



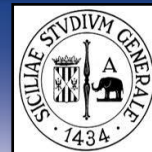
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CONFERENCES ET ACTUALISATION CONTINUË VASCULAIRE  
CONTROVERSIES & UPDATES  
IN VASCULAR SURGERY  
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# Totally occluded popliteal aneurysms : the covered stent graft miracle

*Pierfrancesco Veroux*



## Popliteal Artery Aneurysms(PAAs)

- PAA, despite is the most prevalent peripheral aneurysm, is an uncommon disease
- PAA natural history demonstrates 1-year complication rate of 24% increasing to 68% at 5 years





## Treatment of PAAs

In asymptomatic patients, elective repair of PAAs >20 mm is generally undertaken to prevent clinical complication such as: distal embolization, thrombosis, and less frequently rupture of the aneurysm.



## Open repair of PAAs

- The open repair of PAA offers better long-term results than EV repair.
- The results are better in asymptomatic patients, those undergoing elective surgery with good runoff.
- Saphenous vein bypasses showed better primary patency at 24 months than ePTFE (94.9% vs 79%;  $P = .04$ )
- Poor runoff was an independent factor for worse primary patency

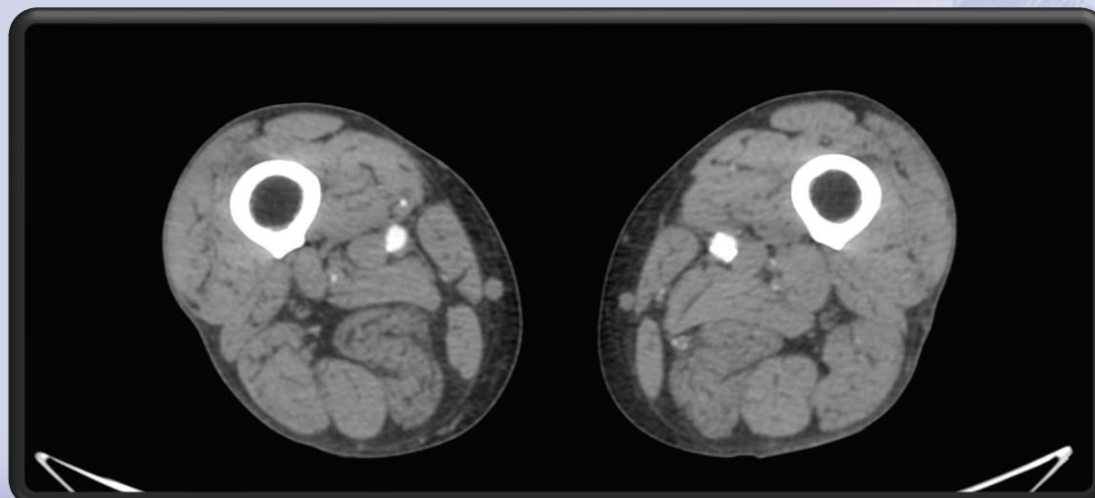


## Endovascular repair of PAAs

5 years FU

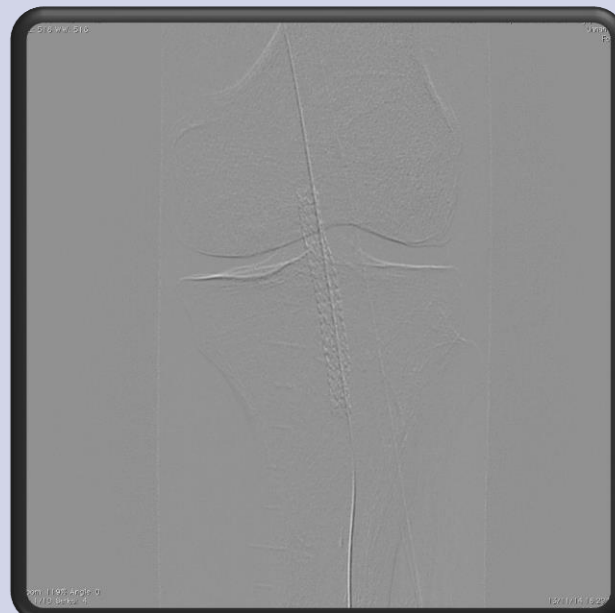
Primary patency	76%
Limb salvage	98%
Survival rate	82%
Significant sac volume shrinkage	

12 months FU





## Endovascular exclusion of PAAs





## Thrombosis of PAAs

The mechanisms leading to thrombosis of PAA is not completely understood.

Anatomic and hemodynamic factors are probably involved:

- Enlargement and severe angulation of aneurysm
- Thrombus mobilization
- Distal embolization and /or BTK occlusive diseases can determine high resistance and flow disturbance in the popliteal segment
- Absence of collateral arising from the aneurysm.



## Treatment of chronic occlusion of PAAs

- Management and treatment are complex and the results are significantly worse than in asymptomatic patients, with an early major amputation rate  $> 10\%$
- Distal saphenous vein by-pass is probably the first line of treatment of chronic occlusion of PAAs in patients with CLI

**But**.....





## Open repair of chronic occlusion of PAAs

### Limitations

- Older patients with severe comorbidity
- No availability of adequate great saphenous vein, especially in case of the aneurysm involve the distal popliteal artery
- Poor run-off: progressive deterioration due to distal embolization or BTK chronic peripheral diseases



## Endovascular repair of chronic occlusion of PAAs

### Personal experience-January 2011-June 2013

- 532 patients with CLI were treated using endovascular procedures
- 11 patients(2 %) with chronic occlusion of PAAs.
- Rutherford-Becker categories 4(8 patients) and 5(3 patients)
- Male 11/11
- Age  $74 \pm 5$  years
- Severe comorbidity 9/11



# Endovascular repair of chronic occlusion of PAAs

## Diagnostic assessment

DUS investigation was performed to assess:

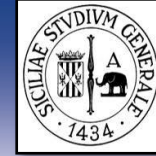
- Access site,
- Size and extension of PAA,
- Stent graft landing zones diameters
- BTK occlusive diseases





## Endovascular repair of chronic occlusion of PAAs

All procedures were performed under local anaesthesia and were approached from an ipsilateral antegrade common femoral artery puncture using DUS guidance and introducer sheaths of appropriate size



# Endovascular repair of chronic occlusion of PAAs

## Key points

Cross the target occluded aneurysm

Distal embolization

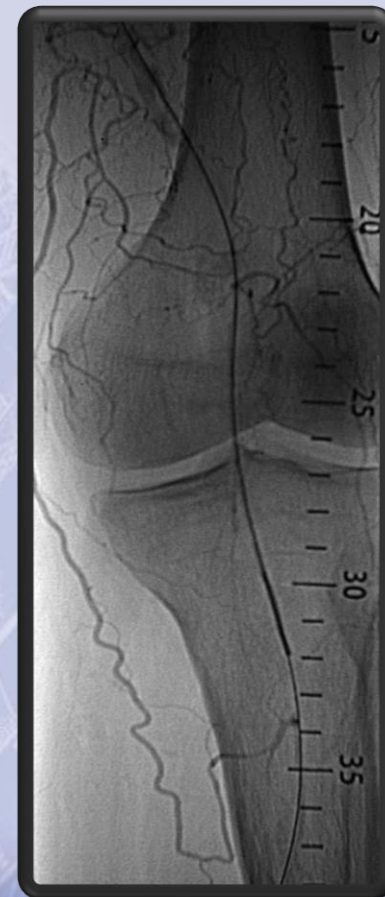
Kinking and/or compression of stent graft



## Endovascular repair of chronic occlusion of PAAs



In the majority of cases (10/11) the distal true lumen was achieved by an antegrade approach.  
In 1 patient a anterior tibial artery retrograde approach was needed to cross the target aneurysm.

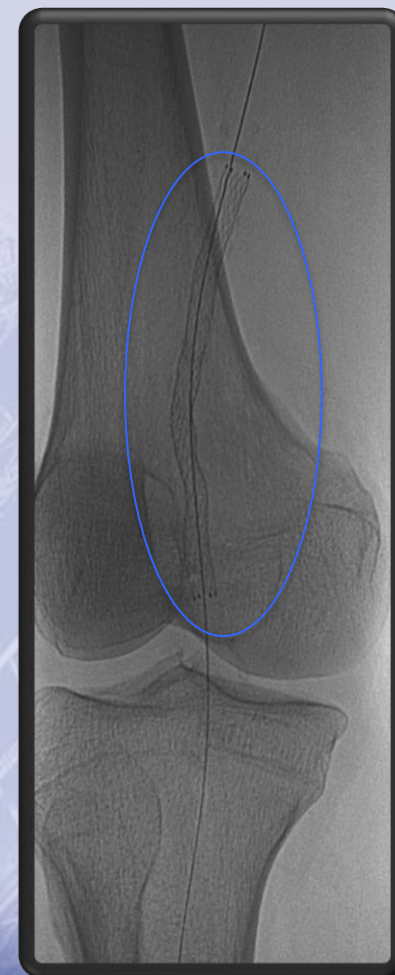
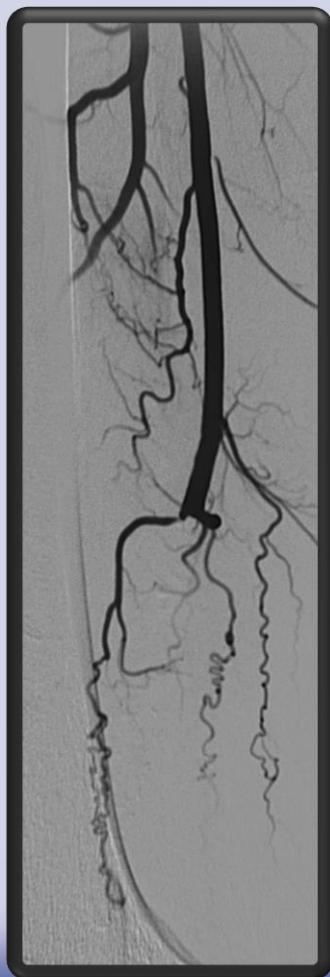




# Endovascular repair of chronic occlusion of PAAs

## First step - Stent implantation

Once the guide wire crossed the lesion, a self-expandable bare metal stent, 1 mm larger than planned stent graft, was delivered at the site of aneurysm. No balloon dilatation was performed after stent release





# Endovascular repair of chronic occlusion of PAAs

## First step - Stent implantation

The intent of use is:

- Contain the thrombus when the flow is not still restored
- Facilitate the stent graft progression and delivery, avoiding pre-dilatation to prepare the bed for stent graft
- Provide an external scaffold for the Viabahn stent graft, in the aim to improve radial stiffness and contrast the biomechanical forces present in the popliteal region that can be amplified in cases of large aneurysm, thus avoiding compression and kinking of Viabahn.





## Endovascular repair of chronic occlusion of PAAs Stent implantation – Viabahn delivery





## Endovascular repair of chronic occlusion of PAAs

### Case 1



The aneurysms were excluded covering the occluded target popliteal segments using a standard delivery of covered stent grafts.  
Flow was finally restored

### Case 2





## Distal landing zone of stent graft

• Proximal popliteal segment (P1)	0/11	0%
• Knee joint-flexion line (P2)	3/11	27%
• BTK popliteal segment (P3)	8/11	73%

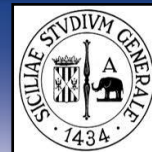
## BTK run off

• 1 vessel line	6/11	55%
• 2 vessel line	5/11	45%
• 3 vessel line	0/11	0%



## Early Results

Immediate Success	100%
Immediate Embolization	9% (1/11)
BTK revascularization	36% (4/11)
Early Mortality	0%



## Mid-term Results

24 months primary patency

82%(9/11)

24 months secondary patency

91%(10/11)

24 months Major Amputation

0%



## Conclusions

Critical limb Ischemia due to thrombosis of PAA , is more common than expected

In older and high risks patients, endovascular exclusion of chronic occlusion of PAA seems a feasible and safety technique, showing promising primary patency and freedom for mayor amputation rates

To minimize distal embolization is mandatory to restore flow only when the thrombosed popliteal segment is completely covered with the stent graft.

External scaffold to stent graft and BTK revascularization seems improving mid-term results



# Endovascular repair of chronic occlusion of PAAs

## Advantage

Percutaneous mini-invasive procedure

Simultaneous BTK revascularization