Head and Neck Injuries in Children

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Overview

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- Head injuries
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- Case studies
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Very, very common presentations in Paediatric EM
Often role of ED middle grade to assess/advise on treatment and investigation
Lots of similar guidelines exist:
  - Head Injury: PECARN/CHALICE/CATCH/NICE
  - Neck Injury: Canadian/Nexus/NICE
Standard practice in UK = NICE guidelines (2014)
NICE guidelines - look complex – previously much more simple!

Broadly reflective of typical clinical practice in UK

Despite relative clarity of pathway, can be tricky to apply in clinical practice at times

Session aims to focus on clinical reasoning and decision making (i.e. not examination technique/radiology interpretation)
Head Injuries in Children
Algorithm 2: Selection of children for CT head scan

Children presenting to the emergency department who have sustained a head injury.

Are any of the following risk factors present?

- Suspicion of non-accidental injury
- Post-traumatic seizure, but no history of epilepsy
- On initial assessment GCS <14, or for children under 1 year GCS (paediatric) < 15
- At 2 hours after the injury GCS < 15
- Suspected open or depressed skull injury or tense fontanelle.
- Any sign of basal skull fracture (haemotympanum 'panda' eyes, cerebrospinal fluid leakage from the ear or nose, Battle's sign).
- Focal neurological deficit
- For children under 1 year, presence of bruise, swelling or laceration of more than 5 cm on the head

Yes  
Perform CT head scan within 1 hour of risk factor being identified. A provisional written radiology report should be made available within 1 hour of the CT head scan taking place.

No  
Are any of the following risk factors present?

- Witnessed loss of consciousness > 5 minutes
- Abnormal drowsiness
- 3 or more discrete episodes of vomiting
- Dangerous mechanism of injury (high-speed road traffic accident either as a pedestrian, cyclist or vehicle occupant, fall from height of >3 metres, high speed injury from an object
- Amnesia (antegrade or retrograde) lasting > 5 minutes (assessment not possible in pre-verbal children and unlikely in any child < 5 years).

Yes, > 1 factor  
Yes, 1 factor  
No

Observe for a minimum of 4 hours post head injury.

Are any of the following risk factors present during observation?

- GCS < 15
- Further vomiting
- Further episodes of abnormal drowsiness

Yes  
Perform CT head scan within 8 hours of the injury. A provisional written radiologist’s report should be made available within 1 hour of the CT head scan taking place.

No

Current warfarin treatment?

Yes  
No imaging required. Use clinical judgement to determine when further observation is required.
Head Injury - NICE Guidelines (2014)

- Focused around the decision whether or not to perform plain CT head scan.
- Acts to group patients into 3 categories:
  1) High Risk – need CT head scan within 1 hour
  2) Moderate Risk – need observation +/- CT scan
  3) Low risk – discharge home with advice
Group work
Head Injury - Case 1

- 10 month old girl brought in by parents
- Fell off kitchen unit when parents changing nappy before bed approx 2 hours ago
- Hit head on floor – no LOC, cried instantly
- Vomited x1 since
- o/e asleep, looks peaceful!
Case 1 - questions

- How should you manage this patient?
- What factors in the history/presentation influence your decision?
- What other concerns does this presentation raise?
Head Injury - Case 2

- 11 month old brought in by mum - fell off sofa 6 hours ago whilst playing with older brother
- Cried briefly then settled
- Bruise to forehead
- Vomited x3 over next 2 hours
- Since playing happily – remains cheerful, alert
- Mum rang 111 – advised to come in to ED via ambulance
Case 2 - questions

- How would you investigate and manage this patient?
- What factors in the history affect your decision?
- What would you wish to clarify in the history/examination? What other questions might you ask to help your decision?
Head Injury - Case 3

- Paediatric trauma call
- RTC – head on collision driver side - combined speed 60mph
- 3yr old girl restrained in car seat on rear passenger side
- No external signs injury
- GCS dropped transiently to 14/15 (drowsy) at scene so blue-light to resus
Case 3 - questions

- How would you manage this patient (in the context of a trauma call)?
- How would you investigate this patient?
- What other injuries might you suspect? How would you investigate them?
Head Injury - Case 4

- 13 year-old boy playing football
- Jumped to head ball, opponent landed on him
- LOC 1 min
- Vomited x1
- Since GCS 15/15
- c/o increasing headache
Case 4 - questions

- How would you investigate/manage this patient?
- What other injuries should you consider?
- What would your discharge criteria be?
- What advice would you give?
Neck Injuries in Children
Algorithm 4: Selection of children for imaging of the cervical spine

Children presenting to the emergency department who have sustained a head injury.

Are any of the following risk factors present?

- GCS < 13 on initial assessment
- Intubation
- A definitive diagnosis of cervical spine injury is required urgently (e.g. before surgery)
- Other body areas are being scanned for head injury or multi-region trauma
- Focal peripheral neurological signs
- Paraesthesia in the upper or lower limbs

Yes

Perform CT cervical spine within 1 hour of risk factor being identified.

A provisional written radiology report should be made available within 1 hour of the CT taking place.

Is there neck pain or tenderness?

Yes

No

Was there a dangerous mechanism of injury (fall from > 1 metre or 5 stairs; axial load to the head [e.g. Diving]; high-speed motor vehicle collision; rollover; motor accident; ejection from a motor vehicle, bicycle collision)?

Yes

No

Perform three-view cervical spine X-rays within 1 hour of risk factor being identified.

Is there a strong clinical suspicion of injury despite normal X-rays, the X-rays were technically difficult or inadequate, or the X-ray identifies a significant bony injury?

Yes

No

Are any of the following low risk factors present?

- Involved in a simple rear-end motor vehicle collision
- Is comfortable in a sitting position in the emergency department
- Has been ambulatory at any time since injury
- No midline cervical tenderness
- Presents with delayed onset of neck pain

Yes

No

On assessment can the patient actively rotate the neck to 45 degrees to the left and right?

Yes

No

No imaging/ further imaging required

C-spine Injury - NICE Guidelines 2014

- Again focused around imaging of patient (XR/CT C-spine)
- Again patients grouped into 3 categories:
  1) Need immediate CT C-Spine – neurologically impaired, major trauma or undergoing head CT
  2) Need XR C-spine prior to examination
  3) Safe to examine neck (rotation 45 degrees R+L)
- Further consideration of whether to immobilise patient prior to imaging (APLS)
Group work
C-spine Injury - Case 1

- 6 year old girl playing on monkey bars in school playground 2 hours ago – 7ft
- Fell – landed on back of neck/head
- Since c/o neck pain and tingling left hand over thumb
- School called ambulance – immobilised in collar/blocks
Case 1 - questions

- How would you assess/investigate this girl?
- What other injuries would you look for?
- What would your actions be if the initial investigations were normal? What further investigations might be required?
C-spine Injury - Case 2

- 9 year old girl – passenger in RTC, restrained rear seat
- Hit from behind ?40-50mph
- Mobile at scene, self extricated
- Pain occurred in neck soon after extrication
- Immobilised by paramedics – brought to ED
Case 2 - questions

- Is it safe to examine this girl's neck?
- What imaging might she require?
- What would you do if the imaging is
  - a) normal
  - b) abnormal?
C-spine Injury – Case 3

- 15 year old boy
- Walked into ED
- Diving yesterday in pool
- Hit head on bottom of pool
- Since c/o pain in neck, unable to get comfortable
Case 3 - questions

- Would you immobilise this patient?
- Is it safe to examine this patient’s neck?
- What would be your imaging of choice if required?
C-spine Injury - Case 4

- 8 year-old boy – playing with older brothers earlier today ‘rough-housing’
- In headlock – since c/o increasing pain in neck
- Keeps neck rotated to right - states stiff ++, unable to straighten due to pain
Case 4

- How would you assess/manage this patient:
  - a) with regard to examination?
  - b) immobilisation?
  - c) with regard to imaging?
- Broadly speaking, what are the two key differential diagnoses?
Questions/Further Discussion
Summary

- Common presentations
- Usually in children represent minor injuries but occasionally life changing/threatening
- Use NICE guidelines
- Key is in the application (guidelines not rules)…!
References

- NICE (2014) - Head injury: assessment and early management
  - https://www.nice.org.uk/guidance/cg176

- NICE (2014) - Investigation for injuries to the cervical spine in children with head injury

- Life in the Fast Lane - http://lifeinthefastlane.com