Vascular Access Closure Devices: Tips and Tricks

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Disclosures

- Abbott Vascular: Speaker, Proctor (MitraClip)
- Boston Scientific: Consultant, honorarium
- Philips: Honorarium
- Medtronic: Research support
- St Jude Medical: Speaker, honorarium
Why?

- Reduce bleeding
- Reduce bed time
- Patient convenience and comfort
Overview

• Variety of substances that help seal the arteriotomy
• Overall good clinical experience
• Limited data
• Some have gone out of business: eg. vasoseal
• Angioseal, Perclose, Prostar, Exoseal, Starclose, Mynx
Tip 1: Know your anatomy

- Pre-procedure femoral angiogram
- Recognize anatomy, incl. bifurcation

Contralateral View

Ipsilateral View
Tip 2: Know Contraindications

- Local or systemic infection
- Multiple punctures
- High stick
- Low stick
- Diseased vessel
- Unfamiliarity with device
Tip 3: Personal preferences

- I like a device with tactile feedback
- Master 2, at most 3 devices
- Proglide useful to know (pre-close capability and re-puncture capability)
St Jude Medical: Angioseal

- Creates a mechanical seal by sandwiching the arteriotomy between a bio-absorbable anchor and collagen sponge, which dissolve within 60 to 90 days
- The VIP (V-Twist Integrated Platform): larger collagen footprint for better coverage and enhanced conformability
Core Angio-Seal Technology

The core sealing components of the Angio-Seal Evolution Device are the same as the VIP platform.

- **Collagen**
  9-Hole Weave
  V-Twist folding pattern

- **Suture**
  Poly-glycolic acid (PGA) Coated

- **Anchor**
  50:50 blend of lactide and glycolide polymers

The same 60-90 day absorption time as previous Angio-Seal platforms.
St Jude Medical: "Angioseal"
Angioseal
New Angioseal

- Latest generation for ease of use
Complications

• Angioseal collagen extrusion
• Device failure and bleeding
• Thrombosis
• Stenosis
• Device embolization
• Foot plate dislodgement
• Infection
Collagen plug

Figure 2. Filling defect in the right popliteal artery.

Figure 4. What was removed from the popliteal artery? The collagen plug!
Tips and Tricks

• Only for CFA
• Angle of insertion ~45 degrees
• Not for patients with many puncture attempts
• Caution in very thin: collagen extrusion: just push in with forceps
• If angled wrongly, foot plates may slip out
• Avoid getting wet
Pitfall #1

• Not ideal to re-access the vessel within 90 days of the index procedure

• Do not use if diseased vessel; “If patients have clinically significant peripheral vascular disease, based on published medical literature, the ANGIO-SEAL device can be deployed safely in patient arteries >5 mm diameter when there is found to be no luminal narrowing of 40% or greater within 5 mm of the puncture site.” Abando, A., Hood, D., Weaver, F., Katz,S., The use of the Angioseal device for femoral artery closure. J Vasc Surg 2004;40:287-90.

• Pull ‘guitar string’ tension but not too hard
Pitfall #2

• Caution in very thin: collagen extrusion: just push in with forceps
• Don’t cut or trim it
• Don’t leave it outside
• Don’t pull it off
Abbott Vascular

- Perclose A-T
- Perclose ProGlide
- Prostar XL
  - XL 8 for 6.5-8F access; XL 10 for 8.5 to 10F
Abbott Vascular: *Perclose Proglide*

- Vascular closure of 5-8F access sites
- Polypropylene Monofilament Suture
- Retains knotted tensile strength
- Auto-Tie
- Automated knot tying with pre-tied, heat set knot
- No vessel re-access restrictions
- Device numbered with deployment sequence
1. **POSITIONING**
   - Advance the Perclose ProGlide straight into the artery coaxial to the tissue tract, keeping the device logo pointed towards the ceiling. Discontinue advancement as soon as arterial flow is seen through the marker lumen.
   - While keeping the device at a 45° angle, lift the lever (marked #1) up to deploy the foot inside the artery.
   - Gently retract the device at a 45° angle until marking has stopped.

2. **NEEDLE DEPLOYMENT**
   - While maintaining a 45° angle, fully depress the plunger (in the direction marked #2) until the collar touches the body of the device. This will deploy the needles and capture the suture.

3. **PLUNGER REMOVAL**
   - While stabilizing the device with your free hand, retrieve the suture by removing the plunger (in the direction marked #3) from the device.
   - Retract the plunger until the suture is pulled taut. Only ONE blue rail suture is presented.
   - Utilizing either the QuickCut™ mechanism (a) or sterile scissors (b), cut the plunger free by cutting the BLUE suture approximately 1 cm below the WHITE link.
**SUTURE HARVEST**

- Relax the device and return the lever (marked #4) to its original position to park the foot.
- Deliberately withdraw the Perclose ProGlide until the guide wire exit port is at skin level. Remove the two suture ends from the device. There should be one BLUE suture (the RAIL suture – BLUE TAIL IS THE RAIL) and one WHITE suture (the NON-RAIL-WHITE MAKES IT TIGHT).

**KNOT ADVANCEMENT/Test for Hemostasis**

- Maintain constant back tension on the BLUE rail suture with your left hand, keeping the suture coaxial to the tissue tract. (This will begin to advance the knot toward the arteriotomy, and tent the artery causing hemostasis). Withdraw the Perclose ProGlide from the tissue tract and pick up the Suture Trimmer with your right hand.
- Load the BLUE rail suture into the Suture Trimmer and advance the knot forward to the arteriotomy.
- With the BLUE rail suture wrapped around your left forefinger, place the Suture Trimmer under your left thumb to assume a single-handed position and complete knot advancement. Tighten the knot gently pulling on the WHITE non-rail suture (WHITE MAKES IT TIGHT).
- Remove the Suture Trimmer from the tissue tract and test for hemostasis by having the patient cough or bend his/her leg.
- If hemostasis is achieved, continue to next step. If additional hemostasis is desired, assume single-handed position for 20 seconds.
- Hold constant back tension and load both suture limbs into the Suture Trimmer and advance to the arteriotomy. Trim the sutures by pulling back on the red Trimming Lever. Keep the red Trimming Lever pulled back during retrieval of the Suture Trimmer from the tissue tract.
Key skill: Preclose with 2 Proglides
The first Proglide is placed at a 2 to 8 o’clock orientation.
Slow backflow of venous blood observed
Re-wiring of the femoral vein via the Proglide after sutures harvested and clamped (red arrow).
The second Proglide is now placed via the guidewire and positioned at the 4 to 10 o’clock position, orthogonal to the first Proglide. Note the venous backflow.
The 2\textsuperscript{nd} Proglide is deployed.
The guidewire is replaced and the 7F sheath is replaced.
The 7F sheath is now in place. The 2 sets of sutures are placed by the side and clamped (red arrows), ready for use at the end of the procedure.
The first Proglide suture is ready to be tied with the removal of the guide. An assistant makes ready to hold manual pressure.
The knot is tied for the first Proglide suture
Tips and Tricks

- Avoid calcified vessels
- Avoid tortuous vessels
- Make sure sufficient skin nick
- Remove wire when at marker
- Push in gently
- Follow the steps
- Put wire back if not sure
- Be careful in thin or fat patients
Cautionary Notes

• Mindful of vessel size
• Watch for ongoing pulsatile bleeding at the puncture site
• Rapid hypotension in cases of a retroperitoneal hemorrhage
• Acute distal ischemia with absent pedal pulses
Personal Preference

• Choose 2, at most 3 technologies
  – Do it as often as possible

• Angioseal
  – Tactile and visual
  – I know how to use it safely

• Perclose
  – Allow pre-close technique
  – Can use for large bore devices
  – Allow wire-re-introduction
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