



CG019 Bronchiolitis

Key Recommendations for operational use		
For use by: ScotSTAR teams, referring centres Internet: Yes		
1	Team	<ul style="list-style-type: none"> Refer any infant with bronchiolitis requiring transfer to the ScotSTAR Paediatric team in the first instance. It may be appropriate for the ScotSTAR Neonatal team to undertake the transfer of infants <5kg with bronchiolitis.
2	Diagnosis	<ul style="list-style-type: none"> < 2 years old Coryzal symptoms for 1-3 days + <ul style="list-style-type: none"> - persistent cough AND - tachypnoea or chest recession AND - wheeze or crackles on auscultation Young infants (especially < 6weeks) may present with apnoea without other signs
3	Initial management	<ul style="list-style-type: none"> Supplemental oxygen (for saturations <92%) Consider upper airway suctioning for infants with respiratory distress Perform CBG in those on > FiO₂ 0.5 or with suspected respiratory failure Insert NG tube and place on free drainage With impending respiratory failure, give IV fluids with 0.9% saline / 5% dextrose and withhold enteral feeds Reduce the maintenance fluid prescription from 100% to 80% of routine requirements if there is a concern than SIADH may develop Early testing for Virology PCR including COVID-19 PCR <ul style="list-style-type: none"> - in the absence of another virus being identified, send a second COVID-19 PCR test. - use near patient testing when available.
4	Deterioration	<ul style="list-style-type: none"> Early anaesthetic review Consider if antibiotic therapy is indicated
5	Intubation	<ul style="list-style-type: none"> Indications: <ul style="list-style-type: none"> - recurrent apnoeas - marked increased work of breathing - exhaustion - worsening hypoxaemia / hypercarbia - deteriorating trajectory (for safe transfer) Consider this anaesthetic regimen: <ul style="list-style-type: none"> - Fentanyl 1-2 mcg/kg - Ketamine 2 mg/kg for induction - Rocuronium 1 mg/kg Do not cut the endotracheal tube Use a micro cuffed endotracheal tube if available Perform a chest x-ray following intubation



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6	Ventilation	<ul style="list-style-type: none">• Use pressure regulated mode of ventilation• May need high pressures initially• Use PEEP 5-7• Minimum iT 0.7• Do not exceed rate of 30/minute• May require manual hand ventilation if PIP >30cmH₂O• Aim for tidal volume 5-7 ml/kg• Permit hypercapnia provided pH >7.2
7	Post-intubation management	<ul style="list-style-type: none">• Sedate with morphine +/- midazolam infusions:<ul style="list-style-type: none">- start morphine infusions at 20-30mcg/kg/hr- consider morphine alone in younger infants- start midazolam at 0.05 mg/kg/hr and up titrate• Paralyse with bolus rocuronium (1mg/kg) or infusion (1mg/kg/hr)• Regular suction of the endotracheal tube may be required• Review blood gases following intubation
8	Transport considerations	<ul style="list-style-type: none">• Apply full monitoring as per normal transport practice (HR, RR, NIBP, O₂ saturations, end tidal CO₂)• Site 2 working IV access points; peripheral access is adequate• Central venous access and arterial access are rarely required• If rising ETCO₂ consider:<ul style="list-style-type: none">- ETT suction- increase ventilation- reduce deadspace• Keep sedated and paralysed for transfer



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Document History			
Reference Number	CG019		
Version	1		
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Distribution	BASICS Scotland		X
	Medic 1		X
	Mountain rescue teams		X
	Referring centres via service websites		✓
	Rural GPs Association of Scotland		X
	SAS	Air Ambulance	for information
		Specialist Services Desk	X
	ScotSTAR	EMRS (West)	for information
		EMRS (North)	for information
		Paediatric	✓
		Neonatal	✓
Tayside Trauma Team		X	
			



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Scope and purpose

- Overall objectives:

The aim of this guideline is to support paediatric and neonatal teams, as well as referring hospitals, in the safe management of a child with bronchiolitis. Bronchiolitis is the most common lower respiratory tract infection in the first year of life. There are no effective therapies for the management of bronchiolitis therefore treatment is supportive. Infants with associated co-morbidities are more likely to require critical care.

- Statement of intent:

This guideline is not intended to be construed or to serve as a standard of care. Adherence to guideline recommendations will not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care aimed at the same results. The ultimate judgement must be made by the appropriate healthcare professional(s) responsible for clinical decisions regarding a particular clinical procedure or treatment plan. Clinicians using this guideline should work within their skill sets and usual scope of practice.

- Feedback:

Comments on this guideline can be sent to: sas.cpg@nhs.scot

- Equality Impact Assessment:

Applied to the ScotSTAR Clinical Standards group processes.

- Guideline process endorsed by the Scottish Trauma Network Prehospital, Transfer and Retrieval group.





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Explanatory Statements		
4.1 Team	Authors' recommendation	Level [Reference]
<ul style="list-style-type: none"> Refer any infant with bronchiolitis requiring transfer to the ScotSTAR Paediatric team in the first instance. <p>This includes the initial conference call between the referring unit and the paediatric ScotSTAR clinician.</p>	Strong	
<ul style="list-style-type: none"> It may be appropriate for the neonatal ScotSTAR team to undertake the transfer of infants <5kg with bronchiolitis. <p>In circumstances where the paediatric team are unavailable, the neonatal team may be asked to perform the transfer. This will only occur after discussion between the consultants in the paediatric and neonatal ScotSTAR teams. Infants up to 5kg can be moved in the neonatal transport incubator. If the neonatal team are asked to undertake the transfer, they should join the conference call to ensure sharing of information. In this instance, the PICU clinicians should support the neonatal transfer team, particularly in areas which differ from neonatal practice: ventilation strategies in bronchiolitis, sedation, and IV fluid choice.</p>	Conditional	
4.2 Diagnosis	Authors' recommendation	Level [Reference]
<ul style="list-style-type: none"> < 2 years old Coryzal symptoms for 1-3 days + <ul style="list-style-type: none"> persistent cough AND tachypnoea or chest recession AND wheeze or crackles on auscultation Young infants (especially < 6weeks) may present with apnoea without other signs 	Information	1
4.3 Initial management	Authors' recommendation	Level [Reference]
<ul style="list-style-type: none"> Supplemental oxygen (for saturations <92%) <p>Other than in specific clinical situations (ie patients with congenital heart disease), oxygen should be delivered to maintain oxygen saturations >92%.</p>	Strong	1
<ul style="list-style-type: none"> Consider upper airway suctioning for infants with respiratory distress <p>Gentle nasal suction may be required to ensure the nasal passages are not blocked with secretions, as this can worsen respiratory distress.</p>	Conditional	1
<ul style="list-style-type: none"> Perform CBG in those on > FiO2 0.5 or with suspected respiratory failure <p>An infant requiring referral to critical care should have a capillary blood gas (with lactate) done. Severe respiratory distress can still occur with a normal blood gas.</p>	Strong	1
<ul style="list-style-type: none"> Insert NG tube and place on free drainage 	Strong	1



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<ul style="list-style-type: none"> With impending respiratory failure, give IV fluids with 0.9% saline/5% dextrose and withhold enteral feeds 	Strong	2
<ul style="list-style-type: none"> Reduce the maintenance fluid prescription from 100% to 80% of routine requirements if there is a concern than SIADH may develop. 	Strong	2
<ul style="list-style-type: none"> Early testing for Virology PCR including COVID-19 PCR <ul style="list-style-type: none"> in the absence of another virus being identified, send a second COVID-19 PCR test. use near patient testing when available. <p>This will facilitate decision making with retrieval and ongoing care in receiving unit, it may expedite retrieval in the case of negative COVID-19 opening other resources available for transfer.</p>	Strong	3

4.4 Deterioration	Authors' recommendation	Level [Reference]
<ul style="list-style-type: none"> Early anaesthetic review. <p>Prior to the arrival of the transport team, early anaesthetic review should be considered if there are concerns about ongoing deterioration and / or increasing work of breathing.</p>	Strong	1
<ul style="list-style-type: none"> Consider if antibiotic therapy is indicated <p>Antibiotics should not routinely be prescribed in children with bronchiolitis. Chest x-ray changes with bronchiolitis can mimic pneumonia. However, in a child requiring critical care, consideration should be given to commencing antibiotics if there is clinical evidence to suggest there may be a secondary bacterial infection</p>	Conditional	4

4.5 Intubation	Authors' recommendation	Level [Reference]
<ul style="list-style-type: none"> Indications: <ul style="list-style-type: none"> Recurrent apnoeas Marked increased work of breathing Exhaustion Worsening hypoxaemia / hypercarbia with respiratory acidosis (pH <7.2) Deteriorating trajectory (for safe transfer) <p>Intubation should not be delayed for the arrival of the transport team. If indicated, the local team should proceed to intubation and ventilation (with support from ScotSTAR / PICU via SSD if required)</p>	Strong	1



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<ul style="list-style-type: none"> Consider this anaesthetic regimen: <ul style="list-style-type: none"> Fentanyl 1-2mcg/kg Ketamine 2mg/kg for induction Rocuronium 1mg/kg <p>Ketamine is cardio-stable, and may be useful for its bronchodilator properties. Although there is a possibility of increased respiratory secretions with ketamine, this does not seem to pose a significant problem.</p>	Conditional	5
<ul style="list-style-type: none"> Do not cut the endotracheal tube 	Strong	
<ul style="list-style-type: none"> Use a micro cuffed endotracheal tube if available 	Strong	
<ul style="list-style-type: none"> Perform a chest x-ray following intubation 	Strong	1

4.6 Ventilation	Authors' recommendation	Level [Reference]
<ul style="list-style-type: none"> Use pressure regulated mode of ventilation. <p>The aim is to use a lung-protective strategy for ventilation.</p>	Strong	6-8
<ul style="list-style-type: none"> May need high pressures initially (limit to <30cmH₂O). <p>These often come down after re-recruitment has occurred.</p>	Conditional	6-8
<ul style="list-style-type: none"> Use PEEP 5-7cm H₂O initially <p>The PEEP can be increased up to 10cmH₂O if required</p>	Strong	6-8
<ul style="list-style-type: none"> Minimum inspiratory time (iT) 0.7sec <p>Using shorter inspiratory times is likely to lead to gas trapping in bronchiolitis. If there is evidence of gas trapping on flow loops, the iT may need to be increased (to a maximum of 1.0sec)</p>	Strong	6-8
<ul style="list-style-type: none"> Do not exceed rate of 30/minute <p>For the same reasons as the iT, faster rates may lead to gas trapping, and worsen the clinical picture</p>	Strong	6-8
<ul style="list-style-type: none"> May require manual hand ventilation if PIP >30cmH₂O <p>If PIP >30cmH₂O is required despite optimizing all other measures (see section 4.7), then the patient may require manual hand ventilation with the T-piece. Occasionally, patients may need to be hand ventilated for the duration of the transport.</p>	Conditional	6-8
<ul style="list-style-type: none"> Aim for tidal volumes 5-7mls/kg 	Conditional	6-8
<ul style="list-style-type: none"> Permit hypercapnia provided pH >7.2 <p>As part of a lung-protective strategy, permissive hypercapnia is tolerated if the pH >7.2</p>	Conditional	6-8



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4.7 Post-Intubation management	Authors' recommendation	Level [Reference]
<ul style="list-style-type: none"> <i>Sedate with morphine +/- midazolam infusions:</i> <ul style="list-style-type: none"> <i>start morphine infusions at 20-30mcg/kg/hr</i> <i>consider morphine alone in younger infants</i> <i>start midazolam at 0.05 mg/kg/hr and up titrate</i> <p>Younger infants may only require morphine sedation and midazolam may not be required. If requiring midazolam, start at 0.05mg/kg/hr (less than suggested on the drug calculator) and titrate up. Neonates are particularly sensitive to midazolam and may develop hypotension. The British National Formulary (BNF) recommends a morphine bolus of 50-100mcg/kg (depending on age) followed by a continuous infusion of 20-30mcg/kg/hr and adjusted to response.</p>	Strong	9
<ul style="list-style-type: none"> <i>Paralyse with bolus rocuronium (1mg/kg) or infusion (1mg/kg/hr)</i> <p>Children require muscle relaxation for transfer. If there are difficulties with ventilation, it is important to ensure both sedation and paralysis are optimal.</p>		9
<ul style="list-style-type: none"> <i>Regular suction of the endotracheal tube may be required</i> <p>Following intubation, initial suction of the endotracheal tube is almost always required. This may then need to be undertaken regularly. Instillation of 0.9% saline <i>via</i> the endotracheal tube may aid suctioning of thick secretions and can be considered particularly if requiring high ventilator pressures.</p>	Conditional	1
<ul style="list-style-type: none"> <i>Review blood gases following intubation</i> <p>Permit hypercapnia provided pH >7.2. A capillary blood gas is appropriate, arterial access is not required in the majority of infants.</p>	Strong	6-8
4.8 Transport considerations	Authors' recommendation	Level [Reference]
<ul style="list-style-type: none"> <i>Apply full monitoring as per normal transport practice (HR, RR, NIBP, O₂ saturations, end tidal CO₂)</i> 	Strong	10
<ul style="list-style-type: none"> <i>Site 2 working IV access points; peripheral access is adequate</i> 	Strong	
<ul style="list-style-type: none"> <i>Central venous access and arterial access are rarely required</i> 	Conditional	
<ul style="list-style-type: none"> <i>If rising ETCO₂ consider:</i> <ul style="list-style-type: none"> ETT suction, increasing ventilation reduce deadspace 	Conditional	6-8
<ul style="list-style-type: none"> <i>Keep sedated and paralysed for transfer</i> 	Strong	9



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References

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