

Trans-Radial Approach for Access Intervention: Surgical Perspective

*Lifeline Physician Operators Forum
Las Vegas, Nevada. January 27 – 29, 2017*



William Jennings, MD



Department of Surgery

DISCLOSURE POLICY

It is the policy of The University of Oklahoma Health Sciences Center College of Medicine to ensure balance, independence, objectivity and scientific rigor in all its educational programs. All faculty participating in these programs are expected to disclose to the program audiences any real or apparent conflict of interest related to the content of their presentation.



St. John Medical Center



University of Oklahoma, Tulsa

This presentation contains no conflict of interest.

William Jennings, M.D.

Speaker Disclosure

financial relationships:

- DaVita: Speaker
- Avenu Medical: Consultant

This presentation contains no conflict of interest.

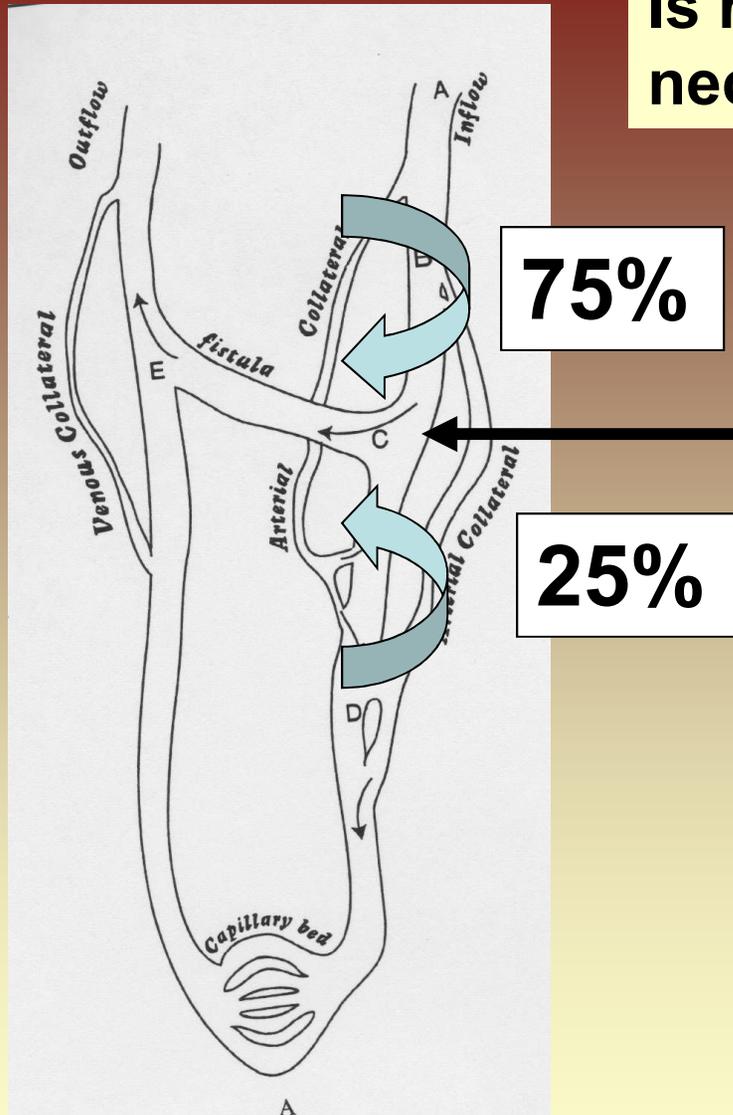
Trans-Radial Access(TRA)

- Extremely low risk of complications
- TRA offers "best angle, easiest access" for many AVFs.
- TRA avoids placing a cannulation/sheath through immature or marginal outflow veins.
- Avoids angioplasty balloon "U" configuration, as when cannulated from proximal site.
- Less bleeding risk
- May be more reliable access in obese patients

Trans-Radial Access Questions

- Is TRA safe?(A rare patient to avoid)
- Learning curve?
- Specific technical issues?
- Is it associated with better or easier procedures?

Is radial artery flow to the hand necessary in most patients?



- In a successful and asymptomatic AVF, flow past the anastomosis is reversed (away from the hand).

- The radial artery may be routinely harvested for surgical bypass in most patients.

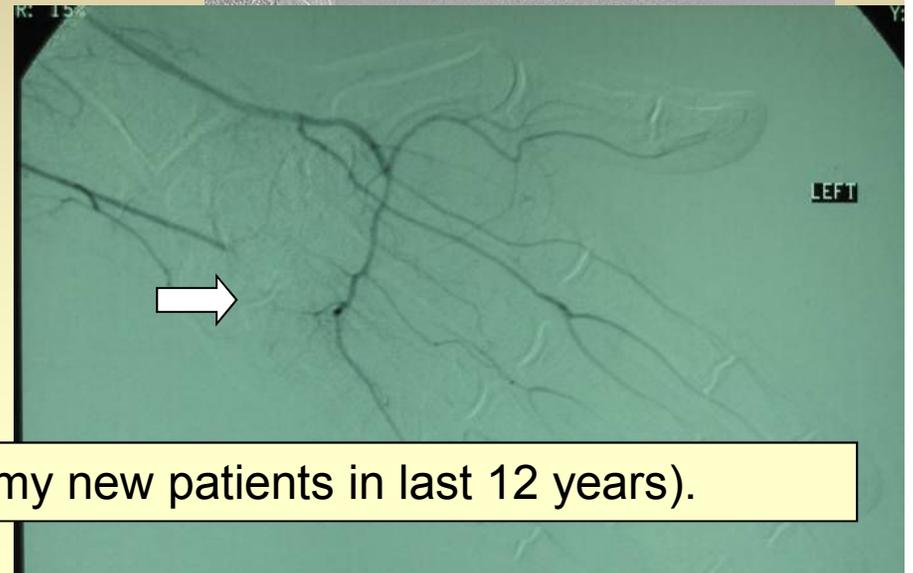
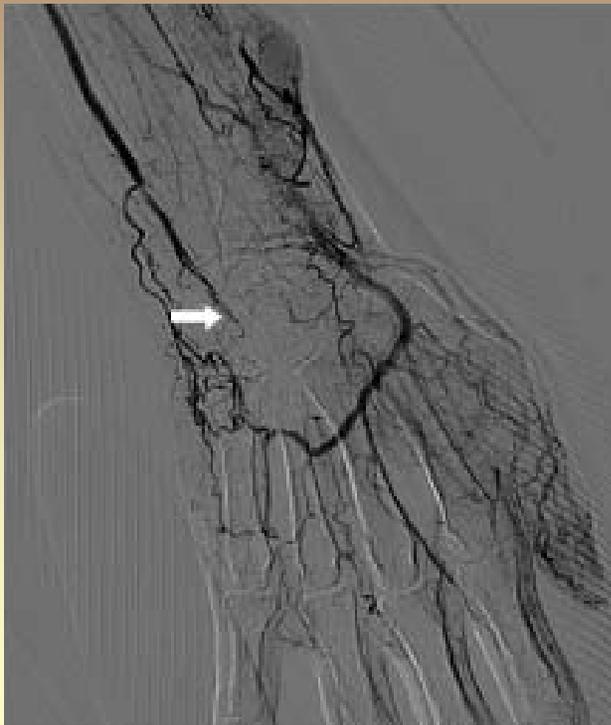
Image from: Wixon CL, Hughes JD, Mills JL. Understanding strategies for the treatment of ischemic steal syndromes after hemodialysis access. J Am Coll Surg. 2000 Sep;191(3):301-310.



Allen's test supplemented with doppler flow evaluation of the palmer arch(s) is a reliable clinical method used to evaluate hand perfusion by both the radial and ulnar arteries.

These patients may carry a bit more risk for radial artery access.

Allen's test with modified US evaluation of palmar arch flow reliably identifies these patients.



(...detected clinically in about 1% of my new patients in last 12 years).

Trans-Radial AVF Intervention

- 511 fistulograms , **55 were trans-radial access**(TRA) procedures and 54 of 55 interventions (98%) were performed for stenotic lesion(s).
- All TRA punctures were successful, with no radial artery thromboses or hand ischemia. Technical success was 88%. Functional patency rate was 83% at 12 months.
- **CONCLUSIONS:** The TRA is a practical option This approach may be particularly attractive for treatment of juxta-anastomotic stenoses in a variety of AV accesses and **offers unique practical advantages** for the maintenance of AV accesses.

Le, L., A. Brooks, et al. Transradial approach for percutaneous intervention of malfunctioning arteriovenous accesses. J Vasc Surg. 2015, 61(3): 747-753.

Trans-Radial AVF Intervention

- 48 patients with access thrombosis
- **All the transradial punctures were successful. Clinical success was achieved in 96% of the cases.**
- Post-interventional secondary patency rates were 93% and 89% at 3 and 12 months, respectively. The complication rate was 4%.
- No puncture-site-related complications were noted, and all the radial arteries were palpable at follow-up.
- **Conclusions.** An endovascular intervention through the radial artery approach is a **safe and feasible strategy choice for restoring occluded AVFs.**

Chih-Cheng Wu, Szu-Chi Wen, Meng-Kan C, et al. Radial artery approach for endovascular salvage of occluded autogenous radial-cephalic fistulae. *Nephrology Dialysis Transplantation*; 24(8): 2497-2502.

Trans-Radial AVF Intervention

- Prospective evaluation of 11 consecutive TRA intervention for patients with dysfunctional AVFs.
- Various interventions included balloon angioplasty, manual catheter-directed thrombo-aspiration and mechanical thrombectomy. Cutting Balloon angioplasty was performed for 3 resistant venous stenoses and for 1 radial artery stenosis.
- **Technical and clinical success were achieved in all patients.**
- **No vessel rupture, perforation, or distal embolization.**
- **No radial artery occlusion or fistula infection was seen during the 6 month follow-up.**
- Transradial intervention for native fistula failure is considered safe and feasible in a selected population; yet requires further validation.

Kawarada O, Yokoi Y, Nakata S, et al. Transradial intervention for native fistula failure. Catheter Cardiovasc Interv. 2006 Oct;68(4):513-20.

- **10,676 trans-radial access *cardiology* procedures....**
- A total of 53 vascular complications(VC) (0.5%) were observed: 44 radial related Major VCs occurred in 16 patients (0.2%) and were **radial related in only 10 patients.**
- Vascular complication rate was stable during the study and **independent of operator's experience.** Access crossover rate was 4.9%, differed according to the operator radial experience and significantly decreased over time.
- **CONCLUSIONS: in a center with high volume of radial procedures, the transradial approach is associated with a very low rate of vascular complications , which was stable during the study period and independent of operator's experience.**

Burzotta, F., C. Trani, et al. (2012). "Vascular complications and access crossover in 10,676 transradial percutaneous coronary procedures." Am Heart J **163**(2): 230-238.

- Cases by **cardiology** operators with case volume >300 TRAs comprised the control group.
- Case volume correlated with TRA failure (P=0.0028), and **odds of failure to access was reduced by 32% for each 50 increments in case volume**. Complication rate not specified.
- **CONCLUSIONS:** TRA success depends on operator experience, and a case volume of >/=50 cases is required to achieve outcomes comparable to experienced operators.

Ball, W. T., W. Sharieff, et al. (2011). "Characterization of operator learning curve for transradial coronary interventions." Circ Cardiovasc Interv 4(4): 336-341.

- **Radial artery spasm (RAS)** is an important consideration in TRA. Nineteen papers including 7197 patients were identified as relevant; **incidence of RAS was 14.7% overall.**
- Use of smaller sheaths and catheters were important.
- Use of hydrophilic coated sheaths and catheters may reduce the incidence of RAS.
- Intra-arterial application of verapamil (1.25-5 mg) and nitroglycerin (100-200 µg) may also reduce the incidence of RAS.
- **RAS may be problematic in TRA, hydrophilic materials and the use of intra-arterial vasodilators are strategies to decrease RAS.**

-Ho HH, Jafary FH, Ong PJ. Radial artery spasm during transradial cardiac catheterization and percutaneous coronary intervention: incidence, predisposing factors, prevention, and management. *Cardiovasc Revasc Med.* 2012 May-Jun;13(3):193-5.

-Kristic I, Lukenda J. Radial artery spasm during transradial coronary procedures. *J Invasive Cardiol.* 2011 Dec;23(12):527-31.

Ulnar artery access

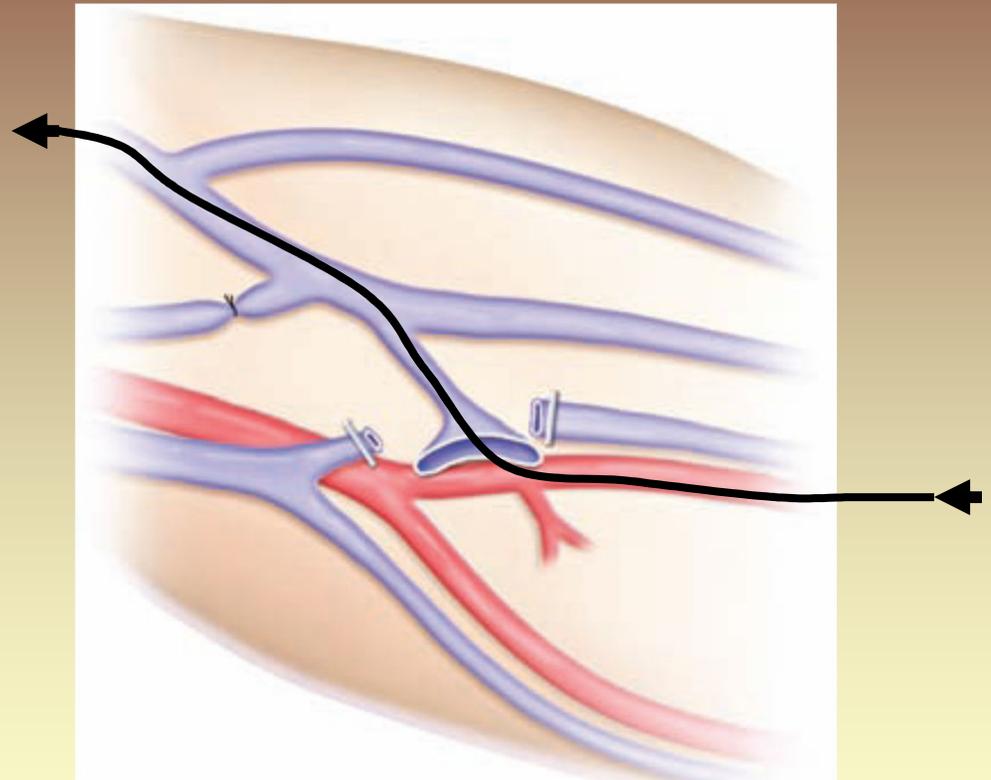
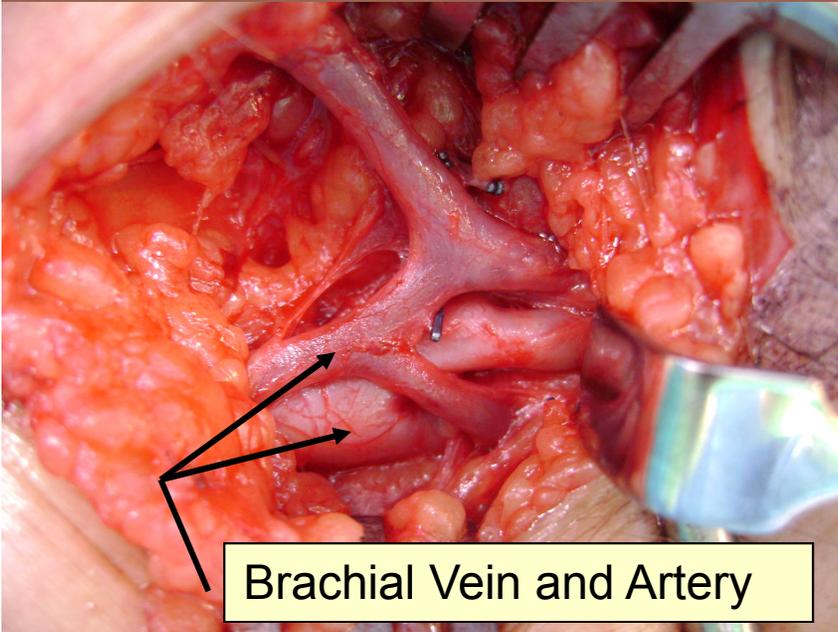
... feasible and safe for routine coronary diagnostic studies and therapeutic interventions.

-Uribe, Gonzalez. Safety and efficacy of ulnar approach. A new route for cardiac catheterization and intervention. American College of Cardiology 2011.

-Aptecar, E., Pernes, J. M., Chabane-Chaouch, M., Bussy, N., Catarino, G., Shahmir, A., . . . Dupouy, P. (2006). Transulnar versus transradial artery approach for coronary angioplasty: The PCVI-CUBA study. Catheterization and Cardiovascular Interventions, 67(5), 711-720.

-de Andrade, P. B., Tebet, M. A., Nogueira, E. F., Esteves, V. C., de Andrade, M. V. A., Labrunie, A., & Mattos, L. (2012). Transulnar approach as an alternative access site for coronary invasive procedures after transradial approach failure. American Heart Journal, 164(4), 462-467.

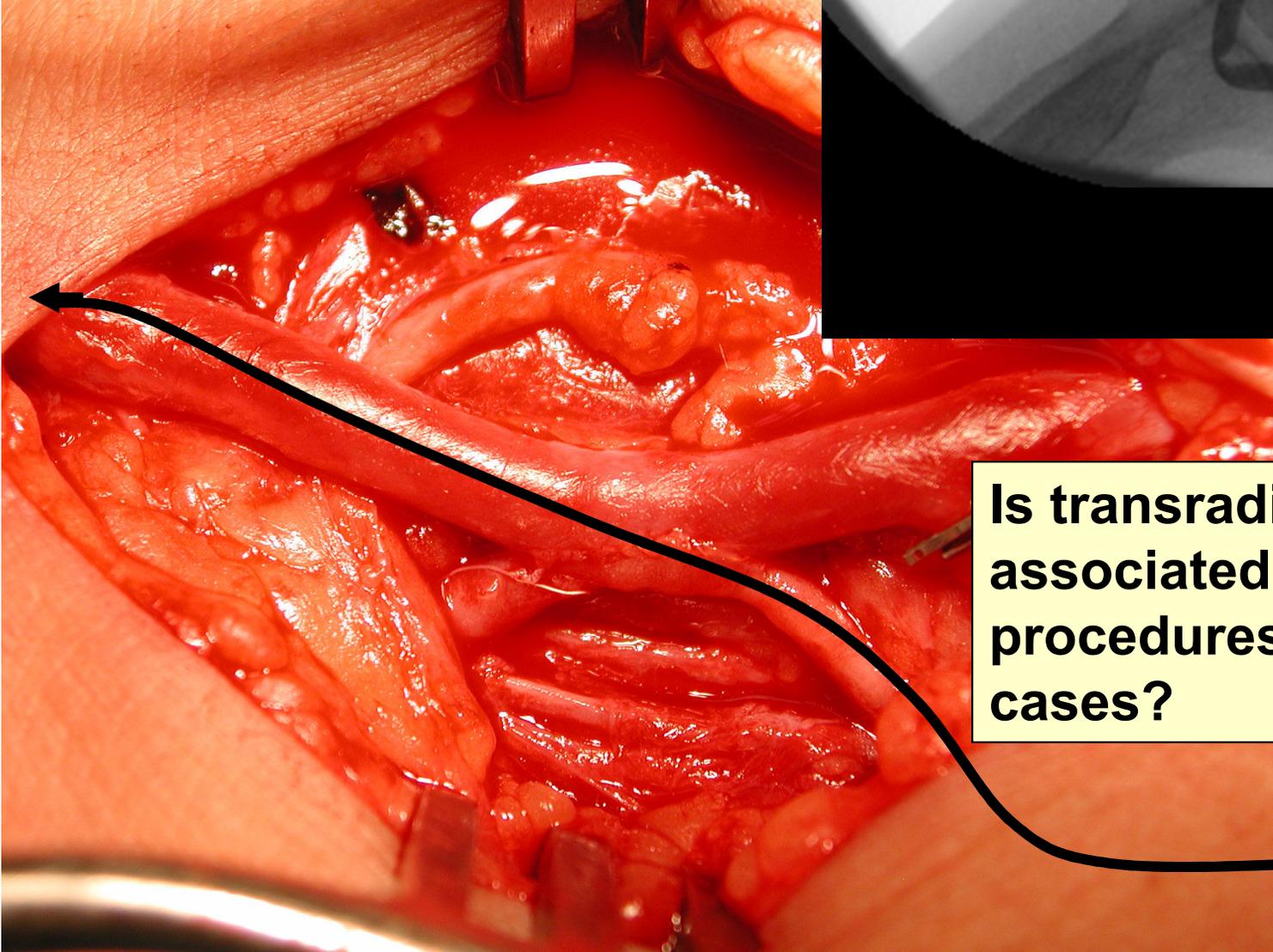
**Favorable angle of approach
to the AVF anastomosis and
outflow vein.**



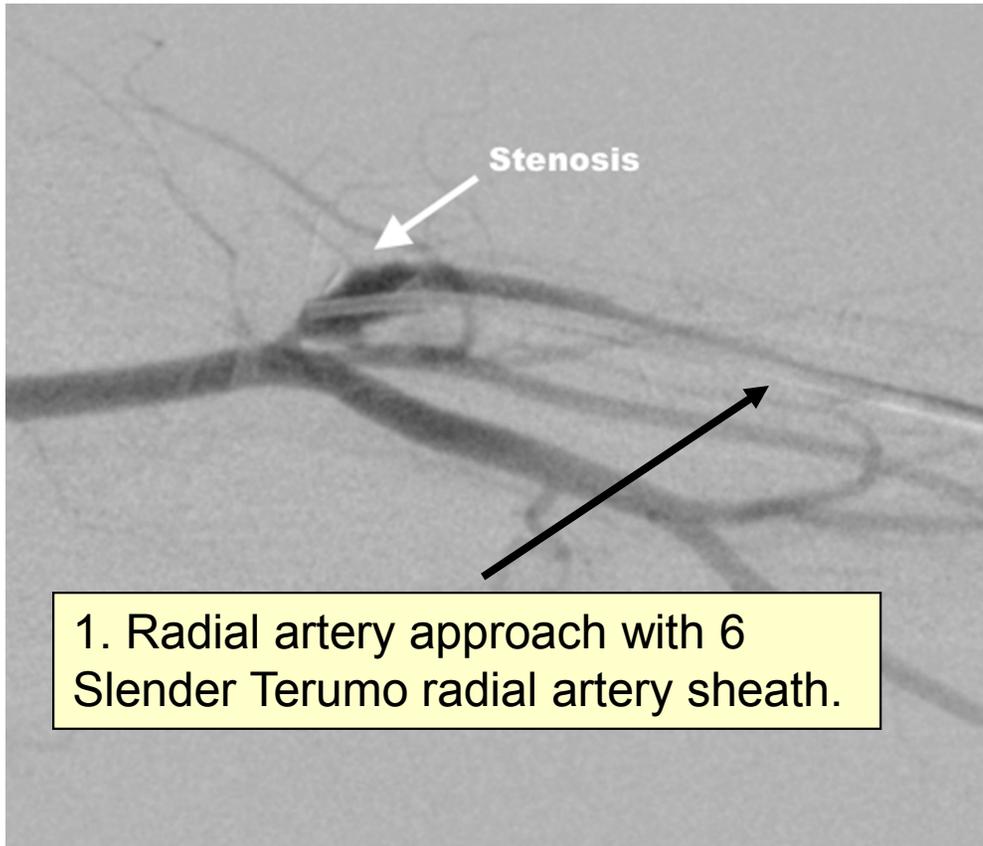
Jennings WC, Mallios A, Blebea J. Upper Extremity Permanent Hemodialysis Access Placement. Darling RC, Ozaki CK, eds. Master Techniques in Surgery: Vascular Surgery: Hybrid, Venous, Dialysis Access, Thoracic Outlet, and Lower Extremity Procedures. Ch.16, p.151-163. Philadelphia: Wolters Kluwer; 2015.

Proximal cannulation may result in angled balloon inflation and vessel distortion

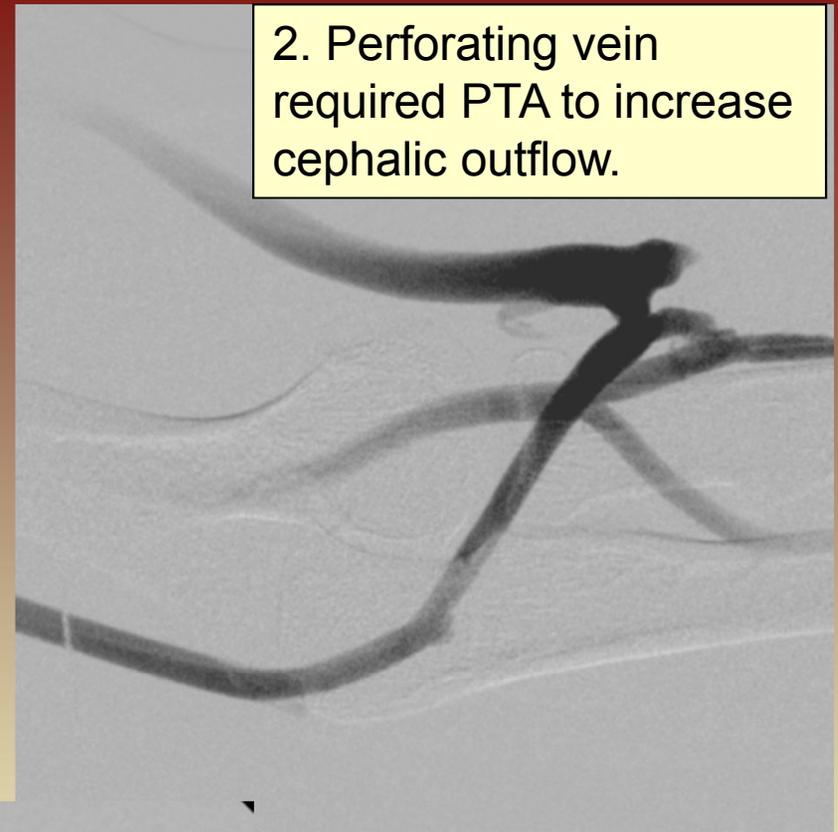
Cannulation site



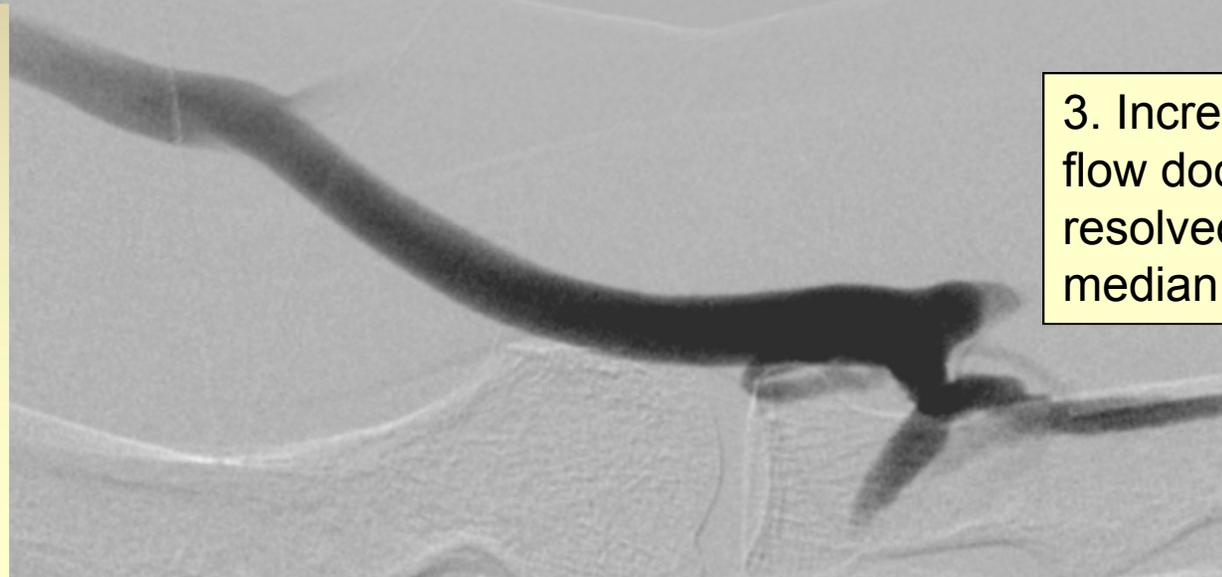
Is transradial access associated with better procedures in some cases?



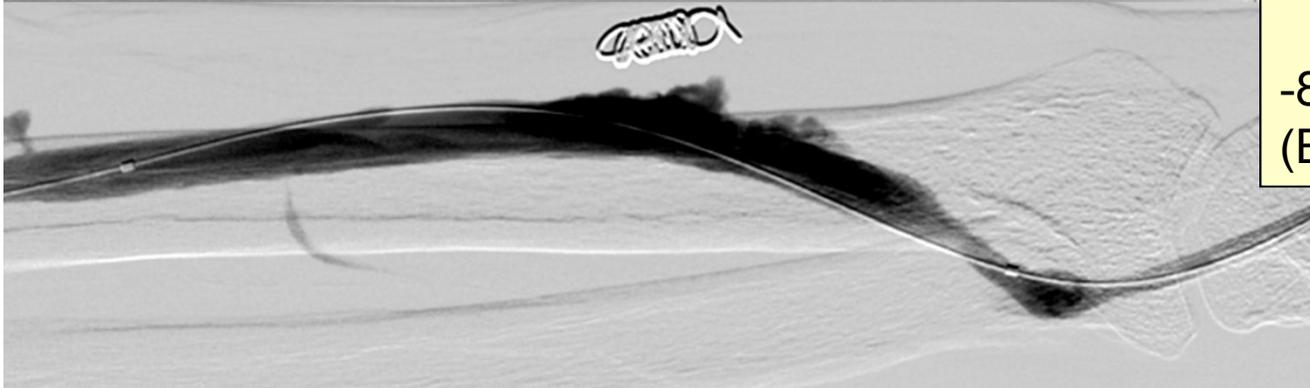
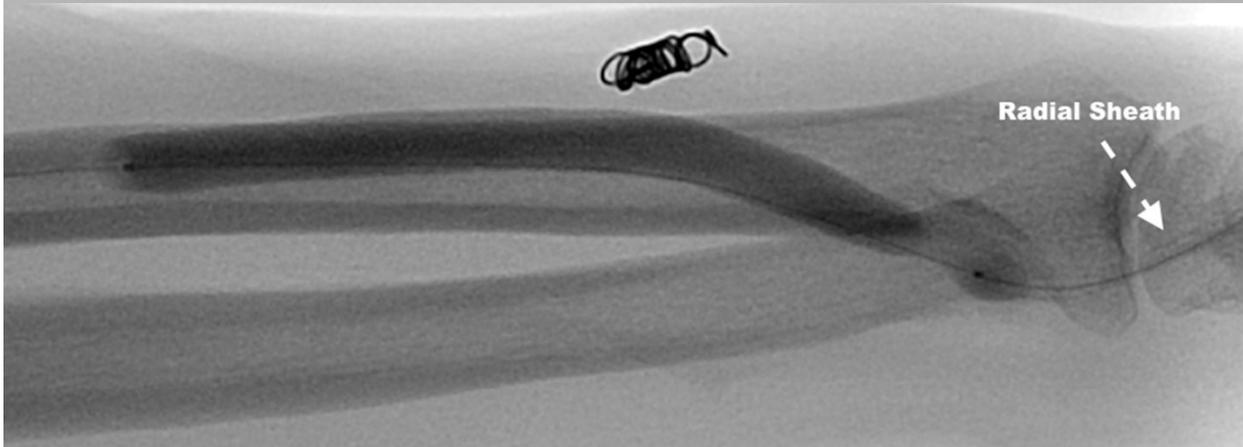
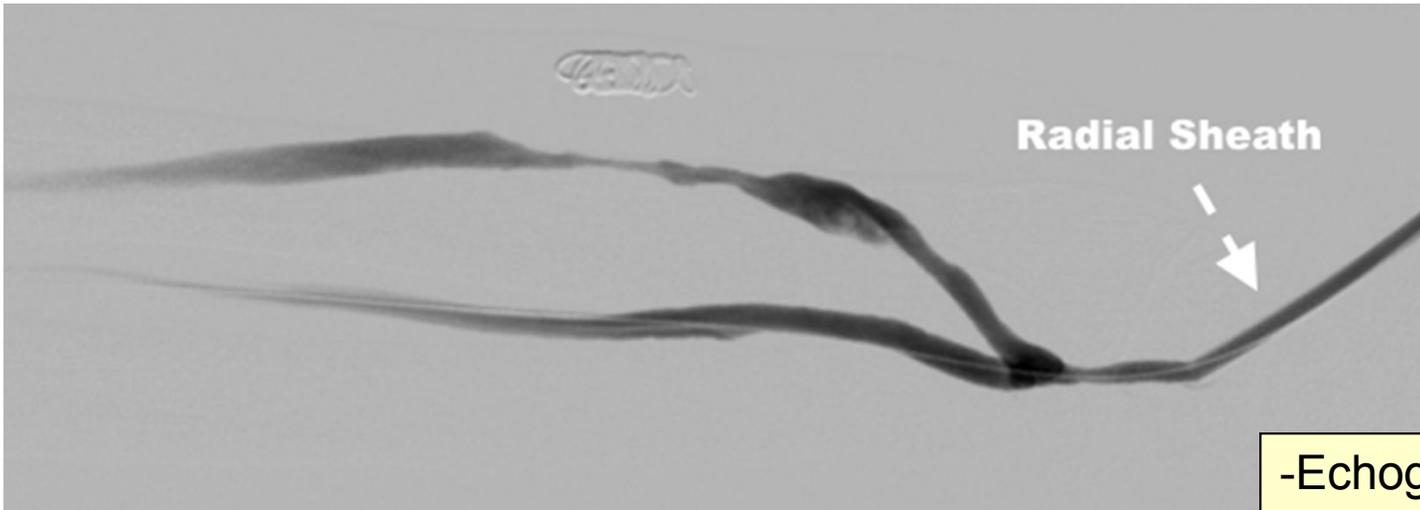
1. Radial artery approach with 6 Slender Terumo radial artery sheath.



2. Perforating vein required PTA to increase cephalic outflow.



3. Increase in cephalic vein AVF flow documented by Doppler with resolved competitive flow through median cubital vein.



-Echogenic needle and a 0.018 guide wire

-6 Slender Terumo radial artery sheath. (6 French inner diameter in a 5 French sheath).

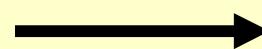
-8 mm Sterling ballon (Boston Scientific).

Conclusions

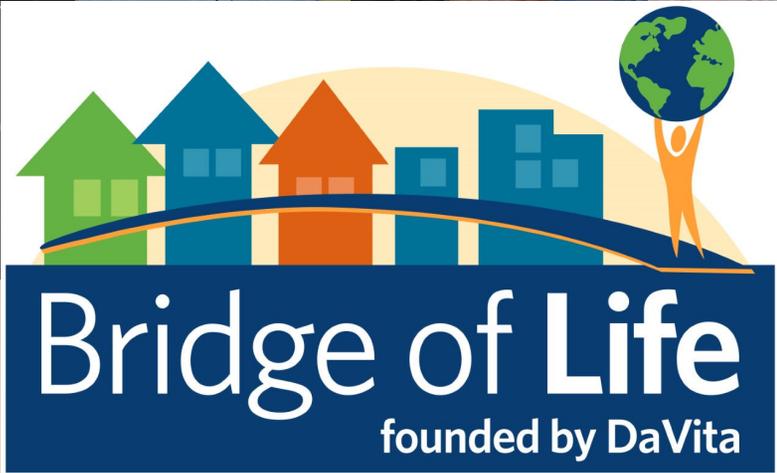
- Use of the radial artery for vascular access intervention is safe and often the preferred procedure site.
- Confirming adequate ulnar artery inflow prior to cannulation is recommended.



DaVita Medical Missions



Bridge of Life



Working together for a healthier world



bridgeoflifeinternational.org

