Diagnosis and Management of Femoral Access Site Complications IV:

Novel Techniques for Endovascular Rescue

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Seattle, Washington
Within the past 12 months, I or my spouse/partner have had a financial interest/arrangement or affiliation with the organization(s) listed below.

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Off label use of products will be discussed in this presentation:
Off label use of nitinol stents for iliac and femoral artery stenting
Access Site Complications

- Hypotension, hematoma, bleeding
- Pseudoaneurysm
- Neuropathy
- AV fistula
- Dissection, thrombosis, acute occlusion
- Infection
Percutaneous Treatment Options

- Balloon tamponade
- Endoluminal grafts
- Coils
- Thrombin injection
Endoluminal Graft for Retroperitoneal Hemorrhage
What is the diagnosis?

Inferior Epigastric Artery Rupture!

Silva et al, CCI 64: 212-222, 2005
Inferior epigastric artery engaged with 6Fr guiding catheter
Balloon inflated across perforation x 3
No change in rapid bleeding

Silva et al, CCI 64: 212-222, 2005
Thrombin 200 IU injected distally
Bleeding reduced but still present

Silva et al, CCI 64: 212-222, 2005
Final angiogram
No flow after 300 IU thrombin

Silva et al, CCI 64: 212-222, 2005
Pseudoaneurysms
Pseudoaneurysms

- **Incidence**
  - Duplex ultrasound $\leq 6.0\%$
  - Clinical detection 1 - 3.0 %

- **Risk factors**
  - Female $> 70$ yrs
  - Diabetes
  - Obesity
  - High or low (SFA) stick
Treatment Options

- Surgical repair
- Manual compression
- Ultrasound guided compression
- Thrombin injection
  - Ultrasound guided
  - Fluoroscopic

Pseudoaneurysms

• Small (≤ 2 cm) may be observed and are likely to close spontaneously

• Larger aneurysms may be closed with:
  - Ultrasound guided compression
  - Ultrasound guided thrombin injection
  - Surgical correction
  - Catheter-based therapy
Ischemia/Thrombosis/Emboli

- Incidence ≤ 1.0%
- Causes:
  - Large access catheter/small artery
  - Presence of peripheral arterial disease
  - Iatrogenic dissection
  - Thrombus within sheath
  - Closure device complication
Ischemia/Thrombosis/Emboli

• Signs and symptoms:
  – Pain
  – Pallor
  – Paresthesia
  – Pulselessness
  – Polar (cold).
Ischemia/Thrombosis/Emboli Management

- Contralateral access and angiography.
- Cross with hydrophilic wire.
- Mechanical thrombectomy.
  AND/OR
- PTA with provisional stenting.
Thrombectomy and PTA
Access site closure
“The right tool for the job!”

- Manual compression
- External mechanical compression (FemoStop, Hold)
- External plug (Vasoseal, Quickseal)
- Internal fixation of external collagen (Angioseal)
- Surgical closure (Perclose, Sutura)
- Thrombin/collagen closure (Duett)
- Vascular Sealing Gel
With new technology comes new problems...
New complications

Closure device related:

• Device failure
• Access site abscess
• Septic emboli
• Collagen embolization syndrome
• Vessel rupture
• Acute limb ischemia
Perclose Complication
Angioseal Complication
## Meta-Analysis of Closure Device Trials

33,125 Patients - 21 Independent Trials

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E. K. Hoffer, et al.      JVIR, July 2003
Meta-Analysis of Closure Device Trials

37,066 Patients - 30 Independent Trials

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**Dx studies**
- OR (95% CI): 1.44 [0.43, 4.82]
- Heterogeneity test P-value: 0.0003

**PCI studies**
- OR (95% CI): 1.11 [0.94, 1.33]
- Heterogeneity test P-value: 0.22

**Both Dx+PCI studies**
- OR (95% CI): 1.83 [1.15, 2.90]
- Heterogeneity test P-value: 0.001

**All studies**
- OR (95% CI): 1.34 [1.01, 1.79]
- Heterogeneity test P-value: <0.0001

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Favors ACD  |  Favors Control

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JACC 2004;44:1200-9
Limitations of the trials

Excluded high risk patients!
- Obese
- Uremia
- CFA calcification
- CFA or external iliac stenosis
- Coagulopathy
- Low platelet count
- Uncontrolled hypertension
- Oral anticoagulants
- Lumbar radiculopathy

So...extrapolation of these results to the general patient population is hazardous!
Access Site Complications

Conclusions

• Bleeding is life threatening and needs rapid diagnosis and treatment.
• CT scans document the obvious but don’t tell you if the patient is still bleeding.
• Diagnosis requires CFD or Angiography
• Treatment options include:
  – Manual compression
  – Percutaneous tamponade, thrombin, ELG and coils
  – Surgery
• AVF only require treatment if symptomatic.
• Pseudoaneurysms, acute ischemia, and other access complications can be managed percutaneously or surgically.
• Baseline angiogram after obtaining access can permit safe intervention without bleeding from collateral bleeding and unusual access configurations.