Acute Limb Ischaemia

Dr Mark Wheatcroft
Vascular Surgeon
St Michael's Hospital

Disclosure
Nothing to disclose

Learning Objectives

Define acute limb ischaemia
Discuss epidemiology and pathology
List important signs and symptoms
Discuss initial assessment, management and referral
Describe treatment options
Know the prognosis

Acute Limb Ischaemia

Disease of elderly co-morbid population
No internationally agreed definition
TASC: “any sudden decrease in limb perfusion causing potential threat to viability”
< 2 weeks duration
Limb threatening..... & life threatening

- ALI often an “end-of-life event”
- High amputation & mortality rate, largely unchanged, despite advances in care
- No single intervention
- Assessment of patient as important as assessment of limb
- Choice of treatment influences outcome

Causes

**Embolic** - in normal arteries, catastrophic
- secondary thrombus occludes prox & distal

**Thrombotic**
- Trauma / iatrogenic - transection, intimal flap
- Dissection
- Cystic adventitial disease, compartment syndrome

Greek “Embolos” = “plug”

**CARDIAC**

- AF — Common
- MI — Dangerous
- Valvular / veg. — Endocarditis/IVDU/Lines
- PFO — DVT present
- Tumour — Atrial myxoma
  - send for pathology

Non-Cardiac embolism

**Athero-embolism**
- Aortic arch
- Thoracic aorta

**Aneurysms**
- AAA
- PAA
Thrombotic

Blood clots within the artery

Causes:
Atherosclerosis (rarely dramatic)
- disease progression
- "sludging" - low BP / CO states
  - increased viscosity
  - MUST recognise & treat underlying problem

Hypercoagulable states
Thrombocytemia
Thrombophilia
Malignancy
HIT

Dissection - High Index of Suspicion
- ALI, young, absent femoral pulse

Graft (common - 15% of ALI)

Trauma

Blunt -
- dissection / intimal flap
- external compression - bone ends

Penetrating - transection

Symptoms & Signs

6 “P”s
Pain (usually acute & severe)
Pallor
Paraesthesia
Paralysis
Pulselessness
Poikilothermia / perishingly cold

Time of onset??
Time & limb appearance

- Waxy, marble white - acute total ischaemia - 0 - 6hrs
  - Reversible
- Non-fixed mottling (blue / purple) - 6 - 12 hrs
  - Partially reversible
- Fixed mottling - > 12hrs
  - Irreversible

Time & neurological status

- VERY important to assess
- Sensory loss first (paresthesia, anaesthesia)
- Motor loss (paralysis)
- Calf tenderness (late sign)
- Helps determines degree of urgency

Rutherford Classification

<table>
<thead>
<tr>
<th>Class</th>
<th>Category</th>
<th>Prognosis</th>
<th>Sensory loss</th>
<th>Muscle weakness</th>
<th>Arterial Doppler</th>
<th>Venous Doppler</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Stable</td>
<td>Severe infarction</td>
<td>None</td>
<td>None</td>
<td>Ausible</td>
<td>Ausible</td>
</tr>
<tr>
<td>IA</td>
<td>Threatened</td>
<td>Severe infarction</td>
<td>Minimal</td>
<td>None</td>
<td>Ausible</td>
<td>Ausible</td>
</tr>
<tr>
<td>III</td>
<td>Threatened</td>
<td>Severe infarction</td>
<td>More than</td>
<td>Mild - moderate</td>
<td>Rare Audible</td>
<td>Ausible</td>
</tr>
<tr>
<td>III</td>
<td>Irreversible</td>
<td>Limb loss or permanent damage</td>
<td>Profound</td>
<td>Profound</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

Other clues....

- Recent MI
- New / recent AF
- Sub-therapeutic INR
- Previous Hx of PVD / aneurysmal disease
- Pulse status in contralateral limb
- Vascular risk factors - smoker, HTN, DM, Chol.
ALI - What to do....

Focused Hx
Thorough but rapid examination
Document ALL pulses, ?AAA, ?PAA
IVA, bloods inc. coag, G&S., analgesia, IV fluids, ECG
Oxygen
COMMUNICATE - Speak to vascular team early

“I have an 86 yr old lady with acute ischaemia of the right leg. She had sudden onset of pain at 0400, and has no pulses palpable below the femoral. She has normal pulses on the left. She has some sensory loss over the dorsum of the foot and reduced movement in her toes but is able to move the ankle. Her calf is non-tender. She is in AF and is usually well”

“Thank you, keep her NPO, give Heparin 5000iu IV stat. Send her over, I am on my way in.......”

Treatment options

Heparin infusion + close observation
Embolectomy +/- fasciotomy
Amputation
CT Angiogram
Transfer Angio & Thrombolysis / CDT
Palliation
Embolectomy

- Brachial - LA
- Femoral - LA or GA
- Popliteal - GA
  +/- fasciotomy

Fogarty Embolectomy Catheter (1963)

Reperfusion Injury

Systemic
- fatal arrhythmia / Massive MI
  - sometimes safer not to revascularize

Local
  - compartment syndrome
Fasciotomy
4 Compartments

Catheter Directed Thrombolysis

Angiogram
Multi-side hole thrombolysis catheter
Recombinant tissue plasminogen activator
r-tPA
Lace thrombus with 5 - 10mg
Infusion at 0.5 to 1mg per hour
Repeat angiogram in 6 - 12 hrs

Catheter Directed Thrombolysis

14 hrs TPA

r-tPA

Half life 6 - 7 mins
Dangerous - life threatening hemorrhage
Contra-indications
CVA
Major surgery
Head injury
Non-compressible vessel puncture
ALI - What to do... 
...after emergency Rx...

- Watch for myoglobinuria
- MI screen, ECHO, 24 hr tape
- Aortic imaging
- Upper limb duplex
- Thrombophilia screen
- Long-term anticoagulant?

Outcomes

- Mortality 15 - 20%
- Amputation rate up to 25%
- 10 - 15% thought salvageable need amp.
- 10% ALI present unsalvageable

Q & A