Interventional Nephrology

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Objectives

• What is Interventional Nephrology?
• What procedures does the Interventional Nephrologist perform?
• How does Interventional Nephrology Benefit Patients?

Disclosures

• None
Nephrologist Dr Belding Scribner-1960
Brescia-Cimino Fistula-1966

Nephrologist Dr. Stanley Shaldon-1961

Femoral Catheterisation (Lancet, 1961)
Nephrologist Dr. Henry Tenckhoff-1968

Peritoneal Dialysis Catheter
Nephrologist Dr. Gerald Beathard-1992

30 Years Later!

Est. 2000
Hemodialysis Catheters

Temporary HD Catheter (Uldall)

Tunneled HD Catheter (Permacatheter)

Indications

1. Emergency hemodialysis
2. Infected vascular access
3. Failed vascular access
4. Failed PD catheter

80% ESRD patients start HD with a TDC!
Peritoneal Dialysis Catheters
Vascular Access: AVF and AVG (Rule of 5)

- Blood flow adequate to support HD (>500 ml/min)
- Allows repeated cannulation
  - Palpable: <5 mm below skin surface
  - Straight segment 5 cm long
  - Accessible anatomic location in the sitting position

Primary failure
Rate of AVF 60%!

Dember LM, JAMA 2008
Why Do AVF and AVG Fail?

Venous Neointimal Hyperplasia

Roy-Chaudhury AJKD 2007
Primary Patency of AVF and AVG

Vascular Access Circuit

Feeding artery stenosis
Anastomotic and juxta-anastomotic stenosis
Draining vein stenosis
Anurysm
Stenosis

From Tom Vesely, M.D.
One Minute Exam: Arm Elevation

Arm Lowered: Prominent

Arm Raised: Flat
One Minute Exam: Palpation: Augmentation

Palpate the strength of the pulse.

Compress.
Auscultation: Normal
Auscultation: Stenosis
Detecting Stenosis on Physical Exam

Arm Lowered

Arm Raised

Prominent

Dilated & Pulsatile

Stenosis

Collapsed

Arm Raised

Angiogram

Stenosis
Reasons for AVF Immaturity

• Inflow
  • Pre-existing arterial anomalies
  • Acquired: Arterial anastomotic stenosis, Juxta-anastomotic stenosis

• Outflow
  • Pre-existing venous anomalies
  • Anatomically small
  • Fibrotic vein (stenotic)
  • Accessory veins (side branches)
Immature AVF: Juxta-Anastomotic Stenosis

Balloon Angioplasty Post Plasty
Immature AVF: Accessory Vein

Two Options
• Cut down ligation
• Coiling

Cut Down

Ligation
Coiling

Case 1

Pre-Coil

Accessory vein

Radiocephalic fistula

Coil

Case 2

Pre-coil

Brachiocephalic fistula

Accessory vein

Coil

Post-coil

Brachiocephalic fistula
Thrombosed Brachiocephalic AVF
Thrombolysis Techniques

• Pharmacologic: TPA, heparin

• Mechanical: Fogarty catheter, angioplasty balloon

• Mechanical for resistant clot: Angiogel, Trerotola device
Successful Thrombolysis and Angioplasty
Angioplasty and Stent in AVG

- Angiogram
- Post-Angioplasty
- Stent Deployed
- Angiogram

Vein
PTFE Graft
Stenosis
Recoil
PTFE Graft
Interventional Nephrology Procedures

- Temporary Central Venous Catheter for HD (Uldall)
- Tunneled Dialysis Catheter (Permacatheter)
- Hickman and Port Catheters
- Peritoneal Dialysis Catheter
- Angiogram of AVF and AVG
- Angioplasty and stents for AVF and AVG stenosis
- Coiling and Ligation of Accessory Veins
- Banding of high flow AVF
- Thrombectomy of clotted AVF and AVG
- Ultrasound guided kidney biopsy
- Ultrasound for AVF maturation and PD catheter placement
Interventional Nephrologist

- Patient benefits
  - One stop shop
  - Same physician providing care
- Clinical care
  - Hemodialysis
  - Peritoneal dialysis
  - Kidney transplantation
- Dialysis access care
  - AVF and AVG
  - PD catheter
  - Kidney biopsy

Happy Mardi Gras!