Neonatal stabilisation for retrieval V6

Clinical Guideline Presentation

45 minutes
Towards CPD Hours
Objectives

- Outline the indications for neonatal transfer/retrieval
- Identify the principles of neonatal stabilisation and resuscitation
- Identify and manage deterioration
- Outline parental support recommendations
# Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BGL</td>
<td>Blood glucose level</td>
</tr>
<tr>
<td>CPAP</td>
<td>Continuous positive airway pressure</td>
</tr>
<tr>
<td>ECG</td>
<td>Electrocardiogram</td>
</tr>
<tr>
<td>ETT</td>
<td>Endotracheal tube</td>
</tr>
<tr>
<td>FBC</td>
<td>Full blood count</td>
</tr>
<tr>
<td>HIE</td>
<td>Hypoxic ischaemic encephalopathy</td>
</tr>
<tr>
<td>IPPV</td>
<td>Intermittent positive pressure ventilation</td>
</tr>
<tr>
<td>IV</td>
<td>Intravascular</td>
</tr>
<tr>
<td>LBW</td>
<td>Low birth weight</td>
</tr>
<tr>
<td>NBM</td>
<td>Nil by mouth</td>
</tr>
<tr>
<td>PEEP</td>
<td>Positive end expiratory pressure</td>
</tr>
<tr>
<td>PIP</td>
<td>Peak inspiratory pressure</td>
</tr>
<tr>
<td>PIVC</td>
<td>Peripheral intravenous access</td>
</tr>
<tr>
<td>RSI</td>
<td>Rapid sequence induction</td>
</tr>
<tr>
<td>RSQ</td>
<td>Retrieval Services Queensland</td>
</tr>
<tr>
<td>SpO₂</td>
<td>Capillary peripheral oxygen saturation</td>
</tr>
<tr>
<td>UVC</td>
<td>Umbilical vein catheter</td>
</tr>
<tr>
<td>≤</td>
<td>Less than or equal to</td>
</tr>
<tr>
<td>&lt;</td>
<td>Less than</td>
</tr>
<tr>
<td>&gt;</td>
<td>Greater than</td>
</tr>
</tbody>
</table>
Indications for transfer/retrieval

Transfer or retrieval may be indicated when the clinical care of the baby exceeds the capability of the local facility

Antenatal considerations

Fetal
• Congenital anomaly
• Multiple pregnancy
• Fetal growth restriction

Maternal
• Preterm labour
• Antepartum haemorrhage
• Prelabour rupture of membranes
Indications for transfer/retrieval

Postnatal considerations:

- Apgar ≤ 6 at 5 mins of age
- Prematurity or low birth weight (LBW)
- Respiratory conditions
- Seizures
- Hypoxic ischaemic encephalopathy (HIE)
- Hypoglycaemia
- Sepsis
- Persistent hypothermia
- Conditions requiring specialty management
Contact **RSQ early** to speak to the coordinating neonatologist (or obstetrician) for:

- **Advice** and/or
- **Retrieval/transfer of pregnant woman or baby**

*Note: Depending on the circumstance, the neonatal retrieval team may be activated prior to the baby’s birth*
Neonatal stabilisation principles

- Identify immediate needs
- Establish and maintain communication with parents and RSQ
- Stabilise and prevent deterioration
- Identify and initiate diagnostic investigations
Anticipate and plan

Initial management is critical for long term outcomes

Identify risks and make a plan

Assess clinical service capability

Prepare for birth of preterm or unwell neonate

Call RSQ for advice and/or support early
Resuscitation

Preparation is KEY

**Staff**
- Skilled in neonatal resuscitation
- Familiar with equipment
- Roles allocated

**Equipment**
- Checked, complete and operational
- Appropriately sized and readily available
- Refer to ‘Neonatal resuscitation trolley checklist’

**Environment**
- Free from clutter
- Preheated overhead radiant warmer—in a draft free position
- Warmed room—increase temperature if indicated (e.g. preterm baby)
Thermoregulation

Preterm babies (especially < 28 weeks) require additional measures to prevent heat loss

Considerations:
• Prewarm environment and equipment
  • Birth room (26 °C)
  • Radiant warmer
  • Blankets and hat
  • Polyethylene bag or sheet
  • Humidified respiratory support (if available)
• Check baby’s temperature to ensure remains normothermic

Normal temperature 36.5 °C - 37.5 °C
Signs of respiratory distress

Increased work of breathing
- Tachypnoea
- Apnoeic episode/s
- Chest recession (sternal, intercostal or subcostal)
- Nasal flaring
- Audible expiratory grunt

Oxygen requirement
- > 30% to maintain SpO₂

Respiratory distress is an indication that continuous positive airways pressure (CPAP) may be required
Commencing CPAP

Commence CPAP at 6–8 cm H₂O

Set flow at lowest level to achieve pressure

Deliver warm humidified air/oxygen mix (37 °C)

Deliver oxygen to maintain target oxygen saturations
CPAP

CPAP can be delivered by:

• Flow-inflating bag and mask
• T-piece device and mask
• Bi-nasal prongs
• Single nasopharyngeal tube
• Nasal mask
• Bubble CPAP device
• Ventilator

Refer to Queensland Clinical Guidelines - Respiratory distress and CPAP
### Indications for IPPV

<table>
<thead>
<tr>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>No spontaneous respirations OR spontaneous respirations not sustained</td>
</tr>
<tr>
<td>Increased or worsening signs of respiratory distress (while on CPAP 8 cm H20)</td>
</tr>
<tr>
<td>Oxygen requirement &gt; 40%</td>
</tr>
<tr>
<td>Poor gas exchange</td>
</tr>
<tr>
<td>Blood gas pH &lt; 7.25 and/or PaCO₂ &gt; 60 mmHg</td>
</tr>
</tbody>
</table>
# Intubation and ventilation

<table>
<thead>
<tr>
<th>Consider difficult airway plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consider rapid sequence induction (RSI)</td>
</tr>
<tr>
<td>Use appropriate size and depth of endotracheal tube (ETT)</td>
</tr>
<tr>
<td>Provide warmed humidified gases at 37 °C</td>
</tr>
</tbody>
</table>

**Set pressures:**
- Positive inspiratory pressure (PIP) 18–20 cmH₂O
- Positive end expiratory pressure (PEEP) 6–8 cmH₂O

**Set inspiratory time** 0.3–0.4 seconds

**Adjust rate** 40–60 breaths per minute

**Deliver oxygen concentration to maintain target oxygen saturations**

**Adjust settings to achieve physiological chest movement**
Surfactant

• Consider if baby:
  o Has signs of respiratory distress requiring IPPV in the first 24 hours of life
  o Is ≤ 32 weeks gestation
  o Has respiratory distress syndrome
• Warm to room temperature prior to administration via ETT
• Continue to provide IPPV until retrieval team arrive
Clinical support

All babies requiring retrieval/transfer require:

**Intravascular access**

- Skin preparation for babies ≤ 28 weeks and/or ≤ 1000 grams—use aqueous chlorhexidine 0.1% (if available)
- Commence IV maintenance fluids—glucose 10%

**Nil by mouth (as advised)**

- Insert gastric tube size 6 or 8 Fr (orogastric if respiratory distress)
  - Leave on free drainage
  - Aspirate 4-6 hourly (unless otherwise indicated)

**Developmental care and comfort**

- Consider developmental care—positioning, handling, environmental stimuli and encourage parental contact
# Fluid requirements

Commence IV maintenance infusion:

- Glucose 10%
- Total fluid intake to include all fluids infused (maintenance and support medicines)

<table>
<thead>
<tr>
<th></th>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
<th>&gt; Day 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preterm</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mL/kg/day</td>
<td>80</td>
<td>100</td>
<td>120</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td><strong>Term</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mL/kg/day</td>
<td>60</td>
<td>80</td>
<td>100</td>
<td>120</td>
<td>120</td>
</tr>
</tbody>
</table>

*Note: If the baby is older than 24 hours—consider sodium levels and weight gain/loss*
**BGL monitoring**

**Measure** when IV access obtained

**Maintain BGL**

- If < 2.6 mmol/L refer to QCG Hypoglycaemia guideline

<table>
<thead>
<tr>
<th>Hours of age</th>
<th>Target BGL (mmol/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–48 hours</td>
<td>2.6 or more</td>
</tr>
<tr>
<td>After 48 hours to 96 hours</td>
<td>3.0 or more</td>
</tr>
<tr>
<td>After 96 hours</td>
<td>3.5 or more</td>
</tr>
</tbody>
</table>

Refer to Queensland Clinical Guideline *Hypoglycaemia–newborn*
Investigations

Suspect sepsis in all unwell babies

• Collect:
  ◦ Blood culture (1 mL if possible)
  ◦ Full blood count

• Commence antibiotics as soon as possible
  ◦ If sepsis is clinically suspected and unable to gain IV/UVC access, consider administering antibiotics by intramuscular (IM) injection

• Chest X-ray

• Other investigations as indicated
  ◦ Blood gas analysis

Note: If unable to collect blood culture or FBC, do not delay administration of antibiotics
Observations and monitoring

Monitor continuously:
Heart rate, respirations, oxygen saturations

Document vital signs:
Hourly (or more frequently if clinically indicated)

Blood pressure:
Baseline (and as clinically indicated)

Temperature:
Skin—continuous (if available)
Per axilla—at least 4 hourly (if within normal limits)
Oxygen saturations

**Preductal** oxygen saturation sensor (right hand or arm)

**Monitor** oxygen requirements

**Target** oxygen saturations
- Term: 92–98%
- Preterm: 90–95%
Cardiovascular compromise

Management will vary according to underlying pathophysiology

Clinical signs
- Hypotension (if mean arterial BP < gestational age in weeks)
- Pallor/mottled skin
- Tachycardia
- Central capillary refill > 2 seconds
- Metabolic acidosis
- Blood loss
- Decreased urine output

⚠️ Caution: Avoid rapid infusion in preterm baby

Treatment
- Volume expander
  - 0.9% sodium chloride 10 mL/kg IV or UVC
- If required, discuss repeat dose/s with neonatologist
- Continue maintenance fluids

Blood loss
- Use CMV negative, irradiated, cross matched blood
  - If unavailable, use emergency O Rh negative blood

If hypotension persists, contact RSQ for advice from a neonatologist. Inotropic support may be required.
Hypoxic-ischemic encephalopathy (HIE)

- Reduced level of consciousness
- Seizures
- Difficulty in initiating and maintaining respiration
- Depression of tone and reflexes

HIE often presents as an abnormal neurological assessment

If HIE is suspected:
- Contact RSQ immediately to speak with a neonatologist for advice
- Commence hourly SARNAT scoring as soon as possible after birth until 6 hours of age

Criteria for therapeutic cooling:
- Evidence of perinatal/intrapartum hypoxia
  - $\geq 35$ weeks
  - $\geq 1800$ grams
  - $< 6$ hours of age

Improved outcome if treatment includes therapeutic hypothermia.
Aim: To minimise pain during procedures and to assist baby cope and recover

Administer analgesia, sedation and comfort measures appropriate to the intervention

**Nonpharmacological**
- Breast milk
- Skin to skin contact
- Non-nutritive suck
- Swaddling/containment
- Noise and light reduction

**Pharmacological**
- Oral sucrose
- Paracetamol
- Morphine
- Local anaesthetic
While waiting for the retrieval team

<table>
<thead>
<tr>
<th>Clinical</th>
<th>Developmental</th>
<th>Hygiene and comfort</th>
</tr>
</thead>
<tbody>
<tr>
<td>• IV access</td>
<td>• Position baby to provide:</td>
<td>• Perform 4–6 hourly:</td>
</tr>
<tr>
<td>• Commence IV fluids</td>
<td>o Flexion</td>
<td>o Nappy change</td>
</tr>
<tr>
<td>• NBM</td>
<td>o Containment</td>
<td>o Mouth care</td>
</tr>
<tr>
<td>• Gastric tube</td>
<td>o Midline alignment</td>
<td>o Position change</td>
</tr>
<tr>
<td>o Free drainage</td>
<td>• Reduce noise and light</td>
<td>o Oxygen saturation sensor repositioning</td>
</tr>
<tr>
<td>o Aspirate 4–6 hourly</td>
<td>• Encourage parental contact</td>
<td></td>
</tr>
</tbody>
</table>

Queensland Clinical Guidelines: Neonatal stabilisation for retrieval
Retrieval team

On arrival the retrieval team will require:

- Clinical handover
- Space and power points for retrieval cot
- Air and oxygen supply
- Procedure trolley
- Assistance until departure
- 2 copies of documentation
- EBM–labelled and packed in esky
- Amenities +/- refreshments
Parents

• Encourage early contact with baby
• Communication—keep informed, provide brochures
• Photographs
• Accommodation—assist with arrangements
• Refer to:
  o Social work service
  o Interpreter service
  o Indigenous Hospital Liaison Officer (IHLO)