Complex Hemostasis Issues Following PCI – Management of Vascular Access Complications

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According to the Press Ganey Group, which of the following is the most common patient complaint following PCI

1. Pain
2. Hospital Food
3. Groin Bleeding
4. Physician Rounding Time
The one thing to make a patient forget about his/her lower back pain
Objectives

• Identify appropriate method for femoral arterial access
• Identify risk factors for femoral access related complications
• Describe evidence-based strategies to maintain hemostasis
• Review techniques for minimizing complications related to femoral arterial access
SB

- **71 yo female** presented to referring MD with c/o angina and dyspnea at 100 ft.  *Angio at referring facility.*
  - pRCA ISR and LAD
- **PMH**
  - CAD (1997 BMSx3 RCA)
  - PAF (not on Coumadin)
  - COPD
  - CRI (1.4)
  - Anemia (Baseline 11.3/32.8)
  - HTN
  - Dyslipidemia
  - PAD (Bilat CEA, left carotid – subclavian bypass), left iliac angioplasty
  - Hx: Back Surgery
SB

• Meds:
  - Lipitor, estrace, **plavix, ASA**, prevacid, lisinopril, cartia XL, iron, calcitriol
  - vicodin and dyazide prn
• Soc Hx & Fam Hx: Non contributory
• Physical Exam
  - BMI 30
  - 190/110-102-20, afebrile
  - JVP 6cm
  - 1+ DPP
  - Cr 1.7
Hemostasis complicated by:
• Procedure started with a 7Fr and switched to an 8Fr guide
  - Bilat NS renal angio
  - Selective right renal angio
  - Right and left coronary angio
  - IVUS RCA
  - Xience RCA

• Severe Back Pain During Procedure
  - Fentanyl 200 mcg
  - Versed 6 mg
  - Dilaudid 2mg

• Procedure Time: 2 hrs

• Transient drop in BP towards the end of case but recovered when NTG turned off
• Do the physicians at your facility routinely perform a femoral angiogram during the procedure?
  1. Yes
  2. No
Ideal Access

• Femoral
  - 1-3 cm below inguinal ligament
  - Above bifurcation
  - Single attempt
  - Single wall anterior stick
  - 45 degree angle
Access Site Landmarks
Progressive Hemostasis

• Vasoconstriction       (1 to 3 min)
• Clot Formation         (3 to 15 min)
• Arteriotomy Sealing    (15 to 30 min)
• Arteriotomy Healing    (2 TO 4 HRS)
Manual Compression Technique

• Apply pressure over the entire estimated compression time, however gradually lessen pressure as bleeding is controlled

• NO PEEKING

• If pressure is removed and pulsatile bleeding is noticed, the clock starts over!
Mechanical Compression Devices

- FemoStop
- “C”-Clamp
- Safeguard

These devices must be monitored during their use.
Leaving a patient unmonitored while using one of these devices could result in complications such as:

1. Vessel occlusion
2. Hematoma formation
3. Uncontrolled bleeding
4. All of the above
Closure Devices

• Designed to achieve immediate hemostasis
• Earlier ambulation and discharge
• Types
  i Sealants
  i Sutures
  i Clips/Staples
Hemostatic Pads

- D-Stat
- Safe-Seal
- Syvek
- V+Pad
Complications

• **Bleeding**
  - hematoma
  - pseudoaneurysm
  - retroperitoneal hematoma
  - A-V fistula

• **Thrombosis**

• **Infection**
Hematoma

- Blood filled mass around puncture site
- Expanding hematoma may result in significant blood loss
- Treated by compression or surgery
- A growing hematoma is sign of active bleeding!
Pseudoaneurysm

- Encapsulated hematoma in communication with the artery
- Tender pulsatile mass with bruit
- Caused by:
  - Punctures that are too low
  - Multiple punctures
  - Improper compression
- Detected by ultrasound
<table>
<thead>
<tr>
<th>Complications</th>
<th>Treatment</th>
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<tbody>
<tr>
<td>Rupture</td>
<td>Compression</td>
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<tr>
<td>Local skin ischemia/necrosis</td>
<td>US guided thrombin injection</td>
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<tr>
<td>Local pain and swelling</td>
<td>Surgery</td>
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<tr>
<td>Neuropathy</td>
<td></td>
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<tr>
<td>Distal embolization</td>
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</table>
**A-V Fistula**

- Abnormal connection between artery and vein
- Diagnosed by continuous murmur or bruit detected by ultrasound or Doppler
- Spontaneous closure
- Ultrasound compression
- Fibrin injection
- Covered stent
- Surgery
Retroperitoneal Bleed

- Bleeding occurs inside the peritoneal cavity.
- Symptoms
  - Abdominal/groin/back pain
  - Diaphoresis
  - Bradycardia or hypotension
  - Fall in hematocrit/hemoglobin
- Risk factors
  - Female gender
  - Low body surface area
  - Double wall stick and high femoral artery puncture
- What To Do:
  - Stay with your patient
  - Stop bleeding
  - Support hemodynamics
Vessel Occlusion

• Occurs more frequently in patients with diabetes or PVD
• Patients have sudden onset of pain, possible parasthesia
• The affected limb is cyanotic, cool, with diminished or absent pulse
• Treated with heparin, lytic agents, or thrombectomy
SB Progression

- Transferred to SDU at 3pm with bilat sheaths in place
- Continued to c/o back pain
- At 4:30 pm, pt c/o angina, diaphoretic, cool
- Vomited and SBP briefly went into 60s
- EKG demonstrated inverted T waves in anterolateral leads
- Right groin tender but no apparent hematoma
- Vital Signs: 95/40 – 60 – 24
- H/H: 8.1/23.5
What is the next step?

1. Give NTG/MSO4 for angina
2. Prepare patient for CVL
3. Remove the sheath
4. Prepare patient for CT scan
• Bradycardic/ Junctional arrest in ICU
• Taken emergently to CVL @ 6pm
• Unable to obtain blood return from right sheath
• Pacer placed and CPS initiated
• R external iliac dissection/perforation
• Inferior epigastric laceration
• 2 Fluency Stents deployed
• Transferred to ICU on CPS
• Full resuscitation
Summary

• Manual compression is still the gold standard for achieving hemostasis but VCDs are gaining in re: earlier time to hemostasis and ambulation, patient satisfaction

• Technology is advancing for arterial access

• Complication prevention starts with patient identification and arterial access

• New technology on horizon for obtaining and managing hemostasis