THE MANAGEMENT OF CHILDREN AND YOUNG PEOPLE WITH AN ACUTE DECREASE IN CONSCIOUS LEVEL

RCPCH
Royal College of
Paediatrics and Child Health
Leading the way in Children's Health

Population: Children aged from 4 weeks up to 18 years who have a decreased conscious level*

IDENTIFY DECON

1 Identify DeCon

GCS ≤ 14
AVPU = P or U

See 'Neurological assessment' box

2 Perform DeCon specific ABCD

A
- Intubate if GCS <9, AVPU = U or if there is suspected/proven raised intracranial pressure* **See 'Signs of raised ICP' box**

B
- 100% Oxygen if oxygen SaO_2 <95%

C
- If circulation compromised give 10 ml/kg isotonic fluid bolus if DeCon associated with either signs of raised ICP or ketoacidosis (as opposed to 20 ml/kg)*

D
- Perform a capillary glucose test ≤15 minutes of presentation*
- If capillary blood glucose ≤3 mmol/L give 2ml/kg of 10% dextrose and consider a hypoglycaemia screen
- In a child with a clinical diagnosis of raised intracranial pressure, before imaging consider sedation, intubation and ventilation to maintain the $PaCO_2$ between 4.5 and 5.0 kPa

***Based on consensus methodology or weaker evidence**

3 Take core investigations

Point of care tests	Capillary blood glucose, Blood gas (arterial, capillary or venous) for pH, PCO_2, BE, Lactate & Urine dipstick
Laboratory tests	Glucose, U&Es, LFTs, FBC, Blood culture, Ammonia (venous or arterial only)
Saved samples	10ml of urine for later analysis including toxicology

4 Start observations

Record hourly:
HR, RR, SaO_2, BP, Temp, physical state/appearance

Continuously monitor:
SaO_2, ECG

Consider differential diagnoses

DIFFERENTIAL DIAGNOSIS

Hypertensive encephalopathy

Investigation	• Look for signs of raised ICP + papilloedema • Do 4 limb BP • Urinalysis for blood/protein + U&Es
PICU and NEPHROLOGY	• Discuss when DeCon + Hypertension (BP >95th centile for age)

Metabolic

Hypoglycaemia	• Hypoglycaemia screen if lab Glucose <3mmol/L • 2ml/kg bolus 10% Dextrose • Then Infusion of 10% Dextrose (Target 4-7mmol/L)
Hyperammonaemia	• If plasma level >100micromol/l • Send a free flowing venous (or arterial) sample of ammonia to the laboratory, which should be informed it is coming. Samples should be transported on ice in case of a delay before analysis which might affect the interpretation • **SEEK EXPERT METABOLIC ADVICE**
DKA	www.bsped.org.uk/clinical/docs/DKAGuideline.pdf

Prolonged fits/Post convulsive

Investigation	Mg^{2+} **and** Ca^{2+} **and** Na^{+}
PICU	**Discuss treatment if:** • Na <125 mmol/L • Ionised Ca^{2+} <0.75 mmol/L • Mg^{2+} <0.65 mmol/L and the convulsion is ongoing despite anticonvulsant treatment

Cause unclear

Consider additional tests and involvement of specialists e.g. Neurologist or Metabolic expert

Investigation	**Additional tests:** • CT/MRI See 'LP WARNING' box • LP • Urine Toxicology • Urine organic and plasma aminoacids • Plasma lactate/EEG

Sepsis

Diagnosis	T^0 >38^{0}C **or** <35.5^{0}C **or** ↑HR **or** ↑RR WCC >12×10^9/L **or** <4×10^9/L **or** a purpuric rash
Investigation	• CXR • Urine culture • Blood PCR (meningococcus+pneumococcus) • Clotting • Skin swab (from areas of inflammation) • Joint aspiration (if septic arthritis) • Thick and thin film (for malarial parasites if foreign travel to endemic area)
Treatment	Broad spectrum antibiotics ≤1 Hour **+** Follow 'Sepsis 6 pathway': http://www.survivingsepsis.org/Bundles/Pages/default.aspx **+ EARLY SENIOR REVIEW**

Intracranial infection

Differential	• Bacterial meningitis • Herpes Simplex Encephalitis (HSE) • Intracranial abscess • TB meningitis
Investigation	• LP including CSF HSV PCR if no contraindications See 'LP WARNING' box
Treatment	• **Bacterial:** www.nice.org.uk/guidance/cg102 • **HSE:** Aciclovir (Duration decided by local ID experts) • **TB:** www.nice.org.uk/guidance/cg117/resources/guidance-tuberculosis-pdf

Raised ICP

Diagnosis	**See 'Signs of raised ICP'**
Treatment	• Refer to the NICE Bacterial meningitis and meningococcal septicaemia Guideline for recognition and Rx www.nice.org.uk/guidance/cg102
PICU	• Discuss acute management with local PICU • Position head in midline • 20^0 head up tilt • Avoid internal jugular CVCs • Isotonic fluids (restricted) • Mannitol or Hypertonic saline • Intubate and ventilate to a $PaCO_2$ of 4.5-5.0 kPa **BEFORE IMAGING**

Alcohol intoxication

Investigation	Consider blood alcohol test when suspected as a cause of DeCon
Treatment	• ABCD/APLS • Treat hypoglycaemia with IV glucose + maintenance Dex/Saline • Beware of and if present treat respiratory failure/aspiration pneumonia and hypotension • Other concurrent ingestions • And avoid emetics (in case of aspiration)
Considerations	• Consider all other likely contributory drugs • Consider contacting local poisons unit

Shock

Diagnosis	Mottled, cool extremities or diminished peripheral pulses **+** systolic BP <5th centile for age **or** urine output <1mL/kg/hr
Differential	Sepsis, trauma, anaphylaxis, heart failure
Treatment	20 ml/kg isotonic fluid bolus (10 ml/kg if raised ICP or ketoacidosis)
Reassessment	↓ HR **See 'Observation'** ↓ Capillary refill time ↑ Level of consciousness **See 'Neurological assessment'** ↑ Blood pressure (to normal level for age) ↓ Lactate concentration and/or improvement in base excess ↑ In urine output
PICU	Consider for intubation/ventilation/inotropes if >40ml/kg fluid given

Neurological assessment

GLASGOW COMA SCORE (GCS)

Eyes	Motor	Voice
4 Open	6 Obeys commands	5 Converses
3 To command	5 Localises pain	4 Confused
2 To pain	4 Flexion withdrawal	3 Inappropriate words
1 No response	3 Abnormal flexion	2 Incomprehensible
	2 Abnormal extension	1 No response
	1 No response	

GCS MODIFICATIONS IN CHILDREN UNDER 5 YEARS

Motor	Voice
6 Normal spontaneous movements	5 Alert, babbles, coos, words or sentences to usual ability
5 Localises to supraorbital pain (SOP) **or** withdraws from touch	4 Less than usual ability, irritable cry
4 Withdraws from nailbed pain	3 Cries to pain
	2 Moans to pain

AVPU SCALE

A = Alert **V** = Responds to voice **P** = Responds to pain **U** = Unresponsive

Observation – normal ranges

Age	Respiratory Rate	Heart Rate	Systolic BP
Neonate	60	160	70
<1 year	35-45	110-160	75
1-5 years	25-35	95-140	80-90
5-12 years	20-25	80-120	90-110
>12 years	adult	adult	100-120

Signs of raised ICP

BRADYCARDIA (heart rate ≤60 bpm) **or** HYPERTENSION MAP≥95th centile for age)

Pupillary dilation (unilateral or bilateral) **or** loss/impairment of reaction to light

Abnormal breathing pattern **or** posture

LP WARNING

Do not attempt an LP if...
- There are signs of raised ICP (Even if GCS is 15) **See 'Signs of raised ICP'**
- GCS ≤8 **or** deteriorating **or** focal neurological signs **or** GCS ≤12 after a seizure lasting ≥10 minutes
- CT /MRI suggesting CSF pathway obstruction
- Clinical evidence of circulatory shock/meningococcal disease

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***This does not include:** Children with a previously diagnosed condition which may decompensate causing a decreased conscious level (e.g. epilepsy, ventriculo-peritoneal shunt, previously diagnosed metabolic condition), who already have an agreed management plan for acute illness; **OR** Children who on a day to day basis score 14 or less on the Glasgow Coma Scale or Modified Glasgow Coma Scale (e.g. children with epileptic encephalopathy, minimally responsive state following acquired brain injury).

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