Arterial Access Management in the OIS: Avoiding & Treating Disasters

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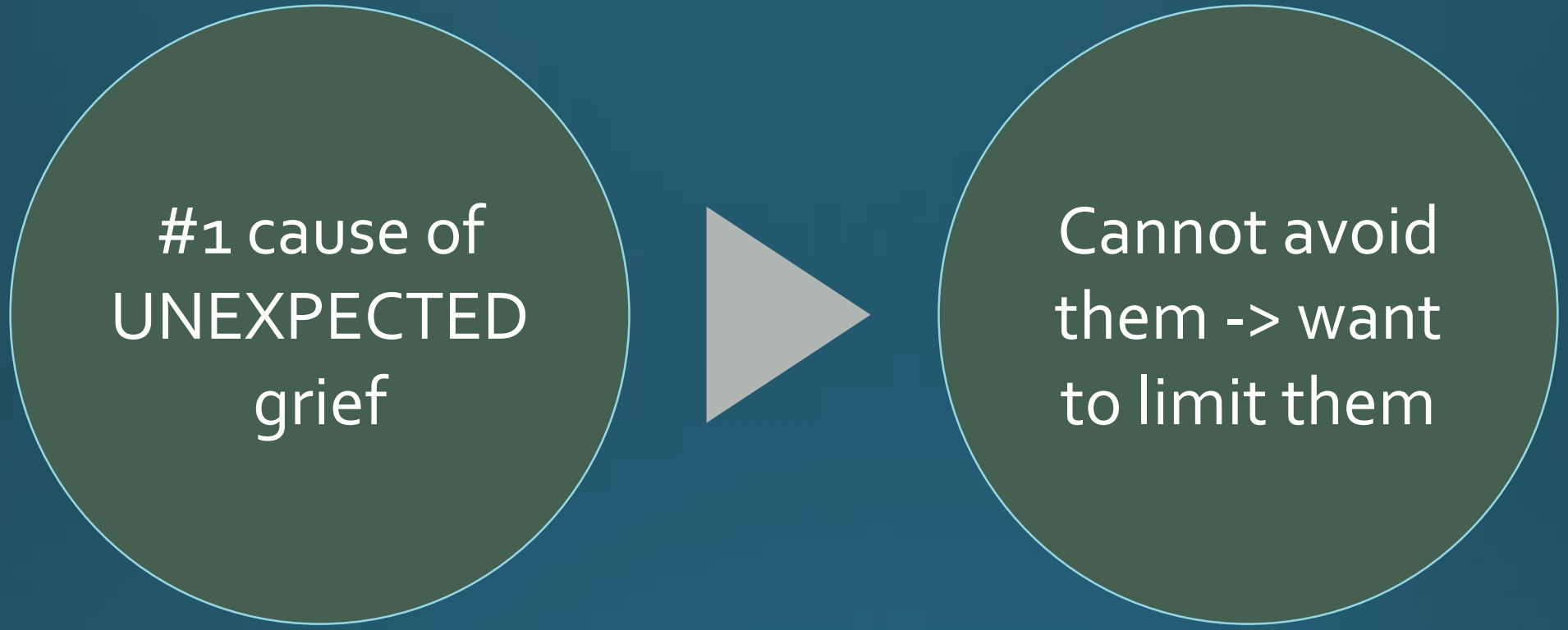


Arterial Access Problems

Goals of Access Management

Limit	Reduce	Improve	Expand
Limit complications	Reduce procedural & fluoroscopy times	Improve technical success rates	Expand the types of patients you can treat

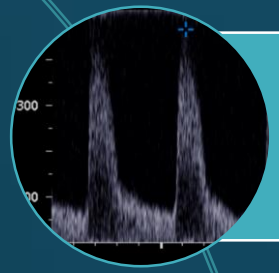
Access Planning

Where are we getting in?

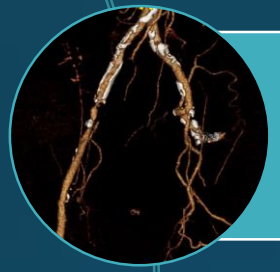
How are we getting out?

What are we going to do when things go wrong

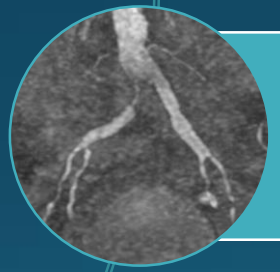
Pre Procedure Anatomical Imaging



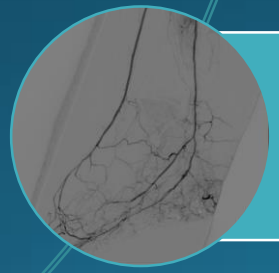
Arterial Ultrasound



CT Angiography



MR Angiography

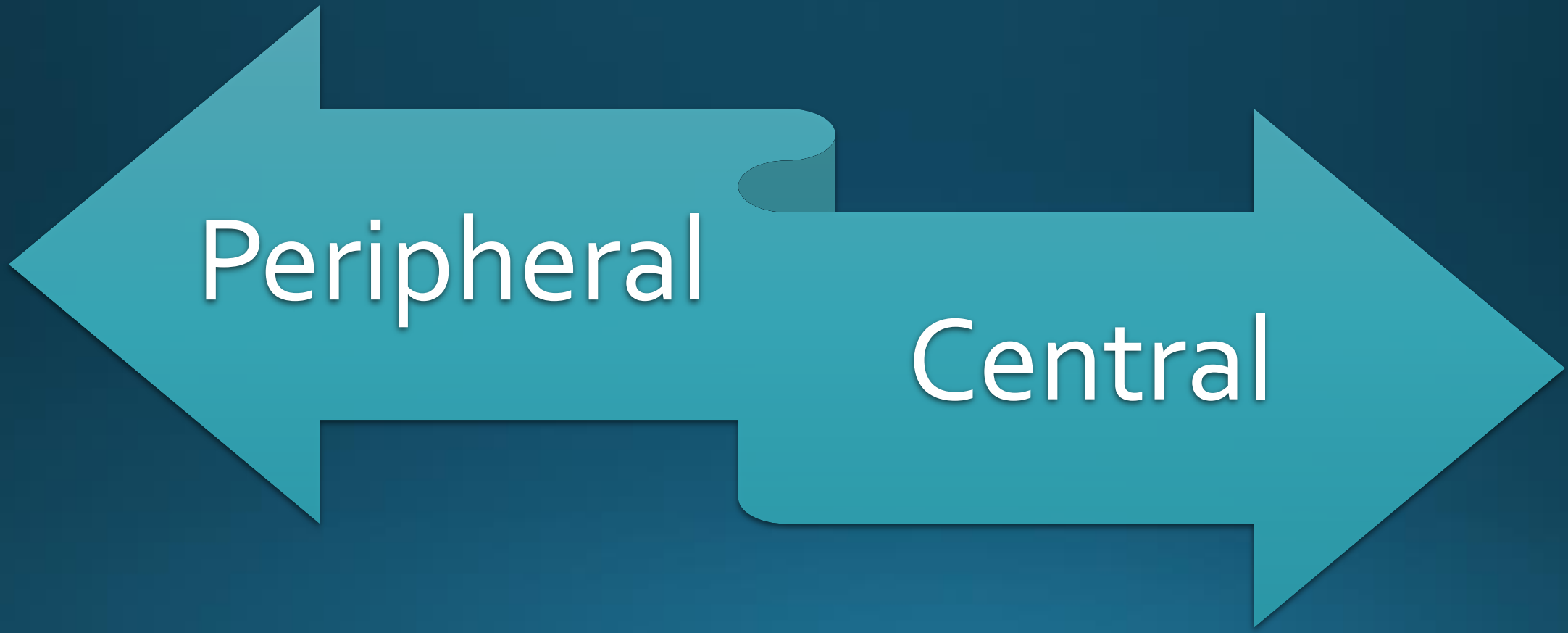


Catheter Angiography

Just about anything you can stick a needle into

Getting In

Access Sites



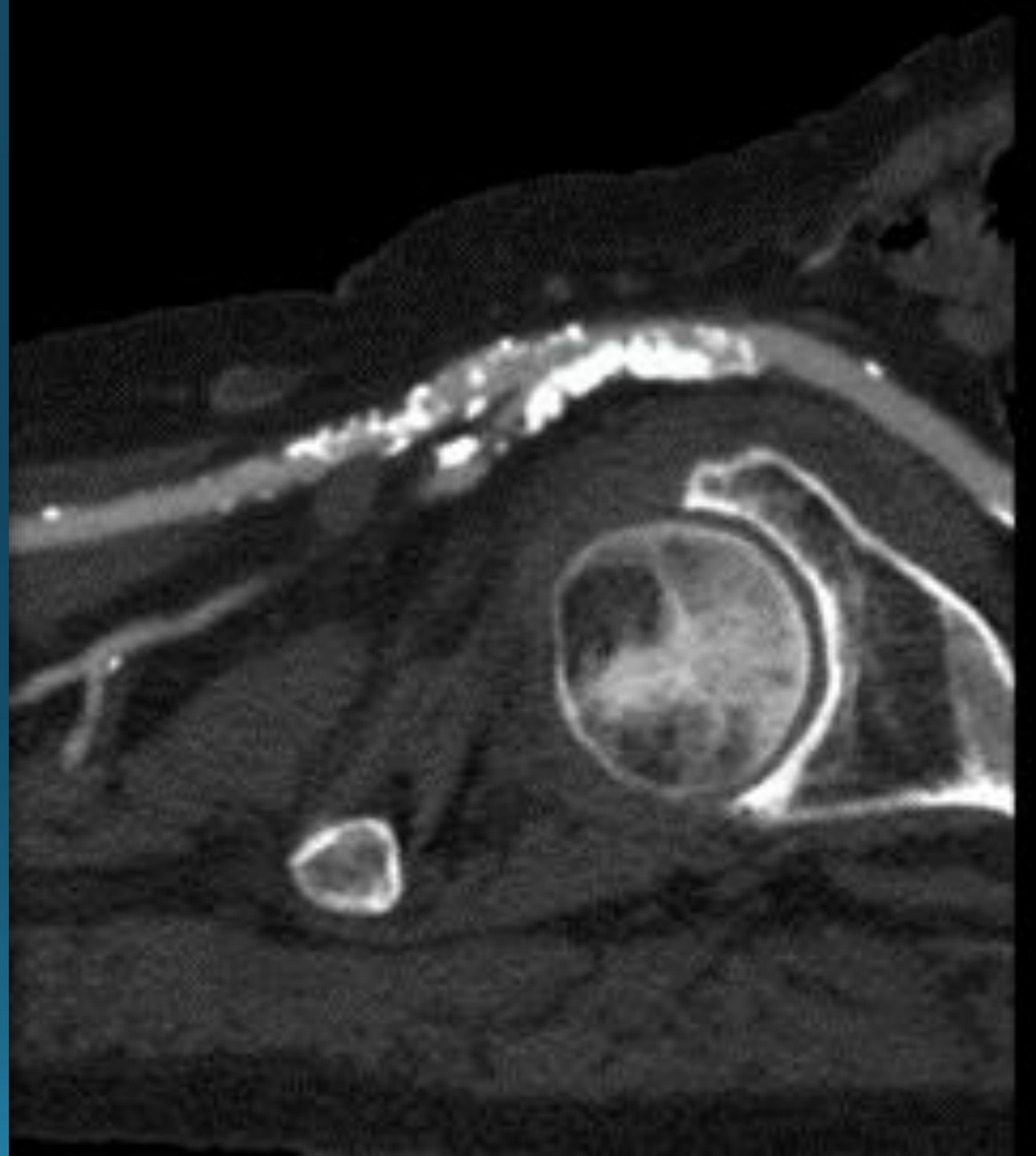
Tibial, pedal, radial has reduced the need for central access

Central access is still required

CFA is often not a good access point

Retrograde CFA

- Often diseased in our patients
- Short runway for ipsilateal EIA procedures
- Cannot treat CFA ipsilateral disease
- Risk of compromise of the PFA



Antegrade CFA

- Can be a very difficult access point
  - Especially obese patients
- Step entry into artery
  - Increase opportunity to cause arterial injury
- Profunda catheterization can take time to deal with
- Closure difficulties due to puncture angle
- Potential to compromise profunda

SFA Access

Excellent alternative to CFA

Proximal to mid SFA easy to use

Safe

Can use VCDs

Expands patients that can be treated endovascularly

Outflow Lower Extremity Procedures

Ipsilateral

- Mechanical Advantage
- Less work and errors (exchanges)
- Less Fluoroscopy
- Required for pedal interventions

Contralateral

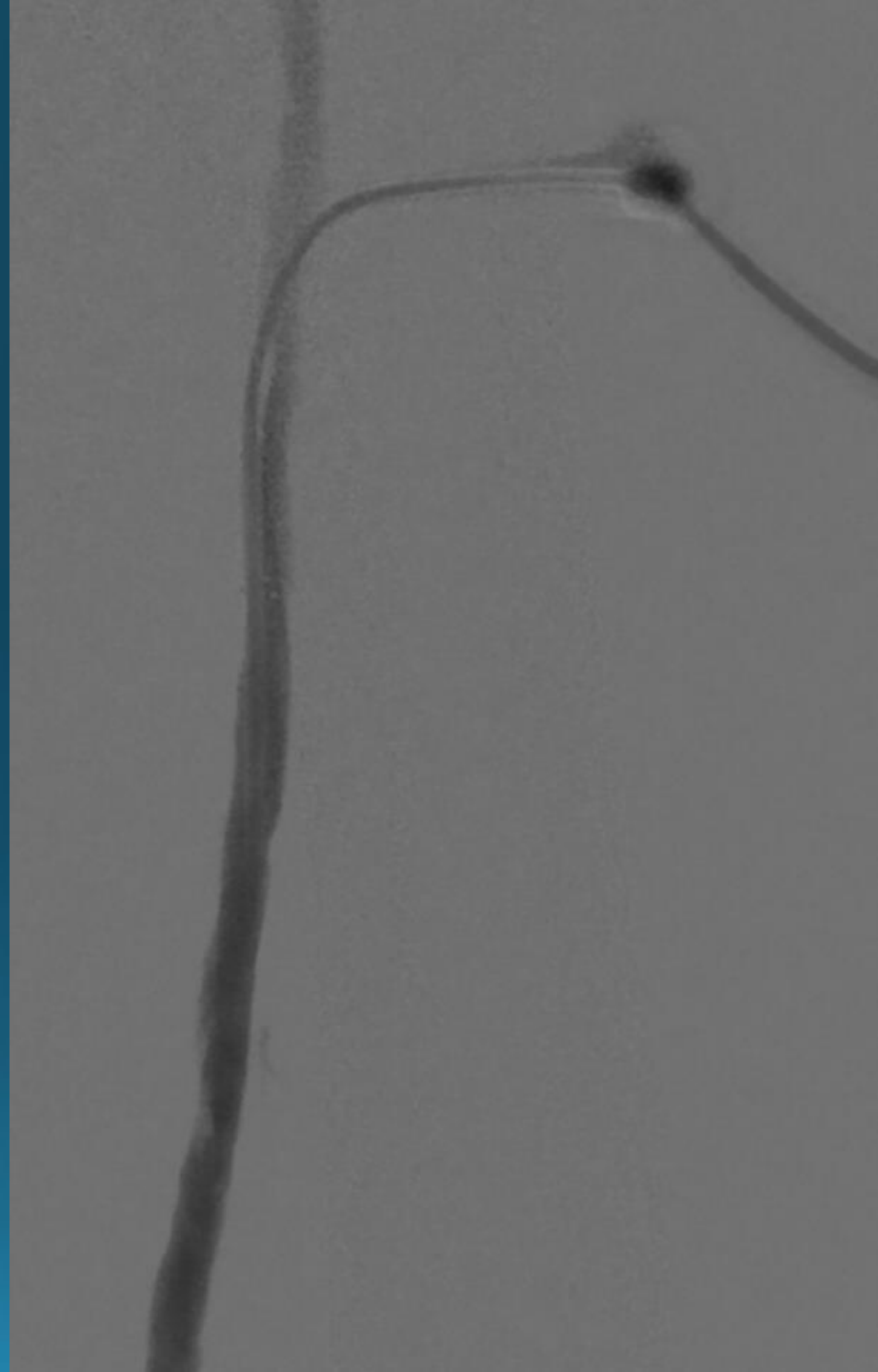
- Time to get up and over
- Loss of Mechanical Advantage
- More work
- More radiation
- May not reach pedal arteries

Antegrade SFA

- Advantages of ipsilateral approach
- Easier access point versus CFA
- Can use VCDs
- Complications can be easily managed
- Do not have to worry about compromising the Profunda

My Experience

- 200 patients
- 7F sheath, SFA, antegrade
- Full anticoagulation
- Angioseal closure
- Closure failure about 3%
- Acute occlusion about 2%
- All failures dealt with in lab, no transfers

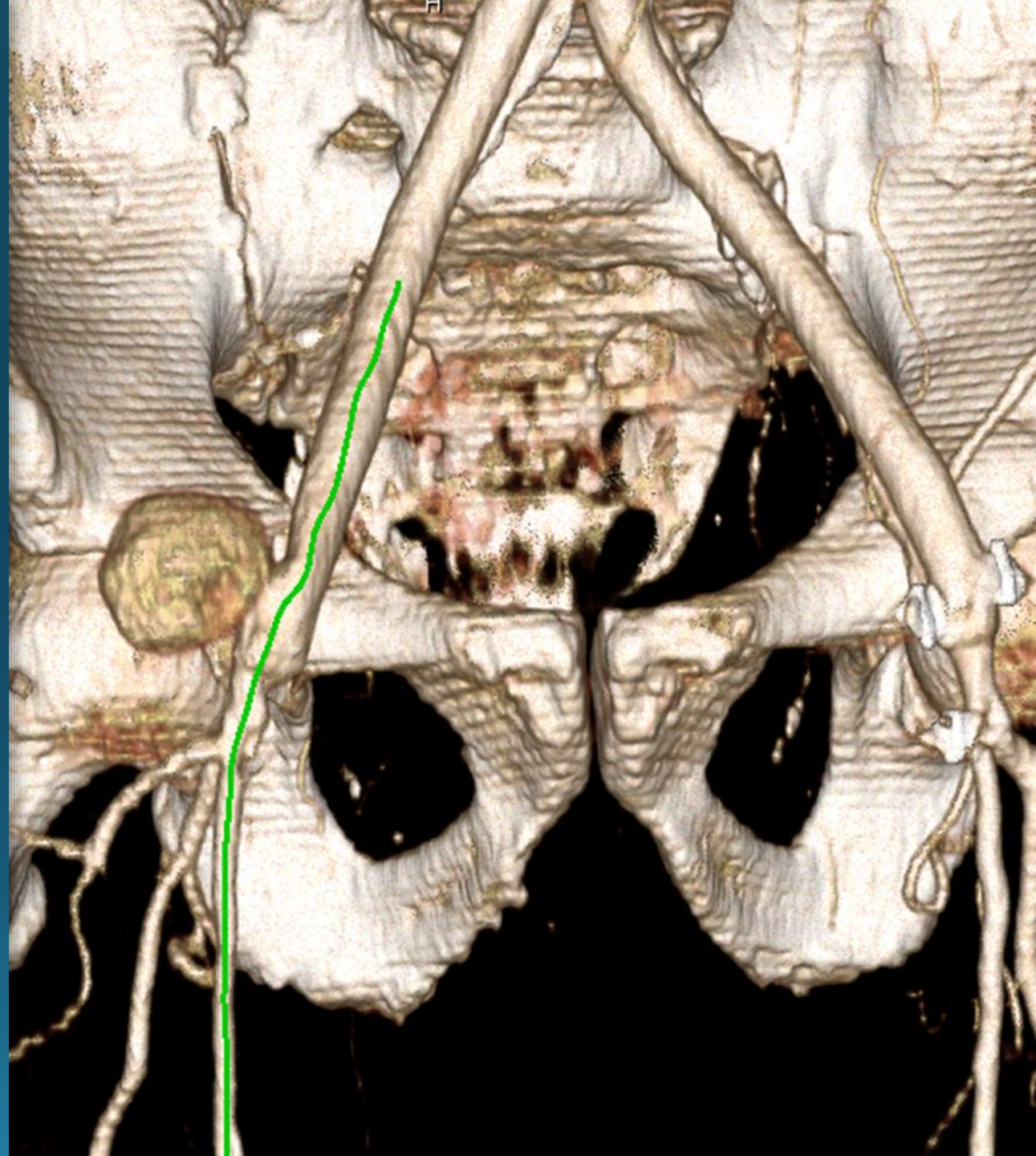


Retrograde SFA

- Great for "short runway"
- Allows treating ipsilateral CFA disease

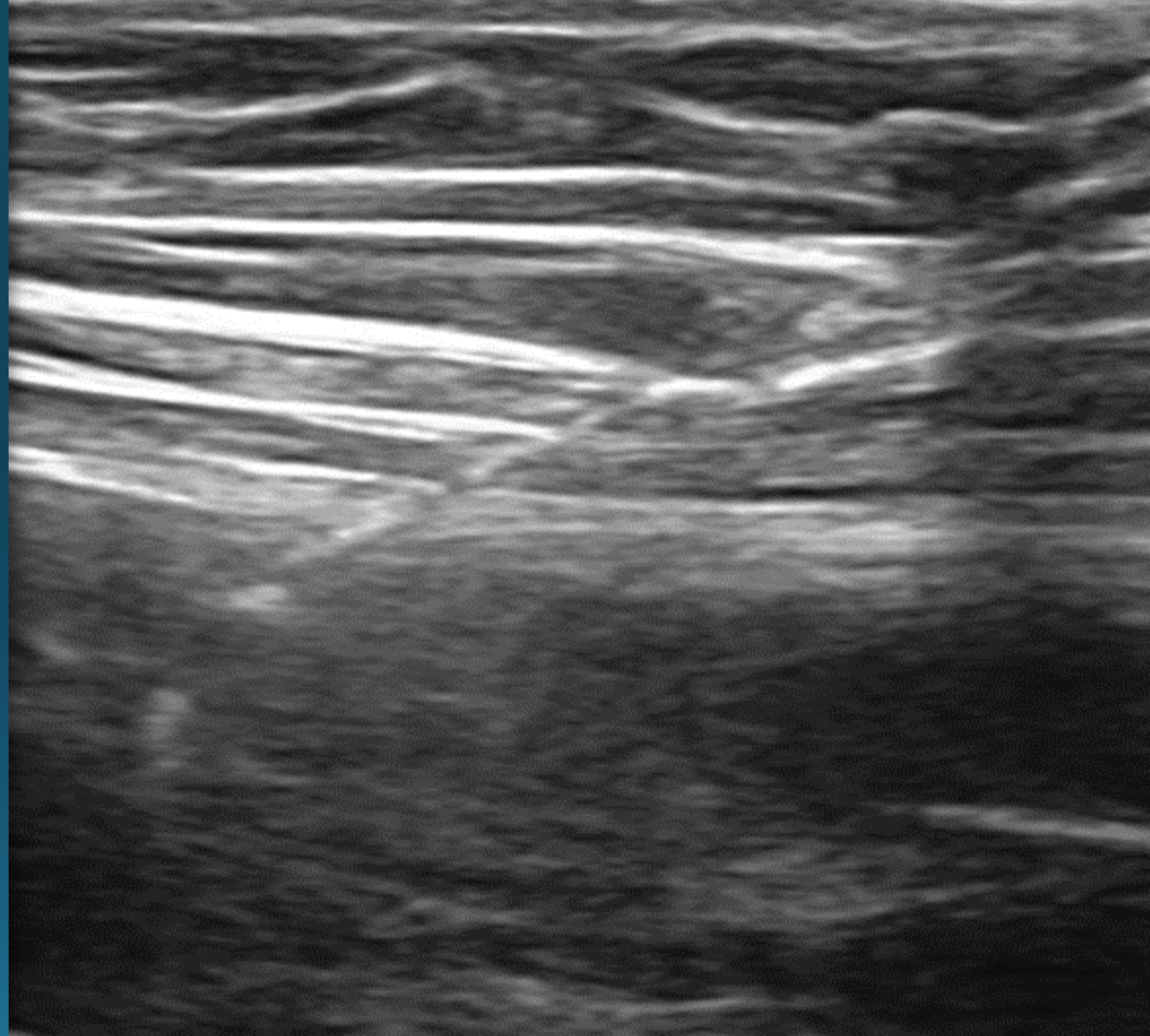
Retrograde SFA

- Excellent option when CFA is not appropriate
- Allows treatment of patients that would otherwise not be doable



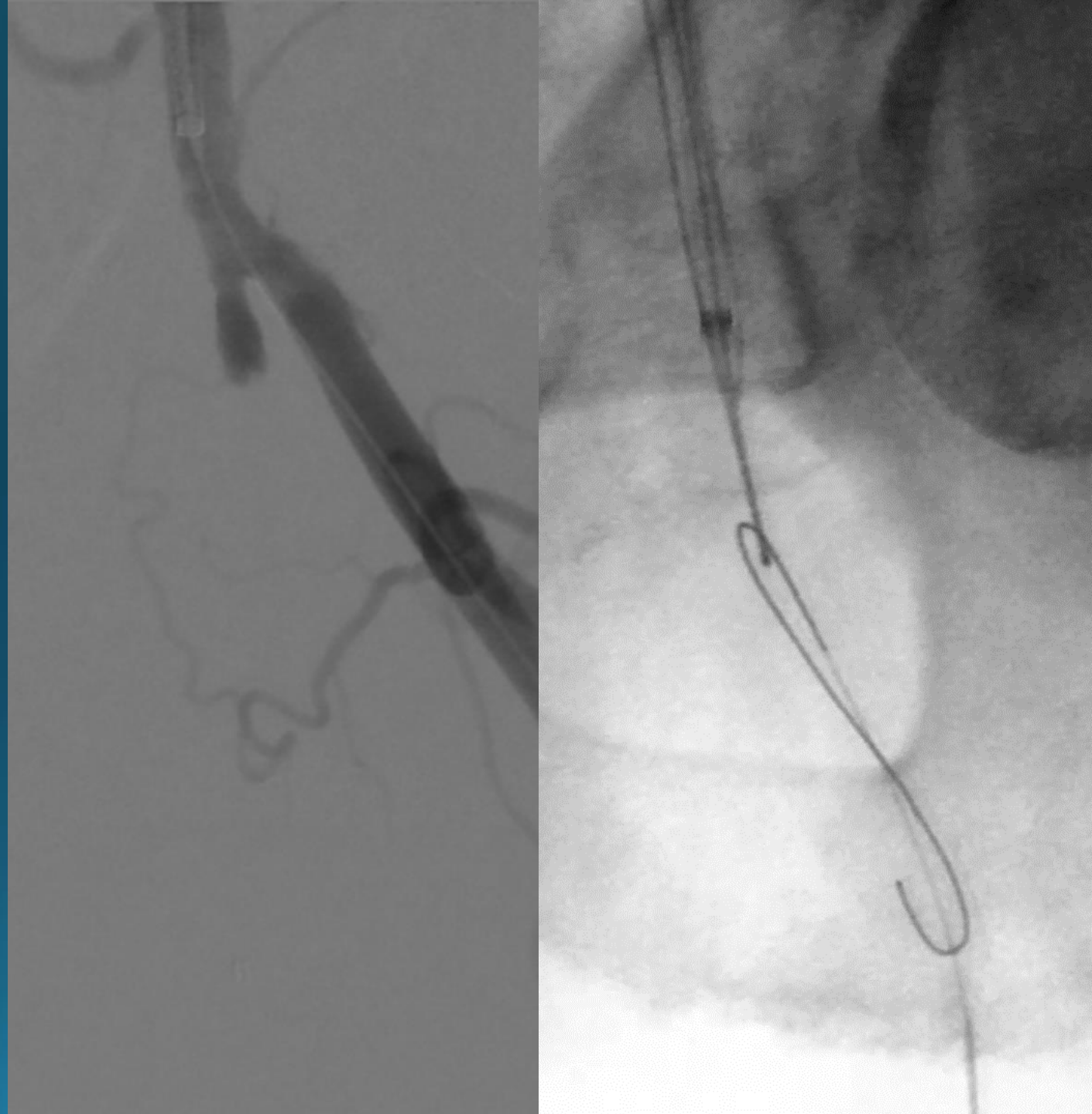
Retrograde Occluded SFA

- Great access point for retrograde procedures
- USG puncture, longitudinal view can be helpful to determine intra arterial location



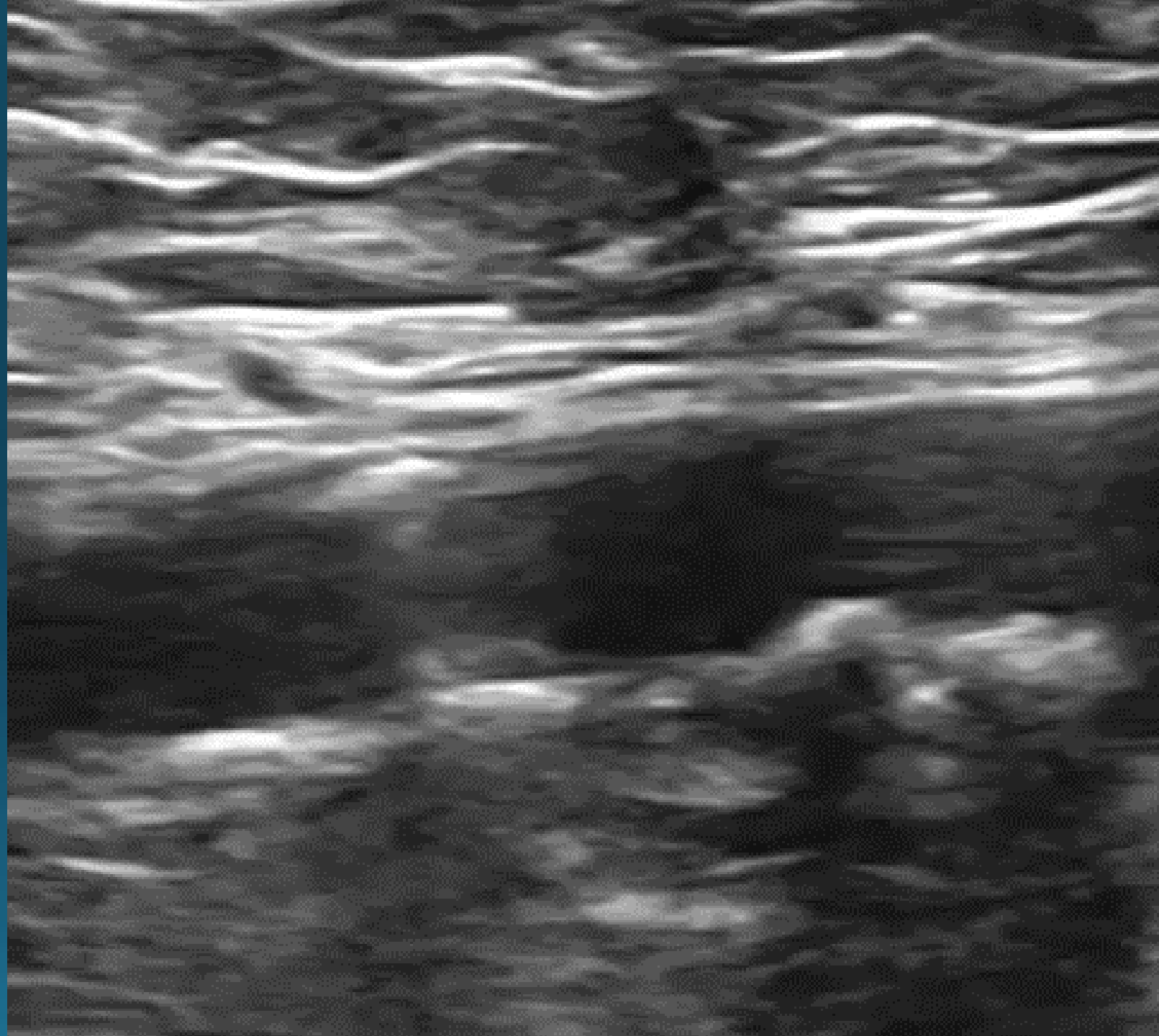
Occluded SFA

- Usually very easy to recanalize an occluded SFA using the standard nitinol wire from a micro puncture kit



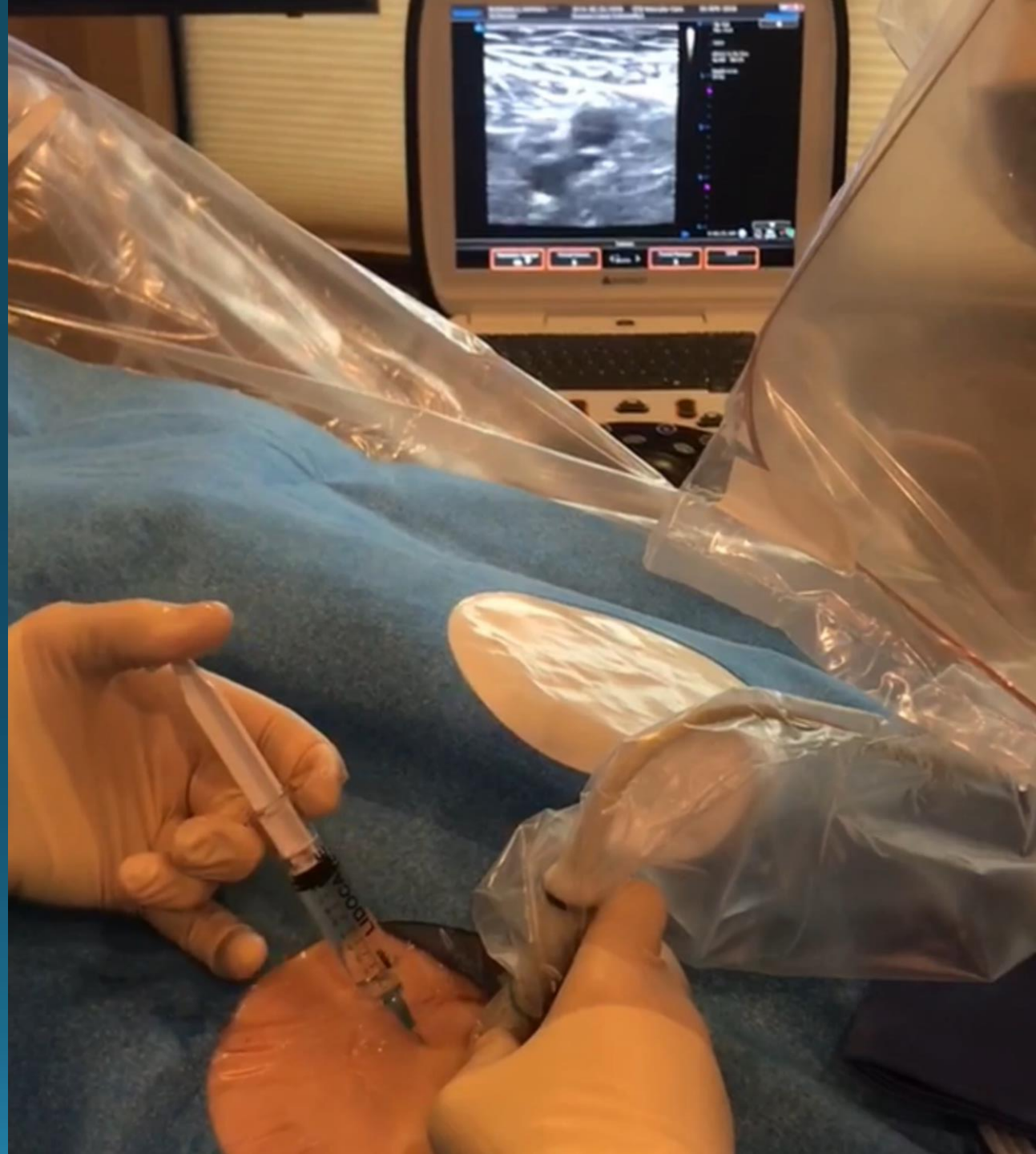
US Guidance

- Should always use
- Important to visualize and avoid plaque
  - Anterior wall, especially suture mediated closure
  - Posterior wall plaques which can catch foot plates
- Lumen size, typically 5mm or > for VCDs

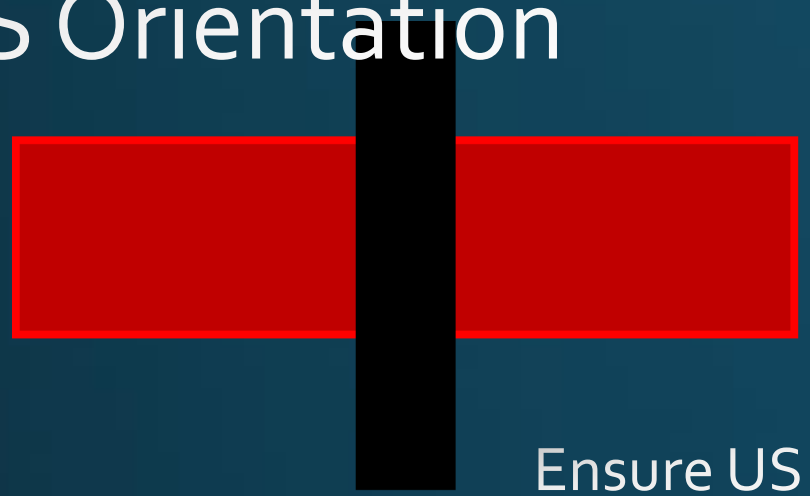


USG Antegrade SFA

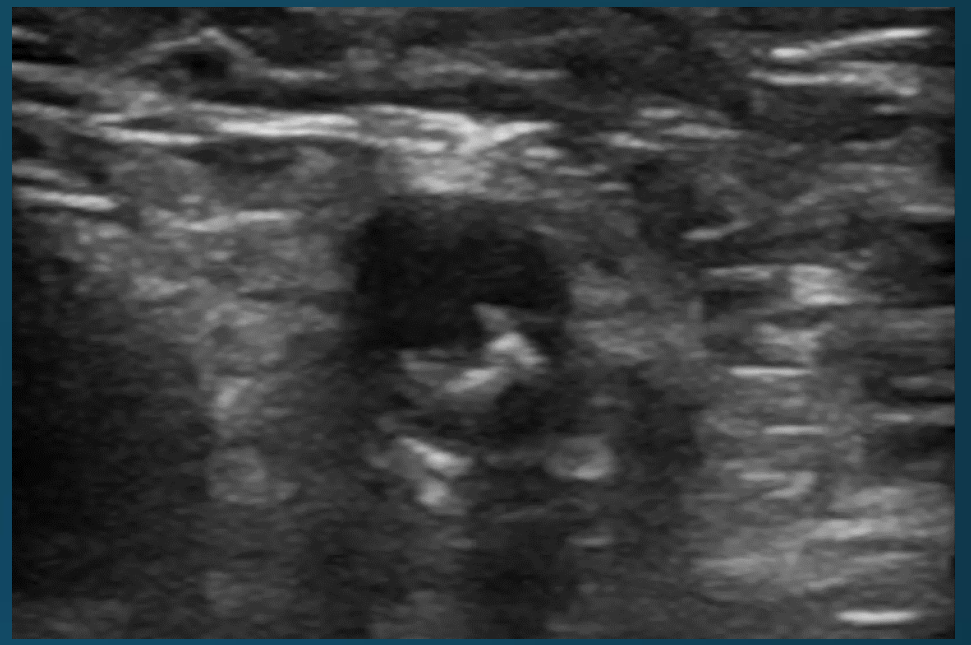
- Remember it's a geometry problem
- Careful alignment
- Always stabilize your hands on the patient
- US hand never moves
- Adjust needle hand to find the needle

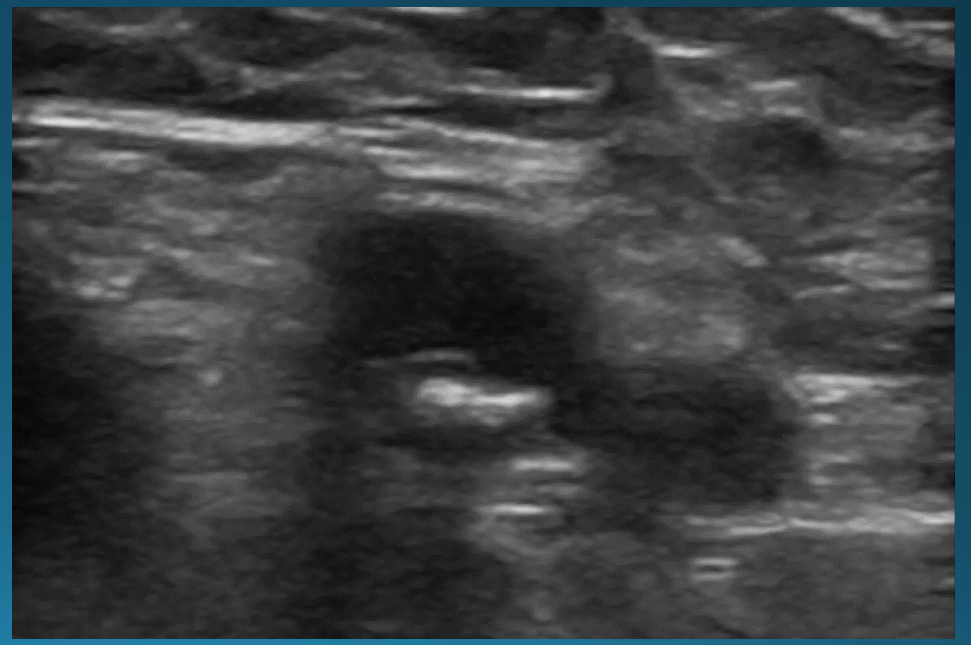


US Orientation



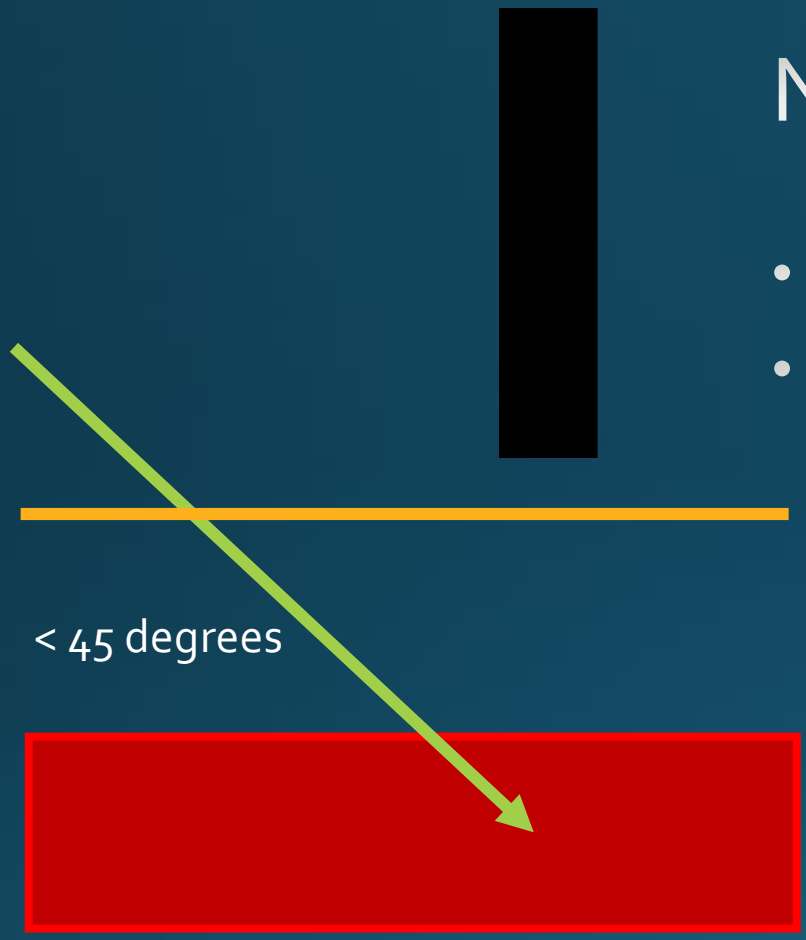
Ensure US transducer perpendicular to the artery by sweeping cranial/caudal

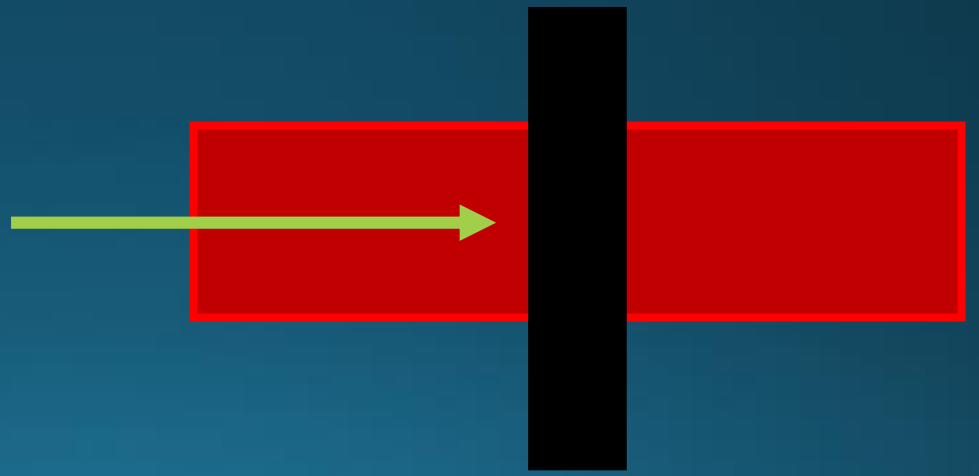




Needle Orientation

- Angle < 45 degrees
- Keep everything in perfect alignment





Manual Compression, Closure Devices, and Getting Out of Trouble

Getting out

Exit Strategy

Primary groin management plan

Backup plan when that fails

Rarely any need to for open repair

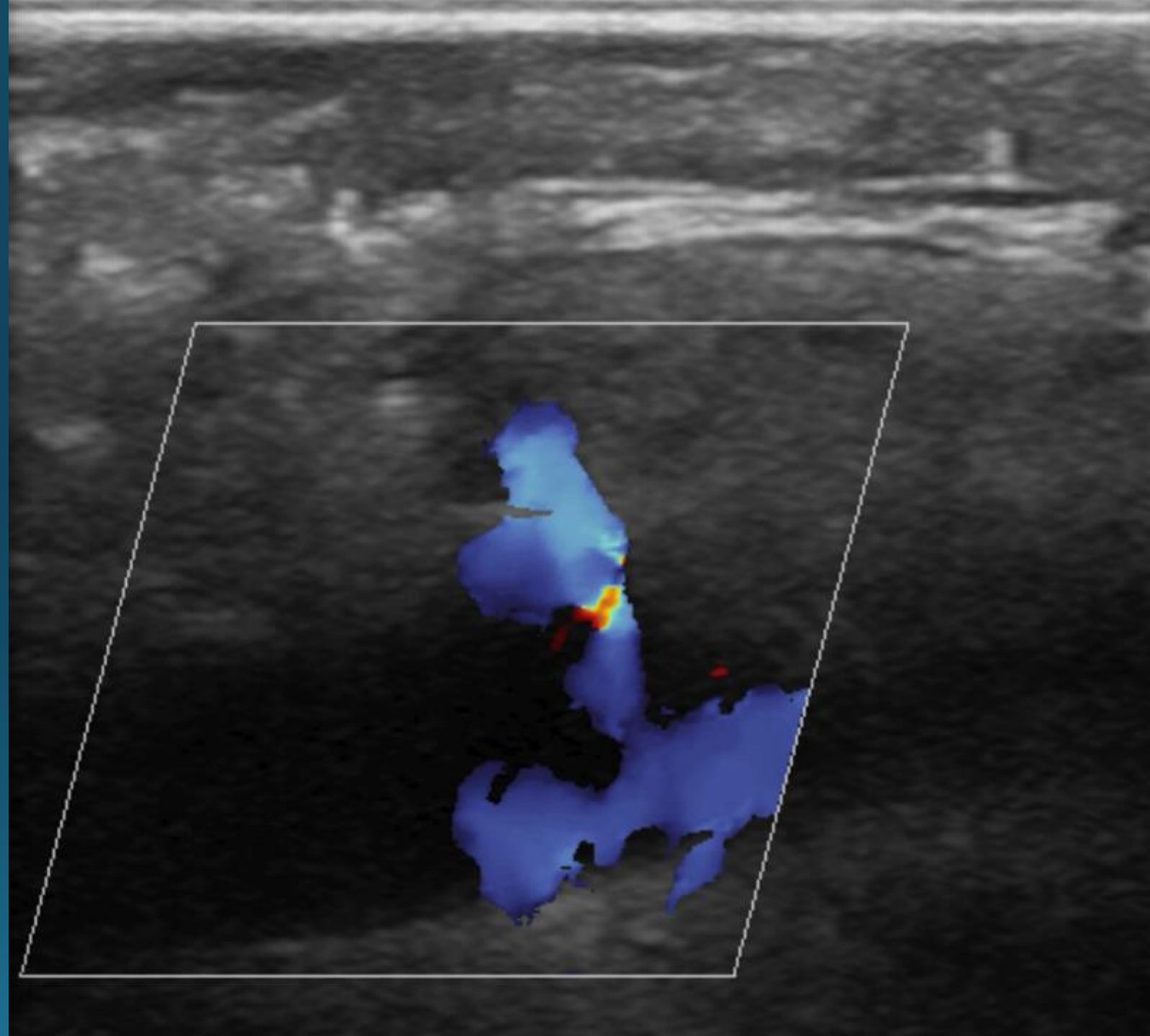
On The Table

Determine closure success/failure

Mark any hematoma

Check the feet

US if any uncertainty

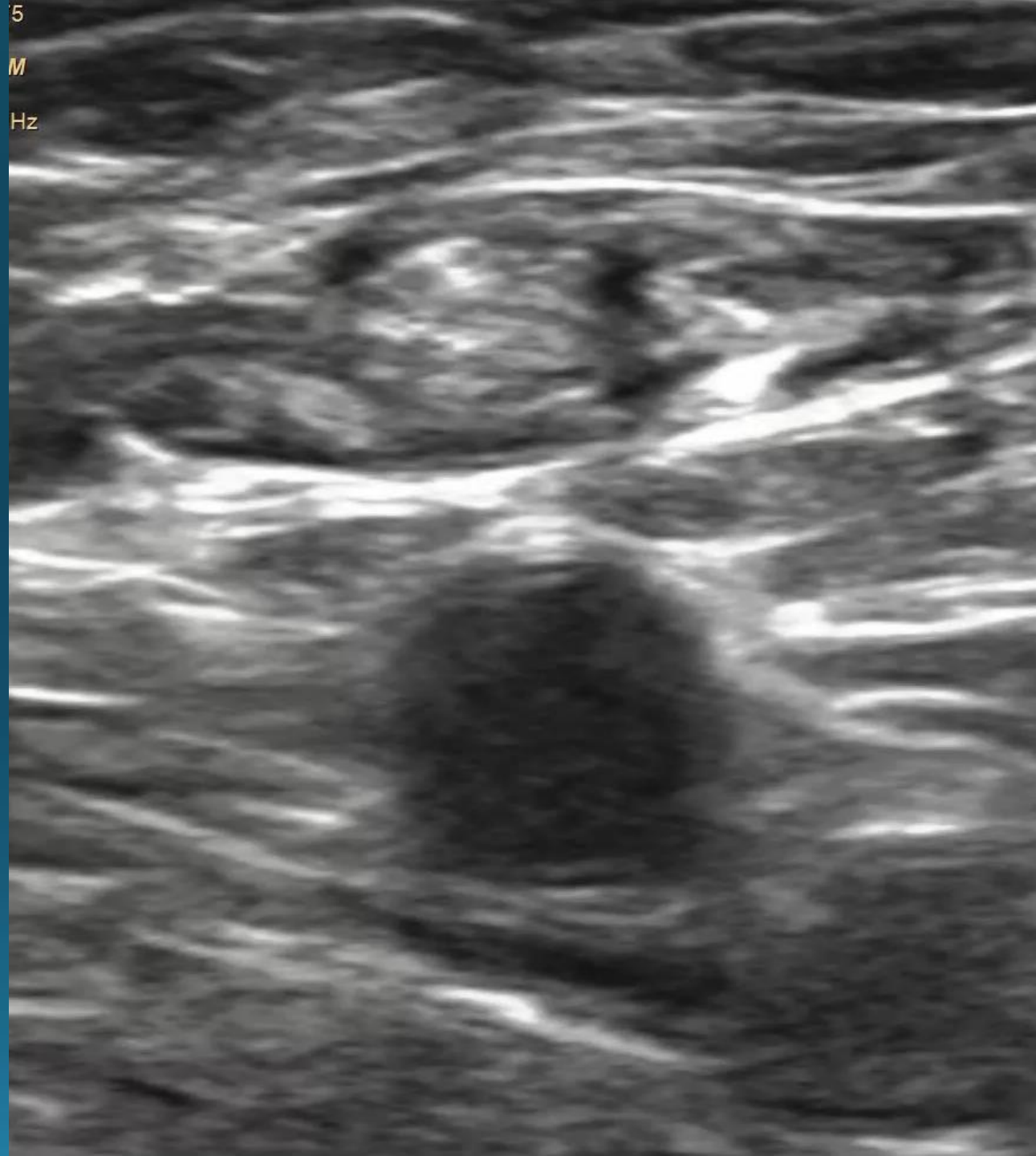


Primary Exit Plan

4F	• Reverse anticoagulation • Manual compression • +/- Gelfoam slurry
>4F	• Vascular closure device

Manual Compression

- Use US prior to sheath removal if any concerns about puncture or hematoma
- US can be used to perform MC as the exact site of the arteriotomy can be determined



VCD's

- Need at least 2 if not 3 that you are comfortable with
- All have a learning curve
- All have various pro/cons

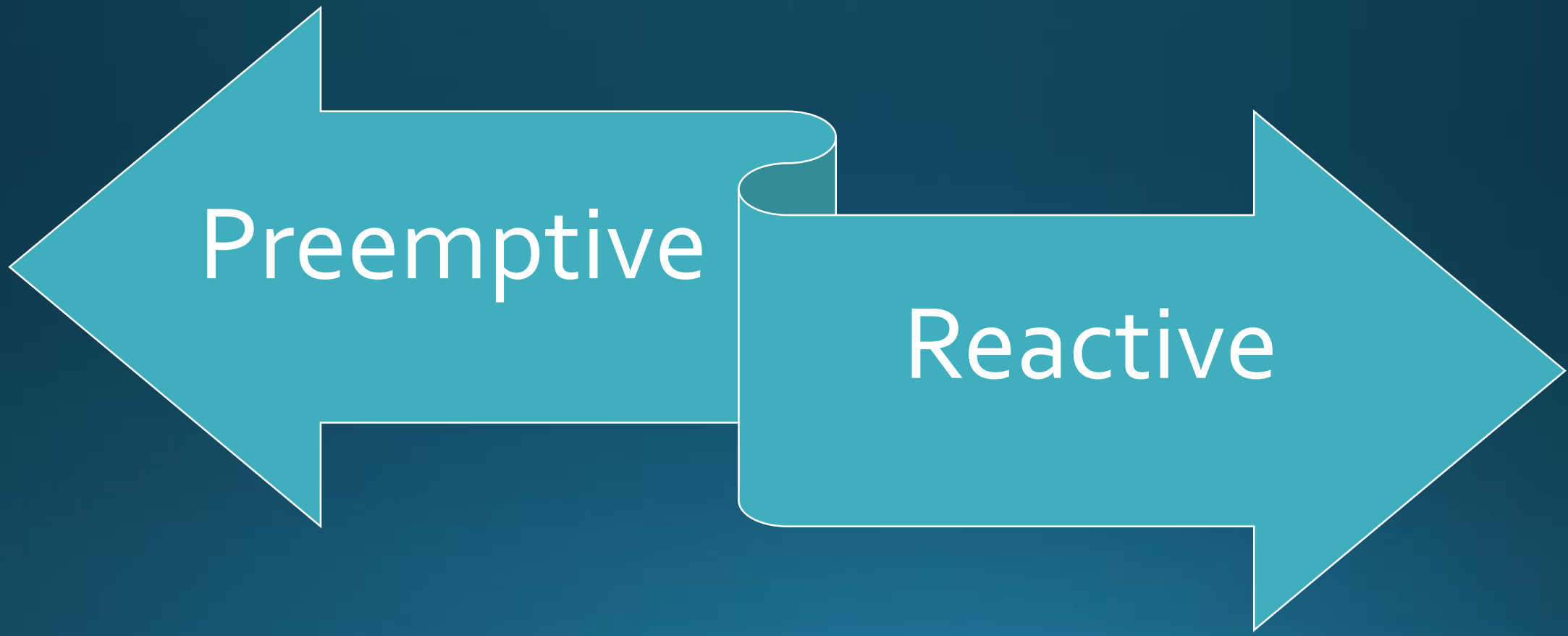
- My choices
  - Angioseal
  - Proglide
  - Starclose

Majority of Acute Groin Complications

Bleeding

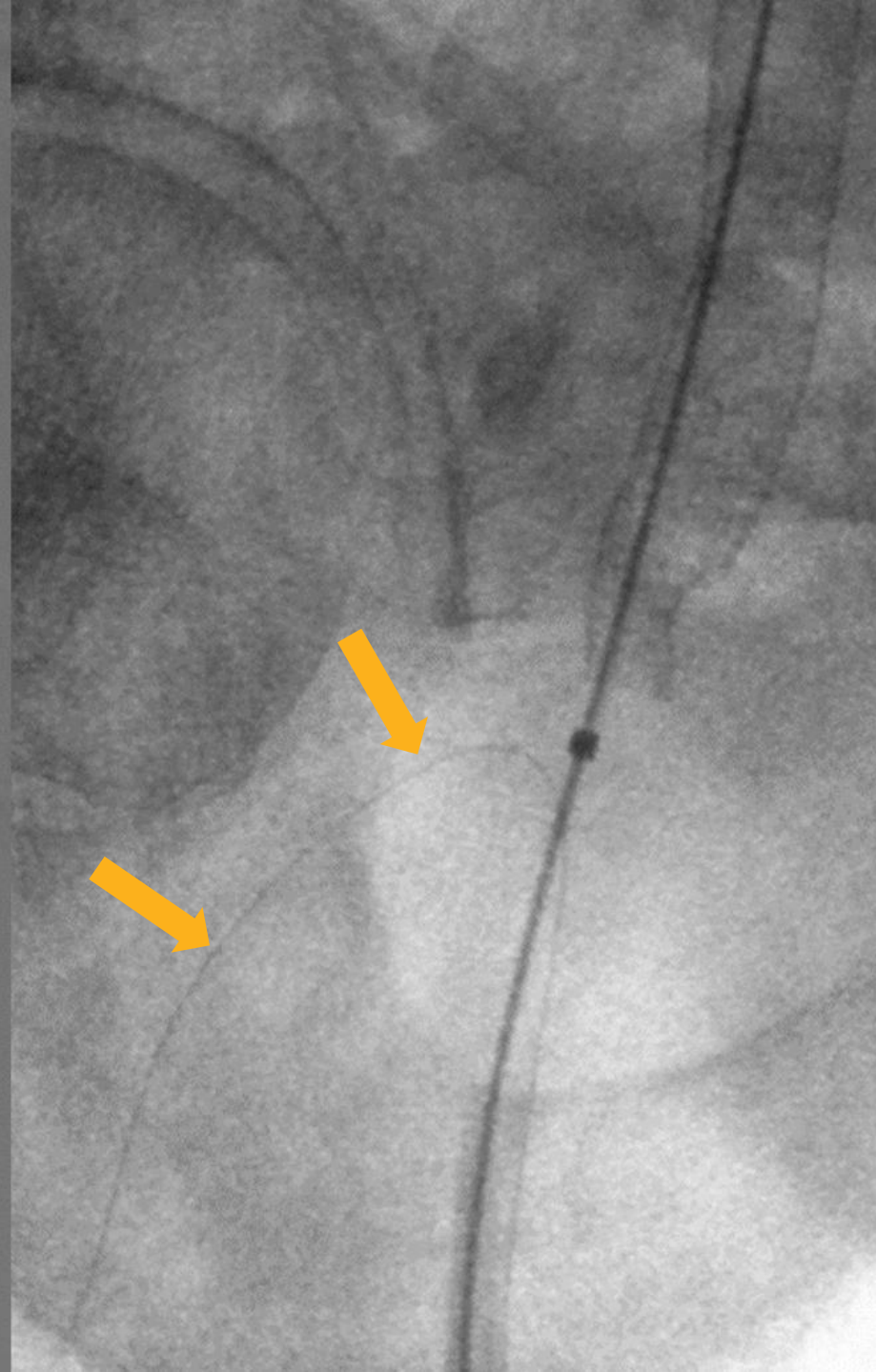
Occlusion

Management Approach



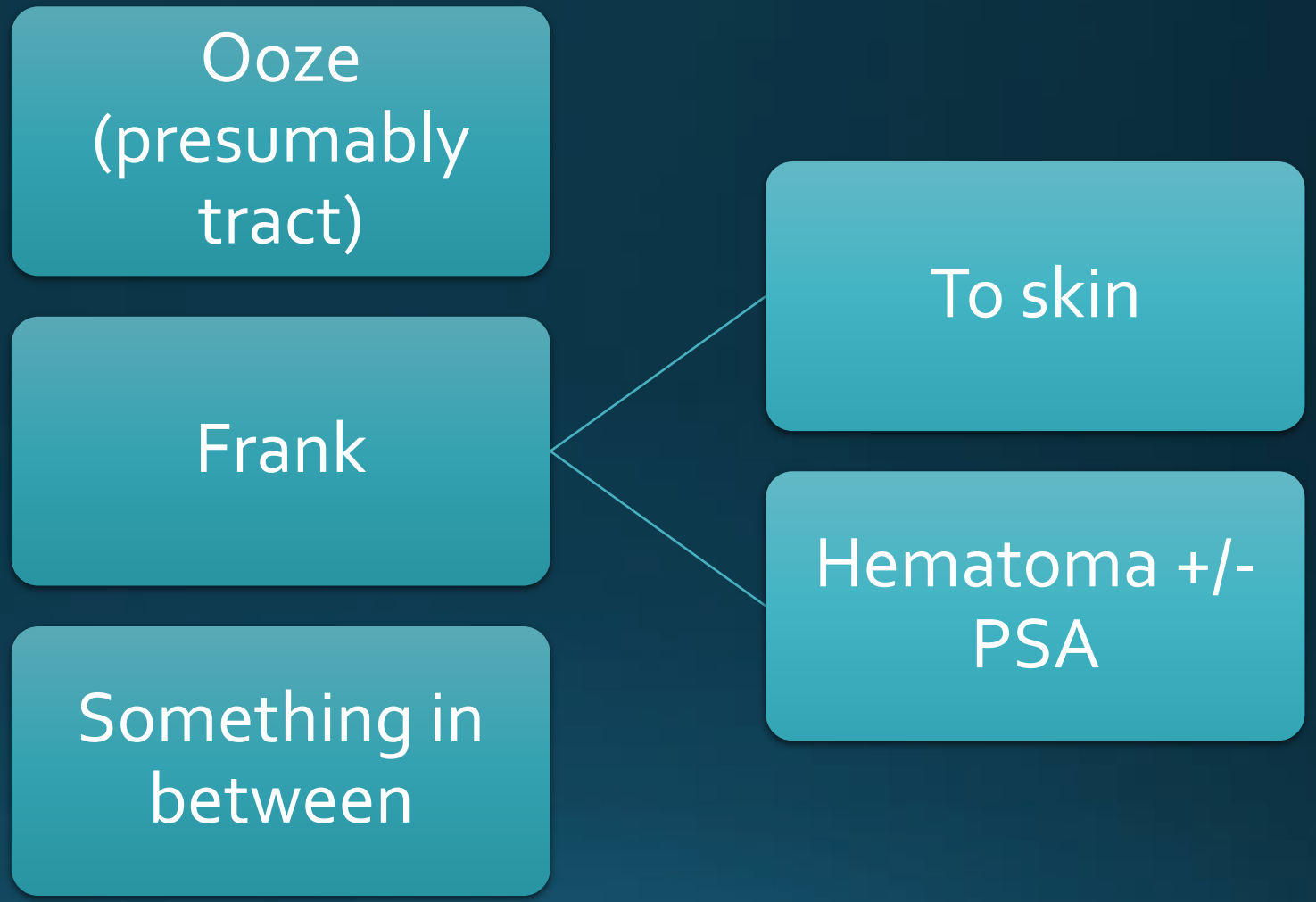
Preemptive

- Second wire .018 in case of closure failure
- Always quick placement of a balloon for tamponade/occlusion

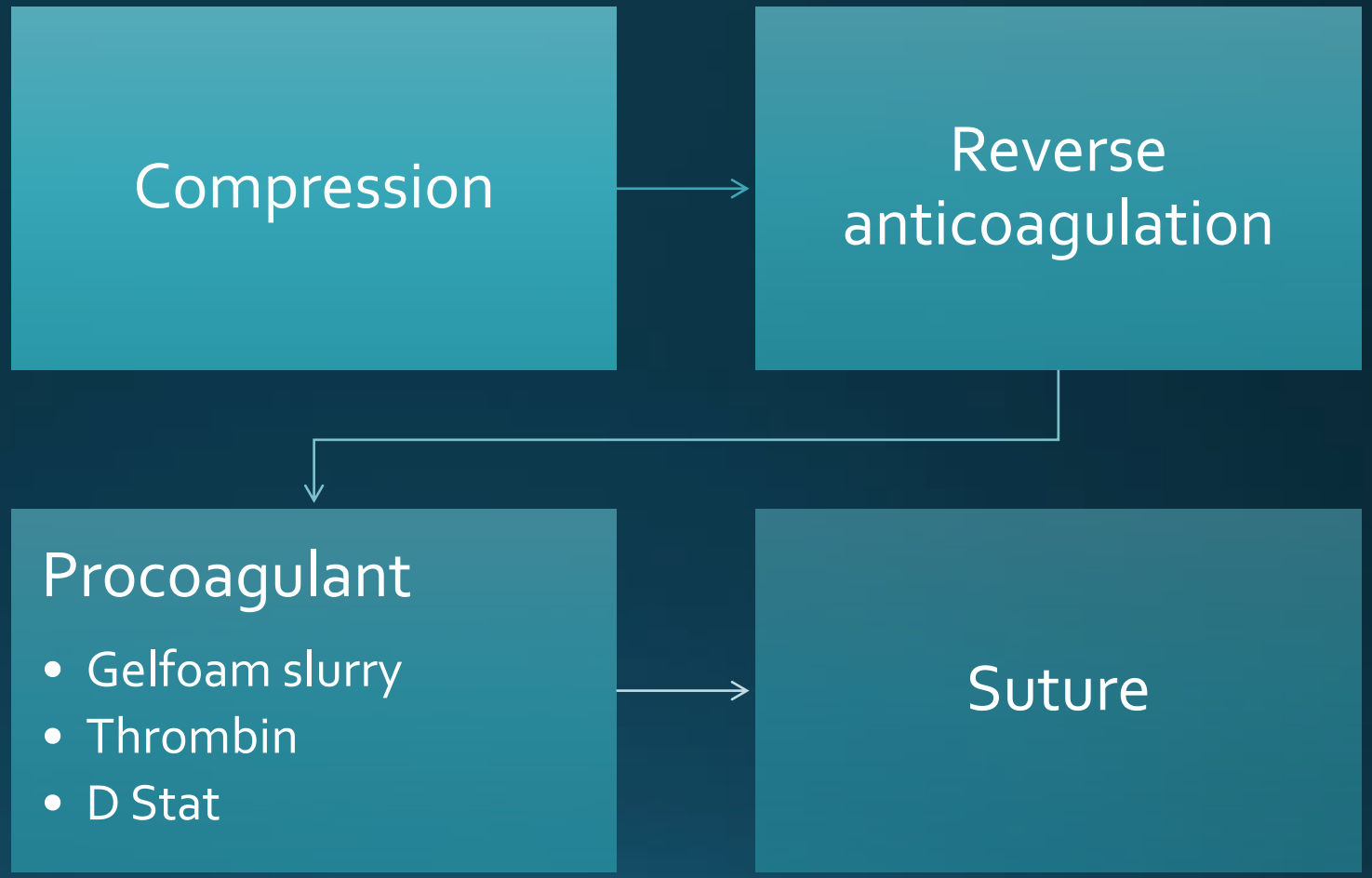


Bleeding

- Liberal use of US if uncertain

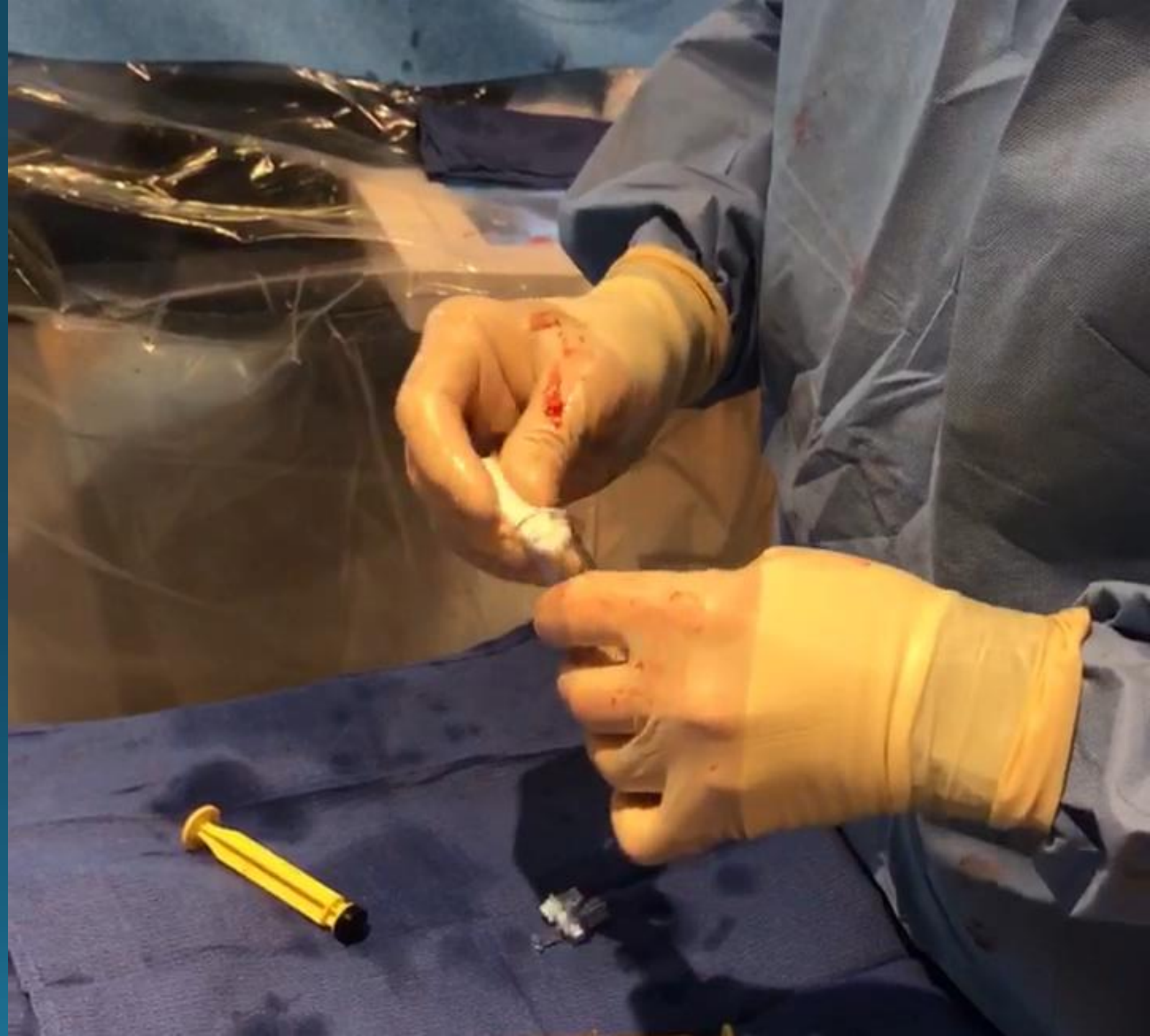


Ooze Management



Gel Foam Slurry

- Macerate Gelfoam pledget using a stopcock
- Inject into tract using a blunt needle or use a the dilator from a sheath



Hematomas

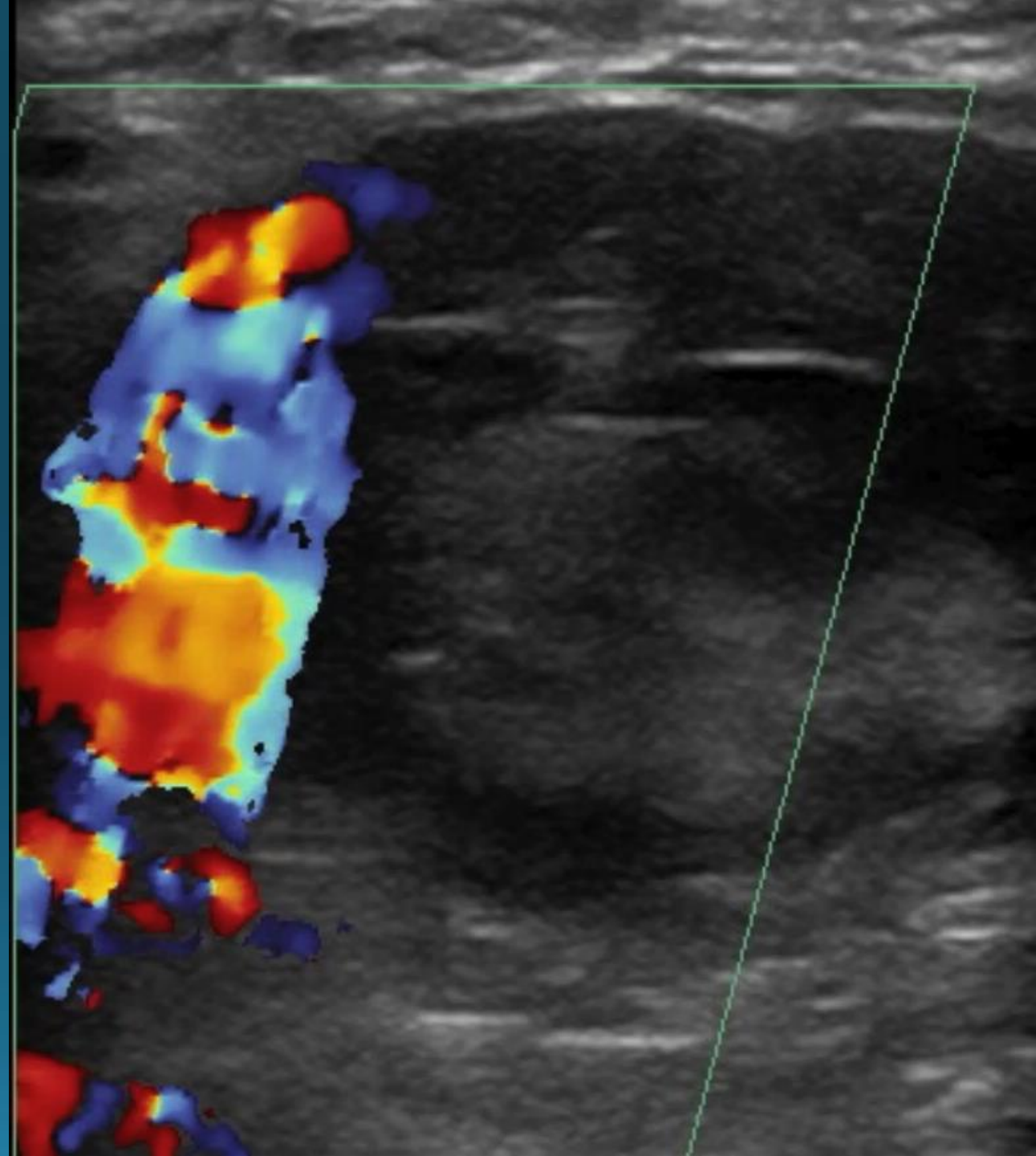
- Can be difficult to differentiate
- No wishful thinking
- Liberal use of US
- Actively manage -> don't do the slow march to a major problem

Unstable hematoma and/or frank bleeding

- Reverse anticoagulation
- US guided compression
- Thrombin injection for PSA
- Low threshold for angiography

Pseudoaneurysm

- USG Thrombin injection
- If concerned about embolization re access and inflate a balloon across the neck
- Alternatively re access and place a stent graft

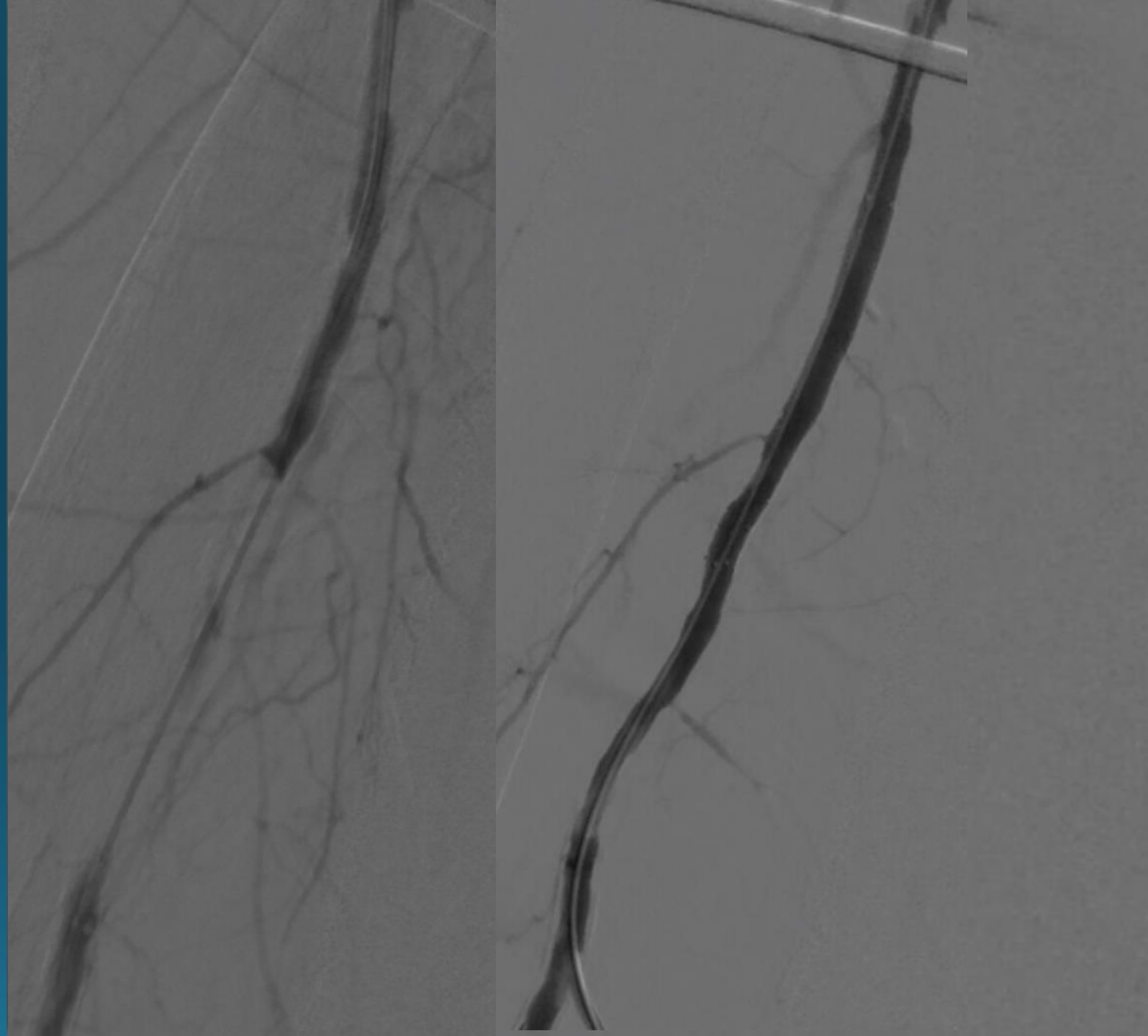


Access Site Acute Occlusion

- Usually secondary to VCD but possible with MC
- When possible diagnose on the table with US
- Re-access and cross and treat as required
  - Angioseal often requires a stent
  - Perclose angioplasty usually enough

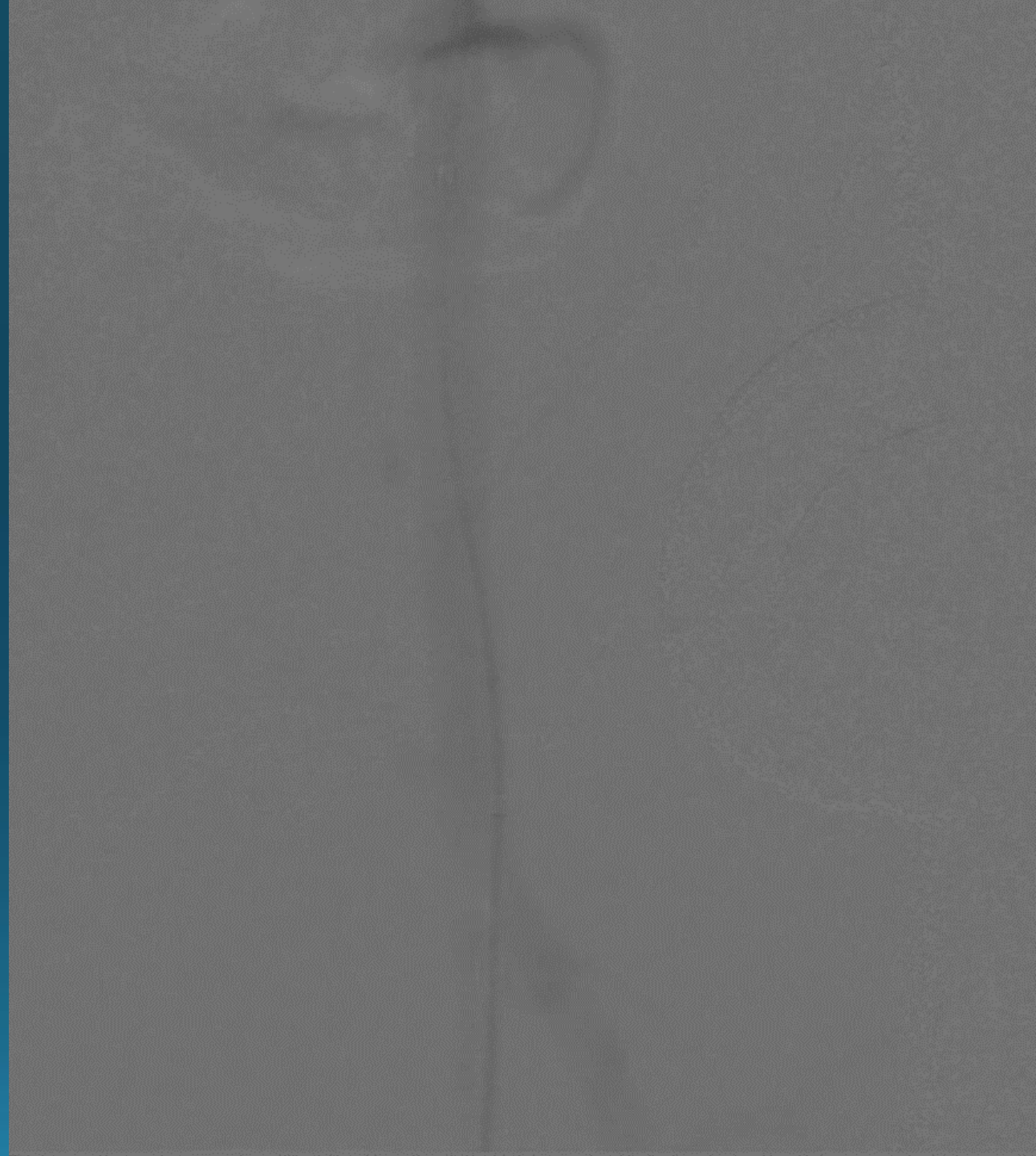
VCD Acute Occlusion

- Majority can be corrected endovascularly
- Ipsi vs contra approach
- Angioplasty +/- secondary stenting



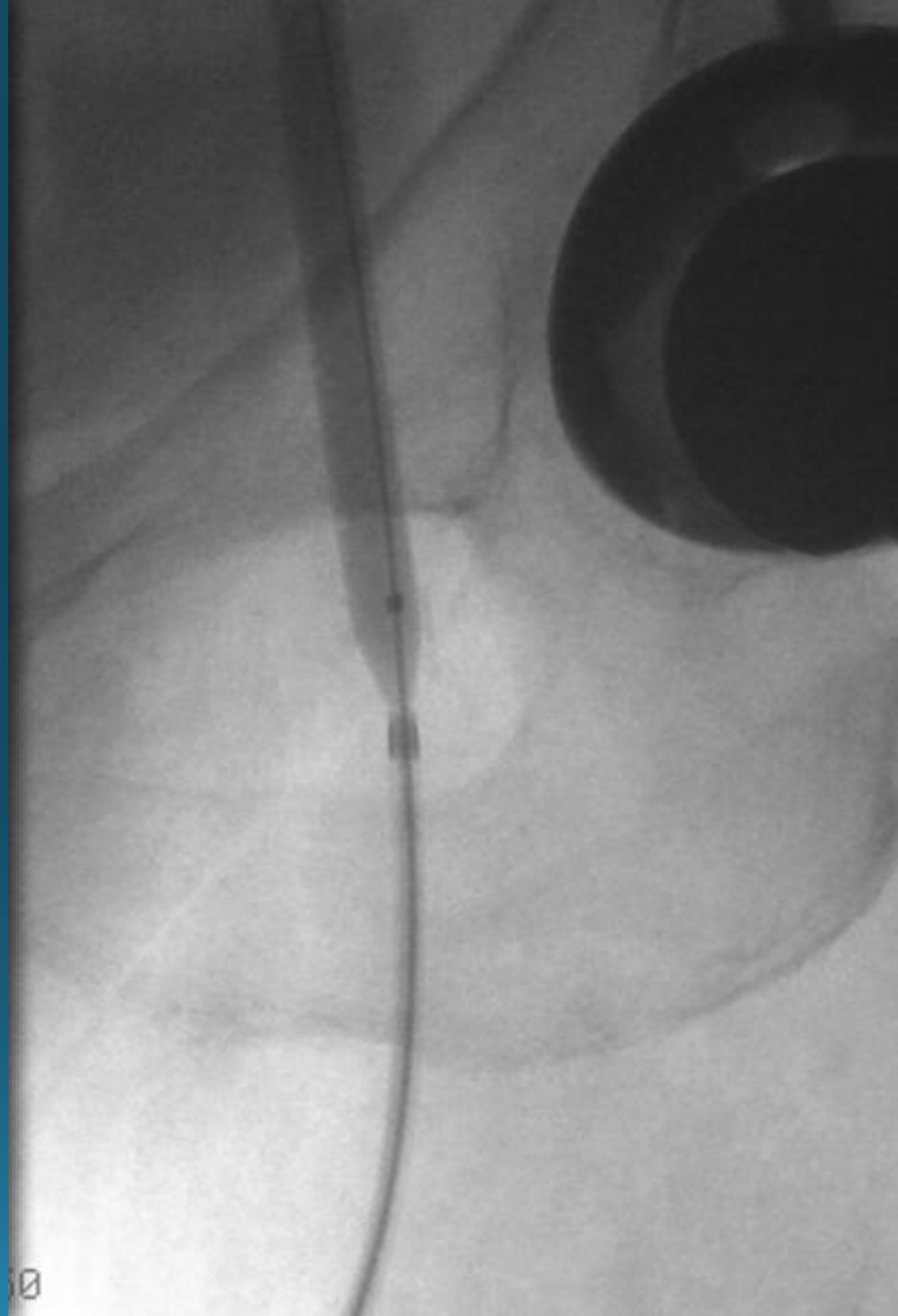
Lost control of the arteriotomy

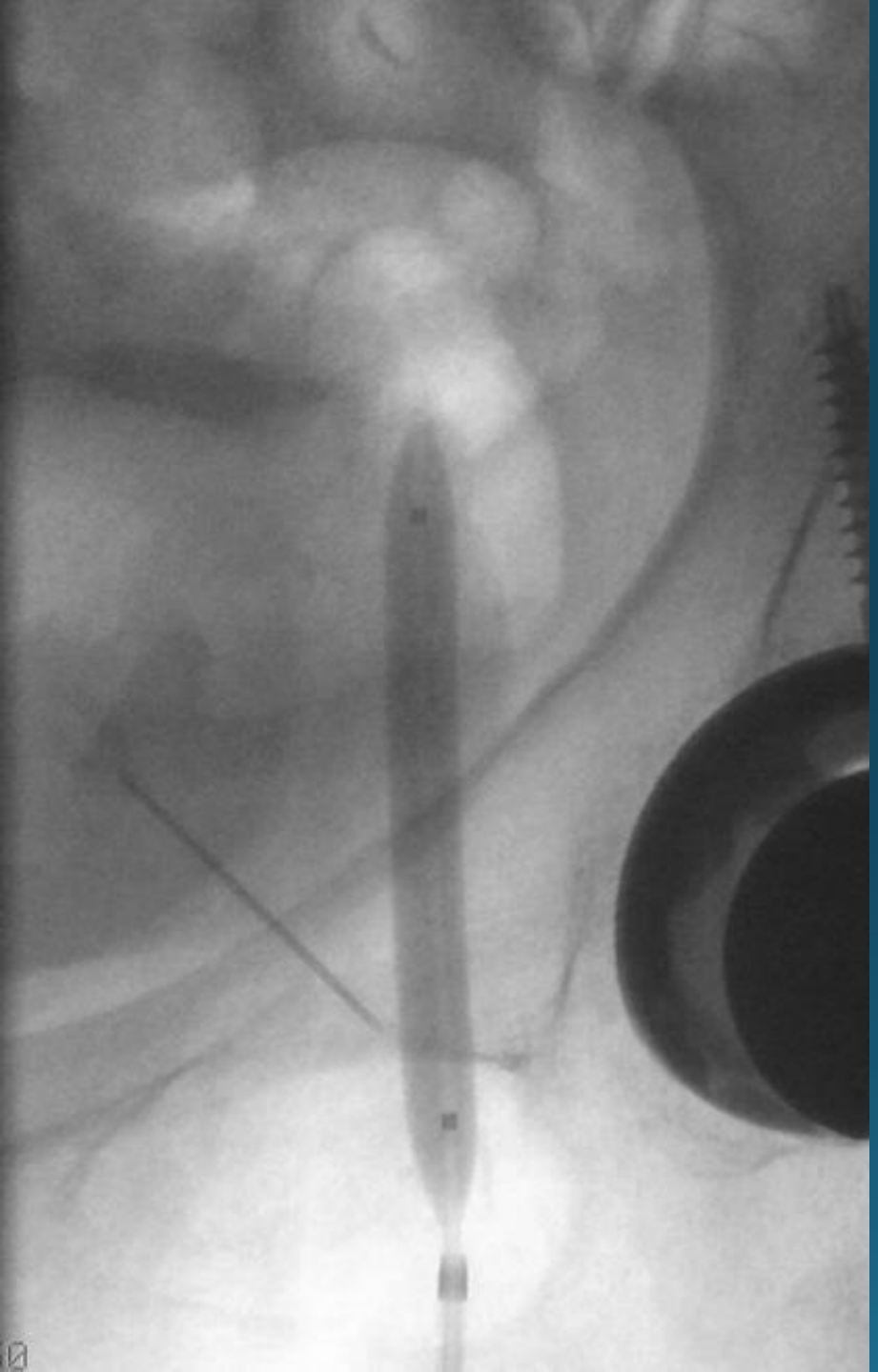
- Re-puncture
  - Contralateral
  - Ipsilateral
- Angiogram
- Balloon tamponade
- Covered stent



Balloon Tamponade

- Reverse anti coagulation
- Retrograde SFA access
- Prolonged balloon inflation





Balloon and Thrombin

- Micro puncture needle advanced under US and fluoroscopic guidance
- 500 units of thrombin injected
- Seal of arteriotomy obtained

Mitigating Access Problems

- Excellent pre procedure imaging
- Always use ultrasound guidance
- Avoid the CFA if any significant disease
- Have a backup plan for when things go wrong

SFA is an excellent alternative for central access

- Expands the number of patients you can treat
- Safe for antegrade and retrograde procedures
- Angioseal, Proglide, and Star Close work
- Occluded SFA for retrograde access

Closure Disasters

- Happen, should be < 5%
- Actively manage them
- Liberal use of US
- Vast majority can be dealt with using endovascular techniques