

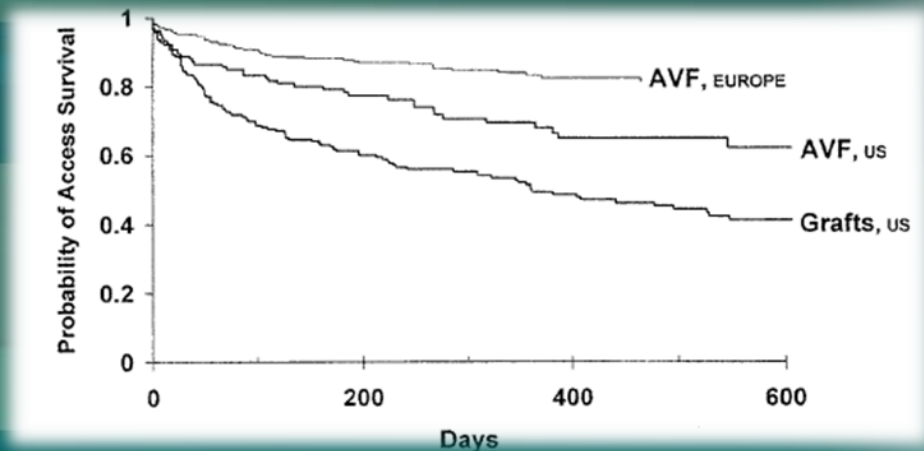
Postoperative management and interventional Therapy in dialysis fistulas

Ernst Groechnig

www.gefaessmedizin.ch

Arteriovenous fistula

- 1966 Brescia and Cimino
 - (avoidable) High primary failure (- 50%)
- PTFE grafts
 - 80% in USA
 - Ease of surgical technique
 - Immediate available for puncture
 - High blood flow → high-efficient short duration of hemodialysis
 - Poorer outcome



Pisoni et al.: Vascular access use in Europe and the United states: Results from the DOPPS, Kidney international 2002

Vascular remodelling and adaption to high flow

- Radial artery
 - Increased flow rate (21.6ml/min → 208ml/min → 600ml/min)
 - Vasodilatation (NO, Prostacyclin)
- Remodelling in uremic patients
 - Early tears and fragmentation of the lamina elastica interna (MPs) → enlarged fenestrae → increased arterial distensibility
 - Reduced NO and Prostacyclin production
 - Increased expression of adhesion molecules: (ELAM-1, VCAM)
 - Increased presence of v. Willebrand Factor
 - Increased expression of tissue factor mRNA
 - Platelet deposition on extracellular matrix
- Iatrogenic remodelling (puncture technique)
 - Rope-ladder puncture: progressive dilatation at the entire length
 - Area puncture: aneurysm formation
 - Buttonhole puncture: cylindrical scar wall

Preinflammatory state

ET-1 Agonists

Evaluation of the patients before surgery

- Don't touch potential shunt veins!
- Duplexsonography:
 - Internal arterial diameter $> 1.5\text{mm}$
 - Venous diameter $> 2.5\text{mm}$ (using tourniquet)
 - Resistance index < 0.8 after fist clenching (vasodilatatory capacity of the palmar arch)

Surgical technique

- Side – to – side anastomosis
- End to end anastomosis
- Side to end anastomosis

- No obstacles to flow
 - Turbulence, endothelial cell damage, increased risk of stenosis.

Monitoring of the fistula

- Predictor of fistula stenosis
 - Turbulence of blood flow
 - Reduction of fistula blood flow
- Duplexsonography
 - Detect morphological changes
 - Detect stenosis/occlusion
- Interventional therapy

Interventional Therapy

- What we do
 - (ultrasound guided) venous puncture
 - Angiocatheter into radial (brachial) artery
 - Shunt angiogram
 - Dilatation
 - Higher balloon diameter than vessel diameter
 - Repeated long term insufflation with high pressure (20 atm)*
 - Stenting of central venous stenosis
 - Careful sensitive compression and compression bandage after intervention
 - Platelet inhibitor or anticoagulation, no discontinuation of anticoagulation
 - Postinterventional monitoring 2 h

Shunt PTAs

- Shunt PTAs from 18.01.01 – 22.06.04 (n = 130)
 - 53.8% men, 67.16 years,
 - 46.2% women, 65.45 years
 - Stenosis type:
 - Near anastomosis: 72.5%
 - Middle portion: 39%
 - Central stenosis: 21.2%
- Primary success rate: 100 %
- Complications:
 - 2 early occlusions: immediately repaired by local lysis
- „long term“ results:
 - 22.3% recurrent stenosis (1 – 10)

Platelet inhibition

- evidence in shunt patients ?
 - Aspirin vs. Plavix vs. Combination:
 - Higher bleeding rate
 - No significant effect on occlusion rate in patients with PTFE – Shunts¹
- Basic therapy of atherosclerosis

¹Kaufmann J. et al.: Randomized controlled trial of clopidogrel plus aspirin to prevent hemodialysis access graft thrombosis, J Am Soc Nephrol 2003, 2313 - 2321