Evaluation and treatment of high flow arteriovenous fistulas after successful renal transplant

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This presentation contains no conflict of interest.
Dilemma of a functional vascular access following successful renal transplant:

- High output cardiac failure and pulmonary hypertension are potential complications of high flow AVFs. These findings are thought to be more common when access flows exceed 1200-1500 ml/min.
- Kidney transplant failure will occur in up to 34% of patients after 5 years.

**AVF Observation versus Ligation?**


Objectives

• We review a series of successful renal transplant patients with high flow AV Fistulas.
• Access flow reduction was established using a simple precision banding procedure with real time ultrasound flow measurements, targeting final access flow volume to 500-800 ml/min.
• Our goal was resolution of high access flow and associated physical findings while preserving AV Fistula functional patency.
Materials and Methods

- Twelve patients were referred for high flow AVF evaluation post successful renal transplant, medical records retrospectively reviewed.
- Eight (66%) were male, and one (8%) obese. Ages were 15-73 years (mean=42). The AVFs were established 24-86 months previously.
- In addition to physical examination (heart rate and the presence or absence of a cardiac murmur before and after AVF compression), each patient had ultrasound flow measurement before and after temporary compression of the access with digital occlusion for 2-3 minutes.
- Pre and post-bandung flow rates were included in the analysis.
Precise banding of an AVF using a coronary dilator as a dowel for reliable sizing of the restriction site. The restriction is created adjacent to the AVF anastomosis using polypropylene suture and sized in one-half millimeter increments, measuring AVF flow, until the target access flow is achieved (500-800ml/min).
Ultrasound image of an anteriovenous fistula (AVF) following precision restriction (banding) using real time flow measurements to guide degree of restriction.

Results

- 11/12 patients underwent a precision banding procedure with real-time flow monitoring. (One patient with poor cardiac function underwent immediate AVF ligation with dramatic improvement in cardiac status.)

- Mean access flow was 2280 ml/min (range 1148-3320 ml/min) before access banding and was 598 ml/min (range 481-876 ml/min) after flow reduction (p<0.01).

- The mean pulse rate declined after AVF-comp from 90/min to 72/min (range 110-78).

- 6 patients had a pre-compression cardiac flow murmur that disappeared with temporary AVF-comp.
  ---Each AVF remained patent although one individual later requested ligation for cosmesis.
  ---Two patients had renal transplant failure and later successfully used the AVF.
  ---Follow-up post banding was 1-18 months (mean=12).
## Results (cont.)

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<th>PULSE Post-Banding (rate/min)</th>
<th>Final banding diameter (mm)</th>
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Conclusions

• Hemodialysis vascular access patients with high flow AVFs had successful resolution of high cardiac output findings and maintenance of access patency using a precision banding procedure.
• Yearly examination of transplanted patients with access flow measurement seems warranted. Flow reduction in symptomatic patients or when AVF flow exceeds 1200-1500 ml/min is recommended.
• Further study is warranted to substantiate these recommendations.
References

• Jan Malik, When Is Access Flow Too High And What To Do About It?, 10th Annual Controversies in Dialysis Access - San Francisco, USA - October 24-25, 2013