



## Course: Key Competences

### Background:

In 2007, the Royal College of Paediatrics and Child Health (RCPCH) published a new curriculum for postgraduate medical education, which has been approved by the Postgraduate Medical Education and Training Board <sup>1</sup>. In addition, the RCPCH has devised an assessment strategy that uses multisource feedback tools to map specifically to assessment standards.

By the completion of Level One training, all trainees are expected to be able to initiate therapy in an infant presenting with Raised Intracranial Pressure. This scenario/ workshop has been designed to assess competence in management of this key condition of childhood.

### Curriculum Elements Addressed:

The management of raised intracranial pressure can be separated into five distinct phases:

- **Assessment**
- **Recognition of the condition**
- **Formulation of differential diagnoses**
- **Investigation**
- **Definitive therapy**

#### Assessment (Expected)

Brief history should be obtained.

Baby should be examined thoroughly.

Key features of examination:

- Slightly low resp rate (and dropping) 20 breaths.min<sup>-1</sup>
- Mildly bradycardic (and falling) 120 beats.min
- CRT normal
- NIBP 90/48
- Liver edge 2cm below costal margin
- Responding only to painful stimulus – becoming unresponsive
- L pupil larger than R.

#### Recognition of condition (Expected)

Signs are of decreased level of consciousness with an enlarged L pupil. Should appreciate importance of dilated pupil.

#### Formulation of differential diagnosis (Expected)

Candidates should consider blocked shunt. Other differentials would include infection, incl meningitis.

<sup>1</sup> A Framework of Competences for Level 1 Training in Paediatrics.  
<http://www.rcpch.ac.uk/Training/Competency-Frameworks>



**Investigations (Expected)**

- Cardiovascular monitoring
- Pulse oximetry
- IV access
- Laboratory investigations (to include U&Es, FBC, blood and urine cultures)
- CT scan urgently once vital signs stabilised
- Contra-indication to LP

**Definitive Therapy (Expected)**

- Take over ventilation and ventilate to low normal carbia
- Call for Anaesthetic / PICU assistance
- Mannitol 0.5g/kg IV over 10 minutes.
- If stabilization obtained should get ready for CT scan

**Assessment Domains:**

RCPCH Standards	Level of Achievement		
	Good	Adequate	Poor
Effective skills in paediatric assessment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Knowledge of common and serious paediatric conditions and their management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Effective initial management of ill-health and clinical conditions in paediatrics, seeking additional advice and opinion as appropriate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Safe practical skills in paediatrics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advanced Neonatal and Paediatric Life Support Skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Effective communication and interpersonal skills with colleagues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## Scenario: Raised Intracranial Pressure - Infant

**Learning Objectives:** At the end of the session candidates should be able to:

1. **Assess a child with decreased level of consciousness**
2. **Know differential diagnosis for decreased LOC**
3. **Recognise signs of raised intracranial pressure**
4. **Know immediate medical management of a child with raised intracranial pressure**
5. **Have working differential diagnosis of reduced level of consciousness**
6. **Know contraindications for lumbar puncture in patient with altered level of consciousness**

### Faculty Script:

An six-month-old infant is referred to the Paediatric Assessment Unit by her GP. She was born at 25 weeks and is known to have hydrocephalus secondary to an intracranial haemorrhage. She has a right sided ventriculo-peritoneal shunt placed 10 weeks ago. She has been well since until the past 48 hours when she has been feeding less well and was slightly irritable yesterday. This morning she was difficult to rouse (P on AVPU scale)

This patient has a blocked/infected VP shunt. The candidates are expected to assess the patient in the **Assessment state** During their assessment over 5 minutes move to **Slow deterioration State**. Candidates are expected to manage patient including stabilisation whilst preparing for neuro imaging. If LP is attempted or there is delay in raised ICP management, move to **Peri – Arrest State** but **DO NOT** allow patient to arrest. Pause scenario and discuss prior to recommencing the scenario and allowing further management of patient.

### Patient Demographics:

**Name:** Gracie Jackson

**Gender:** F                      **Age:** 6 months                      **Weight:** 5 kg

### Candidate Brief:

#### Presenting History (Candidate Storyboard):

An six-month-old infant is referred to the Paediatric Assessment Unit by her GP. History of 48 hours feeding less well and was slightly irritable yesterday. This morning she was difficult to rouse (P on AVPU scale)

#### Previous Medical History:

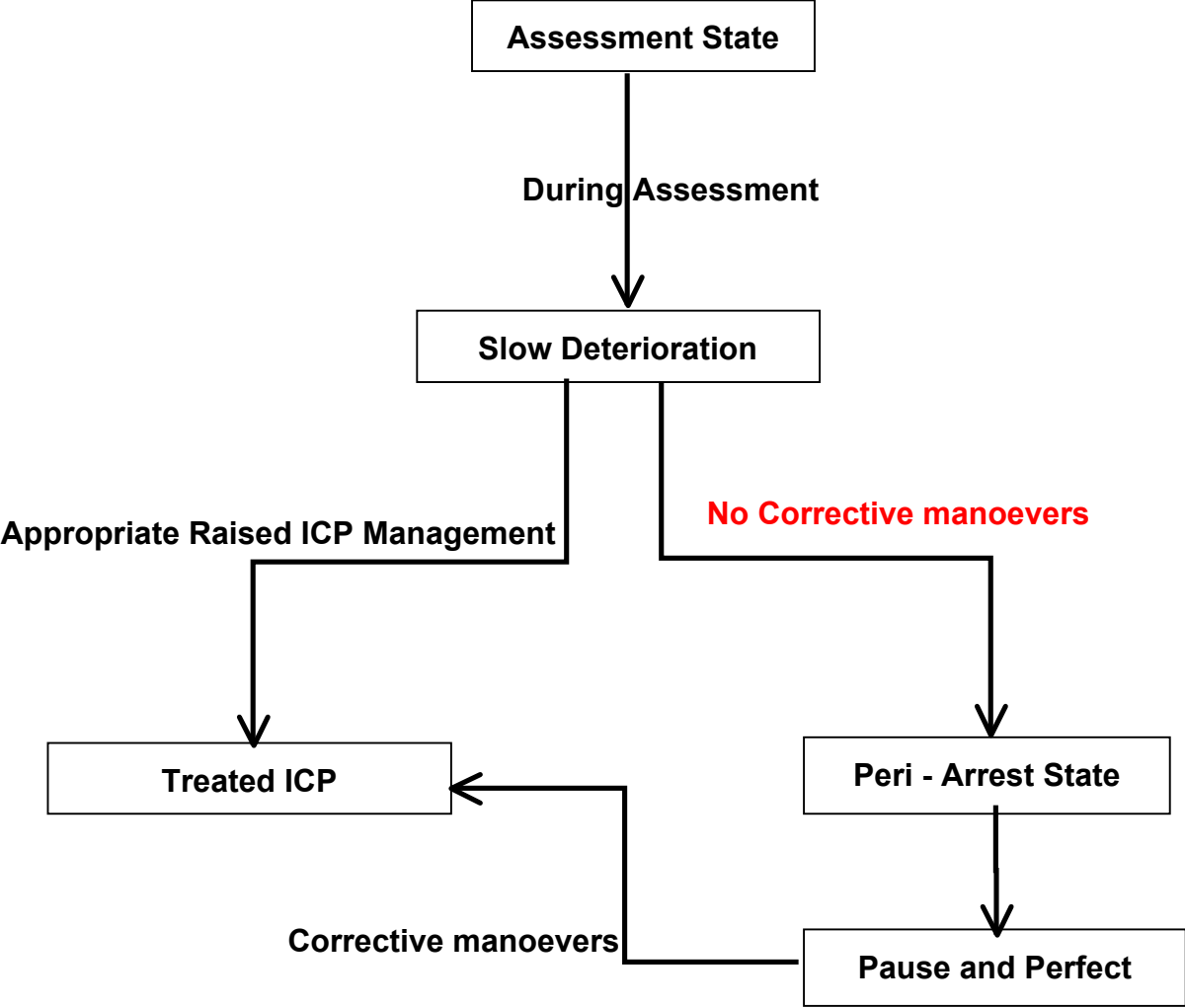
She was born at 25 weeks and is known to have hydrocephalus secondary to an intracranial haemorrhage. She has a right sided ventriculo-peritoneal shunt placed 10 weeks ago.

#### Family Medical History:

Nil of note



Flowchart of Scenario Progression:



**Scenario setup and preparation:**

**Faculty Recommended:** Director  **Control**   
 Actor/Confederate(s)   
 Roles: Parent  
 Nurse

If you have a multiprofessional group of candidate then you should have a multiprofessional faculty.

**Participants:**

**Medical Roles**                      **Nursing Roles**                      **AHP Roles**  
 Paediatric SHO

**Location:** Children’s Assessment Unit / Emergency Department

**Simulator:** Simbaby or alternative that has pupils that can change size

**Monitor Setup:** 3 wave format

**Monitor Parameters Required:**

ECG <input checked="" type="checkbox"/>	S <sub>a</sub> O <sub>2</sub> <input checked="" type="checkbox"/>	RR <input checked="" type="checkbox"/>	EtCO <sub>2</sub> <input type="checkbox"/>	NIBP <input checked="" type="checkbox"/>	ABP <input type="checkbox"/>
CVP <input type="checkbox"/>	PAP <input type="checkbox"/>	ICP <input type="checkbox"/>	CPP <input type="checkbox"/>	Temp (P) <input type="checkbox"/>	Temp (C) <input type="checkbox"/>
Other:					



## Equipment Checklist:

### Respiratory:

Nasal Cannula	<input type="checkbox"/>	O <sub>2</sub> Facemask	<input checked="" type="checkbox"/>	O <sub>2</sub> Reservoir Facemask	<input checked="" type="checkbox"/>
Headbox	<input type="checkbox"/>	Wafting O <sub>2</sub>	<input type="checkbox"/>	Nebuliser	<input type="checkbox"/>
Suction	<input type="checkbox"/>	Yankuer	<input type="checkbox"/>	Suction Catheter <input type="checkbox"/> size	FG
Self inflating Bag	<input checked="" type="checkbox"/>	Ayers T piece	<input checked="" type="checkbox"/>	Nasopharyngeal airway	<input type="checkbox"/>
Oropharyngeal Airway	<input checked="" type="checkbox"/>	LMA	<input type="checkbox"/>		
Intubated?	<input type="checkbox"/>	ETT position		length	0.00cm at
Respiratory Support		Non Invasive			
				➔ Settings:	
				Flow	l/min
				Insp O <sub>2</sub>	%
				PIP	
				PEEP	
		Invasive			
				➔ Settings:	
				iTime	sec
				Insp O <sub>2</sub>	%
				Rate	bpm
				PIP	
				PEEP	

### Vascular Access:

Line Type	Site
Peripheral (1)	R Brachial available when sited
Peripheral (2)	
Central Venous	
Arterial	
Intraosseous	Available when sited

### Other Medical Equipment:

Drug Chart	<input checked="" type="checkbox"/>	Emergency Drug Sheet	<input checked="" type="checkbox"/>	Blood gas Venous
Blood Results Sheet	<input checked="" type="checkbox"/>	X Rays		Imaging
Other Props:				
GP letter				
Neuro Observation Chart				



**IV Fluids:**

Setup	Fluid Type
Fluids Running	
Fluids Available (1)	0.9% Saline
Fluids Available (2)	Mannitol
Fluids Available (3)	5% Saline
Other Fluids	

**Medications: (route, dose/rate)**

Infusions (Running)	Dose	Running Rate (ml/hr)
Nil		

Infusions (Available)	Dose	Running Rate (ml/hr)

Bolus Drugs (Available)	Dose
Mannitol	0.5G/kg
Adrenaline 1:10 000	0.2ml
Atropine	400mcg
Antibiotics	
Thiopentone	2 -5mg/kg
Propofol	2mg/kg
Suxamethonium	2mg/kg
Pancuronium	100mcg/kg

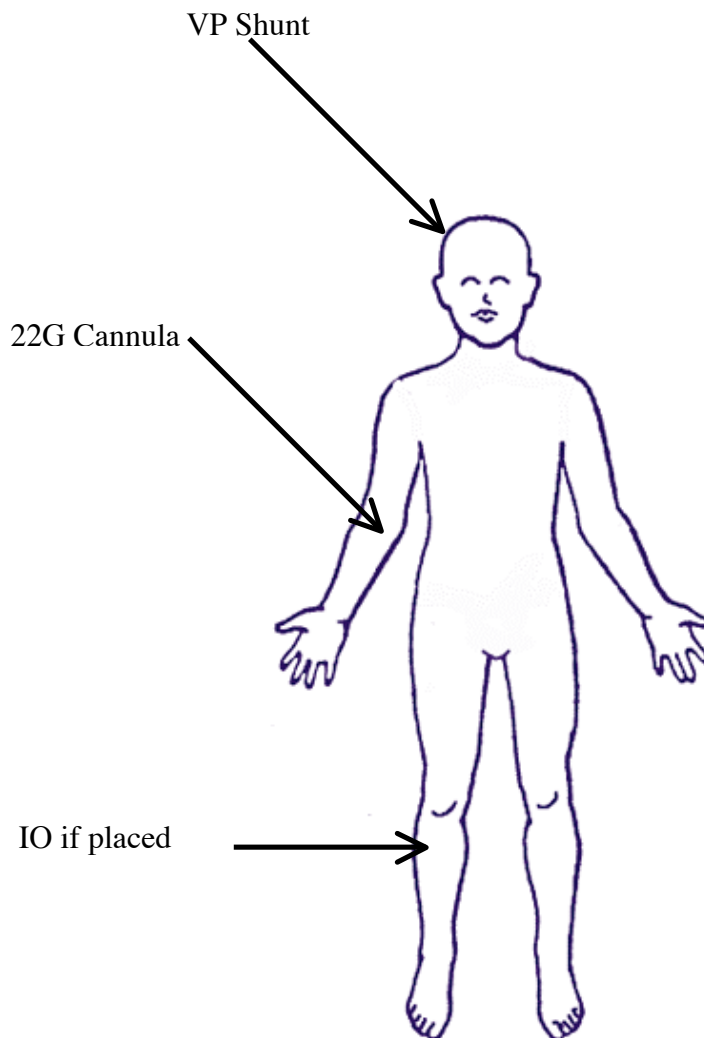




## Moulage:

Effect needed
R sided VP Shunt

Draw relevant equipment needed on diagram e.g. cannula, wounds etc.







### Scenario States:

Name of State	Assessment State	Duration									
<b>Vital Signs</b>											
Rhythm	SR	HR	120	SBP	90	DBP	48	CVP			
Resp Rate	20	SaO <sub>2</sub>	95	ETCO <sub>2</sub>		Temp	35.8	Other			
AVPU	U	GCS	8	Pupils	dilated L	ICP		NIRS			
<b>Assessment</b>											
Periph Pulses	normal	Cap refill	2 sec	Skin	no rash						
ECG/Heart	normal heart sounds										
Airway	normal			Breathing	normal						
Air entry	good			Breath sounds	Normal						
WOB	normal			Recession	none						
Neuro	Unresponsive			Renal		Hepatic					
Other	Dilated L pupil nonreactive										
<b>Results</b>											
Hb	12.2	WCC	22	PLT	36	HCT	0.36	CRP	220		
PH/ H+	7.19	PaCO <sub>2</sub>	61/ 8.1	PaO <sub>2</sub>	44/ 5.8	HCO <sub>3</sub>	21.6	BE	- 5.9	PH/ H+	7.19
Na <sup>2+</sup>	137	K <sup>+</sup>	4.4	Cl <sup>-</sup>	97	Ur	12.5	Cr	75	Na <sup>2+</sup>	137
Ca <sup>2+</sup>	2.6	Mg <sup>2+</sup>	0.6	PO <sub>4</sub> <sup>-</sup>	1.5						
<b>Expected Outcomes:</b>											
<b>Participants should:</b>	<ul style="list-style-type: none"> <li>• Brief history should be obtained.</li> <li>• Baby should be examined thoroughly.</li> <li>• Key features of examination:                             <ul style="list-style-type: none"> <li>○ Slightly low resp rate (and dropping) 20 breaths.min<sup>-1</sup></li> <li>○ Mildly bradycardic (and falling) 120 beats.min</li> <li>○ CRT normal</li> <li>○ NIBP 90/48</li> <li>○ Liver edge 2cm below costal margin</li> <li>○ Responding only to painful stimulus – becoming unresponsive</li> <li>○ L pupil larger than R.</li> </ul> </li> </ul>										
<b>Facilitators should:</b>	Give feedback on perfusion During the assessment move to <b>Slow Deterioration State</b>										





<b>Name of State</b>		<b>Slow Deterioration</b>				<b>Duration</b>					
<b>Vital Signs</b>											
<b>Rhythm</b>	SR	<b>HR</b>	96	<b>SBP</b>	110	<b>DBP</b>	56	<b>CVP</b>			
<b>Resp Rate</b>	16	<b>SaO<sub>2</sub></b>	88	<b>ETCO<sub>2</sub></b>		<b>Temp</b>	35.9	<b>Other</b>			
<b>AVPU</b>	U	<b>GCS</b>	8	<b>Pupils</b>	L dilated	<b>ICP</b>		<b>NIRS</b>			
<b>Assessment</b>											
<b>Periph Pulses</b>	normal		<b>Cap refill</b>	3		<b>Skin</b>	no rash				
<b>ECG/Heart</b>	Normal heart sounds										
<b>Airway</b>	clear			<b>Breathing</b>	shallow and bradipnoeic						
<b>Air entry</b>	reduced			<b>Breath sounds</b>	normal						
<b>WOB</b>	normal			<b>Recession</b>	none						
<b>Neuro</b>	Unresponsive			<b>Renal</b>			<b>Hepatic</b>				
<b>Other</b>	Dilated unresponsive L pupil										
<b>Results</b>											
<b>Hb</b>	12.2	<b>WCC</b>	22	<b>PLT</b>	36	<b>HCT</b>	0.36	<b>CRP</b>	220		
<b>PH/ H+</b>	7.19	<b>PaCO<sub>2</sub></b>	61/ 8.1	<b>PaO<sub>2</sub></b>	44/ 5.8	<b>HCO<sub>3</sub></b>	21.6	<b>BE</b>	- 5.9	<b>PH/ H+</b>	7.19
<b>Na<sup>2+</sup></b>	137	<b>K<sup>+</sup></b>	4.4	<b>Cl<sup>-</sup></b>	97	<b>Ur</b>	12.5	<b>Cr</b>	75	<b>Na<sup>2+</sup></b>	137
<b>Ca<sup>2+</sup></b>	2.6	<b>Mg<sup>2+</sup></b>	0.6	<b>PO<sub>4</sub><sup>-</sup></b>	1.5						
<b>Expected Outcomes:</b>											
<b>Participants should:</b>		<ul style="list-style-type: none"> <li>• Cardiovascular monitoring</li> <li>• Pulse oximetry</li> <li>• IV access</li> <li>• Laboratory investigations (to include U&amp;Es, FBC, blood and urine cultures)</li> <li>• Take over ventilation and ventilate to low normal carbia</li> <li>• Call for Anaesthetic / PICU assistance</li> <li>• Mannitol 0.5g/kg IV over 10 minutes.</li> <li>• If stabilization obtained should get ready for CT scan</li> </ul>									
<b>Facilitators should:</b>		If candidate still does not take appropriate corrective measures or attempts to perform and LP, move to <b>Peri – Arrest State</b> .									





<b>Name of State</b>		Peri - Arrest				<b>Duration</b>					
<b>Vital Signs</b>											
<b>Rhythm</b>	SR	<b>HR</b>	44	<b>SBP</b>	45	<b>DBP</b>	16	<b>CVP</b>			
<b>Resp Rate</b>	apnoeic	<b>SaO<sub>2</sub></b>	no trace	<b>ETCO<sub>2</sub></b>		<b>Temp</b>	35.5	<b>Other</b>			
<b>AVPU</b>	U	<b>GCS</b>	8	<b>Pupils</b>	L dilated	<b>ICP</b>		<b>NIRS</b>			
<b>Assessment</b>											
<b>Periph Pulses</b>	Good		<b>Cap refill</b>	3 - 4		<b>Skin</b>	mottled				
<b>ECG/Heart</b>	Normal heart sounds										
<b>Airway</b>	clear			<b>Breathing</b>	apnoeic						
<b>Air entry</b>	none			<b>Breath sounds</b>	none						
<b>WOB</b>	normal			<b>Recession</b>	none						
<b>Neuro</b>	Unresponsive			<b>Renal</b>			<b>Hepatic</b>				
<b>Other</b>	Dilated unresponsive R pupil										
<b>Results</b>											
<b>Hb</b>	12.2	<b>WCC</b>	22	<b>PLT</b>	36	<b>HCT</b>	0.36	<b>CRP</b>	220		
<b>PH/ H+</b>	7.19	<b>PaCO<sub>2</sub></b>	61/ 8.1	<b>PaO<sub>2</sub></b>	44/ 5.8	<b>HCO<sub>3</sub></b>	21.6	<b>BE</b>	- 5.9	<b>PH/ H+</b>	7.19
<b>Na<sup>2+</sup></b>	137	<b>K<sup>+</sup></b>	4.4	<b>Cl<sup>-</sup></b>	97	<b>Ur</b>	12.5	<b>Cr</b>	75	<b>Na<sup>2+</sup></b>	137
<b>Ca<sup>2+</sup></b>	2.6	<b>Mg<sup>2+</sup></b>	0.6	<b>PO<sub>4</sub><sup>-</sup></b>	1.5						
<b>Expected Outcomes:</b>											
<b>Participants should:</b>											
<b>Facilitators should:</b>	Pause scenario and review progress or lack of improvement whilst identifying potential interventions before restrtng scenario and allowing them to manage patient.										





<b>Name of State</b>		<b>Treated ICP</b>				<b>Duration</b>					
<b>Vital Signs</b>											
<b>Rhythm</b>	SR	<b>HR</b>	145	<b>SBP</b>	95	<b>DBP</b>	56	<b>CVP</b>			
<b>Resp Rate</b>	bagged	<b>SaO<sub>2</sub></b>	96	<b>ETCO<sub>2</sub></b>		<b>Temp</b>	35.3	<b>Other</b>			
<b>AVPU</b>	A	<b>GCS</b>	15	<b>Pupils</b>	4 ERL	<b>ICP</b>		<b>NIRS</b>			
<b>Assessment</b>											
<b>Periph Pulses</b>	Good		<b>Cap refill</b>	2		<b>Skin</b>	no rash				
<b>ECG/Heart</b>	Normal heart sounds										
<b>Airway</b>	clear			<b>Breathing</b>	bagged						
<b>Air entry</b>	good			<b>Breath sounds</b>	normal						
<b>WOB</b>	normal			<b>Recession</b>	none						
<b>Neuro</b>	Pain responsive			<b>Renal</b>			<b>Hepatic</b>				
<b>Other</b>	Pupils equal										
<b>Results</b>											
<b>Hb</b>		<b>WCC</b>		<b>PLT</b>		<b>HCT</b>		<b>CRP</b>			
<b>PH/ H+</b>	7.28	<b>PaCO<sub>2</sub></b>	32 /4.2	<b>PaO<sub>2</sub></b>	45 / 6	<b>HCO<sub>3</sub></b>	12	<b>BE</b>	- 18	<b>Lactate</b>	2
<b>Na<sup>2+</sup></b>	135	<b>K<sup>+</sup></b>	4.4	<b>Cl<sup>-</sup></b>	92	<b>Ur</b>		<b>Cr</b>		<b>Glucose</b>	
<b>Ca<sup>2+</sup></b>		<b>Mg<sup>2+</sup></b>		<b>PO<sub>4</sub><sup>-</sup></b>							
<b>Expected Outcomes:</b>											
<b>Participants should:</b>	<ul style="list-style-type: none"> <li>• Candidates should consider blocked shunt. Other differentials would include infection, incl meningitis.</li> <li>• CT scan urgently once vital signs stabilised</li> <li>• Contra-indication to LP</li> </ul>										
<b>Facilitators should:</b>											



## Educational Material:

In any child seen with altered level of consciousness raised ICP needs to be considered in the differential. In general the child is more likely to come to harm due to raised ICP than the underlying condition.

Etiology of raised intracranial pressure	
Pathological process	Examples
<b>Localised mass lesions</b>	Traumatic haematomas (extradural, subdural, intracerebral) Neoplasms (primary or metastasis) Abscess Focal oedema secondary to trauma, infarction, tumour
<b>Disturbance of CSF circulation</b>	Obstructive hydrocephalus (blocked shunt) Communicating hydrocephalus
<b>Obstruction major venous sinus</b>	Depressed fractures overlying major venous sinuses Cerebral venous thrombosis
<b>Diffuse brain oedema or swelling</b>	Encephalitis, meningitis, diffuse head injury, subarachnoid hemorrhage, Reye's syndrome, lead encephalopathy, near drowning
<b>Idiopathic</b>	Benign intracranial hypertension

### Diagnosis

Raised intracranial pressure (ICP) may develop insidiously or present acutely as a result of a wide range of pathologies.

The signs and symptoms of raised ICP vary with age.

Classical symptoms include;

- Headache Classically morning headache present on waking
- Headache that wakes patient from sleep is also very suspicious
- Vomiting
- Visual disturbance
- Change in behaviour or mood
- Fluctuating level of consciousness
- Ataxia or other motor disturbance
- Abnormal pupils (may be noted by relatives)
- Seizures

Mild or chronically raised ICP may produce subtle signs and it is important to have a high index of suspicion and take a thorough history in children at risk.

Severely raised ICP is indicated by the following signs and symptoms

- Cushing's response (bradycardia and hypertension)
  - This is a pre-terminal sign due to impending herniation of the brainstem requiring immediate action (neurosurgical review and likely scan).

- Papilledema (late sign) in the presence of any decrease in conscious level
  - This constitutes an emergency and immediate help should be sought with managing the patient.
- Sunsetting – eyes deviated medially and inferiorly
  - Signifies critically raised intracranial pressure. Requires immediate action (scan and neurosurgical review).

If any of the following are present, investigation and management (in conjunction with paediatric Intensivists and neurosurgeons) as to the cause of the problem should be urgently undertaken:

- Conscious level reduced to GCS  $\leq 8$  (or responding to Pain or less on the AVPU scale)
- Abnormal respiratory pattern (hyperventilation, irregular resps or apnoeas).
- Abnormal pupils (unilaterally or bilaterally dilated or unresponsive pupils).
- Abnormal posture (decorticate, decerebrate or complete flaccidity)
- Abnormal doll's eyes (oculocephalic) response

## Management

The immediate management of raised ICP is aimed at preventing further brain injury whilst the underlying cause is identified and definitive management instituted.

- Assess and manage A,B,C, D. Provide high flow oxygen
- Document GCS initially and frequently reassess
- Take blood for full blood count, clotting and electrolytes
- Check blood sugar and capillary blood gas. Manage glucose abnormalities.
- Take paired urine/blood sample for **urgent** assessment of osmolality. (This may help differentiate cause of the raised ICP.)
- Tilt patient 20–30° head up.
- Consider **Mannitol** if cause is likely to be related to head injury, intra-cranial bleed or fungal infection.
  - 0.25 g/kg IV over 30 minutes = 1.25 ml/kg of 20% solution.
  - May need to be repeated
  - May be contraindicated in some patients – discuss before use
- Prescribe antibiotics +/- antivirals +/- antifungals if any suspicion of infection
- Prescribe antipyretics if febrile

Urgent contrast enhanced CT scanning is needed once patient has been resuscitated and is stable. CT scanning cannot diagnose raised intracranial pressure, but may indicate the cause of the clinically defined problem.

MRI may subsequently be required to define further the nature of any problem that has been identified. An out-of-hours MRI is rarely necessary.

**DO NOT PERFORM LP IN CHILD WITH REDUCED LEVEL OF CONCIIOUSNESS UNLESS A SCAN HAS EXCLUDED A BRAIN LESION AND DISCUSSED WITH CONSULTANT.**



*A caring practice*  
Everywood Medical Practice  
Bristol  
BS6 6DJ  
Tel: 0117 8928973  
Fax: 0117 8928975

Regarding: Gracie Jackson

6months old

5kg

Dear Doctor

Thank you for reviewing young Gracie. She was brought to our practice today with a 48hour history of not feeding well and being slightly irritable yesterday. Her Mum says she felt "a bit hot" overnight. This morning she was difficult to rouse and she was only responding to voice with me in our surgery.

Gracie was born at 25weeks and is known to have had hydrocephalus secondary to intra-ventricular haemorrhage for which she had a right-sided ventriculo-peritoneal shunt placed 10 weeks ago. She is has been well since the procedure. She has not had any immunisations as yet.

I am unsure as to what is causing her to be unwell but was concerned that she was so drowsy.

Yours Sincerely

Dr M Bigstone

GP



*A caring practice*  
Everywood Medical Practice  
Bristol  
BS6 6DJ  
Tel: 0117 8928973 Fax: 0117 8928975

## Neurological Observation Chart

Name:		CR Number:												
Date														
Time														
COMA SCALE	Eyes Open	Eye opening 4												
		Eye opening 3												
		Eye opening 2												
		Eye opening 1												
	Best verbal/grimace	Verb/Grim 5												
		Verb/Grim 4												
		Verb/Grim 3												
		Verb/Grim 2												
		Verb/Grim 1												
	Best motor (Best arm)	Motor 6												
		Motor 5												
		Motor 4												
		Motor 3												
		Motor 2												
		Motor 1												
Coma Score out of 15														
● ● ● ● ● ● ● ●	1	40											40	
		39.5											39.5	
		Temperature	38.5											38.5
			37.5											37.5
	2	36.5											36.5	
		35.5											35.5	
	● ● ● ● ● ● ●	4	200											200
			180											180
BP			160											160
			140											140
5		120											120	
		100											100	
		80											80	
6	Pulse	60											60	
		40											40	
		20											20	
7	8	Oxygen sats												
		Capillary refill												
PUPILS	Right	Size											+ reaction - no reaction S - sluggish C - closed	
	Reaction													
Left	Size													
	Reaction													
LIMBS	Arms	Normal power											Record Right (R) & Left (L) seperately if different	
		Mild weakness												
		Severe weakness												
		Spontaneously												
		Painful stimuli												
	No response													
	Legs	Normal power											Record strength & move	
		Mild weakness												
		Severe weakness												
		Spontaneously												
Painful stimuli														
No response														



# Bristol PICU Drug Sheet

Name	Gracie Jackson		
Date of Birth		March	2010
Weight	5 kg	Height	
Age	6months		
(SA estimated from weight alone. Enter height for accurate SA)			



Resuscitation Doses	
Adenosine	0.17 ml (100 mcg/kg). Can use up to 0.42ml (250mcg/kg)
Adrenaline	0.5 ml 1:10000 (subsequent doses 1:10000)
Atropine	100 mcg (20 mcg/kg) = 0.17 ml (600mcg/ml)
Bicarb 8.4%	5 mmol - give and reassess (5 ml of 8.4%)
Ca Gluc 10%	2.5 ml - give and reassess
Lignocaine	5 mg (1mg/kg) = 0.5 ml of 1%
Naloxone	50 mcg (10 mcg/kg) = 0.13 ml (400mcg/ml)

100% fluid requirement = 20 ml/hr

Sedation Infusions		Standard Regime	Calculation	1 ml/hr =
Morphine	1mg/kg	made up to 50ml with Dex 5% / Saline 0.9%	5 mg/50ml	20 mcg/kg/hr
Midazolam	5mg/kg	made up to 50ml with Dex 5% / Saline 0.9%	25 mg/50ml	100 mcg/kg/hr
Vecuronium	3mg/kg	made up to 50ml with Dex 5% / Saline 0.9%	15 mg/50ml	60 mcg/kg/hr
Atracurium	15mg/kg	made up to 50ml with Dex 5% / Saline 0.9%	75 mg/50ml	300 mcg/kg/hr
Fent/Vec	Mix 10	mg Vecuronium in 20ml Fentanyl (50 mcg/ml)	0.5 to 1 ml/hr	
Fentanyl	neat	(50mcg/ml)	0.5 to 1 ml/hr (5 to 10 mcg/kg/hr)	
Thiopentone	neat	(25mg/ml) Bolus: 5mg/kg = 1 ml	Infusion: 0.2 to 1.2 ml/hr (1 to 6 mg/kg/hr)	

Cardiac Infusions		Standard Regime	Calculation	1 ml/hr =
Dopamine	15mg/kg	made up to 50ml with Dex 5% / Saline 0.9%	75 mg/50ml	5 mcg/kg/min
Dobutamine	15mg/kg	made up to 50ml with Dex 5% / Saline 0.9%	75 mg/50ml	5 mcg/kg/min
Adrenaline	0.3mg/kg	made up to 50ml with Dex 5% / Saline 0.9%	1.5 mg/50ml	0.1 mcg/kg/min
Noradrenaline	0.3mg/kg	made up to 50ml with Dex 5% / Saline 0.9%	1.5 mg/50ml	0.1 mcg/kg/min
Argipressin	3 Units/kg	made up to 50ml with Dex 5% / Saline 0.9%	15.0 U/50ml	0.001 U/kg/min
Milrinone	1.5mg/kg	made up to 50ml with Dex 5% / Saline 0.9%	7.5 mg/50ml	0.5 mcg/kg/min
Dinoprostone (PGE2 / Prostaglandin)	30mcg/kg	made up to 50ml with Dex 5% / Saline 0.9%	150 mcg/50ml	10 ng/kg/min
Epoprostenol (Prostacyclin)	30mcg/kg	made up to 50ml with Saline 0.9%	150 mcg/50ml	10 ng/kg/min
SNP	3mg/kg	made up to 50ml with Dex 5%	15 mg/50ml	1.0 mcg/kg/min
GTN	3mg/kg	made up to 50ml with Dex 5% / Saline 0.9%	15 mg/50ml	1.0 mcg/kg/min
Amiodarone	30mg/kg	made up to 50ml with Dex 5% only	150 mg/50ml	10 mcg/kg/min
Lignocaine	neat	1% Lignocaine	0.3 to 1.5 ml/hr	(0.5 - 3.0 mg/kg/hr)
High K+	20mmol	made up to 40ml with Saline 0.9%	1 to 2.5 ml/hr	(0.1 - 0.25 mmol/kg/hr)

Bronchodilators		Standard Regime	Calculation
<b>Peripheral</b>			
Salbutamol	10 mg	made up to 50ml with Dex 5% / Saline 0.9%	0.3 ml/kg/hr = 1mcg/kg/min Run at 1ml/kg/hr
Aminophylline	500 mg	made up to 500ml with Dex 5% / Saline 0.9%	
<b>Central</b>			
Salbutamol	3mg/kg	made up to 50ml with Dex 5% / Saline 0.9%	15 mg/50ml
Aminophylline	50mg/kg	made up to 50ml with Dex 5% / Saline 0.9%	250 mg/50ml

Bolus Drugs		Intubation Drugs	
Aciclovir	50 mg	Atropine	100 mcg (20 mcg/kg) (0.17 ml)
Adenosine	0.25 mg, to max 1.25mg	Fentanyl	25 mcg (5 mcg/kg) (0.5 ml)
Ceftriaxone	400 mg (80mg/kg, 12h)	Ketamine	10 mg (2mg/kg) (1 ml)
Dex 10%	25 ml bolus for hypoglycaemia	Midazolam	0.5 mg (100mcg/kg) (0.1 ml)
Lorazepam	0.5 mg	Pancuronium	0.5 mg (100mcg/kg) (0.25 ml)
Mannitol	13 ml of 20% = 0.5g/kg	Propofol	0.5 ml of 1% = 1mg/kg
Mg SO4 50%	1.0 ml, slow iv	Suxamethonium	10 mg (2mg/kg) (0.2 ml)
Phenobarb	75 mg, iv over 30 mins	Thiopentone	1 ml = 5 mg/kg
Phenytoin	90 mg, iv over 30 mins	Vecuronium	0.5 mg (100mcg/kg) (0.3 ml)

**Name: Gracie Jackson**  
**Request: 123-456**

Serum/plasma

Magnesium	0.60	mmol/L	(0.70-1.00)
Calcium	2.10	mmol/L	(2.25-2.80)
Calcium (corrected)	2.60	mmol/L	(2.25-2.80)
Phosphate	1.50	mmol/L	(1.30-2.00)
Bilirubin	12	umol/L	(< 17)
Alkaline phosphatase	175	IU/L	(70-250)
Alanine aminotransferase	35	IU/L	(5-40)
Total protein	46	g/L	(62-80)
Albumin	20	g/L	(29-55)
Globulin	26	g/L	(22-36)

Serum/plasma

Creatinine	75	umol/L	(28-60)
Urea	12.50	mmol/L	(1.4-5.4)
Sodium	137	mmol/L	(133-143)
Potassium	4.60	mmol/L	(3.7-5.2)
Chloride	97	mmol/L	(95-105)
Bicarbonate	21	mmol/L	(21-34)
Anion gap	24	mmol/L	(6-14)
C-reactive protein	220	mg/L	(< 10)

COAGULATION SCREEN

Prothrombin time	18.00	s	(9.5-12.0)
INR	1.50		
Aptt time	63.00	s	(20.0-45.0)
Aptt ratio	1.60		

Hb:12.20g/dL (11.5-16.5) Plt:36 10\*9/L(150-400) Wbc: 22.00 10\*9/L(5.00-19.00)

Rbc	10*12/L	:	4.60	(3.00-5.40)	Neut	10*9/L	:	18.40	(3.00-9.00)
Hct	l/l	:	0.36	(0.33-0.53)	Lymp	10*9/L	:	2.80	(3.00-16.00)
MCV	fL	:	98.0	(92.0-116.0)	Mono	10*9/L	:	1.00	(0.30-1.00)
MCH	pg	:	32.0	(30.0-36.0)	Eosi	10*9/L	:	0.00	(0.20-1.00)
MCHC	g/dL	:	35.0	(29.0-37.0)	Baso	10*9/L	:	0.00	(< 0.11)
Hypo	%	:	2.00						

# Rapidsystems™

## VENOUS SAMPLE

1:00

System Name Emergency Dept

System ID 2376-25327

Patient ID 1483564N

Last Name Jackson

Operator JONESR

ACID/BASE	37.0	°C
pH	7.19	
pCO <sub>2</sub>	61.3	mmHg
pO <sub>2</sub>	43.7	mmHg
HCO <sub>3</sub> - act	22.7	mmol / L
HCO <sub>3</sub> - std	21.6	mmol / L
BE (B)	-5.9	mmol / L
BE (ecf)	-6.2	mmol / L

## CO-OXIMETRY

Hct	38.3	%
tHb	12.4	g / dL
sO <sub>2</sub>	60.7	%
FO <sub>2</sub> Hb	80.3	%
FCOHb	17.7	%
FMetHb	1.2	%
FHHb		%

OXYGEN STATUS	37.0	°C
ctO2(a)		mL/dL

## ELECTROLYTES

Na <sup>+</sup>	137.0	mmol / L
K <sup>+</sup>	4.4	mmol / L
Ca <sup>++</sup>	1.1	mmol / L
Cl <sup>-</sup>	97.0	mmol / L

## METABOLITES

Glu	14.6	mmol / L
Lac	1.7	mmol / L

pAtm	754	mmHg
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# Rapidsystems™

## VENOUS SAMPLE

1:00

System Name Emergency Dept

System ID 2376-25327

Patient ID 1483564N

Last Name Jackson

Operator JONESR

ACID/BASE	37.0	°C
pH	7.19	
pCO <sub>2</sub>	8.1	kPa
pO <sub>2</sub>	5.8	kPa
HCO <sub>3</sub> <sup>-</sup> - act	22.7	mmol / L
HCO <sub>3</sub> <sup>-</sup> - std	21.6	mmol / L
BE (B)	-5.9	mmol / L
BE (ecf)	-6.2	mmol / L

## CO-OXIMETRY

Hct	38.3	%
tHb	12.4	g / dL
sO <sub>2</sub>	60.7	%
FO <sub>2</sub> Hb	80.3	%
FCOHb	17.7	%
FMetHb	1.2	%
FHHb		%

OXYGEN STATUS	37.0	°C
ctO2(a)		mL/dL

## ELECTROLYTES

Na <sup>+</sup>	137.0	mmol / L
K <sup>+</sup>	4.4	mmol / L
Ca <sup>++</sup>	1.1	mmol / L
Cl <sup>-</sup>	97.0	mmol / L

## METABOLITES

Glu	14.6	mmol / L
Lac	1.7	mmol / L

pAtm	754	mmHg
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