Arteriovenous Fistula Salvage with the Minimally Invasive IRANI Procedure

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Disclosure

Speaker name: Umair Munawar

I have the following potential conflicts of interest to report:

☐ Consulting
☐ Employment in industry
☐ Stockholder of a healthcare company
☐ Owner of a healthcare company
☐ Other(s)

☒ I do not have any potential conflict of interest
Introduction

- Arteriovenous fistulae (AVF) are the preferred hemodialysis access modality
  - Increased durability, prolonged patency, and low infection rates\(^1\)
- Disadvantages:
  - Primary failure rates up to 50%, prolonged maturation times, and significant abandonment rates\(^2\)
- Primary maturation failure causes:
  - Early thrombosis and failure of the draining vein to dilate, but 46% of all cases are due to alternative outflow routes via accessory veins\(^3\)
- National Kidney Foundation 2003 Fistula First Breakthrough Initiative:
  - Avoid central venous catheter placement and salvage of non-maturing fistulas\(^4\)
- AVF salvage:
  - Accessory vein occlusion using suture ligation or coil embolization\(^5\)
IRANI Procedure

- Interrupting Rivaling Access-flow with Nonsurgical Image-guided ligation “IRANI” procedure:
  - Tunnel needles deep and superficial to the target vein to serve as conduits for sutures which are then tied to occlude the accessory vein
  - Collateral vein identified by US (A), Hawkins needle tunneled underneath with suture advanced through (sagittal B, axial C), then Hawkins needle is tunneled superficial to target vessel creating suture loop (sagittal D, axial E), then suture is pulled tight to occluded vessel (F & G)

Case Discussion

• A 55-year-old male with a history of venous hypertension presented following a dialysis session two weeks prior where he reported significant pain at the fistula access with swelling and return of blood clots

• Ultrasonography revealed thrombosis with absent through collapsed fistula, and two large collateral vessels confirmed on fistulogram (A)

• The clot was macerated with 6- and 8-mm balloons, revealing a waist at the clotted portion (B). 6 mg tissue plasminogen activator (tPA) was instilled and trapped into the fistula by balloon insufflation for 6 minutes. The balloon was then taken down
Case Discussion

• Using the “IRANI” technique, the collateral vessels were suture ligated with a 3-0 Vicryl utilizing an 18-gauge coaxial needle (C-E). A 10-mm balloon and cleaner device were then used to further macerate the thrombus.

• Venogram demonstrated patency of the fistula following intervention (F).
Case Discussion

• The patient was discharged without complication and seen 2 weeks later for a follow-up fistulogram to assess for patency
• Fistulogram demonstrated patency of the fistula as well as two small collateral vessels (A)
• Reflux brachial arteriogram demonstrated absence of previously ligated collaterals (B)
Conclusions

• Conventional approaches with suture ligation and coil embolization can be expensive and time-consuming
  • Increased operating room costs and technical challenges when attempting to cannulate accessory veins

• The IRANI procedure is a minimally invasive technique which offers:
  • Increased safety for reaching deeper accessory veins
  • Decreased infection risk
  • Cheaper materials
  • Ability to be performed safely in the outpatient setting
References


