Cerebral Oedema in DKA

This is a medical emergency. Once suspected it should be treated immediately. Call for senior help.

Background

Cerebral oedema is a major cause of mortality and morbidity in children with diabetic ketoacidosis. It can occur any time up to 24 hours after the start of resuscitation. It can be present at presentation of DKA.
One of the most important principles of management is the slow correction of biochemical abnormalities. This will help prevent the development of cerebral oedema.

Risk Factors

- Young age (< 5 years)
- Adolescents
- pCO2 < 2 kPa at presentation
- pH < 7.1 at presentation
- 40mL/kg IV Fluid in first 4 hours
- Rapid falls in *corrected* Sodium (> 5 mmol/L/hour)
- $NaHCO_3$ therapy
- Raised serum urea
- Hyperventilation post-intubation

Symptoms

- Headache
- Impaired level of consciousness
- Confusion
- Seizure
- Irritability
- Incontinence

Signs

- Hypertension
- Bradycardia
- Low saturations
- Change in neurological status
- Focal neurology
- Abnormal posturing
- Seizures

Management

- Increase frequency of neurological observations to every 15 minutes
- Exclude hypoglycaemia
- Give 5 mL/kg of 2.7% saline over 5 to 10 minutes
  If there is a response this can be repeated but watch plasma and corrected sodium levels
  Monitor chloride levels. May develop prolonged hyperchloraemia
- Restrict fluids to 50% maintenance and replace the deficit over 72 hours instead of 48
- Nurse at 15° head up and keep head in midline
- Call anaesthetists as may need intubation and ventilation
- Liaise with PICU
- Once patient stabilises organise a CT to exclude other diagnoses such as thrombosis, haemorrhage or infarction which can present similarly.

References

1. BSPED guideline on DKA 2009 (minor review 2013
2. STRS website (www.strs.nhs.uk)

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