Lower Extremity: Acute Limb Ischemia

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Disclosure

- I have no relationships to disclose.
- I have no unlabeled or unapproved uses of drugs or devices in my presentation.

Lower Extremity Acute Ischemia

- Characterized by sudden onset of:
  - Pain, pallor, paraesthesias, pulselessness, poikilothermia (sometimes paralysis)

- Caused by:
  - Acute thrombosis
  - Acute embolus
  - Acute thromboembolus

- Most common cause is acute thromboembolism from a cardiac source

Categories of acute limb ischemia

Inter-society Consensus for the management of Peripheral Arterial Disease (TASC II). J Vasc Surg 2007;45(supp)S41A

Lower Extremity Acute Ischemia

- Neuromuscular recovery following ischemic intervals

- History and physical exam commonly indicates etiology
  - History or exam findings of cardiac condition
    - Atrial fibrillation
    - Recent myocardial infarction with reduced EF
    - Aortic valve abnormalities
    - Recent of concomitant deep venous thrombosis

- History or exam findings of chronic limb ischemia
Lower Extremity Acute Ischemia

- History and physical exam commonly indicates etiology
- History or exam findings of chronic limb ischemia
  - Exertional leg pain (claudication)
  - Aortic or extremity aneurysm disease
  - Previous interventions or operations for chronic limb ischemia (open or endovascular)
  - Exam of effected as well as contralateral lower extremity

Lower Extremity Acute Ischemia

- Management depends on category of ischemia

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Severe Ischemia</th>
<th>Moderate Ischemia</th>
<th>Minor Ischemia</th>
<th>Acute Deafness</th>
<th>Severe Deafness</th>
<th>Stable Deafness</th>
</tr>
</thead>
<tbody>
<tr>
<td>I: Stable</td>
<td>Not immediate hemodialysis</td>
<td>Isolated</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>II: Thrombosis</td>
<td>Subacute/subacute</td>
<td>Intact</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>III: Hemodynamic</td>
<td>Hemodynamic</td>
<td>Intact</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>IV: Reversable</td>
<td>Acute reperfusion</td>
<td>Intact</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

- Category I (observation or revascularization)
- Category II (revascularization)
- Category III (amputation)

Lower Extremity Acute Ischemia

- Category IIa (often able to tolerate time necessary for catheter-directed thrombolytic therapy)
- Category IIb (often requires immediate open revascularization)

Lower Extremity Acute Ischemia

- Open Operative Management
  - Approach major branch points (femoral vs. trifurcation)
  - Choice depends upon physical exam and any available imaging
  - Exposure and tactile examination of arterial segment
  - Configuration of arteriotomy may be transverse or longitudinal
  - Thromboembolectomy with embolectomy catheter

- Transverse arteriotomy for non-diseased vessels
- Longitudinal arteriotomy for diseased vessels in anticipation of patch angioplasty
Lower Extremity Acute Ischemia

- Open Operative Management
  - Open thromboembolectomy or thrombectomy with catheter

Lower Extremity Acute Ischemia

- Open Operative Management
  - Thromboembolectomy catheters

- Thromboembolectomy catheters may be used to control bleeding with use of a 3-way stop cock to maintain inflation. Sized: 2-7 Fr, diameter: 2 and 3 Fr/4 and 5 mm. Most common size is 2 and 3 Fr although maximum inflated diameter of 4 Fr is 9 mm which can be used for occlusion of the femoral and iliac vessels. Inflate: 1 cc tuberculin syringe (0.2-0.75 cc). Goal: clot, removal/“don’t over-inflate or “drag”

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- Endovascular management (catheter directed thrombolysis)
  - Consider contraindications for thrombolytic therapy (e.g., age > 80, recent operation, history of stroke, gastrointestinal bleeding or cancer)
  - Performed using infusion catheter with tPA 2-4 mg pulsed bolus followed by 0.05-0.1 mg/kg/hr for 12-24 hours
  - Concomitant use of heparin administered through the side port of the sheath

Lower Extremity Acute Ischemia

- Eight months after femoral to above knee popliteal bypass with ePTFE for short distance claudication a 67 y/o man presents with 1 day history of nocturnal foot pain, parasthesias and an ABI of 0.3 on the operative side; duplex shows occluded graft.
  - Conservative management with exercise
  - Re-do bypass with contralateral GSV
  - Arteriography with catheter-directed lysis of graft
  - Subintimal recanulization of native SFA
  - Open thrombectomy of the graft only
Lower Extremity Acute Ischemia

• Catheter-directed thrombolytic therapy is best option
  - STILE Trial: patients with acute arterial occlusion were most likely to benefit from thrombolysis within 2 weeks of occlusion
  - TOPAS (Thrombolysis or Peripheral Arterial Surgery for ischemia of the lower extremity) Trial compared urokinase to operation: amputation free survival rates were the same with higher rate of bleeding complications in the lytic group

Lower Extremity Acute Ischemia

• 7 days after acute MI, 66 y/o woman has acute onset left leg pain. History CHF & O2-dependent COPD. Symmetric/ femoral pulses and normal pulses in right leg and foot. Left leg has popliteal pulse but no pulses or signals below knee. Left foot is cool with parasthesias. Motor intact.
  - Femoral tibial bypass
  - Cilostazole
  - Urgent arteriography with catheter-directed lysis
  - Pain control and outpatient follow up
  - Popliteal thromboembolectomy

Lower Extremity Acute Ischemia

• A 59 year old man with abdominal aortic aneurysm presents with 6 hrs right leg coolness, pain and parasthesias. Absent right femoral pulse and no pulses below the groin. He has no arterial signals in the right leg which is modeled and has signs of motor weakness.
  - Heparin bolus
  - Arteriogram with initiation of thrombolysis
  - Endograft repair of his aortic aneurysm
  - Exploration of right groin with thrombectomy
  - Femoral to below the knee popliteal bypass

Lower Extremity Acute Ischemia

• 65 year old man 1 week history of left calf swelling and 2 day history of a painful cool left foot. No hx of claudication or arrhythmias. Leg swollen and foot cool/ no pulses. Weak posterior tibial signal. Duplex shows thrombosed popliteal aneurysm
  - Lysis with covered stent exclusion of aneurysm
  - Lysis with post. approach endoaneurysmorrhaphy
  - Distal popliteal exploration, tibial thrombectomy and exclusion of aneurysm with vein bypass
  - Lysis with exclusion of aneurysm with vein bypass via medial approach

Lower Extremity Acute Ischemia

• DVT in 6% of PAA cases. Endoaneurysmorrhaphy is best method to relieve compression of large aneurysm.
  • Exclusion by proximal and distal ligation followed by femoral popliteal bypass is acceptable although further aneurysm expansion through persistent geniculate vessel flow occurs in 5-30% of cases.
Lower Extremity Acute Ischemia

- Fasciotomy
  - Less likely necessary if there was underlying history of chronic ischemia

Questions?