PHILIPS

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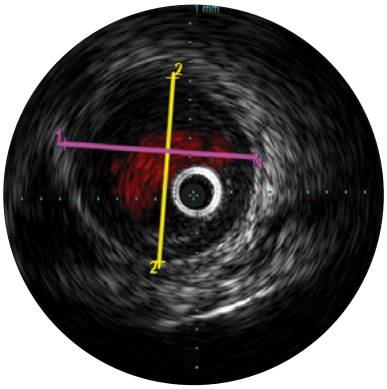
Quick reference

Arteriovenous access application

IVUS imagery

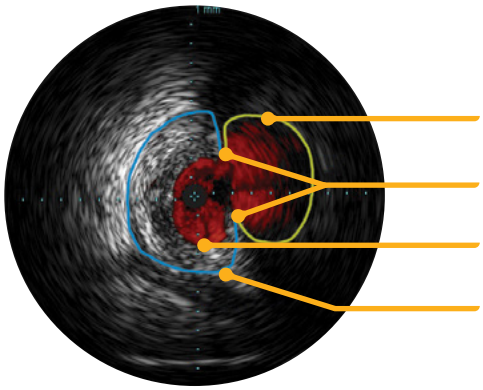
IVUS images in AV access



10 mm

9.7 mm

Cordis Saber PTA Dilatation catheter was used.



Pseudoaneurysm

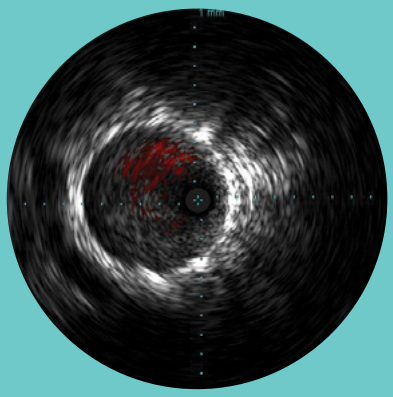
Defect

Graft lumen

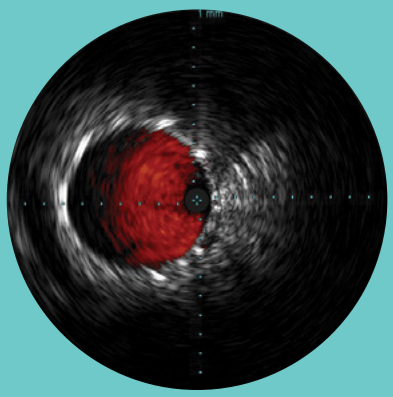
Graft wall

Aneurysm size was measurable only by IVUS. It is important to measure the neck size of the aneurysm. Since the neck was less than 3 mm, Dr. Pavillard chose not to treat with coils or secondary stent graft.

Example of ChromaFlo before and after thrombus removal

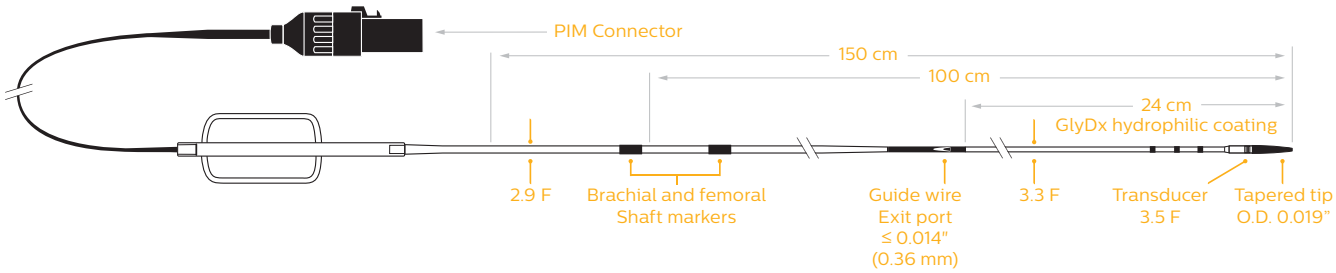


Extensive Thrombus, minimal blood flow shown by ChromaFlo



Minimal residual thrombus increased blood flow

Visions PV .014P IVUS catheter



Workflow for suspected venous outflow complication

1. Upper extremity venous access (ultrasound guided, if necessary)
   - Patient is therapeutically heparinized if not already anticoagulated
   - Use a 5F micropuncture kit
   - Insert a sheath through percutaneous access site via standard interventional technique

2. Wire placement
   - Advance a hydrophilic 0.035 guide wire directed centrally through the venous outflow
   - An angled guide catheter may be used to facilitate placement
   - Exchange for an 0.014 wire

3. Perform venogram (optional – often deferred initially)

4. Advancement of IVUS catheter
   - Prepare the PV .014P IVUS catheter by flushing the guide wire lumen, and then wipe down the entire working length with sterile heparinized normal saline
   - Connect the IVUS catheter to the imaging system's Patient Interface Module (PIM) as described in the imaging system Operator's Manual. Verify that the device is imaging.
   - Advance the IVUS catheter to the central veins over guide wire
   - Use ChromaFlo
   - Adjust image diameter to approximately twice the anticipated diameter of vessels to be assessed. The PV .014P catheter default is set to 10 mm which is adequate to view a 5 mm vessel if the catheter is against the sidewall.
   - May use compression, augmentation maneuvers and flushing to further assess

5. IVUS pullback for pathology / branch identification
   - Look for areas that may be aneurysmal, tortuous, stenotic, thrombosed, thickness of the vein, external compression
   - Measure diameters to further assess the vessel sizes for intervention
   - Measure the length of narrowed section using the Visions PV .014 IVUS catheter's radiopaque or inked markers
   - Spot fluoroscopy may be utilized to identify position of the IVUS catheter
   - Physician evaluates the patient's condition. Physician decides whether it is medically necessary to intervene and whether to proceed with venoplasty, stent placement, or thrombolysis/mechanical thrombectomy

6. Venography with dilute dye may be used to confirm pathologic findings on IVUS

7. The physician will then use preferred choice of angioplasty balloon, and treat the affected venous and/or arterial segment(s). Sheath may be upsized, as needed.

8. Perform post intervention IVUS assessment to access adequacy of treatment

9. Perform final venogram

10. Remove wire and sheath per standard interventional procedure

Workflow for suspected inflow complication is performed in similar fashion; typically through a second sheath access placed retrograde from the venous end of the fistula / graft. Direct arterial puncture proximal to the arterial-venous anastomosis is another option and may be perfomed with a 4 Fr platform.

These workflow instructions were developed in consultation with Edward Pavillard, DO (a paid Philips Volcano consultant) and are intended to serve as a general reference guide for incorporating the use of IVUS in the diagnosis, and when medically necessary, the treatment and post intervention assessment of arteriovenous fistula. They are not intended to replace the instructions for use of any medical device used in the procedure or the physician's own workflow based upon his/her medical experience and judgment.

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