



Training Scenarios for Pediatric Patients

Purpose

Use these scenarios at your health care facility to discuss pediatric care. Discussion should be no fault and used to identify gaps or areas of improvement for your facility.

Scenario 1

EMS report: 5-year-old boy riding his bike was hit by a car. He was unresponsive on arrival of first responders with pupils 5mm and sluggish bilaterally. No response to pain. He had good respiratory effort. Blood was suctioned from the mouth and nose; oxygen was applied by mask. No IV access was able to be obtained. PMH/Allergies unknown.

Primary Survey:

A – minimal blood to nares, patent, breathing spontaneously

B – clear lungs bilaterally, oxygen saturations 98% on O₂, during transition to ED O₂ fell to 90%

C – capillary refill intact, color good, heart sounds normal, peripheral pulses palpable

D – no response to pain x4 – GCS 1 + 1 + 1 = 3, pupils 4mm L, 6mm R sluggish

VS – 100/70, 128, 16, 98% on mask O₂

Initial Assessment and Expected Actions:

- Recognize severe head injury and potential for multi-system injury
- Activation of referral process / rotor-wing or other retrieval unless at definitive care center
- Call for additional help
- Obtain IV access – rapid progression to IO if any difficulties – discuss sites including tibia (proximal and distal), distal femur and humeral head
- Intubation – talk through equipment, size of blade/tube, doses of medications (sedation – e.g. ketamine or etomidate for sedation, paralysis – succinylcholine or rocuronium – avoid propofol due to potential for hypotension)
- Ongoing sedation and/or paralysis
- Management of increased intracranial pressure – consider mild hyperventilation (temporary) and administration of (e.g. hypertonic saline 3% at 2ml/kg or mannitol 1g/kg)
- Re-assessment and evaluate for signs of shock (persistent tachycardia, poor color, signs of poor perfusion)
- Further diagnostics and evaluation – ultrasound, CXR, pelvis XR, cervical spine xray – to be done if there is time while waiting for transport. Please be sure to send copies of all images with the transport team.

PEDIATRIC PATIENT SCENARIOS

- Spinal precautions maintained throughout – regardless of any CT findings
- OG placed
- Indwelling urinary catheter
- Dosing for analgesics
- Consideration of anti-epileptic medications (fos-phenytoin 18mg/kg)
- Packaging for transport
- Labs – emphasize importance of checking glucose on all critically injured/ill children (very little reserve), Hgb, serum CO2 value / base deficit

Secondary Survey:

- Possible abdominal firmness to palpation
- Abrasions R shoulder and upper back
- Swelling and tenderness R wrist

Secondary Considerations:

- Discuss if pupils do not equalize consider CT head on-site if available and if will not delay transport (especially if will intervene on-site)
- Discuss seizure management including use and dosing of IM benzodiazepines (midazolam 0.1mg/kg, for example) and IM fos-phenytoin if IV access not easy to obtain. Use intranasal versed 0.4mg/kg for seizures if no IV access – can use as both of the initial 2 doses of benzodiazepines in the status pathway.

Scenario 2

EMS report: 10-year-old riding on ATV was thrown off at about 30mph when the driver hit a log in tall grass, crying, complaining of pain to the R forearm and R hip area and nausea. BP 100/p, HR 120, deformity and laceration to R mid forearm noted – bandaged and splinted. C-collar and long board. No IV access obtained in field. Father reports asthma medical history, albuterol inhaler prn, no drug allergies.

Primary Survey:

A – protecting airway, crying, breathing spontaneously

B – clear lungs bilaterally, oxygen saturations 98% on room air

C – capillary refill intact, color slightly pale skin, heart sounds normal, peripheral pulses palpable

D – awake, alert, anxious and crying, moving all extremities, neuro intact x4, pupils normal

VS – 100/70, 128, 16, 98% on room air

Initial Assessment and Expected Actions:

- Activation of referral process / rotor-wing or other retrieval unless at definitive care center
- Call for additional help
- Obtain IV access – rapid progression to IO if any difficulties – discuss sites, too old for distal femur (<6), but could use tibia (proximal or distal) or humeral – for humeral need adult needle – if patient is hemodynamically stable – hold on IO access but have the IO available for any decompensation
- Need for symptom management - analgesia – IV/SQ/intra-nasal (consider fentanyl 2ug/kg intra-nasal, for example), anti-emetic - ondansetron
- Need to re-assess vitals after analgesia – is tachycardia and poor color related to shock, or pain and nausea?
- Re-assessment and evaluate for signs of shock (persistent tachycardia, poor color, signs of poor perfusion)
- Spinal precautions maintained
- Further diagnostics and evaluation – ultrasound, CXR, pelvis XR, cervical spine xray
- Indwelling urinary catheter - if expected to have prolonged wait for transport

Secondary Survey:

- Abdomen/pelvis – tenderness to low abdomen, soft, pain with any manipulation of RLE referred to hip (pelvis not compressed during exam due to risk of fracture)
- Open, deformed R both-bone forearm fracture, pulses, motor/sensory intact, bleeding controlled
- CXR – possible early pulmonary contusions (watch out for increased oxygen requirement and consider early intubation if exhibits hypoxia – children often will not fracture ribs but have severe pulmonary contusions)

- Pelvis XR – symphyseal diastasis, questionable right acetabular fracture, right sacroiliac joint widened (growth plates can make interpretation / diagnosis of acetabular fracture tough – compare the two sides)

Secondary Considerations:

- Will fracture need reduction? If so, and you are comfortable, what sedative would you choose? (propofol = bad choice in patient who you are uncertain of borderline shock due to vasodilation, ketamine probably best choice overall at 0.5-1.0mg/kg IV)
- What can you do for the pelvis injury? – pelvic immobilizer perhaps, but for kids likely best to sheet wrap unless immobilizer designed for them.
- With pelvis fracture, obtain additional IV access and consider sending blood (if available) in transit with patient – refer to center capable of interventional radiology if possible
- Watch VS and clinical condition carefully for evidence of evolving shock
- Watch for any evolving hypoxia – do not generally provide supplemental oxygen to kids (unless you have access to end tidal CO2 monitoring), titrate to oxygen saturations
- Do not over-resuscitate with intravenous crystalloid – if heart rate is not coming down after 20ml/kg of saline and adequate analgesia (and pelvic compression) give the next 20ml/kg bolus while considering/ordering packed red blood cells 10ml/kg. Do not wait for blood pressure drop to treat shock in children.

Scenario 3

EMS report: 7-year-old boy backseat unrestrained passenger in rollover MVC. No loss of consciousness. Good respiratory effort. No IV access was able to be obtained. Crying, difficult to localize pain, but seems more central than extremities. C-collar did not fit well so not applied. Long back boarded. Motor/sensory intact x4 extremities, pupils equal, no external head trauma. Mask oxygen applied, saturations 100%. BP not obtained, HR 130. Per mother no significant medical history or allergies.

Primary Survey:

A – Alert, protecting, patent, breathing spontaneously

B – Difficult exam as crying, apparently clear lungs bilaterally, oxygen saturations 98% on O₂, during transition to ED O₂ fell to 90%

C – capillary refill slight delay, color slight pallor, heart sounds normal, peripheral pulses palpable

D – Alert, awake, crying, moving all extremities, GCS 15

VS – 100/70, 128, 20, 96% on mask O₂

Initial Assessment and Expected Actions:

- Activation of referral process / rotor-wing or other retrieval unless at definitive care center
- Call for additional help
- Primary concern is whether child has significant oxygen requirement – 96% on room air very different than requiring 10lpm by mask to maintain 96%!
- Obtain IV access – rapid progression to IO if any difficulties – discuss sites including tibia (proximal/distal), distal femur (borderline age for this, usually <6) and humeral head
- Spinal precautions maintained throughout – regardless of any CT findings, find and apply c-collar if possible, if not, consider taping head, sandbags, etc.
- Further diagnostics and evaluation – ultrasound, CXR, pelvis XR, cervical spine xray
- Dosing for analgesics and route (consider intra-nasal or SQ prior to IV access)
- Re-assessment and evaluate for signs of shock (persistent tachycardia, poor color, signs of poor perfusion)
- Labs – emphasize importance of checking glucose on all critically injured/ill children (very little reserve), Hgb, serum CO₂ value / base deficit

Secondary Survey:

- Chest seems to exhibit some tenderness diffusely
- Possible upper abdominal tenderness
- No evident extremity/head injury
- CXR – hazy R>L lung with evident R pneumothorax (small on AP chest) – no evident fractures
- Attempt transition to nasal cannula oxygen – sats falling to the mid 80s

Secondary Considerations:

- Asymmetric haziness with pneumothorax suggests hemothorax (but either way,
- Likely also has pulmonary contusions which will worsen over time
- Needs a right chest tube – option to do this without intubating, but with a significant oxygen requirement early after injury should be intubated – will make procedure easier – since relatively stable can prep for chest tube, intubate, then complete chest tube procedure
- Size of ET tube $\text{age}/4 + 4 = 5.5$ (roughly) – should be cuffed. Chest tube should be 4x ET size or about 24F
- Intubation – talk through equipment, size of blade/tube, doses of medications (sedation – e.g. ketamine, paralysis – succinylcholine or rocuronium – avoid propofol due to potential for hypotension)
- Landmarks for chest tube, use of local anesthesia (and toxicity of local anesthetics – max about 7mg/kg lidocaine with epinephrine, 4mg/kg without), consider sedation with ketamine or etomidate to minimize further trauma if hemodynamically stable, drainage/suction set-up
- Ongoing sedation and/or paralysis
- OG placed
- Indwelling urinary catheter
- Packaging for transport