Effects of sympathetic blockade on the success and survival of arteriovenous fistula

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Arteriovenous fistula

- AVF preferred over AVG for chronic HD
- However, initial failure rates approximates 25%
- Significant clinical and financial implications
AVF – What is adequate?

- Rules of 6s
  - > 0.6 cm diameter
  - < 0.6 cm from skin surface
  - > 600 mL/min flow

- Inadequate flow rate $\rightarrow$ thrombosis $\rightarrow$ loss of AVF

- AVF flow may be compromised by arterial vasospasm and sympathetic activity from surgery

- Recent evidence suggests regional anesthesia may improve AVF flow

Vascular Access Work G. 2006
Sidawy et al. 2002
He et al. 1997
Yildirim et al. 2006
Mercado et al. 2008
Malinzak et al. 2009
Anesthesia for AVF

- Conducted under either
  
  A. General anesthesia (GA)
  B. Local anesthetics (LA)
  C. Regional anesthesia - Brachial plexus block (BPB)
BPB for AVF

• Sympathectomy associated w BPB
  • Enhances post-anesthesia diameter and blood flow
    • Improves site-selection for AVF creation
  • Enhances postop AVF blood flow
    • Associated w/ early patency
  • ? Better long-term patency?
SGB for AVF

- Enhances postoperative AVF blood flow
- Enhances average peak flow velocity
- Shortens maturation time

- Better long-term survival?
BPB vs SGB vs LA?

• Literature search on MEDLINE

• no randomized trial has been conducted to directly compare axillary block (AB), stellate ganglion block (SGB) and LA alone on success and survival of AVF
Hypothesis

Sympathetic blockade with either axillary block or stellate ganglion block improves radiocephalic short-term and long-term patency as compared to local anesthetics infiltration alone.
Inclusion criteria
• 18-65 yo
• ESRD
• Radio-cephalic AVF formation

Exclusion criteria
• Previous AVF
• Stenosis or calcifications of RA or CV
• RA diameter < 1.6 mm
• CV diameter < 2.5 mm
• Unilateral RLN or phrenic nerve palsy
• Coagulopathy
• Anticoagulants or anti-platelet therapies
• IV drug use
• Allergy to LA
• Pregnancy
• Morbid obesity

Patient from SJH

Consent

Randomization

Axillary Block

SGB + LA

LA
Group AB

- Motor, sensory and sympathetic blockade
Group SGB + LA

- Sympathetic blockade
- Surgical site infiltration
  - 15 mL of 0.25% bupivacaine without epinephrine
Group LA

• Surgical site infiltration only
  • 15 mL of 0.25% bupivacaine without epinephrine
Axillary Block → SGB + LA → LA → Infrared thermography → Radiocephalic AVF → ± Rescue opioid → ± GA → Minville et al. 2009
Radiocephalic AVF

Primary outcomes
• 3-months primary patency rate

Secondary outcomes
• AVF blood flow
• AVF diameter
• Change in cephalic vein diameter pre- and post-anesthetic
• Change in radial artery diameter pre- and post-anesthetic
• 1-year primary patency rate
• 1-year secondary patency rate
• Duration of surgery
• GA conversion
• Total intraoperative narcotic use
• Adverse events
• Maturation time
• Duration of hospital stay
• Patient satisfactions
Anticipated results

• Group Axillary Block and SGB + LA >>> Group LA
  
  • Higher 3-months primary patency rate
  • Higher 1 year primary patency rate
  • Higher 1 year secondary patency rate
  • Shorter maturation time
Implications

• First study to compare effect of SGB with axillary block on long-term survival of AVF

• Financial and clinical implications
4. He GW, Yang CQ. Radial artery has higher receptor-mediated contractility but similar endothelial function compared with mammary artery. Ann Thorac Surg [Internet]. 1997 May;63(5):1346-52.
Thank you

- Questions?