Popliteal Artery Aneurysm
What is the best mode of treatment?

Thomas Schmitz-Rixen
Disclosures in relation to the topic (last 5 years)

- Travel Grants
  - Gore, Medtronic, GE
- Educational Grants
  - Gore
- Scientific Grants
  - DFG, LOEWE, DGG
- Consulting
  - TVA
- Employment in industry ø
- Shareholder in a healthcare company ø
- Owner of a healthcare company ø

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Normal Diameter of the popliteal artery (PA)

- 5 – 11 mm (tapered)

Aneurysm develop

- in the upper third of the PA

Aneurysm definition:

- 1,5 x of the ø of the SFA

Threshold for treatment:

- ø 20 – 25 mm
Epidemiology

- > 95 % m
- 50 % contralateral
- 40 % AAA
- Incidence (in hospital)
  - 7.4 per 100,000 men
  - 1 per 100,000 female
- Prevalence in AAA-Pat: 8 %
  - Probability of aneurysm development in 10y: 50 %

Incidence

- Incidence: 1% m 65-80y
- Medicare Data:
  - 1000 treatments /y
- Vascunet:
  - 9,6 PAA interventions / million person-years
  - (8 European countries)
  - Range: 3,4 Hungary – 17,6 Schweden

PAA: the silent leg killer

- Rare rupture
- Asymptomatic: pulsatile mass, silent thromboembolic events
- Symptoms:
  - Distal embolisation or thrombotic occlusion
    - CLI
    - Acute limb ischemia
  - Compression
    - pain, leg swelling, DVT, Peroneus nerv palsy
  - Symptoms correlate with size and thrombus formation
Guideline AHA – Evidence-Level B

- Intervention threshold:
  - Ø > 20 mm
  - Symptomatic thrombus formation

American College of Cardiology Foundation / American Heart Association. Management of patients with peripheral artery disease. ACCF/AHA Pocket Guideline November 2011


Surgery on May 22nd 1785

THE BRITISH JOURNAL OF SURGERY


EPOCH-MAKING BOOKS IN BRITISH SURGERY.

By SIR D'ARCY POWER, K.B.E., LONDON.

X. HUNTER'S OPERATION FOR THE CURE OF ANEURYSM.

So obsessed have modern English surgeons become by the name of Hunter that it would be difficult for many of them to say off-hand why Hunter is looked upon, by those who know, as the greatest of surgeons. He was a bad lecturer, a confused thinker, and a very indifferent writer, yet he founded surgery medieval and clinical; he left it a science. How was it done? Go to the museum he collected and let each one see for himself. Study it and the whole science of surgery is displayed in terms of moral anatomy, comparative as well as human. Many surgeons before him had collected pathological specimens and made museums, but they had used them solely for teaching purposes and they had passed by sale from teacher to teacher. Hunter alone collected not to teach but to learn, and comparing like with like he thought about them and drew wholly fresh conclusions. A few of his contemporaries and the most receptive of his pupils entered into his spirit. To them he was 'the Dear Man'; they had penetrated his dryness and quarrelsome ness, and to them he was a personality ever urging them to follow out his lines of thought. He thus became the founder of a great school of scientific surgery which owed as much to his successors as to himself for its widespread influence both at home and abroad.

Hunter's work was encyclopaedic, for his curiosity was insatiable. We are concerned only with the surgical side, and it is difficult to make a selection. The treatise on inflammation, divested of its rugged style, contains...
First clinical in situ vein graft – June 12th, 1906

Jose Goyanes of Madrid
- 41y old candy maker with a syphilitic PAA
- In situ repair with popliteal vein
- Reported in *El signo medico*
- Mention of a prior iliac artery repair with an autologous (reversed) vein segment

*Figure 6.4* Jose Goyanes (from Harrison LH Jr. Historical aspects in the development of venous autografts. Ann Surg 1979; 182:101).
Standard of care?
Open Surgery

Medial approach
- Preferred technique (?)
- Long extension
- Acute ischemia
- Ligature of the collaterals (30% "Typ 2 endoleak")

Posterior approach
- Popliteal II Aneurysm
- Decompression at large diameters
- Cave nerve injury
- Secondary in case of "Endoleaks"
Open Surgery 5y results

- Excellent patency
- Excellent limb salvage
- Reintervention rate (20%?)
- Autologous vein > Alloplast

High risk pat (?)
Quick and easy
Low morbidity
Anatomic Limitations
Typ 2 endoleaks
Risk of intraprocedural embolisation
Cave: sufficient overlap

2008 Metaanalysis

- 141 pat
- PEVAR 5,05x higher occlusion rate
- PEVAR 18,8x higher reintervention rate
- 3,9 days less LOS

Comparison 2014

Trial details

- Meta-Analysis
  - 1 RCT
  - 3 Kohort – Studies.
  - ER (n=43) vs. OR (n=116)
- Cumulative analysis for PEVAR with another 27 case studies
  - n=1 to n= 73 / total n=320

Results

- Primary patency 1y:
  - PEVAR 83,7% (36/43) / OS 85,3% (99/116)
- Secondary patency 1y:
  - PEVAR 86% (37/43) / OS 94,8% (110/116)
- Primary patency PEVAR 3y:
  - 6 studies (n= 139): 74%
- Secondary patency PEVAR 3y:
  - 5 studies (n= 141): 85%

Open questions 2015

- PEVAR vs Oberschenkel
- Approach in OS
- Reconstruction material
- Fibrinolyis in acute ischemia
- Gender
- In- and outflow procedures
- Amputation rate
- Regional differences
OVERPAR
- Asymptomatic patients
- No stratification

Our RCT calculation:
- 800 Procedures
- with stratifications > 1200 Procedures

Eslami MH. Open Versus Endovascular Repair of Popliteal Aneurysm Trial (OVERPAR). ClinicalTrials.gov Identifier: NCT01817660
[http://clinicaltrials.gov/ct2/show/NCT01817660]
Prospective Registry

- Consecutive cases www-based
  - OS
  - PEVAR
  - Fibrinolysis
  - Surveillance
  - Amputation
- 5y follow up
Systematic
Benefit for participants

- Improve quality
- Benchmark at yearly intervals

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Endpoints

Basic data

- Genderage
- Indication
- Diameter
- Inflow / Outflow
- Previous interventions
- Therapy
- Thrombolysis
- Open surgery approach
- Material
- Stentgraft diameter, nr.
- Complications
- LOS

Yearly follow up, 5y

- Survival
- Patency
- Reinterventions
- Stentfracture / Instent Stenosis / Edge Stenosis
- Endoleak
- Symptoms
- Amputation
- Readmission
- Quality of life (SF 36)