Thrombin Injection for Pseudoaneurysm

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Pseudoaneurysm

Blood flow outside the arterial lumen from a puncture, contained by surrounding tissues
**Pseudoaneurysm**

- Incidence .2-8%
- Risk Factors
  - Low puncture
  - Inadequate compression post procedure
  - Female >70y
  - Calcified arteries
  - Obesity
  - Anticoagulation
- Small (<2cm)
  - Spontaneous closure (observation now rare)
- Large
  - Thrombin injection
  - Ultrasound guided compression
  - Surgical repair

Physical Findings

- Pain, swelling, ecchymosis in groin
- Pulsatile mass
- Bruit
Course of Femoral Artery
Low Puncture May Result in Inadequate Compression
Angiographic Predictors of Femoral Access Complications

- Most complications (70%) occurred in Groups 1, 3, and 4.
- All retroperitoneal hemorrhages were in Groups 3 and 4. All pseudoaneurysms occurred in Group 1.

Anatomy of a Pseudoaneurysm

- Common Femoral Artery
- Neck
- Sac
Pseudoaneurysm: Ultrasound Assessment

Assessment:
- Origin Vessel
- Neck
- Width/Length
- Lobe (Sac) Size and Number
- Surrounding Hematoma
Ultrasound Findings

- **Gray Scale:**
  - Large fluid collection in soft tissue
    - Often with visible movement of fluid within sac
    - Sac is usually pulsatile

- **Color:**
  - Swirling blood flow throughout sac
  - Color flow in opposite directions

- **Doppler**
  - “To and Fro” Doppler signal in neck of Pseudoaneurysm
  - Preserved native arterial flow distal to neck
Anatomy of a Pseudoaneurysm

Sac

Native CFA
Left Femoral Artery PSA
After Cardiac Cath, Patient on Coumadin for Mechanical Valve

“Yin and Yang” Sign
Pseudoaneurysm Following Cardiac Catheterization
Pseudoaneurysm Following Cardiac Catheterization
Pseudoaneurysm Following Cardiac Catheterization
US Guided Thrombin (Factor IIa) Injection

Table 2 The advantages of ultrasound guided thrombin injection over ultrasound-guided compression

- Greater technical success, 96% compared with 74%\textsuperscript{33}
- Shorter procedural time (6 s compared with 41.5 min in one study\textsuperscript{19,33})
- Better patient toleration/less painful\textsuperscript{11}
- No conscious sedation required
- Effective in patients on heparin or warfarin\textsuperscript{34,35}
- Suitable for pseudoaneurysms arising above the inguinal ligament
- Performed as an outpatient procedure\textsuperscript{33}
- Lower relative cost.\textsuperscript{36}

Recombinant Thrombin

5,000-unit RECOTHROM reconstitution

1. Remove flip-off cap from the top of the RECOTHROM vial.

2. Attach the needle-free transfer device, and snap it into place on the vial by placing the vial flat on a surface and attaching the transfer device straight into the center of the vial stopper.

3. Attach the prefilled diluent syringe to the needle-free transfer device.

4. Inject the 5 mL of diluent from the syringe into the product vial. Keep the syringe plunger depressed.

Draw into tuberculin syringe: 1 ml = 1000 units
UGTI Technique

- ABI pre and post procedure
- Visualize Sac in 2 Views
- Local skin prep/anesthetic
- Needle placed in center of sac
- 100 - 300 U (.1 - .3 mL) thrombin (look for pulsatility to go away)
- Inject deepest sac first
- Do not inject neck
- Give additional thrombin as needed
UGTI: Example

RT GROIN S/P THROMBIN INJECTION

PSEUDO

CFA

CFV
82 yo WF

- Long history of valvular heart disease
  - Prosthetic Mitral Valve
  - Chronic warfarin therapy
- Presents with progressive angina, exertional dyspnea, and syncope
- Found to have critical Aortic Stenosis
- Refuses aortic valve surgery
- Undergoes successful balloon valvuloplasty via right femoral access
**Evening After Procedure**

- Repeated episode of re-bleeding from femoral access site
- Painful “lump” noted by nursing overnight at access site
Post-Procedure Duplex US
Post-Procedure Duplex US
Immediately Post-Thrombin Injection
What Do You Do Now?

• Surgical Consultation
• Inject thrombin to close the neck
• Ultrasound-guided compression
• Femostop
• Observation
• Don’t Worry…it will close on its’ own
24 hour Post-Injection
24 hour Post-Injection

Col 69%  Map 1
WF Low
PRF 1500 Hz
Flow Opt: Med V

SV Angle 0°
Dep 2.4 cm
Size 2.0 mm
Freq 4.0 MHz
WF Low
Dop 78%  Map 4
PRF 10000Hz

UCDAVIS
Now What?

- Surgical Consult
- Repeat Thrombin Injection
- Compression
- Observation

Remember…the patient has a prosthetic mitral valve and requires anticoagulation
Course

• Patient was treated with LMWH and warfarin
• Discharged from hospital
• Instructed to avoid lifting, stair climbing
• Told to return for follow up duplex US in 48 hours
24 hours later....
Course

- Hemodynamically unstable
  - SBP 80
- Hematocrit reduced from 29% to 20%
- INR 1.5
- aPTT 32 seconds
- Emergent surgical exploration
- Bleeding site noted and repaired