Introduction

Paediatric vascular injuries are rare

Ten year series:
Swedish Vascular Registry (1998) 34 cases
23 cases – arterial trauma of the extremities
Lazarides et al J Vasc Surg 2006; 43:72-6

In Europe: iatrogenic injury increasing

Luminal Diameter

1.5mm at birth – 7.5mm at 18yrs

0.7mm at birth – 1.8mm at 18yrs

Investigations/management
- general anaesthesia
- Thermoregulation
- Intravascular volume
Bi-plane angiography

Femoral artery
Safe in children >3 kg
In good hands, children >0 kg
Umbilical artery - 1st few days of life
Axillary and brachial arteries - size...
Non-ionic contrast (5 mL/kg is safe)
Iodine concentration 300 mg/mL

French Catheter Scale
*Sizes are outside Diameter

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<th>French</th>
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<tr>
<td>1</td>
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Embolectomy catheter sizes 1 & 2
Microvascular instruments
Operating microscopes

Endoluminal equipment

Children are not small adults....
Need appropriately sized tools
Trials in children
Off label use of coronary stents
Bioabsorbable stents

Plan ahead......what is the bail out when child has outgrown device?

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Traumatic arterial injury in children

Mangled Extremity Severity Score

- Skeletal/soft-tissue injury
  - Low-energy blunt, simple fracture, minor girth
  - High-energy blunt, extensive fracture, dislocation, amputation
  - Open fracture (very high energy, tissue loss)
- Shock
  - Stable (bypass must maintain > 50 mmHg)
  - Hemorrhagic shock
    - Persistent hypotension
  - Unstable (no bypass)
- Time (if applicable)
  - > 24 hours (worse)
  - < 24 hours (mild)
  - N/A (normal perfusion)
- Vascular trauma (isolated or ruptured)
  - Exposed vessel (no exposure requiring)
- Anatomy
  - Single
  - Multiple
- Age
  - < 30 years
  - 30-50 years
  - > 50 years

Score range: 1 - 14

11/18/2015
Indirect vascular injuries 1 (2.3%)
Direct vascular injuries 43 (97.7%)

Potential complications:
Ischaemia
Amputation
Volkmann’s contracture
Supra-condylar fracture management

Reduction closed or open
– casting, K-wire stabilisation or traction

In the majority-radial pulse returns

In < 30% of cases absence of a pulse persists with or without poor circulatory status
  – White cold pulseless hand – Exploration required
  – Pink warm pulseless hand

How to manage the well perfused but pulseless hand?

Umbilical catheters in pre-term neonate

Pre-term neonate

Umbilical venous line placed
  – Plain X-ray – arterial path
Second try– same path
Line left in place
Leg ischaemia noted
  – Leg placed in bag with oxygen
After 12 hours
Line removed
IV Heparin given
24 hours later thrombolysis attempted

Pre-term neonate

• Delay in
  - Recognising mal placement of line
  - Removing the line
  - Giving IV heparin
  - Commencing Thrombolysis
  - Gaining Vascular Consultation

• Below knee amputation
10 week baby with femoral arterial line and leg ischaemia

Popliteal embolism
Line removed immediately
IV heparin given – minor improvement after 4 hours

Angiography and intra-arterial thrombolysis r-TPA
Rapid return to normal perfusion

Conclusions
Challenging cases
Especially for adult trained vascular surgeons
Surgical principles still apply

Team approach -Discuss and share knowledge
International cohort of expertise

Paediatric Vascular Surgery
Incorporate into the Vascular curriculum
Champions required