# THE MANAGEMENT OF CHILDREN AND YOUNG PEOPLE WITH AN ACUTE DECREASE IN CONSCIOUS LEVEL (DECON)

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 Intracranial pressure (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 ICP, 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<br>• Do 4 limb BP<br>• 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<br>• 2ml/kg bolus 10% Dextrose<br>• Then Infusion of 10% Dextrose (Target 4-7mmol/L) |
| **Hyperammonaemia** | • If plasma level >100micromol/L<br>• 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<br>• **SEEK EXPERT METABOLIC ADVICE** |
| **DKA** | www.bsped.org.uk/media/1629/bsped-dka-aug15_.pdf |

### Prolonged fits/Post convulsive

| | |
|---|---|
| **Investigation** | $Mg^{2+}$ **and** $Ca^{2+}$ **and** $Na^{+}$ |
| **PICU** | **Discuss treatment if:**<br>• Na <125 mmol/L<br>• Ionised $Ca^{2+}$ <0.75 mmol/L<br>• $Mg^{2+}$ <0.65 mmol/L<br>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
- LP
- Urine Toxicology
- Urine organic and plasma aminoacids
- Plasma lactate/EEG

**See 'LP WARNING' box**

### Sepsis

| | |
|---|---|
| **Diagnosis** | $T^0$ >38°C **or** <35.5°C **or** ↑HR **or** ↑RR<br>WCC >12×10⁹/L **or** <4×10⁹/L **or** a purpuric rash |
| **Investigation** | • CXR<br>• Urine culture<br>• Blood PCR (meningococcus+pneumococcus)<br>• Clotting<br>• Skin swab (from areas of inflammation)<br>• Joint aspiration (if septic arthritis)<br>• 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<br>**+ EARLY SENIOR REVIEW** |

### Intracranial infection

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

### 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<br>• Position head in midline<br>• 20⁰ head up tilt<br>• Avoid internal jugular CVCs<br>• Isotonic fluids (restricted)<br>• Mannitol or Hypertonic saline<br>• 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<br>• Treat hypoglycaemia with IV glucose + maintenance Dex/Saline<br>• Beware of and if present treat respiratory failure/aspiration pneumonia and hypotension<br>• Other concurrent ingestions<br>• And avoid emetics (in case of aspiration) |
| **Considerations** | • Consider all other likely contributory drugs<br>• 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<br>(10 ml/kg if raised ICP or ketoacidosis) |
| **Reassessment** | ↓ HR **See 'Observation'**<br>↓ Capillary refill time<br>↑ Level of consciousness **See 'Neurological assessment'**<br>↑ Blood pressure (to normal level for age)<br>↓ Lactate concentration and/or improvement in base excess<br>↑ 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).

National Reye's Syndrome Foundation UK

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