

Clinical Practice Guidelines

Management of Acute Bronchiolitis

Departments of Pediatrics & Emergency Medicine

THIS GUIDELINE PROVIDES EVIDENCE BASED RECOMMENDATIONS ON THE DIAGNOSIS, ASSESSMENT AND MANAGEMENT FOR CHILDREN WITH ACUTE BRONCHIOLITIS PRESENTING TO EMERGENCY ROOMS AT KING KHALID UNIVERSITY HOSPITAL

Introduction:

Bronchiolitis is the second most common cause of admission of infants and toddlers to King Khalid University Hospital. It causes significant morbidity especially in young infants and those at high risk. These guidelines are designed to reduce the use of unnecessary investigations, antibiotics, reduce inappropriate use of inhaled therapy and steroids, provide teaching tool for parents and encourage use of NG feeds rather than IV fluids for babies refusing or unable to feed orally.

SCOPE AND PURPOSE

Children less than 2 years of age presenting to King Khalid University Hospital with acute bronchiolitis will be managed according to this guideline. This guideline provides evidence-based recommendations for diagnosis, assessment and management of acute bronchiolitis in children.

STAKEHOLDER INVOLVEMENT

The guideline is based on those on the Scottish intercollegiate guideline network (SIGN)

It is adapted from SIGN and reviewed by all parties (Paediatric Pulmonology, General Paediatrics, Pediatric ER and PICU, Clinical Pharmacist and Head Nurses) involved in the management of children with Acute Severe Asthma in King Khalid University Hospital.

PLAN OF ACTION

Implementation of these guidelines will be supervised by senior Pediatricians (Consultants, Senior Registrars and Registrars) in ER , PICU and Ward.

Audits will be designed to monitor, assess and measure implementation and deviation from these guidelines. These clinical guidelines will be reviewed after one year of implementation. (Jan 2012)

Clinical Assessment	Level of	
	Evidence	Recommendation
<p>Bronchiolitis is a clinical diagnosis. It generally affects children under 2 years of age. 90% of those affected are in infancy. Infants with acute bronchiolitis may present with a wide range of symptoms and severity from mild respiratory infection to impending respiratory failure. Respiratory Syncytial virus is the commonest causal agent</p> <p>A number of other conditions can mimic acute bronchiolitis. Pulmonary causes of bronchiolitis like symptoms include asthma, pneumonia, congenital lung disease, cystic fibrosis or inhaled foreign body. Non-pulmonary causes include CHD, sepsis or severe metabolic acidosis</p>	4	
<p>PULSE OXIMETRY</p> <p>Pulse oximetry should be performed in every child who attends hospital with acute bronchiolitis.</p>		C
<p>Diagnostic criteria for bronchiolitis include, but are not limited to the following:</p> <ol style="list-style-type: none"> 1. Preceding upper-respiratory illness and/or rhinorrhea. 2. Signs of respiratory illness which may include the following common lower respiratory infection signs: 3. Fever (Although children may present with fever , its absence does not rule out bronchiolitis. One should also look for alternative diagnosis and investigate appropriately children with high grade temperature (>39 *C as it is very unusual- RSV +ve but toxic look 4. Cough (cough is usually characteristic and is one of the earliest symptom to appear) 5. Increased respiratory rate should arouse suspicion of LRTI (bronchiolitis or pneumonia) 6. Increased work of breathing and intercostal /subcostal recessions 7. Shortness of breath 8. Low oxygen saturation 9. Wheeze 10. Crackes / Crepitations 11. Color change 12. Nasal flaring 13. Apnea 14. Poor feeding 15. Signs of dehydration 16. Exposure to persons with flu like illness <p>Diagnosis of acute bronchiolitis should be considered in an infant with nasal discharge and a wheezy cough, in the presence of fine inspiratory crackles and/or high pitched expiratory wheeze. Apnoea may be a presenting feature.</p>	<p>4</p> <p>4</p> <p>3/4</p> <p>3/4</p> <p>3/4</p> <p>4</p> <p>4</p>	<p>D</p> <p>D</p> <p>D</p>
<p>Ward Admission Criteria</p> <p>Decision to admit patient with bronchiolitis will depend mainly on the clinical judgment of the treating physician. Use the following as admission criteria:</p> <p>Oxygen desaturations < 92%</p> <p>Moderate to severe respiratory distress</p> <p>Apnea</p>	2+/3+	C

Inability to take orally \pm any signs of dehydration Unstable social situation Underlying cardiopulmonary illness		
High Risk -Have lower threshold for admitting patients with 1. Prematurity 2. Chronic lung disease 3. Congenital heart diseases 4. Congenital malformation of the respiratory system Other risk factors: (Tracheostomy/ Neuromuscular disease/ Immunodeficiency/ Trisomy 21/Age less than 2 month)	2	C
Laboratory and Radiological Results Unless adequate isolation facilities are available, NPA for RSV is recommended in infants who require admission to hospital with acute bronchiolitis, in order to guide cohort arrangements	2+	D
Investigation should be limited to minimize handling and increasing distress of infants Bacteriological testing of urine should be considered in febrile infants less than 60 days old. Routine laboratory studies to rule out infants with serious bacterial infection <i>ARE NOT</i> generally helpful	1+/2+	C/D
Chest x-rays <u>ARE NOT</u> routinely recommended. (See appendix (1c) for Chest X-rays indications) Nasogastric feeding should be considered in infants with acute bronchiolitis who cannot maintain oral intake or hydration	2+	C
Pulse oximetry	2+	C
Capillary or arterial bloods gases are recommended only in severe cases	2-	D

<p><u>Management</u></p>		
<p>Medications</p>		
<p>Starting supplemental oxygen when the saturation is consistently less than 92% and weaning oxygen when higher than 92% is considered reasonable.</p>	4	
<p>Scheduled or serial use of bronchodilator (Salbutamol/ Racemic Epinephrine) aerosol therapies is not recommended unless there is a documented clinical improvement response from a given patient.</p>	1+	B
<p>Epinephrine Neb is not recommended for the treatment of acute bronchiolitis. (however a trial may be justified in infants with h/o atopy)</p>	1-	√ A
<p>There is no benefit from nebulised ipratropium in acute bronchiolitis</p>		√
<p>Antibiotics are not recommended in the absence of an identified bacterial focus.</p>	1++	√ A
<p>Antihistamines, oral decongestants and nasal vasoconstrictors are not recommended for routine therapy.</p>		A
<p>Inhaled or oral Steroid therapy is not recommended.</p>		A
<p>Anti – Viral (Ribavirin) therapy Ribavirin is not recommended for majority of patient with bronchiolitis.</p>	1+	
<p>Isolation</p>	1+	B
<p>Note 1: Single room/or cohort with other patient with bronchiolitis taking in consideration result of screening.</p>		A
<p>Note 2: Hand wash: hands should be washed before and after each patient contact.</p>		A
<p>Personal protective equipments (gloves, gown, mask) with the patient interactions.</p>		
<p>Minimal handling</p>		
<p>Respiratory Care Therapies</p>		A
<p><i>Supervised cough and suction & Chest Physiotherapy are not recommended. Cool mist therapy is not recommended.</i></p>		
<p>Suction: The importance of a patent nasal airway for infants has been established There is no evidence to support routine “deep” suctioning of the lower pharynx</p>	1+	D
<p>Feeding</p>		
<p>If the child is tachypnoeic and having difficulty in feeding or refusing feeds, then consideration to a naso-gastric feeding should be given before IV fluids option is chosen</p>	4	D
<p>Oxygen</p>		
<p>Infants with oxygen saturation levels $\leq 92\%$ or who have severe respiratory distress or cyanosis should receive supplemental oxygen by nasal cannulae or facemask</p>	4	D

Monitoring

Repeated clinical assessment is the most important aspect of monitoring.

Heart & respiratory rate monitoring in hospitalized patients during the acute bronchiolitis.

Utilize scheduled spot checks for pulse-oximetry or continuous pulse-oximetry.

Close observation of oral intake, if patient has poor feeding or evidence of dehydration or a patient at risk of aspiration e.g. respiratory rate >60/min. consider IV fluid/NG feeds/NPO.

PICU admission Criteria

Decision to admit to PICU either form Emergency Department or from ward depends on clinical judgment of treating physician, factors to consider are:

Severe respiratory distress with respiratory rate more than 70/min.

Persistent hypoxemia in spite of oxygen supplement

Decreased level of consciousness

Intermittent apnea

Carbon dioxide retention (CO2)

Pulmonology Consultation

Atypical course of the disease (i.e. when difficult to wean off oxygen)

If child admitted to ICU

If patient a candidate for Palivizumab

Palivizumab is recommended in the following conditions:

Infants born at 32 weeks of gestation or less and who is less than 6 month of age at the consent of the RSV season.

Children with chronic lung disease who are less than 2 years of age at the onset of the RSV season and who required oxygen therapy in the preceding 6 month.

Congenital heart disease: children younger than 2 years with hemodynamically significant cyanotic or a cyanotic heart disease.

RSVIG :Three RCTs found that RSV hyperimmune globulin (RSVIG) is effective in reducing the incidence of RSV hospitalisations in premature infants and children with bronchopulmonary dysplasia or congenital heart disease.

1++

4

4

1+

1+

<p>Discharge Criteria</p> <p><i>Respiratory status :</i> Child is no significant respiratory distress, and is relatively comfortable Patient is saturating above 92% on room air.</p> <p><i>Nutritional status:</i> The patient is on oral feedings at a level to prevent dehydration</p> <p><i>Social :</i> Home resources are adequate to support the use of any necessary home therapies Parent or guardian is able to comply with medical advice</p> <p><i>Follow-up:</i> The child should return to KKUH ER if there are any signs of deterioration such as increasing difficulty breathing, cyanosis, apnea, poor intake, or increased sleepiness. Follow up as decided by the treating consultant</p> <p>Parent Education :Educate parents on the basic pathophysiology and expected clinical course of bronchiolitis Educate parents when to come back by explaining the signs of worsening clinical status.</p>	<p>3/4</p>	
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Appendix 1

Remember:

Apnea, is most likely to occur during the first 48 hours of illness with RSV. It is most common in premature infants and infants < 1 month of age.

The incidence of bacterial co-infection with RSV bronchiolitis or RSV pneumonia is low

Patients should be considered for removal from the bronchiolitis pathway if;

No improvement in clinical condition in 48hours

Significant deterioration

Primary diagnosis seems questionable

Indications of Chest Radiograph:

The chest radiographs should not be done routinely in suspected typical bronchiolitis. Chest radiograph may be indicated if:

If the child in ED fulfilling the criteria for PICU admission.

Patient with unexpected clinical deterioration

Patient with underlying respiratory or cardiac disease

If another diagnosis is suspected

No improvement the expected rate.

Criteria for supplemental feedings or I.V. fluids:

NG feeds are preferred for inadequate intake (<75% of maintenance for >24 hours) or mild dehydration

Indications of IVF:

Severe retractions or consistent RR>70

Dehydration more than mild.

Definition of Maintenance Fluids:

1-10 kg :4cc/kg/hr

11-20 kg :40cc/hr + (2cc/kg/hr for each kg >10)

>20 kg :60cc/hr + (1cc/kg/hr for each kg >20)

Modified Pulmonary index score

	0	1	2
Saturation	>93% in RA	<93% in RA	<93% with 40% FiO2
Cyanosis	None	In RA	In 40% FiO2
Inspiratory Breath Sounds	Normal	Unequal	Decreased to Absent
Accessory Muscle Usage	None	Moderate	Maximal
Adventitious Breath sounds	None	Occasional Crackles ± Wheeze	Significant Crackles ± Wheeze
Cerebral Function	Normal	Depressed /Agitated	Reduced response to pain
Add 2points for frequent interventions (suction, positioning, O ₂ changes)or multiple IV attempts. Score ≥7 Assess every 30 min. =6 Assess every 1-hr. •= 5 Assess every 1-2 hr. •= 0-4 Assess every 4 hrs			

APPENDIX 2 :KEY TO EVIDENCE STATEMENTS AND GRADES OF RECOMMENDATIONS

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LEVELS OF EVIDENCE

1++	High quality meta-analyses, systematic reviews of RCTs, or RCTs with a very low risk of bias
1+	Well conducted meta-analyses, systematic reviews, or RCTs with a low risk of bias
1 –	Meta-analyses, systematic reviews, or RCTs with a high risk of bias
2++	High quality systematic reviews of case control or cohort studies
	High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal
2+	Well conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal
2	Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal
3	Non-analytic studies, e.g. case reports, case series
4	Expert opinion

GRADES OF RECOMMENDATION

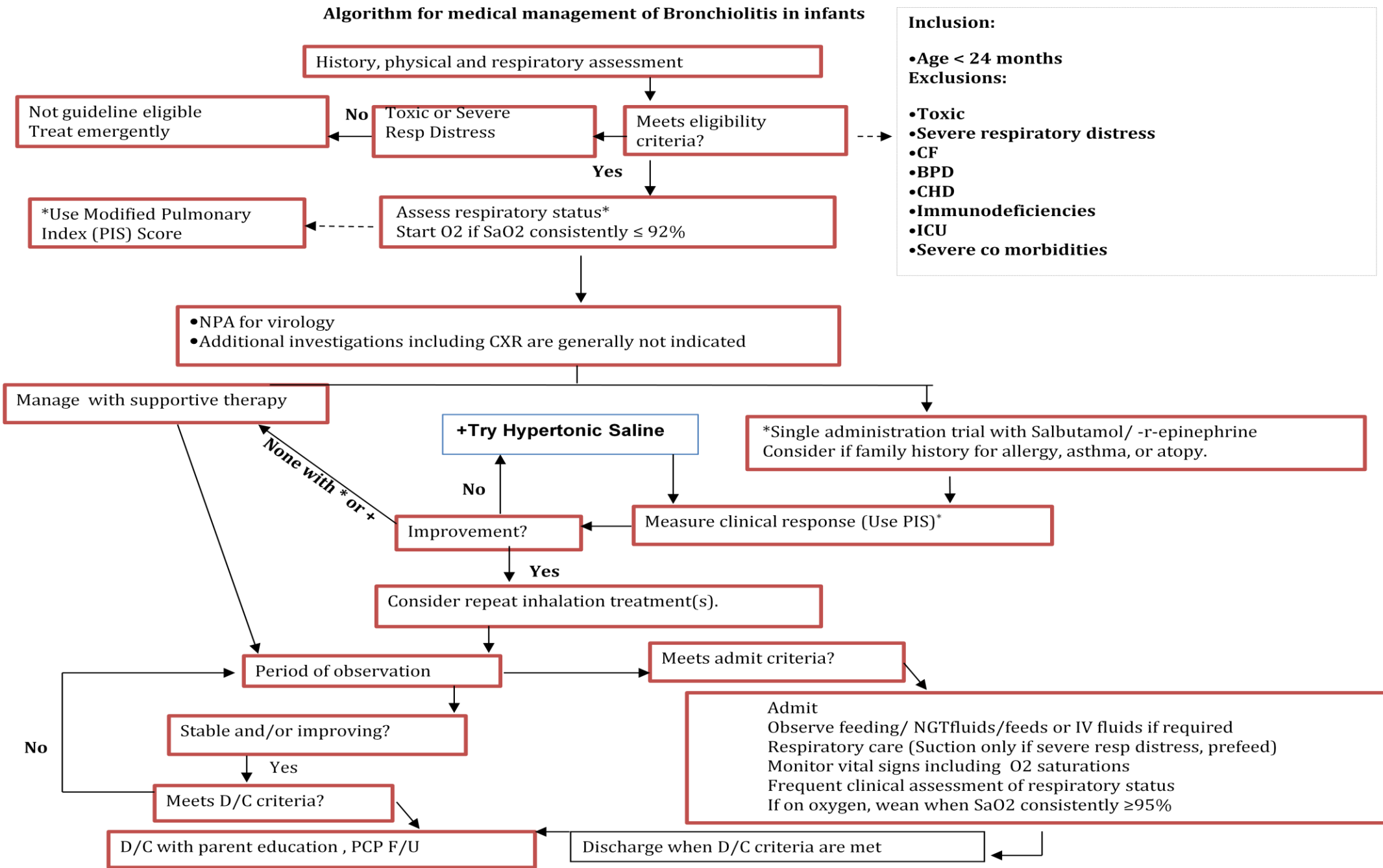
Note: The grade of recommendation relates to the strength of the evidence on which the recommendation is based. It does not reflect the clinical importance of the recommendation.

- A** At least one meta-analysis, systematic review, or RCT rated as 1++, and directly applicable to the target population; or
A body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results
- B** A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 1++ or 1+
- C** A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 2++
- D** Evidence level 3 or 4; or Extrapolated evidence from studies rated as 2+

GOOD PRACTICE POINTS

Recommended best practice based on the clinical experience of the guideline development group.

Algorithm for medical management of Bronchiolitis in infants



Inclusion:

- Age < 24 months

Exclusions:

- Toxic
- Severe respiratory distress
- CF
- BPD
- CHD
- Immunodeficiencies
- ICU
- Severe co morbidities

History, physical and respiratory assessment

Not guideline eligible
Treat emergently

Toxic or Severe
Resp Distress

Meets eligibility
criteria?

*Use Modified Pulmonary
Index (PIS) Score

Assess respiratory status*
Start O2 if SaO2 consistently ≤ 92%

•NPA for virology
•Additional investigations including CXR are generally not indicated

Manage with supportive therapy

+Try Hypertonic Saline

*Single administration trial with Salbutamol/ -r-epinephrine
Consider if family history for allergy, asthma, or atopy.

Improvement?

Measure clinical response (Use PIS)*

Consider repeat inhalation treatment(s).

Period of observation

Meets admit criteria?

Stable and/or improving?

Admit
Observe feeding/ NGTfluids/feeds or IV fluids if required
Respiratory care (Suction only if severe resp distress, prefeed)
Monitor vital signs including O2 saturations
Frequent clinical assessment of respiratory status
If on oxygen, wean when SaO2 consistently ≥95%

Meets D/C criteria?

D/C with parent education , PCP F/U

Discharge when D/C criteria are met