Cannulation techniques for Arteriovenous Fistulae

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Overview

- Why we care
- What is a fistula?
- Fistula evaluation
- Approaches to cannulation
- Approaches to fistula failure

DOPPS: Dialysis Outcome and Practice Pattern Study

- Started 1996
- 16,200 patient
- Looked at Clinical factors as well as Access Type

DOPPS Phase II

Countries Participating in the DOPPS Phase II

Incident Patients

NVAII Change Concepts

1. Routine CQI review of vascular access
2. Early referral to Nephrologist
3. Early referral to surgeon for “AVF only”
4. Surgeon selection
5. Full range of appropriate surgical approaches

6. Secondary AVFs in AVG patients
7. AVF placement in catheter patients
8. Cannulation training
9. Monitoring and surveillance
10. Continuing education: staff and patient
11. Outcomes feedback
What is a fistula?

• Direct communication of artery to vein

Types of Fistulae

Fistula

• Direct: arterial-venous, subcutaneous, direct

Evaluation

• Initial evaluation at 4 weeks
• Assess 1st 3 cannulations & look for problems

Physical Examination

• Need to assess all patients regularly
• All patients with fistulae:
  – Assess current function
  – Communicate which vein to use to surgeon
• All patients without fistulae:
  – Is there a vein that can be used to convert graft or catheter to fistula?
  – Examine all patients with tourniquet & look for cephalic vein
  – If cephalic is poor, is there an alternative?
  – Do I need imaging to find the vein?
• Supplement exam with flow screening if thrombosis rates high

Fistula Evaluation

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Physical Examination

• Thrill throughout = Normal access
• Pulsatile = Outflow stenosis
• No thrill and no pulse = Access thrombosis
• Examine weekly
• Follow trends
• Thrill at the venous end of dialysis grafts is predictive of successful outcome following intervention*

* Ponce P, et al JVIR 14 (2) pt 2, Feb 2003; S28-29

How to puncture

• Palpate with at least 2 fingers
• Puncture at 25-45 degrees
• Goal is a single wall puncture
Cannulation Technique

- Identify the inflow & the outflow
  - May require palpation
  - Never puncture unless you are sure where the vein is & that it can be pinned
- Puncture at an angle
- Watch for flash
- Lower angle & advance

Problems with the fistula

- Venous outflow problems
  - High venous pressures
  - Low flow
  - High recirculation
  - Infiltration
- Arterial inflow problems
  - High negative arterial pressure
  - Pulling clots

What to do with problems

- Fistulogram
  - Change in physical exam
  - Problem with dialysis
  - Change in monitoring protocol (transonic or other)
  - Failure to mature

Failure to Mature

- 84 y/o male with BCF
Dialysis Catheter Removed 6 weeks later

44 y/o with thrombosed AVF

Procedure
• 3000 U Heparin
• PTD
• OTW Fogarty
• Treat stenoses

Post PTD

4 months Later
• Pt returns for high venous pressures
Cannulation Camp!

- **Goal:**
  - To give you practice in puncturing collapsible structures similar to the native fistula
- **4 Stations**
- Use dialysis needles
- Model is based upon ultrasound targeting models for trainees

The Cannulation model

- Chicken Breasts
- Penrose drain
- Drain is collapsible
- Drain is tunneled under surface of chicken breast
- Opportunity to practice

Summary

- Cannulation takes practice
- Be sure of physical exam prior to puncture
- Ask questions if you are not sure
- Use proper technique
  - Approach at 25-45 degrees
  - Look for flash
  - Lower bevel & advance
- When problems arise in fistulae send them for fistulography