# Damage Control Resuscitation in Children: same, same - but different

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# History (22:30)

- **12** year old boy, farm 100km from Melbourne
- Mother driving, child on front bull bar

# History (22:40)

- **12** year old boy, farm 100km from Melbourne
- Mother driving, child on front bull bar
- Child fell from bull bar, and was driven over his abdomen and chest
- No LOC, complaining chest & abdominal pain with some difficulty breathing

# Ambulance (22:40)

- Local road & MICA flight crew dispatched


Access issues

# At Scene

- **A:** Airway patent, speaking
- **B:** Poor AE and chest rise on right
  RR **32**, Sats **88**% on 10L mask
- **C:** HR **132**, BP **155/80**
  Abdominal pain, grazes, 1L N/Saline IV bolus
- **D:** GCS **14**/15 ($E^3$, $V^5$, $M^6$)
- **E:** Space blanket, estimated Wt **45** kg

# At local hospital (23:55)

- Cannula decompression of a suspected (tension) right pneumothorax
  - air and a small amount of blood
  - some non-sustained improvement

- Intubated, RSI

# 00:45

- Deteriorating respiratory status
- Discussed with **RCH** coordinating team
- Right lateral ICC inserted
  - Air and **140**ml blood drained

# Arrival to RCH (02:20)

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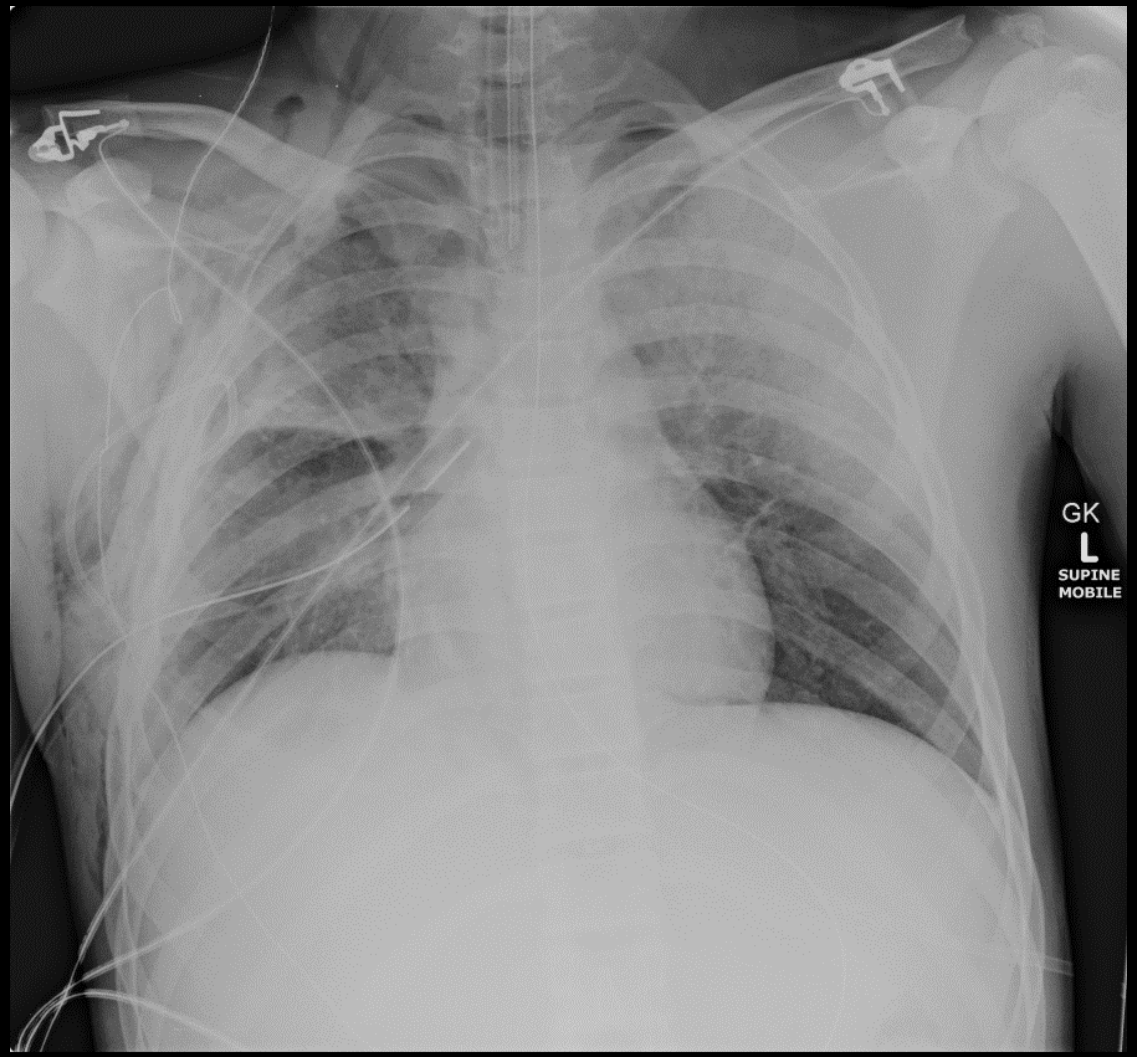
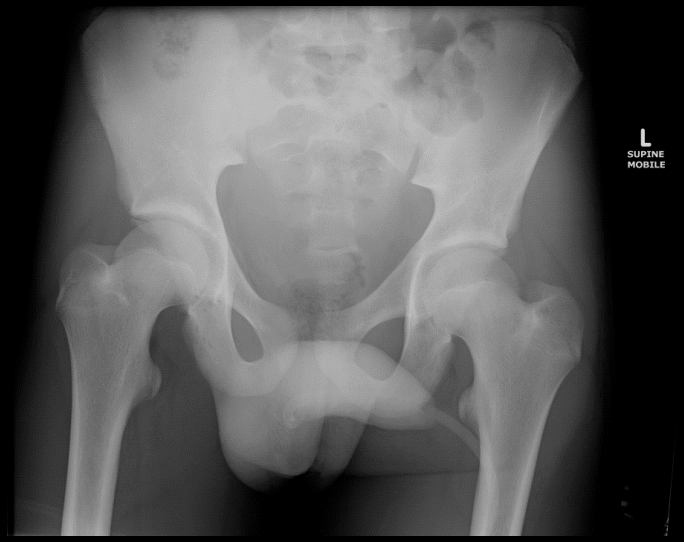
- **A:** intubated, C-collar on
- **B:** $SaO_2$ 100%, Right ICC swinging  Adequate AE bilaterally, R>L creps
- **C:** HR 112, BP 100/60, CCRT <2s, feet cool, Hb 100.  Commenced 2nd 1L NS bolus
- **D:** GCS **3**/15, PEARL







cm

# Trauma Series

# What to do now?

Complete NS bolus

Stop NS and commence PRBC bolus

Stop all fluid bolus resuscitation

Be guided by FAST

# What to do now?

A) Complete NS bolus

B) Stop NS and commence PRBC bolus

C) Stop all fluid bolus resuscitation

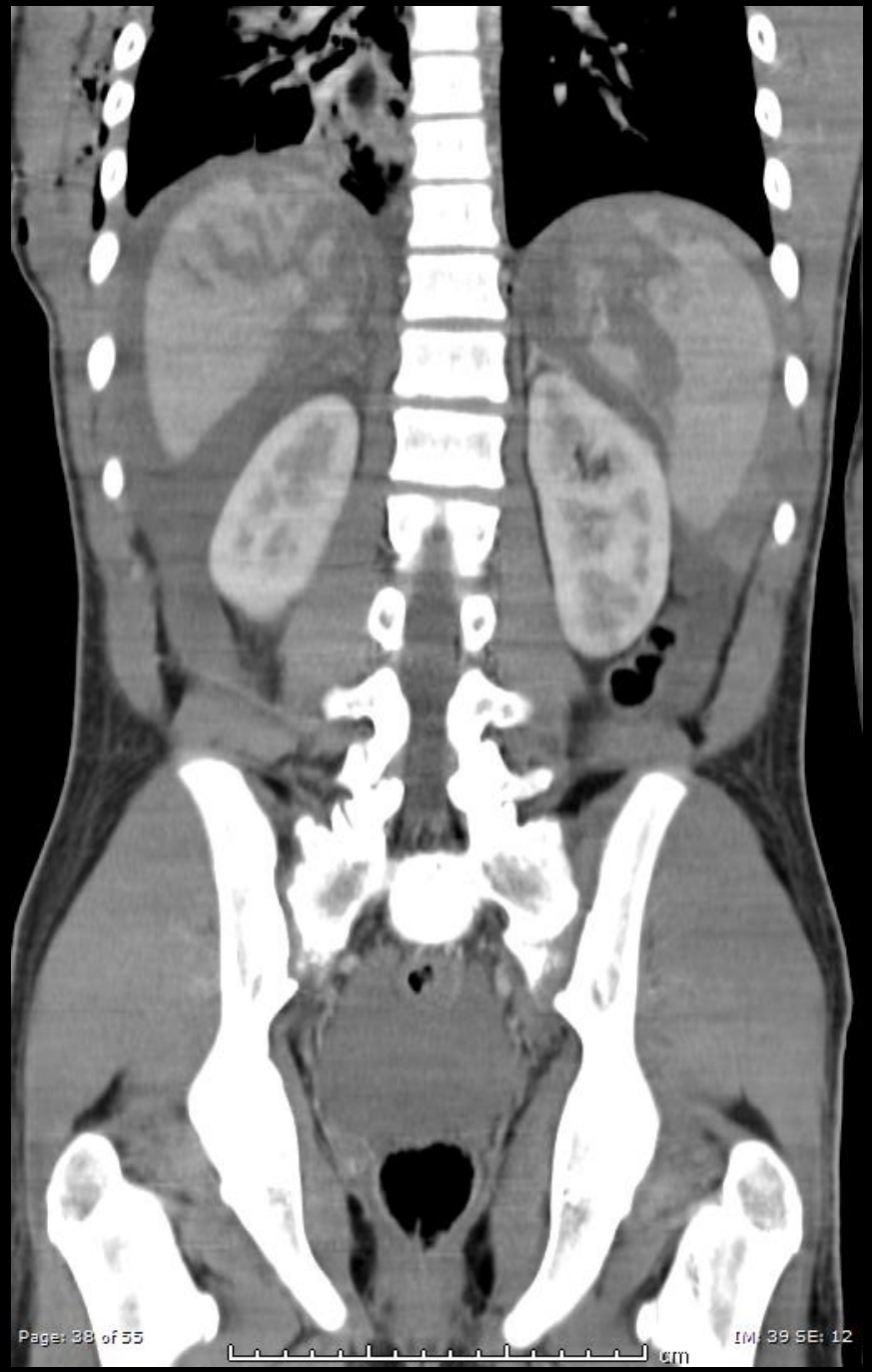
D) Be guided by FAST

# Arrival to RCH (02:20)

- A: intubated, C-collar on
- B: $SaO_2$ 100%, Right ICC swinging
  Adequate AE bilaterally, R>L creps
- C: HR 112, BP 100/60, CRT <2s, feet cool, Hb 100.
  Commenced 20ml/kg PRBC
- D: GCS **3**/15, PEARL

# Progress at RCH (0230)

- Stable ventilation and oxygenation
- Improved tachycardia, BP OK (but reduced and widened pulse pressure), reduced perfusion, Hb ↓ (?)
- Commenced blood
- Investigations pending
- No FAST performed
- Safe for CT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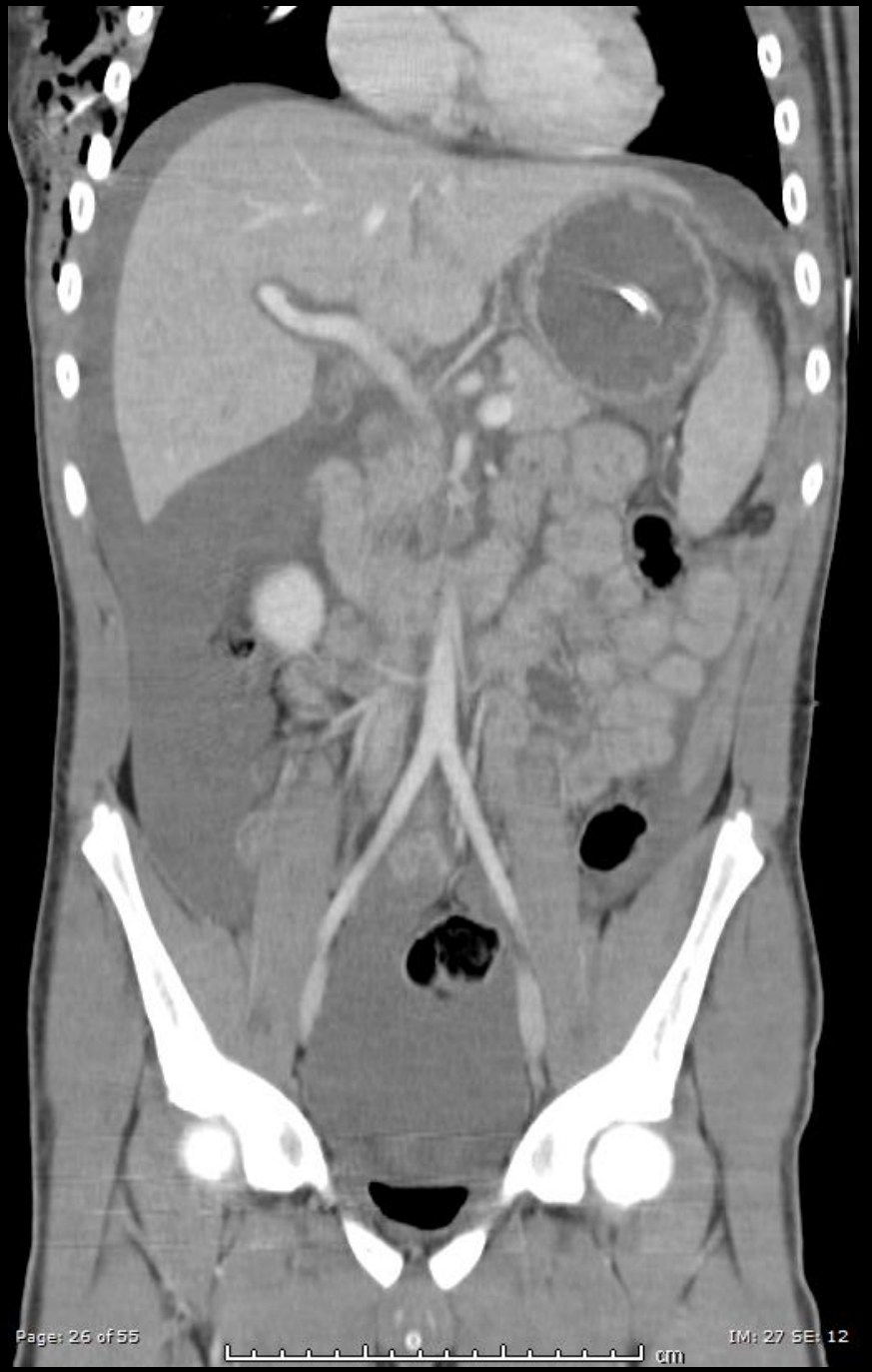
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# CT findings

- CT Chest
  - Right pneumothorax with bilateral pulmonary contusions, small pleural effusion, rib #s
- CT abdomen
  - Grade IV splenic and liver lacerations
  - Significant haemoperitoneum, no blush
  - Possible contused small bowel, No free air
  - Widening of left SI joint
- CT Brain/C-spine NAD

# Summary

- 12 yr old with blunt chest and abdominal trauma
- Hamorrhagic shock with large haemoperitoneum from grade IV spleen and liver
- Receiving blood
- Remains tachycardic, borderline BP
- Brain OK

# What to do now?

Theatre

ICU

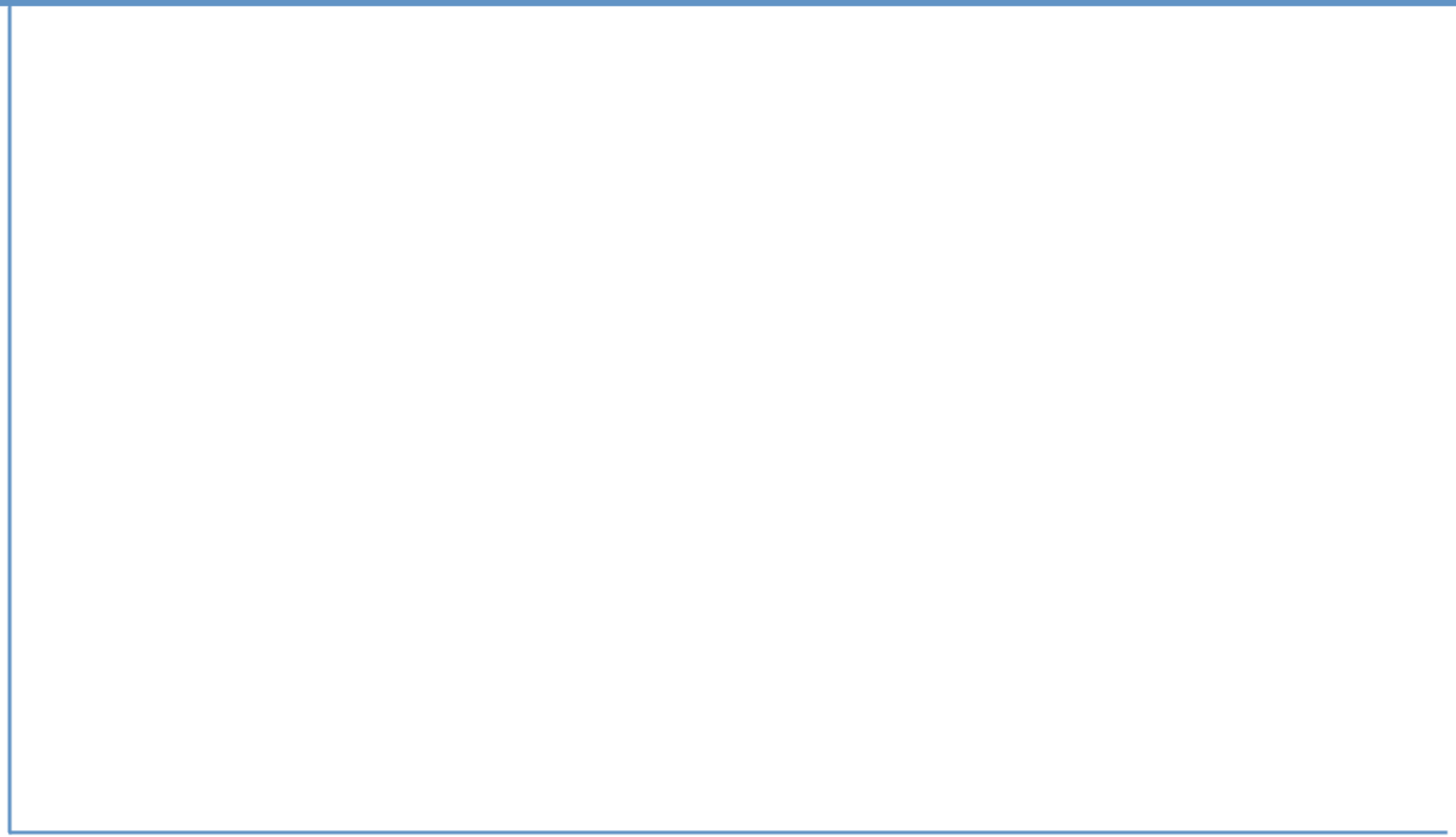
Angiography

# What to do now?

A) Theatre

B) ICU

C) Angiography



# Action taken

- Transfusion PRBC 20ml/kg
- Deferred theatre/angio
- Admitted to ICU for close observation

## Next morning (and days)

- Stable haemodynamics, Hb 86
- No further PRBC, No sepsis

# Outcome

- Steady recovery

  *Never required laparotomy or angio*
  *Conservative management of spleen and liver*

- Discharged from ICU to ward d3
- Discharged from ward to home d10

# Post discharge instructions

- Restricted activities 6 wks

# Damage Control Resuscitation in Paediatrics

- Not at the extreme of the spectrum
- Does illustrate the principles of DCR in children
  - Identical to what you all apply to adult trauma (with minor exceptions)

# Same, same - but different

Haemostatic resuscitation

- Definite shift away from crystalloid
- Early use of warmed blood and products
- Coagulopathy of trauma and iatrogenic
- Hypothermia
- Acidosis
- MTP ratios

# Same, same – but different

Permissive Hypotension

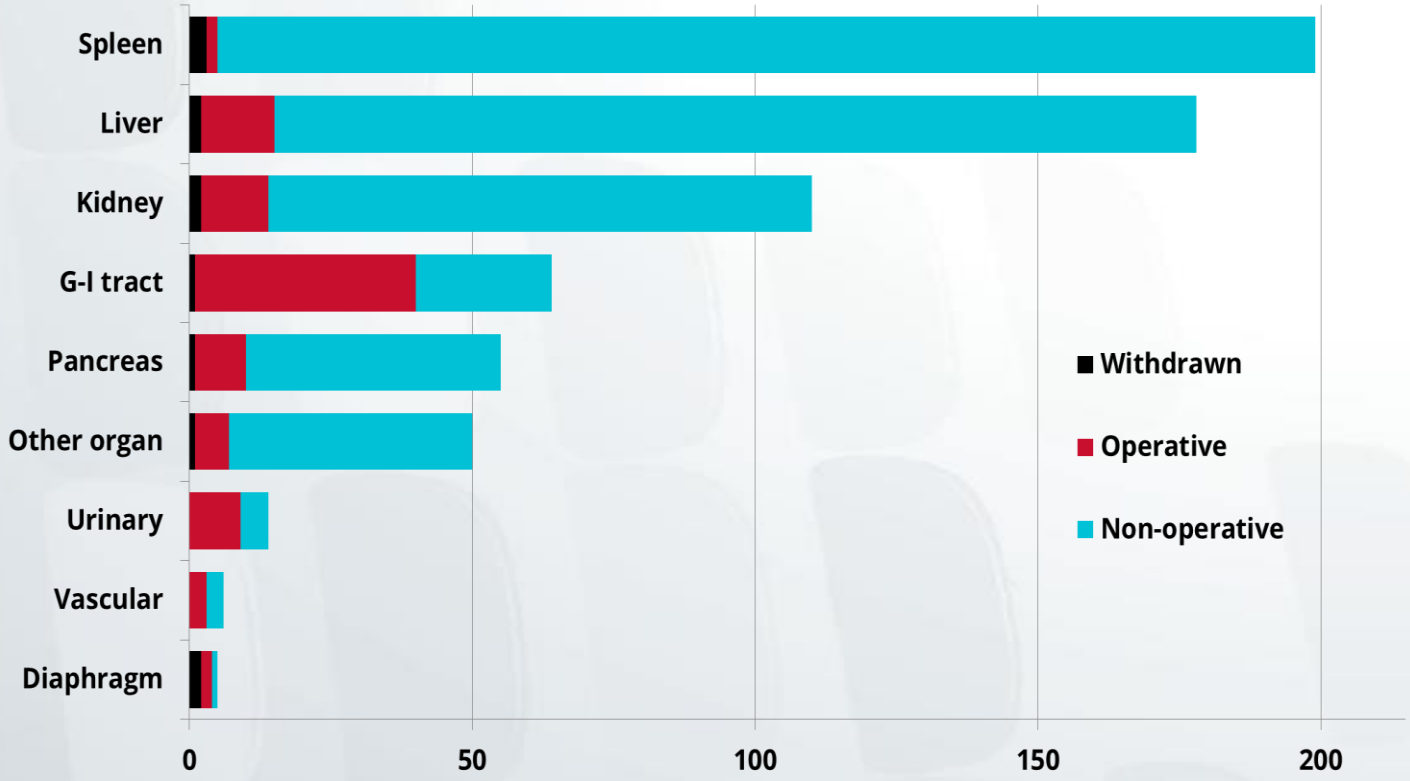
- Hmmm…
- Penetrating trauma rare, head trauma common, low BP in kids scary
- Aim for normal BP
- There is a limit to what we are happy to translate from adult / military experience

# Same, same – but different

The Royal Children's Hospital Melbourne

Damage Control Surgery

- Strong believers in non operative management in ICU to stabilise acidosis, coagulopathy and physiology before contemplating definitive surgery
- We adopt the same principles
- Bias towards no surgery



# Final Thoughts and Keeping Perspective