ANAESTHETIST CALLED TO THE PAEDIATRIC EMERGENCY DEPARTMENT

N Akhtar

ST7 Anaesthetics

OUTLINE

- Some principles of management
- Key points
- Case discussions

- Some preparation for that walk to ED…

BASIC PRINCIPLES

- A to E approach
- Age specifics
- Pneumonics and formulae
- Never be afraid to ask for help

- KIDS INTENSIVE CARE AND DECISION SUPPORT (bwc.nhs.uk)
- https://kids.bwc.nhs.uk/wp-content/uploads/2019/05/Drug_Calculator_v23.xlsx
- https://www.nwts.nhs.uk/documentation/crashcall

THINGS TO CONSIDER

- For all look for
  - Tone
  - Interactivity
  - Consolability
  - Look or appearance
  - Speech/cry

  - Consider trauma, NAI
  - If it is a chronic illness listen to the parents

THINGS TO CONSIDER

- Neonates, babies
  - Do you remember…

  - Sepsis
  - Intracranial disorder (haemorrhage, tumour)
  - Congenital heart disease
  - Congenital adrenal hyperplasia/adrenal crisis
  - Feeding problems
  - Intestinal emergencies
  - Toxicological

THINGS TO CONSIDER

- Older children
  - All of the above
  - Injury; trauma or burns
  - Failure to thrive (complicates recovery)
  - Cancers
  - Diabetes Mellitus
  - Seizures
  - Chronic diseases/conditions
  - Behavioural, e.g. autism

KEY POINTS

- Great ability to compensate…
- Great ability to deteriorate

- Think sepsis
- Consider congenital abnormalities
- But there is potentially a wide range of differentials

- WETFLAG
- Drug calculators
- Remember age specifics

FORMULAE

$$\Delta 0.1\ \text{pH} \approx \Delta 12\ \text{mmHg}\ \text{PaCO}_2 \approx \Delta 6\ \text{mmol/L}\ \text{HCO}_3 \approx \Delta 0.3\ \text{mmol/L}\ \text{K}^+$$

FORMULAE

- Weight
  - 0 – 1 years = (Age/2)+4
  - 1 - 5 years = (Age x2)+8
  - 6 - 12 years = (Age x3)+7

- ETT
  - Size (Age/4) + 4
  - Length
    - Oral (age/2) +12
    - Nasal (age/2) +15

PNEUMONICS

- WETFLAG

Weight	(Age + 4) x 2	kg
Energy	4 J x Weight	J
Tube	Internal Diameter = Age / 4 + 4 Length (oral) = Age / 2 + 12 Length (nasal) = Age /2 + 15	Internal Diameter: cm Length (oral): cm Length (nasal): cm
Fluids	Medical = 20 ml x Weight Trauma = 10 ml x Weight	Medical = mls Trauma = mls
Lorazepam	0.1mg x Weight	mg
Adrenaline	0.1ml x Weight of 1:10,000 Adrenaline	mls
Glucose	2ml x Weight of 10% Dextrose	mls

SEPSIS

- https://www.networks.nhs.uk/nhs-networks/north-west-north-wales-paediatric-critical-care/documents/file.2014-09-09.8485162030/file_popview

CASE 1 - BACKGROUND

- 2 year old, afro-Caribbean, brought into ED by parents
- Unwell for ~ 36 hours
- Not himself, lethargic, vomiting
- Vitals
  - RR 46, sats 92% on air,
  - HR 160, BP 90/60,
  - T 40.2, AVPU – V just about
- O/E – appears very dry, pale, rousable with mum

CASE 1 - INVESTIGATIONS

- VBG
  - pH 7.02, pCO2 3.6, pO2 8.1
  - Lactate 14.4, BE -18.2, HCO3 12, gluc 9, Hb 147
- Urine – none
- Anything else?

CASE 1 - THOUGHTS

CASE 1 - MANAGEMENT

- A to E approach
- Rapid resuscitation
- Sepsis 6
- Inotropes
- And so IPPV
- Blood?

- Get help!!!

CASE 1 - MANAGEMENT

- Advice from KIDS team
- Child deteriorated after initial resuscitation
  - Now P on AVPU, haemodynamics worse
- Allocation of roles and tasks
  - Particularly drugs and infusions
  - Who will do the lines?
  - Who will intubate

- Further resuscitation, including blood products and KIDS team arrival
- Intubated with them on site

KIDS TEAM

- Step 1 – Phone call to the KIDS call centre - **Number: 0300 200 1100**
- Any clinician can call the KIDS Call Centre 24 hours a day.
  Calls are free within the UK.
- Step 2 – Initial details taken by the call centre operator
  - Reason for referral
  - Name of child
  - Child's DOB
  - Child's address
  - Child's weight
  - Child's GP name and address
  - Referring doctor's name
  - Referring consultant's name
  - Referring doctor's contact number
  - Referring hospital and ward
  - Clinician preference of receiving PICU
- Step 3 – Conference call with KIDS consultant
- The call centre operator will call back the referring clinician and connect them onto a conference call with the KIDS duty consultant. Any other relevant clinicians can also be added to the conference call.
- Step 4 – Management plan
- The KIDS consultant will give advice and agree an initial management plan with the referring clinicians. When a decision is made to retrieve the child, KIDS will mobilise a retrieval team.
- Step 5 – Further advice
- Whilst the retrieval team is travelling to the referring hospital, the KIDS consultant can give further advice regarding the patient's management if required.
- Step 6 – PICU bed found for the patient
- A paediatric intensive care bed will be found and the KIDS consultant will liaise with the receiving intensive care unit's consultant.
- Step 7 – Referring hospital updated with progress
- KIDS contacts the referring hospital to update them that a PICU bed has been found for the child.

CASE 1 - OUTCOME

- Arrested post-induction
- Prolonged efforts, ROSC x2 but shortlived

- Died ~ 90 minutes after arrest…

- Confirmed meningococcal septicaemia

CASE 2 - BACKGROUND

- 9 day old, brought in by ambulance
- Not feeding well – vomiting and floppy after feeds
- Mum unsure if this is normal (1st baby)

- In ED – rousable, 'normal' baby sounds
- Vitals
  - RR 62, sats 84% on oxygen,
  - HR 180, BP 60/40,
  - T 37.8, AVPU – A
- Some extended CRT (3-4sec)

CASE 2 - INVESTIGATIONS

- CBG
  - pH 7.14, pCO2 6.8, pO2 9.1 (on oxygen)
  - Lactate 11, BE -12, HCO3 16, gluc 4.7, Hb 154
- Urine – small amounts
- Anything else?

CASE 2 - THOUGHTS

CASE 2 - MANAGEMENT

- A to E approach
- Rapid resuscitation
- Sepsis 6
- Inotropes??
- IPPV?

- Get help!!!
- Paediatric consultant and KIDS team

CASE 2 - MANAGEMENT

- Paediatric consultant review
- Advice from KIDS team

- Gave 1 bolus of IVF and antibiotics
- CXR
- Allocation of roles and tasks
  - Particularly drugs and infusions
  - Who will do the lines?
  - Who will intubate??

CASE 2 - OUTCOME

- CXR – boot shaped heart
- IPPV
- Commenced prostaglandin E2 infusion

- Transfer to BCH
- Coarctation of the aorta
- Operated on D3 at BCH
- Recovered well

CASE 3 - BACKGROUND

- 14 year old girl, BBA
- ?seizure at school
- No significant PMHx
- Parents arrive; also distraught

- In ED – maintaining airway, decerebrate movements, painful groaning
- Vitals
  - RR 28, sats 92% on oxygen,
  - HR 160, BP 100/60,
  - T 39.2, GCS E1V2M2

CASE 3 - INVESTIGATIONS

- ABG
  - pH 7.22, pCO2 4.4, pO2 28.1
  - Lactate 5.7, BE -9.5, HCO3 20, gluc 16, Hb 126
- Urine – none
- Anything else?

CASE 3 - THOUGHTS

CASE 3 - MANAGEMENT

- A to E approach
- Rapid airway control
- Sepsis?

- Investigate further once control gained

CASE 3 - MANAGEMENT

- ECG, mild QTc prolongation
- Bloods
- Tox screen
- CT head

- E – empty pack of mefenamic acid found in pocket

- Senior review

CASE 3 - OUTCOME

- All investigations NAD

- ? Cause
- Likely OD but to what?

- What precautions would you take?

- Woken the next day, full recovery
- … although she never admitted to anything…

SUMMARY

- Variety of differentials in paediatric emergencies
- Always keep to basic principles
- Ask for help
- Remember aids, such as drugs calculators, WETFLAG etc
- Remember age specifics
  - can affect equipment you need and your technique

SUMMARY

- Other sources of help
  - ODPs!!!
  - ToxBase, Pharmacists, play therapists

- KIDS team are useful source of advice, not just for transfer
- When referring a child for transfer, remember basics for any referral

USEFUL RESOURCES

- (PDF) The Critically Ill Child (researchgate.net)
- North West & North Wales Paediatric Critical Care Operational Delivery Network — NHS Networks
- Guidelines for Management of Sepsis in Children - FINAL -10th September 2014.pdf
- Referral and transfer of the critically ill child | BJA Education | Oxford Academic (oup.com)
- Poisoning in children | BJA Education | Oxford Academic (oup.com)
- Referral process (bwc.nhs.uk)
- Early Management of the Critically Ill Child • LITFL• CCC Paediatrics