Clinical Guideline

WATCh – ACUTE DECREASED LEVEL OF CONSCIOUSNESS AND/OR SUSPECTED RAISED INTRACRANIAL PRESSURE IN CHILDREN

SETTING	Wales and West Acute Transport for Children (WATCh)
FOR STAFF	WATCh Team, South West and Wales District General Hospital medical and nursing teams.
PATIENTS	Children presenting with acute decreased level of consciousness and/or suspected or confirmed raised intracranial pressure who do NOT require time critical transfer for neurosurgery.

GUIDANCE

This guideline is intended to describe the immediate management of children presenting with acute decreased level of consciousness and or the clinical signs of acute raised intracranial pressure who **do not** require time critical local team transfer for immediate tertiary neurosurgical intervention.

- For children with **Diabetic Ketoacidosis** – please refer to the WATCh DKA guideline for specific management of suspected cerebral oedema / raised intracranial pressure in these patients
- For children presenting with **severe traumatic head injury** please refer to the 'South West Paediatric Major Trauma Network Severe Head Injury in Children: Guideline for Initial Management and Transfer'.

Clinical signs of Raised Intracranial Pressure (RICP)

Reduced (GCS < 8) or fluctuating level of consciousness
Bradycardia and hypertension / abnormal respiratory pattern
Focal neurological signs
Abnormal posture or posturing
Seizures
Unequal, dilated or poorly responsive pupils / Papilloedema / Abnormal 'doll's eye' movement
Bulging fontanelle

Glossary of abbreviations used

GCSS	Glasgow Coma Scale Score	ICP	Intracranial pressure
GCS	Glasgow Coma Score	NaCl	Sodium Chloride
BVM	Bag-Valve-Mask	OD	Once Daily
IV / IO	Intravenous / Intraosseous	BD	Twice Daily
U&E	Urea and Electrolytes,	TDS	Three times per day
LFTs	Liver Function Tests	QDS	Four times per day
FBC	Full blood Count	RSI	Rapid Sequence Induction
CXR / ETT	Chest X-Ray / Endotracheal Tube	$ETCO_2$	End Tidal Carbon Dioxide
HR	Heart Rate	BP	Blood pressure

RELATED DOCUMENTS	WATCh Guideline for Time Critical Transfers by Local Teams WATCh Guideline for the Management of Suspected Non-Accidental Injury WATCh Guideline for the Management of the Collapsed Neonate South West Paediatric Major Trauma Network Severe Head Injury in Children: Guideline for Initial Management and Transfer
AUTHORISING BODY	WATCh Governance Group
SAFETY	Call the WATCh team for advice and support
QUERIES	0300 0300 789

ACUTE DECREASED LEVEL OF CONSCIOUSNESS AND/OR SUSPECTED RAISED INTRACRANIAL PRESSURE IN CHILDREN

IMMEDIATE MANAGEMENT

Airway	Ensure patent airway / presence of airway protective mechanisms Apply airway opening manoeuvres and use guedel airway if not maintaining own airway Indications for intubation = *GCS < 8 / apnoea or hypoventilation / uncontrolled seizures / clinical signs of raised intracranial pressure*
Breathing	High flow oxygen 15Lpm via non-rebreathe mask; monitor respiratory rate, pattern and saturations Support ventilation with BVM / anaesthetic bagging circuit (dependent on experience) if inadequate respiratory effort
Circulation	Monitor heart rate and blood pressure – establish IV / IO access (2 points) Treat shock if present – 10mL/kg 0.9% NaCl OR PlasmaLyte 148 bolus dose and reassess
Disability	Treat hypoglycaemia (2mL/kg 10% glucose bolus followed by continuous glucose containing infusion) Osmolar therapy if signs of raised intracranial pressure – 5 mL/kg 2.7% NaCl or Mannitol 0.25 g/kg over 5 minutes and reassess Assess for and treat seizures – Benzodiazepine x 2 doses followed by Phenytoin 20 mg/kg OR Levetiracetam 40 mg/kg (Phenobarbitone 20 mg/kg if < 28 days of age or already on Phenytoin)

DIFFERENTIAL DIAGNOSIS

Metabolic - Hypoglycaemia
Hyperammonaemia
Hypo / hypernatraemia
Non-accidental injury
Sepsis
Intracranial infection
Intoxication – alcohol / toxins
Hypertensive Encephalopathy

CORE INVESTIGATIONS

- Blood glucose and gas (arterial/capillary or venous)
- Urine dipstick plus 10ml sample for toxicology
- Urine organic and plasma amino acids
- Formal bloods – glucose / U&Es / LFTs / FBC / Clotting studies
- Ammonia (needs to go on ice; venous or arterial sample only)
- CT head +/- neck and spine once stabilised
- Body map if injuries present

CONTRAINDICATIONS TO LUMBAR PUNCTURE

Presence of signs of RICP

- GCS < 13 or a fall in GCS of > 2 from previous assessment
- Focal neurological signs (including unequal, dilated or poorly responsive pupils)
- Abnormal posture or posturing
- Presence of papilloedema
- Seizures
- Bradycardia and hypertensive signs

Other contraindications

- Significant oedema, tight basal cisterns on CT scan
- Systemic shock
- Haematological abnormalities
- Platelets < 100 / abnormal coagulation screen / anti-coagulant therapy
- Suspected meningococcal septicaemia

ANTIMICROBIAL THERAPY

0 - 28 days of age	1 month and older
Cefotaxime (IV) < 7 days = 50 mg/kg BD 7-20 days = 50 mg/kg TDS > 21 days = 50 mg/kg QDS **Amoxicillin (IV)** < 7 days = 100 mg/kg BD 7-28 days = 100 mg/kg TDS	**Ceftriaxone (IV)** 80 mg/kg OD (max dose 4g) OR **Cefotaxime (IV)** 50 mg/kg QDS

Aciclovir (IV)
< 3 months = 20 mg/kg TDS

3 months -11 years = 500 mg/m^2 TDS

> 12 years = 10 mg/kg TDS

NEURO CRITICAL CARE MEASURES

Ventilation	Modified RSI using intubation checklist – these patients should be ventilated throughout the procedure to avoid an acute rise in ICP secondary to hypercarbia Induction agents Fentanyl 1-3 micrograms/kg + Ketamine 1-2 mg/kg and Rocuronium 1-2 mg/kg Titrate ventilation / FiO_2 to achieve $ETCO_2$ between 4.0-4.5 kPa and SpO_2 > 95% O/NGT post intubation then CXR for ETT position (T2-T3 ideal)
Circulation Avoid hypotension	Correct hypovolaemia (10mL/kg fluid boluses) – aim for euvolaemia and avoid over correction Maintain age appropriate mean arterial blood pressure* Metaraminol – **bolus dose 10microgram/kg / starting infusion rate 2.5microgram/kg/min** • Noradrenaline – **no bolus / starting infusion rate 0.1microgram/kg/min** Restrict maintenance fluids to 2/3 total allowance
CNS	Ongoing sedation – Morphine, Midazolam and Rocuronium infusions as per WATCh drug sheet Maintain head up 30 degrees with head in midline position Emergency management of suspected rise in ICP (HR▼ BP▲ +/- dilated pupil) = 5mL/kg 2.7% NaCl bolus dose (subsequent doses 1-3mL/kg monitor serum sodium aim for maximum 150mmol/L) Regular assessment of pupils. Monitor for seizures.
Other	Maintain normothermia and avoid fever. Monitor blood glucose – maintain above 3mmol/L.

Age (yrs.)	*MAP (mmHg)
< 1	> 50
1 – 4	> 60
5 – 11	> 70
> 12	> 80