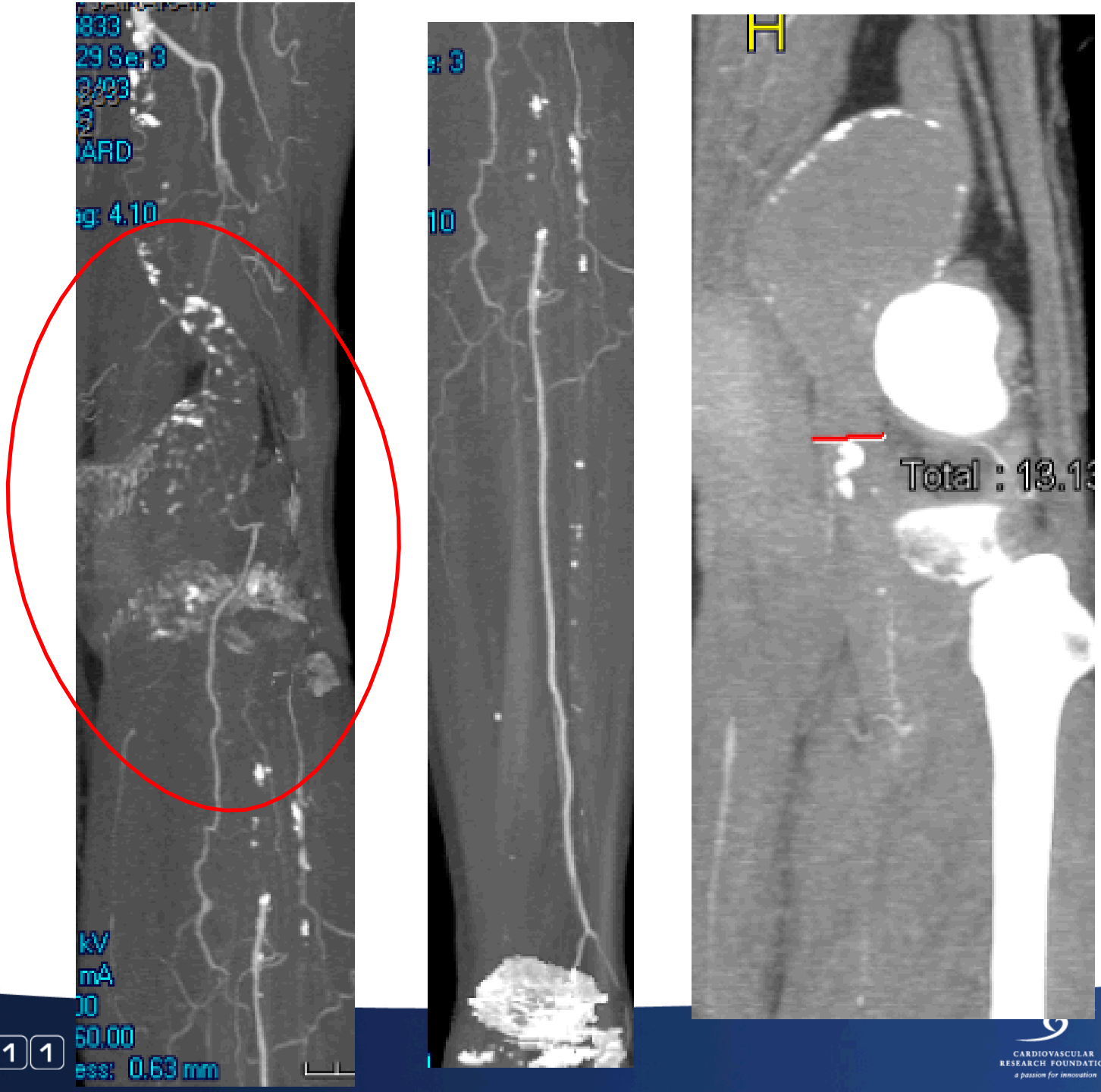


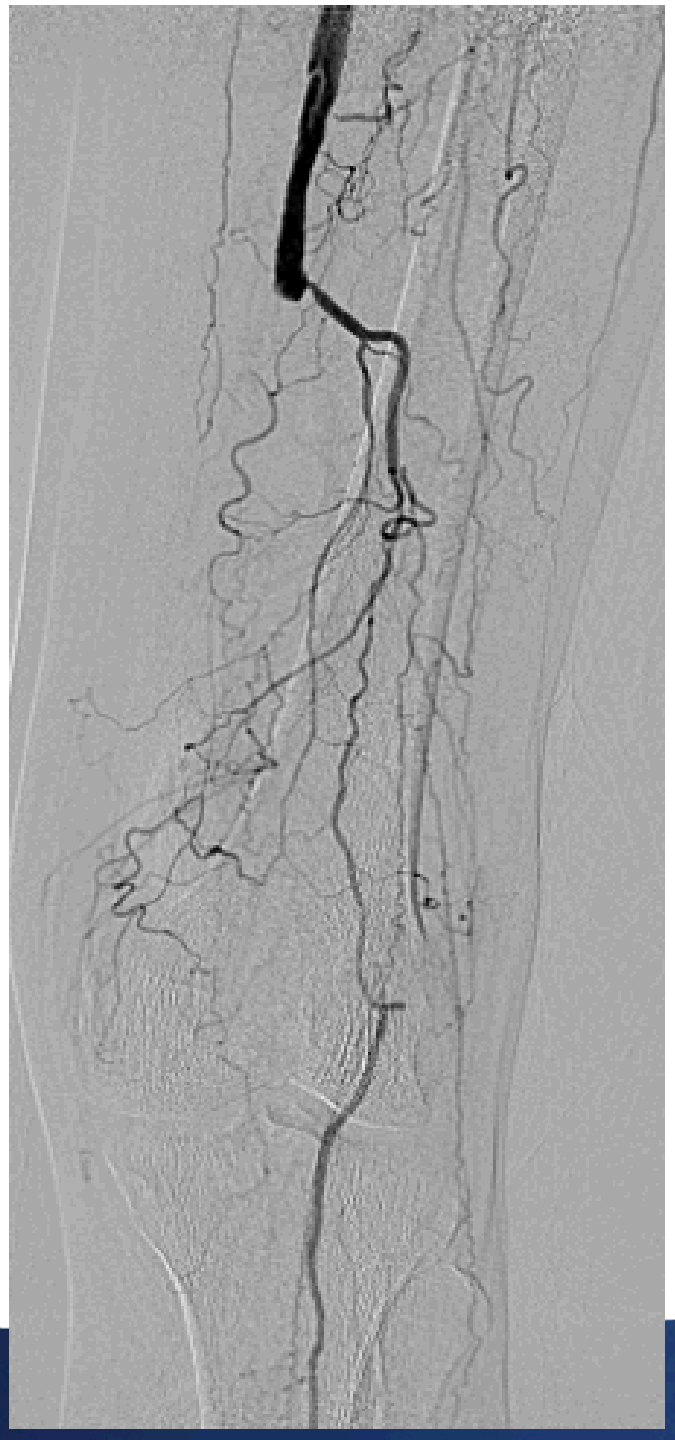
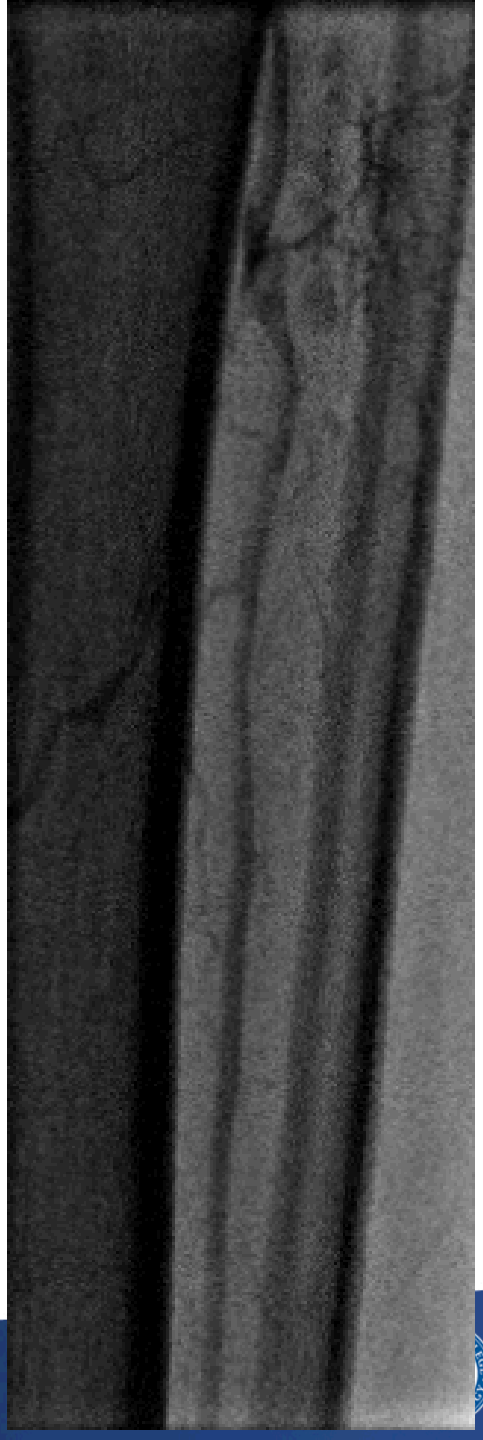


THROMBOSED

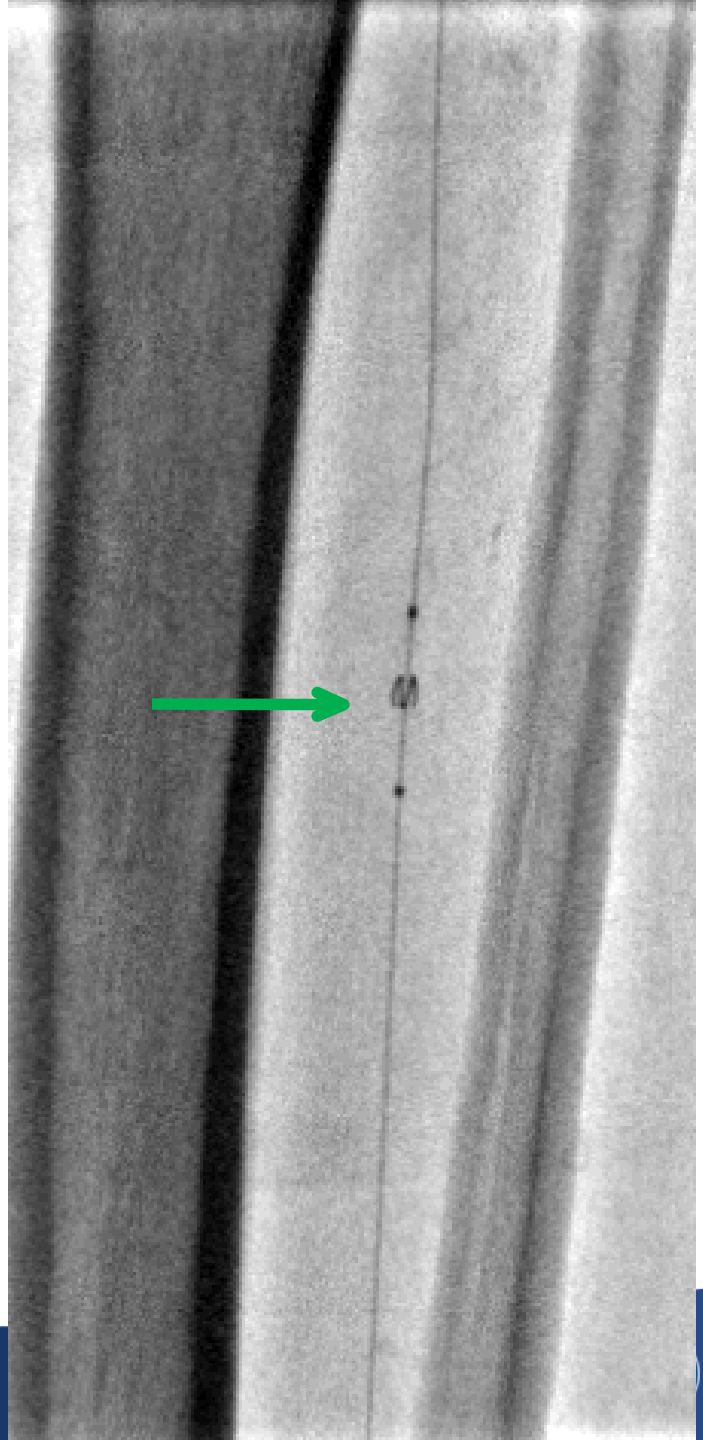




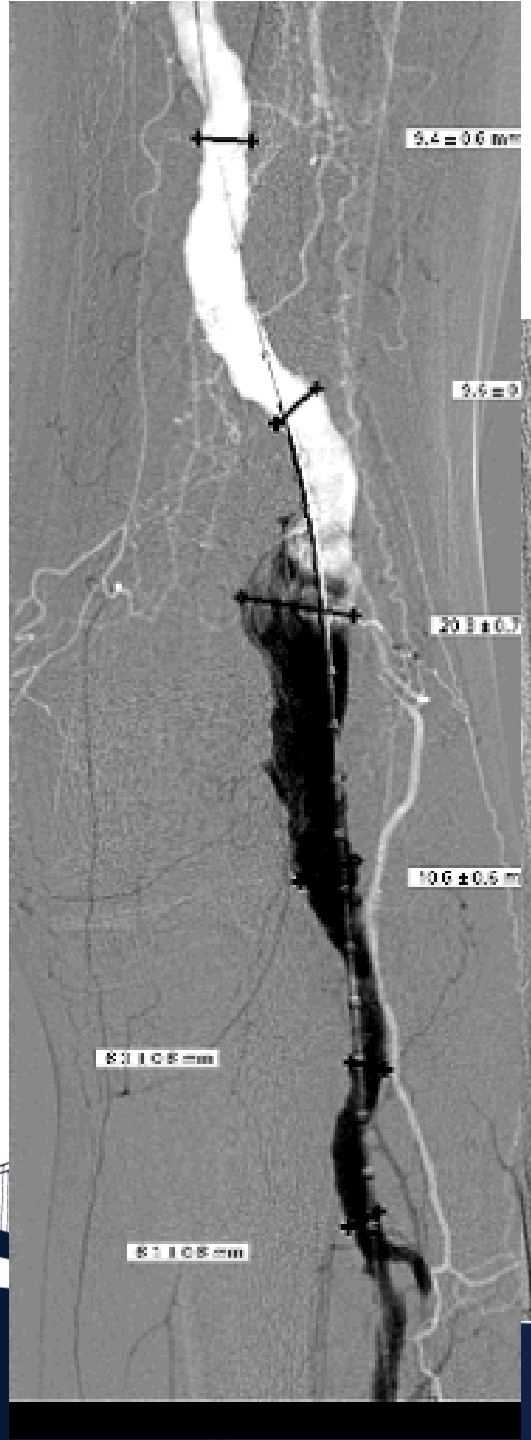
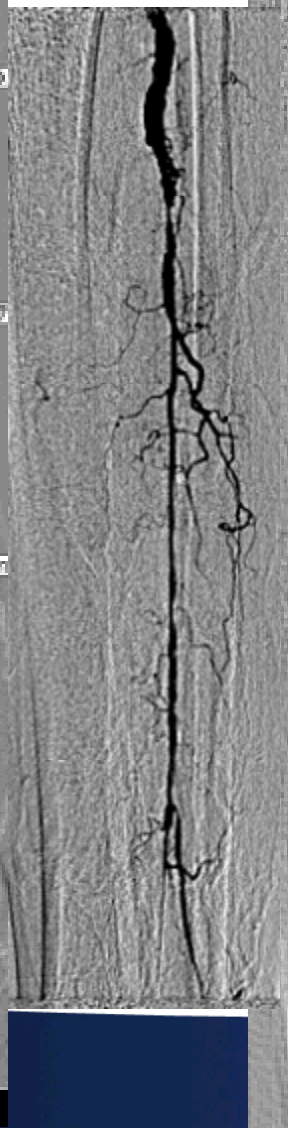


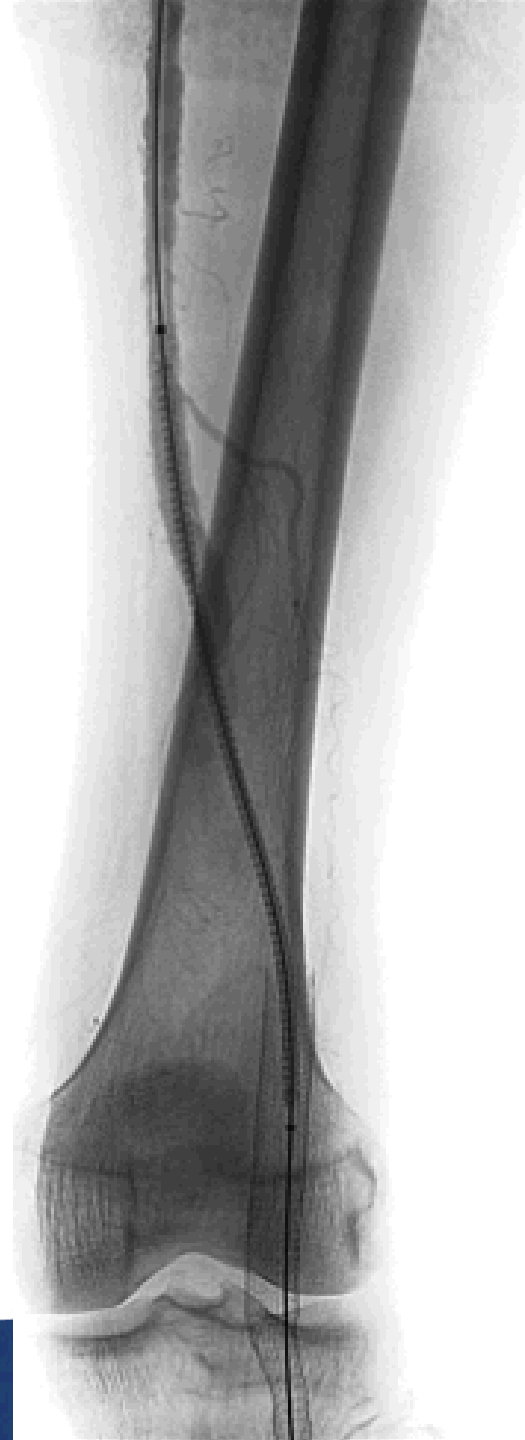




Cragg-McNamara Thrombolytic Infusion Catheter and Emboshield Nav6 Filter







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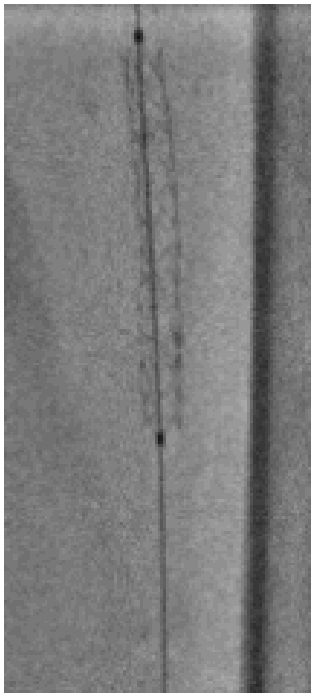
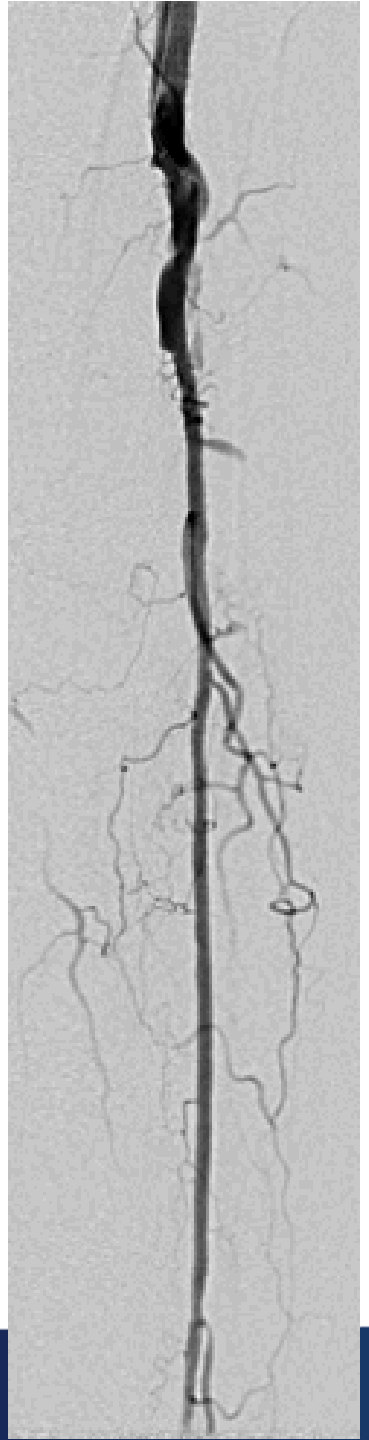
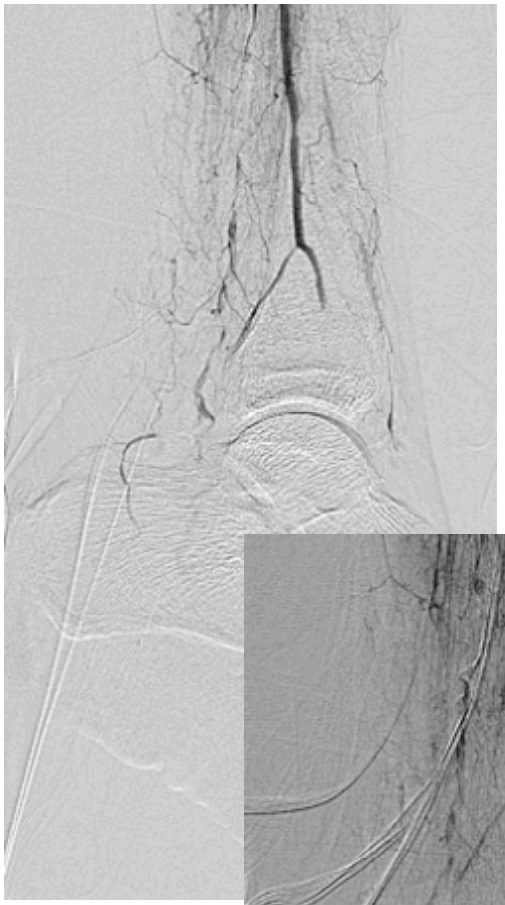
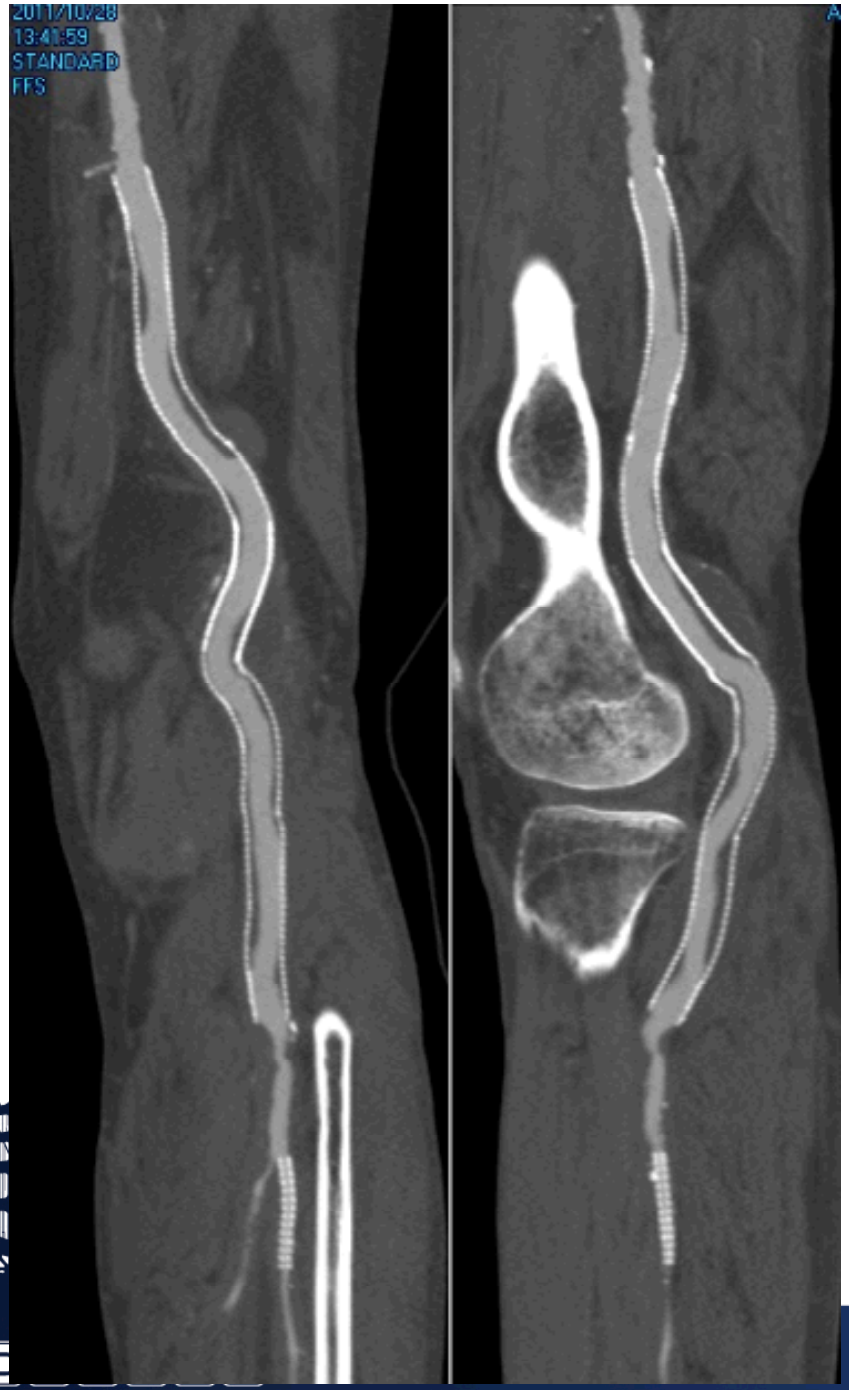




6 month follow-up

Published literature

AUTHOR	YEAR	REPAIR TYPE ENDO vs SURG	1 YR PATENCY 1o	1 YR PATENCY 2o	1 YEAR LIMB SALVAGE	LATE PATENCY 1o	LATE PATENCY 2o	LATE LIMB SALVAGE	LAST F/U YRS
Bellosta, et al	2010	Surgical	86%			60%		92%	3 yrs
Zimmerman, et al	2010	Surgical	77%						2 yrs
Johnson, et al	2008	Surgical	92.60%		97. 6%			97.10%	4 yrs
Davies, et al	2007	Surgical				75%	95%	98%	6 yrs
Ravn, et al	2007	Surgical	85%			90%			7.2 yrs
Antonello, et al	2007	Surgical	100%			71.40%	88.10%		6 yrs
		Endovascular	80.90%			88.10%	85.90%		6 yrs
Jung, et al	2010	Endovascular	100%			84.60%	100%		4.5 yrs
Etezadi, et al	2010	Endovascular	94%			86%			1 yr
Tielliu, et al *	2010	Endovascular	80%	90%		78%	87%		4 yrs / 2 yrs
Midy, et al	2010	Endovascular	85.80%	87.50%	96. 5 %	82.30%	87.50%		3 yrs
Idelchik, et al	2009	Endovascular	93.90%	96.90%		84.80%	86.80%		3 yrs
Tielliu, et al	2007	Endovascular	77%	86%		70%	76%		2 yrs
Mohan, et al	2006	Endovascular	92.90%	96.50%		80%	88.70%		2 yrs
Gerasimidis, et al	2003	Endovascular	64%	88%		47%	75%		1 yr

Endovascular treatment of popliteal artery aneurysms: Results of a prospective cohort study

Ignace F.J. Tielliu, MD,[a] Eric L.G. Verhoeven, MD,[a] Clark J. Zeebregts, MD, PhD,[a] Ted R. Prins, MD,[b] Mark M. Span, PhD,[c] and Jan J.A.M. van den Dungen, MD, PhD,[a] *Groningen, The Netherlands*

- N=67 PAA's, 57 pts
  - 10 excluded
  - 5 acute thrombosis
  - 52 chronic

Criteria

Non-thrombosed:
- at least 3 cm prox and distal landing zones in popliteal
- absent of inflow aneurysmal or stenotic disease

Thrombosed:
- Rutherford category I or IIa ALLI
- successful thrombolysis with appropriate anatomy

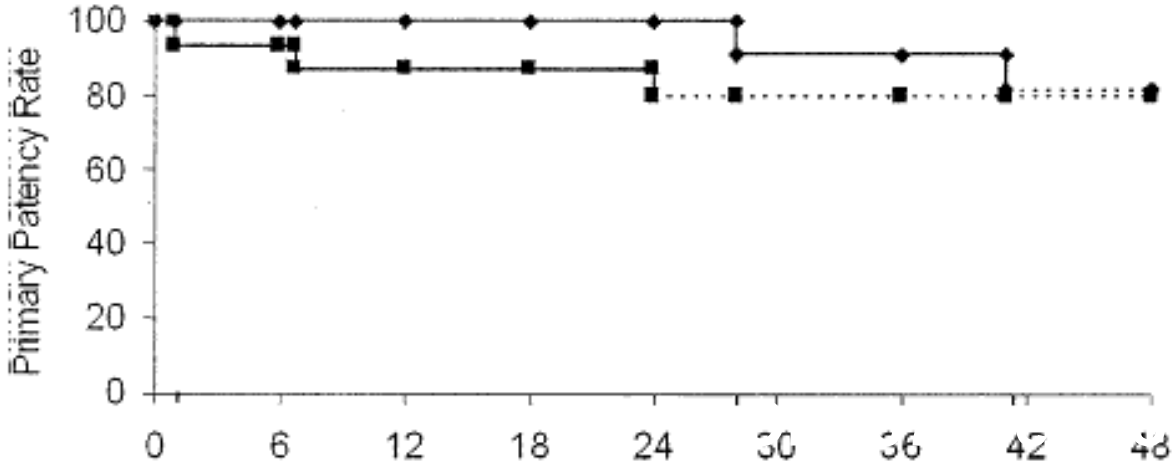
12 (21%) reoccluded
5/12 within 1 mth
8/12 within 6 mths

Rx → ⌨
thrombolysis, 1 surgery, 4 conservative

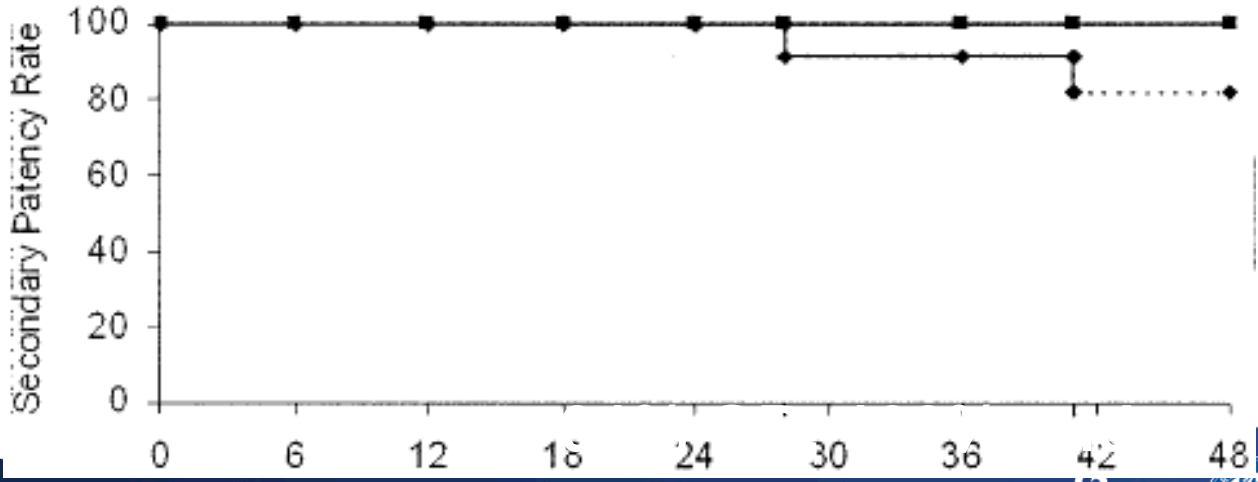
No bypasses or amputation

Clopidogrel (n=18) only predictor of long-term success on both uni- and multivariate analysis

N=26 pts, 30 PAA's



	OR	endo
Rx time(min)	155.3	75.4
hospital (d)	7.7	4.3



Stent fractures

Tielliu, et al. JVS 2010

- **22% @ 5 YR, 27% @ 10 YR**
- **Younger age**
- **Multiple overlapping stent**

- **Fractures at overlap zones and adductor tubercle**

- **No relationship with graft occlusion**

Conclusion

- Endovascular repair of PAA's has similar outcomes out to 5 years as open repair
- Learning curve likely accounts for early failures
  - Graft sizing and attention to landing zones critical
- Antiplatelet therapy critical for at least 3 mths
- Stent fractures may represent a late hazard → restrict endovascular repair to older pts!