

# MAJOR TRAUMA - INJURIES BY ASSAULT

## Learners Guide

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### PRE-READING FOR LEARNERS

[Clinical Practice Guidelines : Trauma - primary survey](#)

[Major trauma: assessment and initial management | Guidance | NICE](#)

[Major paediatric trauma radiology guidance | The Royal College of Radiologists](#)

### OUTLINE

- Pre-reading
- Basics (10 Minutes)
- Main session: (2 x 15 minute) case discussions covering the key points and evidence
- Advanced session: (2 x 20 minutes) case discussions covering grey areas, diagnostic dilemmas, advanced management and escalation
- Sim scenario (30-60 mins)
- Quiz (10 mins)
- Infographic sharing (5 mins): 5 take-home learning points

## BACKGROUND

In the UK, the prevalence of paediatric injuries caused by assault is alarming, with data from the Office for National Statistics indicating a rise in violent crime involving children in recent years. According to the latest figures (2022), there were approximately 6,000 recorded offences where a child was a victim of violence, including physical assault, sexual abuse, and homicide. Trauma is the most significant contributor to childhood mortality, with the mechanism changing with maturity and social development.

In younger children, the predominant mechanism of inflicted injury is by shaking or beating, and most commonly, the abuser is a family member or caregiver. With increasing age, children and young people are more at risk of other mechanisms of violent crime, such as assaults with weapons, e.g. stabbing. Additionally, perpetrators start coming from outside the family unit.

The paediatric trauma patient differs from adults in anatomy, physiology, cognition and psychology. When involved in the same kind of trauma as adults, children may suffer quite different injuries because of these differences.

The management of paediatric trauma requires prompt and systematic assessment through a <C>ABCDE (catastrophic haemorrhage, airway with spinal protection, breathing, circulation, disability and exposure/environment) primary survey approach. This should include early identification of life-threatening injuries, targeted fluid resuscitation using blood products, pain management, then eventual safeguarding and psychological support. Given the unique variation in children's presentation and injuries based on age and development, clinicians must tailor their approach to meet the needs of paediatric patients. Early intervention and multidisciplinary management are key to minimising the long-term consequences of trauma in children.

## **BASIC CASE 1: KICK TO THE HEAD**

Ali, a 12-year-old male, is pre-alerted by ambulance to ED. He was walking home from school an hour ago when his phone was stolen. When he tried to protest, he was pushed down and kicked in the head.

The pre-alert from the ambulance states his GCS is 12 (E3V4M5), moving all 4 limbs with an obvious large haematoma to the back of his head. There are no signs of any other injury and he is haemodynamically stable.

**How would you prepare for the patient's arrival to ED?**

**What would be the approach to assessing this patient on arrival?**

**Which investigations would you consider?**

**Is any other immediate pharmacological treatment indicated while awaiting further investigation?**

## BASIC CASE 2: STAB WOUND TO THE CHEST

Lee, a 14-year-old male, is brought into the ED by his friends, stating he has been in a fight. On initial assessment, you note a deep puncture wound to his right chest. You suspect he has been stabbed, put out a trauma call, move him to resus and start a primary survey.

**What key pathologies would you try to identify and manage during the primary survey?**

**After the primary survey, you decide to complete a stab check. Why is that important, and where are the other areas on the body to check?**

**You feel the patient needs fluid resuscitation. How would you approach this?**

**Before Lee's eventual discharge, you want to assess if any measures can be put in place to reduce the risk of him becoming a victim of violent crime again; how would you approach this?**

## ADVANCED CASE 3: NON FATAL STRANGULATION

Ana, a 15-year-old female, self-presents to ED. She is reluctant to go into detail at triage but eventually states during an argument, her partner pinned her down by the neck.

Ana is a bit confused about what happened after that and states the next thing she remembers is that she woke up alone and that she had “wet herself.” You have a cursory look at her neck and don’t see any bruising.

**What are the red flags to cover while assessing Ana to determine the risk profile of this injury?**

**Is any further investigation indicated based on the above information?**

**How common do you think domestic violence is in adolescent relationships, and is this injury mechanism significant?**

**Do you feel Ana needs any further support or follow-up on discharge?**

## QUIZ QUESTIONS: (10 MINUTES)

### Question 1.

**Juvenile polyposis syndrome is predominantly defined as:**

- A:** Polyps in a child less than 10 years old.
- B:** More than one polyp in the colon.
- C:** Five or more JPs of the colon or rectum.
- D:** Blood with stools.

### Question 2.

**A 10 year old boy presents to the emergency department with a history of loose stools with mucus, intermittent blood, abdominal pains and anorexia. What would you do to objectively document the patient's symptoms?**

- A.** Use the PUCAI as there is no histological diagnosis yet.
- B.** Use PCDAI as this is likely to be Crohn's disease.
- C.** Use his descriptions from the history.

### Question 3.

**What is a useful rule to remember the pathophysiology and epidemiology of Meckel's Diverticulitis in children?**

- A.** Rule of 4.
- B.** Rule of 3.
- C.** Rule of 2.

## ADVANCED CASE 4: GUNSHOT WOUND TO THE ABDOMEN

David is a 15-year-old male who has been pre-alerted by the ambulance with a wound to his abdomen from an unknown weapon. He was sitting in a car with friends in the park when someone reached through the window and fired.

You receive this ATMIST:

- A - 15
- T - 60 minutes ago (some delay whilst police cleared the scene)
- M - ?Gunshot wound
- I - Penetrating wound to LUQ of the abdomen
- S - HR 125, BP 90/50, RR 24, Temp 35.1° C, CRT 4s, GCS 14 (combative)
- T - 500ml IV fluid bolus, IV co-amoxiclav, IV TXA, small bolus, IV ketamine for analgesia/anxiolysis

After completing a primary survey, you feel the cause of the patient's haemodynamic instability is hypovolaemia.

How have you identified hypovolaemia, and what other signs may be present from the information above?

There is a discussion about imaging required if the patient stabilises.

**A colleague hopes to minimise radiation and suggests a CT abdomen would be sufficient. Do you agree?**

**The patient deteriorates further, resulting in a loss of cardiac output. What are your next priorities, and how do these differ from a non-traumatic cardiac arrest?**

**Should this patient's attendance and injuries be shared with other agencies?**

## QUIZ QUESTIONS

### Question 1.

In moderate to severe traumatic brain injury, TXA has proven to reduce mortality and morbidity.

What GCS would the administration be recommended for?

A: GCS <15

B: GCS  $\leq$ 14

C: GCS  $\leq$ 12

D: GCS  $\leq$ 8

E: GCS 3

### Question 2.

At what threshold of blood loss do children begin to show signs of haemorrhagic shock?

A: 5% blood volume

B: 10% blood volume

C: 20% blood volume

D: 25% blood volume

E: 40% blood volume

### Question 3.

Which of the following features is not a red flag when assessing a patient presenting with non fatal strangulation?

A: Oral petechial haemorrhages

B: Dysphagia

C: Amnesia

D: Painful but full range of movement of the neck

E: Bruising on the neck



## Question 4.

**Which is not a key aspect of fluid resuscitation in trauma?**

- A:** Balanced blood product transfusion 3 pRBC:2 FFP:1 Platelets
- B:** Calcium replacement
- C:** Avoid hypothermia
- D:** Avoid acidosis
- E:** Replace cryoprecipitate to target normal fibrinogen

## Question 5.

**If a patient presents with a stab wound, they have a \_\_\_\_ chance of having a 2nd stab wound on examination. The key areas to examine for these additional wounds as part of a stab check are the \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.**

## Question 6.

**In paediatric traumatic cardiac arrest, when would a resuscitative thoracotomy be considered?**

- A:** Stab wound to the chest, CPR for 35 minutes
- B:** Isolated significant head injury with blown right pupil, CPR for 10 minutes
- C:** RTC causing polytrauma, CPR for 20 minutes
- D:** Stab wound to the abdomen, CPR for 10 minutes
- E:** Fall from building causing polytrauma, CPR for 15 minutes

## Take Home Points - Major Trauma

### 1 CHECKLISTS

A trauma checklist can help the team ensure readiness and anticipate potential needs and complications.

### 2 PRIMARY SURVEY

Follow the >C<ABCDE approach to quickly identify and address life-threatening conditions.

### 3 FLUID RESUSCITATION

Fluid resuscitation in paediatric trauma ideally involves boluses of blood products in a balanced ratio of packed red blood cells, plasma, and platelets. Emphasis is placed on addressing the cause of haemorrhage, preventing hypothermia, acidosis, hypocalcaemia, and coagulopathy—the “diamond of death”—to optimise outcomes.

### 4 CARDIAC ARREST

Paediatric traumatic cardiac arrest requires rapid implementation of a group of interventions to correct potential causes, e.g. thoracostomies, aggressive fluid resuscitation and haemorrhage control, sometimes taking priority over CPR.

### 5 THINK HOLISTICALLY

In all paediatric patients presenting with injuries related to assault, this should prompt professionals to provide trauma informed care and display curiosity about the young person’s life and experience. It should also trigger child protection and safeguarding processes.

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