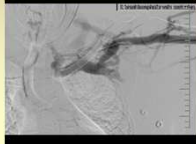


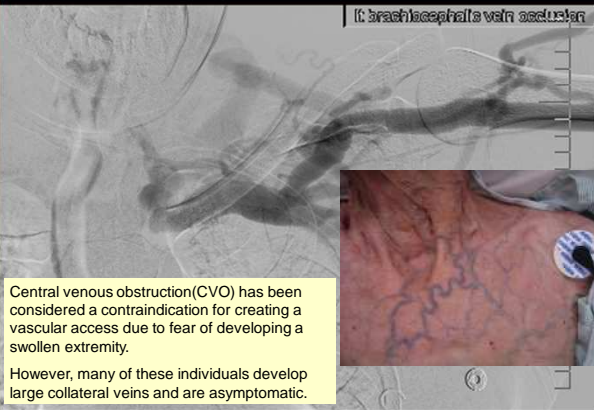
AVF Creation in the Patient with Known Central Venous Obstruction

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Disclosures:
"Nothing to disclose."



- Central venous stenosis and occlusion are common problems facing hemodialysis patients.
- These lesions are generally associated with hemodialysis catheters and are more commonly found in patients with multiple catheters, a history of catheter infections, or long-term catheter use.

MacRae JM, Ahmed A, Johnson N, Levin A, Kiaii M. Central vein stenosis: a common problem in patients on hemodialysis. *ASAIO J.* 2005 Jan-Feb;51(1):77-81.
Agarwal AK, Patel BM, Haddad NJ. Central vein stenosis: a nephrologist's perspective. *Semin Dial.* 2007 Jan-Feb;20(1):53-62.

Symptomatic patients are often treated successfully by central venous angioplasty with or without stent placement..... however the lesions tend to recur.

-Agarwal AK, Patel BM, Haddad NJ. Central vein stenosis: a nephrologist's perspective. *Semin Dial.* 2007 Jan-Feb;20(1):53-62.
-Oderich GS, Treiman GS, Schneider P, Bhirangi K. Stent placement for treatment of central and peripheral venous obstruction: a long-term multi-institutional experience. *J Vasc Surg.* 2000 Oct;32(4):760-9.
-Agarwal AK. Central vein stenosis: current concepts. *Adv Chronic Kidney Dis.* 2009 Sep;16(5): 360-70.

Surgical bypass for a **symptomatic** vascular access patient with central venous obstruction is less commonly utilized a major procedure in these individuals.

-Suliman A, Greenburg JI, Angle N. Surgical bypass of symptomatic central venous obstruction for arteriovenous fistula salvage in hemodialysis patients. *Ann Vasc Surg.* 2008 Mar;22(2):203-9.
-Chemla ES, Korrakuti L, Makanjuola D, Chang AR. Vascular access in hemodialysis patients with central venous obstruction or stenosis: one center's experience. *Ann Vasc Surg.* 2005 Sep;19(5):692-8.
-Kalra M, Gloviczki P, Andrews JC, et al. Open surgical and endovascular treatment of superior vena cava syndrome caused by nonmalignant disease. *J Vasc Surg.* 2003 Aug;38(2):215-23.
-Glass C, Maevsky V, Massey T, Illiq K. Subclavian vein to right atrial appendage bypass without sternotomy to maintain arteriovenous access in patients with complete central vein occlusion, a new approach. *Ann Vasc Surg.* 2009 Jul-Aug;23(4):465-8.

- Individuals with central venous occlusive disease may be **asymptomatic** and successfully undergo dialysis on a routine basis with venous outflow provided by multiple collateral vessels.
- Levit, et al. found better outcomes in those **asymptomatic** individuals followed by observation than those treated by intervention with angioplasty.

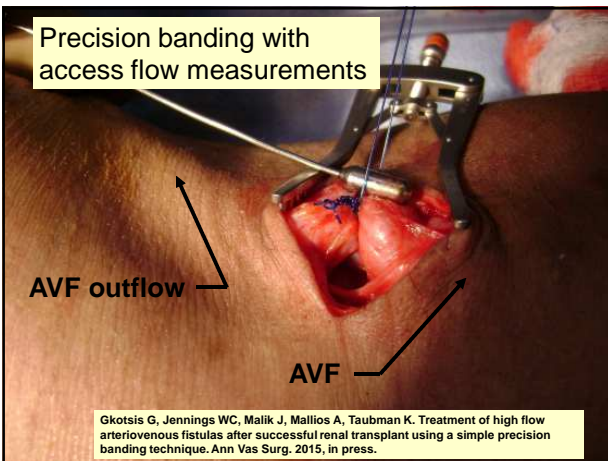
Levit RD, Cohen RM, Kwak A, et al. Asymptomatic central venous stenosis in hemodialysis patients. Radiology. 2006 Mar;238(3):1051-6. Epub 2006 Jan 19.

We found flow reduction (banding) to be successful in treatment of arm swelling due to central vein occlusion in association with an AVF.

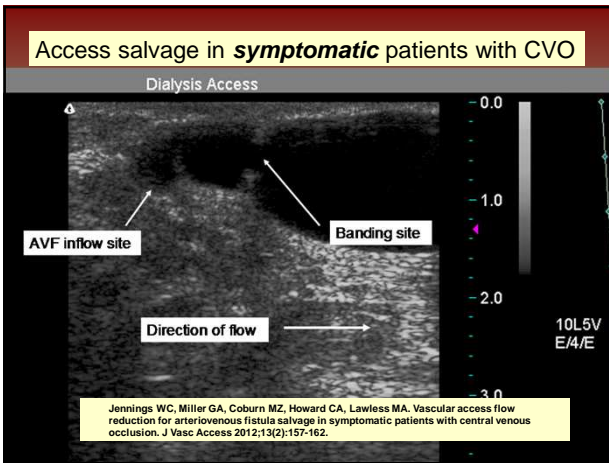
⇒ Operative access flow measurements with restriction in ½ mm increments is key.

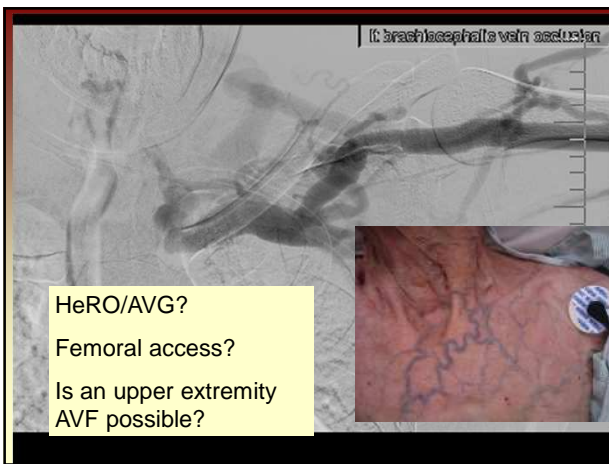
Jennings WC, Miller GA, Coburn MZ, Howard CA, Lawless MA. Vascular access flow reduction for arteriovenous fistula salvage in symptomatic patients with central venous occlusion. J Vasc Access 2012;13(2):157-162.

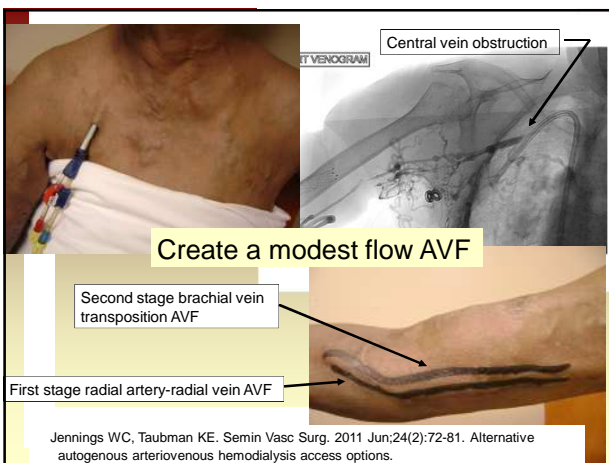
Precision banding with access flow measurements

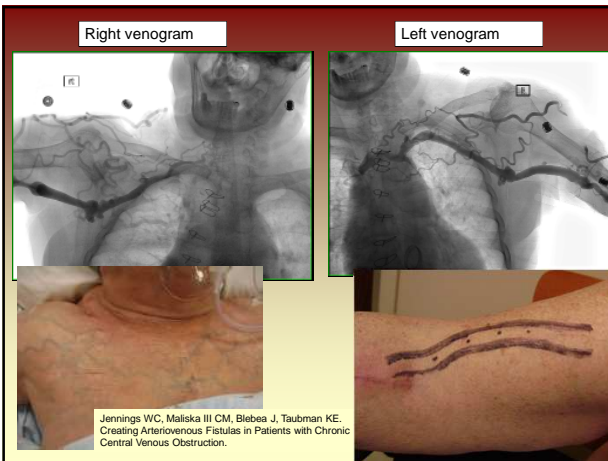


Gkotsis G, Jennings WC, Malik J, Mallios A, Taubman K. Treatment of high flow arteriovenous fistulas after successful renal transplant using a simple precision banding technique. Ann Vas Surg. 2015, in press.

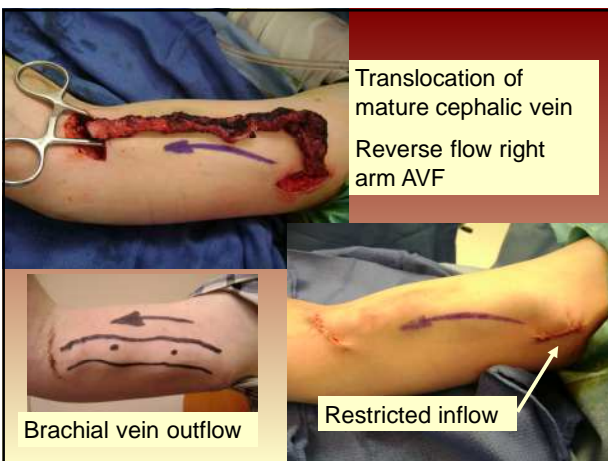












Creating Arteriovenous Fistulas in Patients with Chronic Central Venous Obstruction.

Methods: Patients with a new AVF constructed in the presence of known CVO were identified.

- Venous imaging confirmed proximal obstruction and extensive collateral venous return.
- The AVF was constructed in the extremity with the most favorable ultrasound vessel mapping and collateral central venous outflow.
- Arterial inflow via the radial artery was utilized when feasible, creating a lower flow access.

Results:

AVFs associated with known CVO were constructed in 19 patients during an eight year time period.

- The mean age was 53 years, 63% were female, and 58% diabetic.
- Arterial inflow was from the radial artery in 15 patients and the brachial or axillary artery in 5 individuals.
- Post-operative AVF flow volumes were 415-910 ml/min (mean=640ml/min).
- Three individuals had previous Hemodialysis Reliable Outflow (HeRO) catheters placed elsewhere. Each had a successful AVF created.

Results:

Eight patients(42%) developed some degree of arm edema. Two resolved without intervention. The others required inflow banding(2), outflow branch coiling(1), and recanalization with angioplasty(4) of the CVO. Each resolved. No AVFs were lost due to arm edema.

Mean follow-up was 14 months.

Two AVFs failed at 8 and 16 months. Primary and cumulative patency rates were 49% and 100% at 12 months and 39% and 80% at 24 months, respectively.

Conclusions: Central venous occlusion need not preclude the creation of a successful AVF. Extensive venous collaterals and avoiding high flow AVFs are important elements for success. Cumulative patency was 80% at 24 months.

