M04: Pediatrics - Neurological Emergencies

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Introduction

An altered level of consciousness is an abnormal neurological state where a child is less alert and responsive than would be appropriate for their age. Signs of an altered level of consciousness range from mild confusion, to coma.

Hypoglycemia is a common, and easily treated, cause of altered levels of consciousness. Seizures can have complex origins, and produce a variety of signs and symptoms. Although uncommon, strokes can occur in children, particularly those with congenital malformations.

Syncope is common in children and adolescents. Most are neurological in nature, caused by breath holding and vasovagal stimulation. Life threatening cardiac causes can be present in up to 6% of cases. A small, but significant, type of pediatric emergency are spinal conditions, either congenital, neoplastic or trauma related.

Essentials

- Plan for early and rapid transport
- Ensure the airway is protected, and that oxygenation and ventilation are supported as necessary
- Search for signs of trauma and impaired circulation
- Check blood glucose and correct hypoglycaemia
- If there is any reason to suspect a head injury with rising intracranial pressure, transport urgently and discuss specific management with CliniCall
- Consider maltreatment and follow reporting procedures if suspect

Additional Treatment Information

- As with adults, assessments of patients with an altered level of consciousness should focus on airway protection, oxygenation, ventilation, and an evaluation of blood glucose
- Febrile seizures are generally benign, do not require treatment if of short duration. Treating fever does not prevent recurrence of seizures
- Assessment and treatment priorities of stroke are primarily maintaining ABCs and vascular access if it does not interfere with rapid transport to a tertiary facility
- If not associated with a primary cause that requires intervention (such as trauma), headaches can be treated with support, positions of comfort, and a calm dark environment
- Treatment in spinal emergencies is supportive and prioritization of transport to a tertiary centre
- Syncope is frequently benign, but should not necessarily prompt a decision to not transport. In cases where a patient has a cardiovascular history, careful monitoring of the ECG and vital signs is important.

Referral Information

All patients exhibiting signs and symptoms of altered LOC and neurological disorder require evaluation in hospital, even if transient. Remember that all pediatric non-transport referrals must by discussed via Clinicall.

General Information

- Seizures are very common prehospital emergencies. They typically resolve spontaneously, and generally only require airway protection and supplemental oxygen. Many of these seizures are caused by a high fever in a young child (between six months and five years). Status epilepticus is defined in children as it is in adults – a series of two or more seizures without a recovery of consciousness, or a seizure lasting longer than five minutes. Patients who continue to seize on arrival of paramedics should generally be considered as being in status epilepticus.

- Increased intracranial pressure can manifest with a decreased level of consciousness and impaired respirations. Maintain oxygenation using appropriate basic and advanced airway techniques; promote cerebral drainage by elevating the head of the bed, removing cervical collars if in place.
- Pain from headaches can be acute or chronic, generalized or localized and can range from mild to severe. The common types of headache include vascular (migraine), tension characterized by a dull, achy pain, or organic caused by tumours, infection, or other diseases of the brain. Never disregard or minimize the emergent nature of a headache. Diagnosis of the cause of the pain cannot be performed in the prehospital setting.
- Be aware of malignant causes of headache:
  - Hemorrhagic strokes: onset of a sudden and severe headache.
  - Meningitis: continuous throbbing headache (usually in occiput) with sudden onset of fever, nausea, vomiting, confusion, and stiff neck. Frequently associated with a rash which may be maculopapular petechial or urticarial
- Apparent life-threatening events (ALTE) and brief, resolved, unexplained events (BRUE) are not specific disorders, but are terms for a group of alarming symptoms that can occur in infants. They both involve the sudden appearance of respiratory symptoms, such as apnea, a change in color or muscle tone, or altered responsiveness. These events are most common in children under 1 year, with a peak incidence between 10 and 12 weeks of age. Some of these events are unexplained (and hence are referred to as BRUEs), but there are many other potential causes.

Interventions

First Responder

- Position the patient
- Provide supplemental oxygen as required
  - → A07: Oxygen and Medication Administration
- Provide positive pressure ventilation if respirations are inadequate (consider use of oropharyngeal airway)
  - → B01: Airway Management
- Correct hypoglycemia: Glucogel
- Correct suspected narcotic intoxication (focus on oxygenation and ventilation)
  - → J12: Opioids (but do not give naloxone to neonates)

Emergency Medical Responder – All FR interventions, plus:

- Provide supplemental oxygen to maintain SpO2 > 94%
  - → A07: Oxygen and Medication Administration
- Obtain capillary blood sample
- Transport urgently
- Consider ACP intercept

Primary Care Paramedic – All FR and EMR interventions, plus:

- Consider use of nasopharyngeal airway if unsuitable for oropharyngeal airway
  - → PR07: Nasopharyngeal Airway
- Consider use of supraglottic airway in obtunded patients
  - → PR08: Supraglottic Airway
- Correct documented hypoglycemia
  - → E01: Hypoglycemia and Hyperglycemia
- Consider vascular access and fluid administration
  - → D03: Vascular Access
- Consider need for analgesia:
  - → E08: Pain Management
    - Ibuprofen
    - Acetaminophen
    - KetAMINE

Advanced Care Paramedic – All FR, EMR, and PCP interventions, plus:

- Advanced airway management as required
  - → PR18: Anesthesia Induction
- Monitor for cardiac dysrhythmia
- Control seizures where required.
  - → F02: Seizures
  - MIDAZOLam
- If trauma suspected and asymmetric pupils consider hyperventilation with CliniCall consult
- Analgesia
  - FentaNYL
  - KetAMINE
  - Contact CliniCall if additional analgesia is required
  - Unlike with adults, pre-treatment with ondansetron significantly decreases ketamine induced vomiting. Consider ondansetron whenever using ketamine in children aged 12-18

Evidence Based Practice

Pediatric Altered Mental Status (NYD)

References

1. Conicella E, et al. The child with headache in a pediatric emergency department. 2008. [Link]
2. Konstantinidis T. Febrile seizures: Don't Forget the Bubbles. 2014. [Link]
3. Müller MJ, et al. Syncope in children and adolescents. 2018. [Link]
4. Raab CP, et al. ALTE and BRUE (Brief Resolved Unexplained Event). In Merck Manual Professional Version. 2019. [Link]