RAPID GUIDANCE - BRONCHIOLITIS

Bronchiolitis is a common viral respiratory tract infection in children, associated with lower airway obstruction, air trapping and atelectasis. This PCCS guideline applies to patients managed in a Level 1/Level 2 paediatric critical care (PCC) setting as defined in the 2015 PCCS standards here. This PCCS guidance is based on recommended best practice from regional PIC retrieval services. Please read this guidance in conjunction with the latest NICE guidance and RCPCH guidance.

Clinical presentation:

- Fever, rhinitis, cough
- Tachypnoea, wheeze, ↑ WOB
- Apnoea (esp. <2 months old)
- Cyanosis
- Poor Feeding
- Low grade fever <39°C

Differential diagnosis:

- Asthma
- Aspiration
- Bacterial/ atypical pneumonia
- Cardiac disease
- Sepsis
- Foreign body
- Vascular ring

When deciding whether to admit to critical care, also consider known risk factors for severe bronchiolitis:

- Chronic lung disease
- Haemodynamically significant congenital heart disease
- Age <3 months (corrected gestational age)
- Prematurity (especially <32 weeks)
- Neuro-muscular conditions
- Immune deficiency
- Trisomy 21

Investigations for children admitted to a PCC area:

- NPA for respiratory viruses
- Capillary blood gas
- Electrolytes to check Na^+ and if on IV fluids
- Other investigations such as CXR, FBC, CRP, blood cultures, 'septic screen' only if:
  - diagnostic concern (e.g. pyrexia >39°C) and/or
  - worsening respiratory failure (such as FiO_2 > 0.5 to maintain sats ≥92%)

L1/ L2 PCC management:

General

- Minimal handling and frequent reassessment by senior clinician
- Monitoring: O_2 saturation, ECG, apnoea monitoring if required
- Suctioning nasal secretions if obstructed

Respiratory

- High flow nasal cannula therapy (2 L/kg/min or equivalent weight-banded flow rate; max 50 l/min) or CPAP 5-7 cmH_2O to maintain SpO2 ≥92%
- Prone positioning in infants if ↑ WOB

Nutrition

- If intubation unlikely, commence trial NG/OG milk feeds as per local policy
- If intubation likely, and/or gastric feeding not tolerated, begin suitable intravenous isotonic fluids (with/without glucose) at 70% maintenance requirements

Antibiotics are not generally indicated in uncomplicated bronchiolitis

- Consider if diagnostic uncertainty, suspected bacterial infection (compatible CXR / blood findings), or critically ill

Unproven therapies: hypertonic saline, nebulised adrenalin, salbutamol, montelukast, ipratropium bromide, systemic or inhaled corticosteroids

De-escalation care

- Reduce HFNC/ CPAP/oxygen support as per local policy
- Consider step down from L1/L2 PCCU once off HFNC/CPAP support and no apnoeas for 12 hours
- If antibiotics commenced, review at 48 hrs depending on NPA and blood culture results, inflammatory markers, and clinical course

PCCS Paediatric Critical Care Society

BRONCHIOLITIS RESPIRATORY MANAGEMENT FLOW DIAGRAM

When to admit to L1/L2 PCC area:

- Sats <92% despite supplemental FiO_2 0.4*
- Moderate/severe ↑ WOB
- Apnoea (observed or reported)
- As per hospital paediatric early warning system

** Equates roughly to standard humidified nasal cannula O_2 delivered at 4-5 l/min or O_2 delivered via a face mask without a rebreather bag at 6-10 L/min. High flow nasal cannula oxygen therapy at flows <2 L/kg/min may be delivered in a non L1/L2 setting with appropriate safeguards.*

- High flow nasal cannula therapy (2 L/kg/min) or CPAP 5-7 cmH_2O to maintain SpO2 ≥92%
- Consider changing between supports if not tolerated or continues with WOB
- Consider prone positioning in infants if ↑ WOB
- Monitor capillary blood gases on starting support and then at regular intervals

Relative indications for discussion with local anaesthetic team, intubation and ventilation, and referral to regional PCC retrieval service:

- FiO_2 requirement > 50% to maintain SpO2 >92% despite HFNC /CPAP support
- Persistent apnoeas
- Impending respiratory failure/ exhaustion
- Reduced level of consciousness
- Worsening hypercarbia / respiratory acidosis

RED FLAGS:

- Apnoea associated with CVS instability
- Reduced level of consciousness
- Neuromuscular disease

Relative indications for de-escalating care:

- Ability to wean FiO_2 and maintain sats >92%
- No apnoeas
- Respiratory rate in normal range for age / ↓WOB
- Minimal hypercarbia / respiratory acidosis
- Decreased irritability
- Normocarbia/no respiratory acidosis

Intubation and ventilation:

- Use an intubation checklist
- Pre-oxygenate
- Decompress stomach by gastric tube aspiration
- Ensure 2 points IV access
- Consider fluid bolus prior to anaesthesia
- Choose appropriate ETT to minimise leak
- Ensure end tidal CO_2 monitoring available
- Give appropriate CVS stable induction drugs (e.g. ketamine 1-2 mg/kg, rocuronium 1 mg/kg)
- Secure ETT and check CXR post intubation for ETT position
- Initial ventilation strategy: PIP to move chest, PEEP 5-7, i-time 0.8 secs, RR 20-30
- Initial gas exchange targets: Sats >92%, permissive hypercapnia (pH >7.25, pCO_2 5-10)
- Arterial line usually not required unless CVS instability
- Saline suction via ETT and chest physiotherapy may be helpful if mucus plugging

Sedate and paralyse for ventilation and onward transfer to L3 PCCU

Troubleshooting (DOPES):

Displaced ETT - check $ETCO_2$ and exact length
Obstruction – suction ETT and check catheter passes to end
Pneumothorax – clinical examination; differential is air trapping due to hyperinflation
Equipment – check ventilator settings including oxygen
Stomach – ensure decompressed with gastric tube

De-escalation care: *

- Wean FiO2 ≤40% to maintain SpO2 >92%
- Reduce HFNC flows / CPAP pressures as per local policy
- Consider step down from L1/L2 PCC area once off HFNC / CPAP support and no apnoeas for 12 hours

** when de-escalating care ensure that indications /observations maintained as above; if not, revert to previous FiO_2 / support levels and reassess*

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