



**EDITION-8**

# MEDICAL INSIGHTS

**Bronchiolitis in children** – Clinical practice guidelines

**Croup in children** – Clinical practice guidelines

# The Complete Healthcare Experience for Women and Children



# FOUNDER'S NOTE

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**Dr Krishna Prasad Vunnam**

Founder & MD

Ankura Hospital for Women & Children

Season's Greetings to one and all!

As we begin another year, another chapter in the fight against Covid, I want to thank everyone in our medical fraternity who stepped up and helped confront the extraordinarily difficult circumstances that 2020 brought us and extended into 2021 as well.

As I reflect our actions over the past year, I am especially proud of every member in the Ankura Hospitals' family. Your willingness and ability to meet challenges and opportunities head-on is greatly appreciated. The Ankura Vaxathon, our Covid vaccination drive, has been one of

the largest vaccination drives in the Telugu States, having vaccinated around 4 lakh plus citizens so far. Now, as we gear up to vaccinate our young ones, I trust that this spirit of fortitude will continue to motivate us each day!

I'm also happy to share that we had a wonderful representation at the renowned Neonatology Conference (NEOCON) and Paediatric Academy of Telangana State (PATSCON) that were held in December 2021. We are honoured and excited to foster such an environment that promotes free flow of medical insights and ideas between peers across the medical fraternity.

As a trusted healthcare organization, we are passionate about providing reliable medical information through our monthly newsletter and Ankura Knowledge Hub. The overwhelming appreciation that we received for the first 7 editions has fortified our commitment to this mission! I specially thank Dr Srinivas Jakka and his team for his unrelenting passion in this endeavour.

Finally, my message for 2022 is simply a renewed commitment to offer the best of woman and child healthcare to our nation. I'm proud of our organization's efforts to bring superlative care to our patients: 'business as usual' even in these unusual times. I'm very optimistic in my 2022 outlook and want to sum up my best wishes to all my colleagues, friends and family for the new year in a single phrase: To your health and our country's health. Cheers!

Best Wishes,

Dr Krishna Vunnam

# Message From The Editor

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## Editor

### Dr Srinivas Jakka

MD (Paeds), MRCPCH, FRCPCH,  
CCST (UK), Diploma in allergy (UK),  
Diploma in diet & nutrition (UK)

### Consultant in Paediatrics, Pulmonology and Allergy

Ankura Hospital for Women & Children  
E-mail: srijakka365@gmail.com  
Ph: 040-49599999

Dear friends,

Thank you for continuing to encourage our magazine. I commend all the paediatricians (residents academicians and practitioners) for showing remarkable courage and commitment during the Covid pandemic. This edition is mainly intended for the benefit of residents and fresh practitioners. As we all know, winter season is the time for many viral infections like rhinitis, tonsillo-pharyngitis, croup, lower respiratory infections, bronchiolitis, viral associated wheeze etc. We have already addressed asthma and pneumonia in our previous editions. The current edition includes evidence-based guidelines for the management of croup and bronchiolitis. Students need to remember the following important aspects when managing viral respiratory infections:

1. Inform the parents that the possible cause of illness is viruses.
2. Acknowledge the fact that there is no specific treatment for many viral infections.
3. In many cases, our role is symptomatic and supportive.
4. Hence in many viral infections, we may not be able to accurately predict the course and outcome of the disease.

Sometimes doctors feel uneasy to say that “we do not have specific treatment available for your child’s condition”. However, this should not be the case. Doctors should not hesitate to acknowledge the fact that specific treatment is available for only few viral infections. Such honest counselling at the beginning of treatment will only help build better trust between patients and doctors. This will also reduce pressure on the doctors to show improvement in the patient condition only after few days of treatment. In addition, it will reduce the need for unwarranted investigations, and the use of antibiotics and other medications which may not have scientific evidence in the management of viral respiratory infections. I hope that this edition would help us get updated in the management of the above two common respiratory conditions. I request all of you to use the necessary safety precautions and stay safe from COVID infection in the forthcoming months.

# BRONCHIOLITIS IN CHILDREN

## CLINICAL PRACTICE GUIDELINES



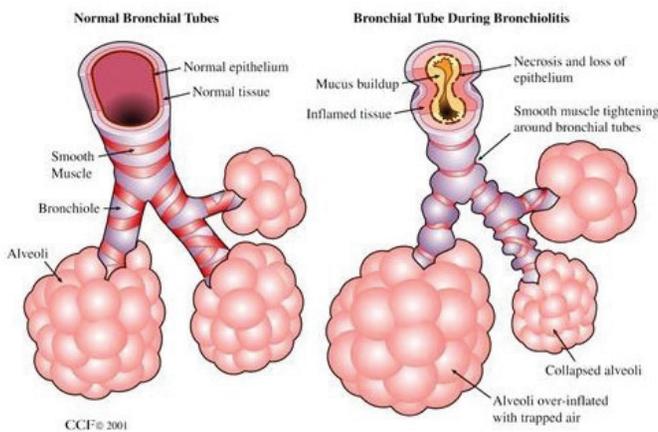
**Dr. Arun Moturi**  
DNB student,  
Ankura Hospitals, Hyderabad



**Dr. Srinivas Jakka,**  
Consultant in paediatrics, pulmonology & allergy,  
Ankura Hospitals

### INTRODUCTION

Bronchiolitis is caused by respiratory viruses that invade the epithelial cells of the small airways leading to excessive mucus production, obstruction of the bronchioles, varying degrees of bronchospasm and air trapping.



### ETIOLOGY

Respiratory syncytial virus is the most common virus associated with bronchiolitis. Other viruses causing bronchiolitis are rhinovirus, parainfluenza virus, human metapneumovirus, influenza virus, adenovirus, coronavirus and human bocavirus.

### CLINICAL FEATURES

Bronchiolitis begins with URI symptoms of rhinorrhoea followed by persistent cough, tachypnoea, chest wall recessions and widespread crackles, wheeze, or both. These symptoms peak on days three to five and then gradually resolve in most previously healthy infants.

The most common complications are dehydration, apnoea, and secondary bacterial infection.

### MANAGEMENT

The high-risk groups include infants less than 3 months of age, premature infants or with underlying chronic diseases (cardiopulmonary disease, immunodeficiency, neuromuscular disorders) are at high risk of severe disease. These groups should have lower threshold for admission.

NICE (2015) published a guidelines for the hospital management of bronchiolitis.<sup>4</sup>

Indications for hospital admission
Apnoea (observed or reported)
Persistent oxygen saturation less than 92%
Inadequate oral fluid intake (less than 50% of usual volume)
Signs of severe respiratory distress
1. Respiratory rate >70/min
2. Nasal flaring
3. Grunting
4. Severe chest wall recessions

The current recommendations by NICE on the management of bronchiolitis are given below:

### FLUID MANAGEMENT

- Small and frequent feeds are usually tolerated better. For those who cannot maintain hydration orally, orogastric or nasogastric feeding may be needed.
- Intravenous fluids should be reserved for infants with impending respiratory failure and

those unable to tolerate enteral feeding. Fluids are restricted to 2/3<sup>rd</sup> of maintenance requirement to prevent electrolyte imbalance caused by inappropriate secretion of antidiuretic hormone (SIADH).

## RESPIRATORY SUPPORT

Supplemental oxygen is administered to those with oxygen saturations below 92%. Those with more severe disease often receive a trial of HHFNC therapy and/or CPAP before ET intubation.

- **SUPPLEMENTAL OXYGEN:**  
Oxygen is the mainstay of treatment for respiratory distress, and is usually administered via nasal cannula, face mask, head box, or wafted near the face to minimize handling.
- **HIGH-FLOW NASAL CANNULA THERAPY:**  
Its beneficial effect is exerted by reducing the respiratory resistance of the nasal passages and delivering low levels of positive airway pressure without damaging the respiratory mucosa because the air is heated and humidified. Studies have shown that the use of high-flow nasal cannula therapy at 2 liters/kg/min decreased the rate of escalation in care by 11% compared to standard oxygen therapy.<sup>1</sup>
- **CONTINUOUS POSITIVE AIRWAY PRESSURE:**  
CPAP is recommended in children with bronchiolitis who have impending respiratory failure.<sup>6</sup>
- **ENDOTRACHEAL INTUBATION:** Infants with worsening severe distress who fail to improve on standard treatment may require endotracheal intubation and mechanical ventilation.

- **NASAL SUCTIONING:** It is recommended for symptomatic relief of nasal congestion in infants with apnoea, respiratory distress or feeding difficulties, and in children with apnoea even in the absence of obvious secretions.
- **CHEST PHYSIOTHERAPY:** Routine chest physiotherapy is not supported by the existing evidence.

## PHARMACOLOGICAL INTERVENTIONS

- **BRONCHODILATORS (salbutamol, ipratropium, adrenaline):**  
These reverse bronchoconstriction by causing relaxation of the airway smooth muscle. Bronchodilators other than adrenaline have no effect in reducing hospitalization & length of hospital stay<sup>7</sup> and may cause adverse effects (tachycardia and tremor) and increase the cost of care. A Cochrane review that included 19 studies with a total of 2256 participants concluded that adrenaline reduced rates of admission compared with placebo on the day of the emergency department visit but found no difference at 1 week.<sup>5</sup> Adrenaline is not recommended in children with bronchiolitis except as a rescue agent in hospital.
- **HYPERTONIC SALINE:**  
It is believed to improve airway obstruction by increasing mucociliary clearance. There is mixed evidence on usage of 3% NS in bronchiolitis. Earlier studies showed there was reduction in length of stay in hospital. More recent studies showed that the use of hypertonic saline did not reduce the length of hospital stay compared to standard treatment.<sup>2</sup>
- **GLUCOCORTICOIDS:** The use of systemic or inhaled glucocorticoids do not improve duration of hospital stay or severity of symptoms.

- **OTHER DRUGS:** Including Heliox, leukotriene inhibitors, antibiotics, antivirals (Ribavirin) have shown no role in the management of bronchiolitis in children.

### KEY PRACTICE RECOMMENDATIONS FOR HOSPITAL MANAGEMENT OF BRONCHIOLITIS

- Give supplemental oxygen if saturations <92% in air.
- HHHFNC/CPAP may be indicated in case where oxygen alone is not sufficient.
- Give fluids by nasogastric/orogastric tube or IV in children with bronchiolitis if they cannot take in enough fluid by mouth
- Perform upper airway suctioning in babies with apnoea.
- Do not routinely perform investigations like chest X-rays, blood gases.
- Do not routinely prescribe bronchodilators, nebulized adrenaline, steroids, antibiotics, leukotriene receptor antagonists or ribavirin.
- Do not routinely perform physiotherapy.

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# CROUP IN CHILDREN

## CLINICAL PRACTICE GUIDELINES



**Dr. Hari Rama Krishna A**  
DNB student,  
Ankura Hospitals, Hyderabad



**Dr. Srinivas Jakka**  
Consultant in paediatrics, pulmonology & allergy,  
Ankura Hospitals

### ETIOLOGY

Croup is a common childhood respiratory illness involving the larynx, trachea and bronchi. It occurs most commonly in children between 6 months and 3 years of age. It is predominantly caused by

viruses (table 1) with Parainfluenza virus accounting for 75% of all cases<sup>1</sup>. The type of infectious agent does not affect the initial management or outcome of the disease.

**Table 1- Common organisms causing croup in children**

<b>Viral</b>	<b>Bacterial</b>
Parainfluenza type 1 Respiratory syncytial virus Metapneumovirus Influenza A and B Adenovirus Coronavirus	Mycoplasma pneumoniae Corynebacterium diphtheriae.

### PATHOLOGY

Viral invasion of the laryngeal mucosa leads to inflammation, hyperemia and edema. This leads to narrowing of the subglottic region. Children compensate for this narrowing by breathing more quickly and deeply leading to turbulent flow of air. In children with severe illness, as the narrowing progresses, their increased effort at breathing becomes counter-productive.

### CLINICAL FEATURES

Viral croup often presents similarly to an upper respiratory infection, with 12 to 72 hours of low-grade fever and coryza. The clinical diagnosis of croup can be made by history and physical examination. It has typical findings of abrupt onset of a barking cough, inspiratory stridor, and hoarseness, dyspnea and fever. The absence of fever should not reduce suspicion for croup. Symptoms may be exacerbated by emotional distress, are worse at night, and peak between

24 and 48 hours. Croup typically resolves within 48 hours to one week.

Severe cases of croup may present with hypoxemia and signs of respiratory distress (nasal flaring, chest retractions etc). The most common auscultatory finding is overt inspiratory stridor in the neck. If wheezing is present, it is typically mild; substantial wheezing should prompt evaluation for alternate diagnoses<sup>1</sup>

Croup severity can be assessed by Westley croup scoring system (Table 2).

**TABLE 2: WESTLEY CROUP SCORE**

<b>Clinical sign</b>	<b>Score</b>
Level of consciousness <ul style="list-style-type: none"> <li>• Normal (Including sleep)</li> <li>• Disoriented</li> </ul>	0 5
Cyanosis <ul style="list-style-type: none"> <li>• None</li> <li>• With agitation</li> <li>• At rest</li> </ul>	0 4 5
Stridor <ul style="list-style-type: none"> <li>• None</li> <li>• When agitated</li> <li>• At rest</li> </ul>	0 1 2
Air entry <ul style="list-style-type: none"> <li>• Normal</li> <li>• Decreased</li> <li>• Markedly decreased</li> </ul>	0 1 2
Retractions <ul style="list-style-type: none"> <li>• None</li> <li>• Mild</li> <li>• Moderate</li> <li>• Severe</li> </ul>	0 1 2 3
Total score <ul style="list-style-type: none"> <li>• &lt;2</li> <li>• 3-7</li> <li>• 8-11</li> <li>• &gt;12</li> </ul>	Severity <ul style="list-style-type: none"> <li>• Mild</li> <li>• Moderate</li> <li>• Severe</li> <li>• Impending respiratory failure</li> </ul>

## DIFFERENTIAL DIAGNOSIS

Although most children with abrupt onset stridor have croup, the following differential diagnosis should be borne in mind (table 3)

TABLE 3

Condition	Typical age	Presentation
Bacterial Tracheitis	<6 years	High fever, barking cough, respiratory distress and rapid deterioration
Epiglottitis	3-12 years	Acute onset of dysphagia, odynophagia, drooling, high fever, anxiety, and muffled voice
Foreign body aspiration	<3 years	Acute onset of choking, asymmetrical findings
Retropharyngeal abscess	2-4 years	Fever, drooling, dysphagia, odynophagia, and neck pain

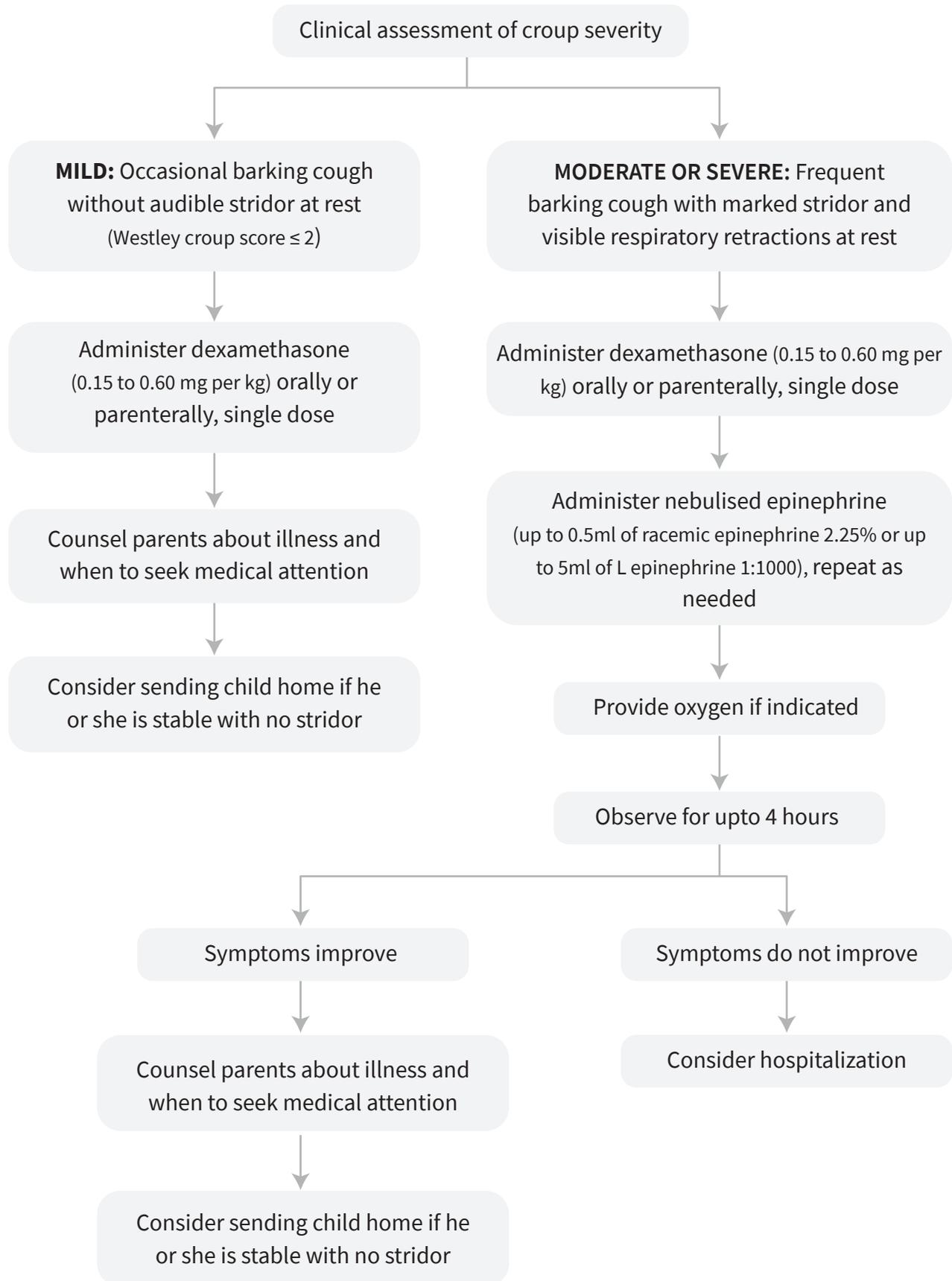
Investigations are not typically needed for the diagnosis of croup. CBC with lymphocytosis suggest viral etiology and neutrophilia suggest bacterial etiology. Although radiographic imaging is not routinely indicated, croup is often associated with the steeple sign. Laryngoscopy should be reserved for atypical presentations or when alternate diagnoses are suspected.

## Management

Management of croup is based on the severity of illness.

- OXYGEN should be administered to children with hypoxemia or severe respiratory distress
- CORTICOSTEROIDS Should be used in patients with croup of any severity<sup>2</sup>. Corticosteroids are thought to work by decreasing laryngeal mucosal edema through their anti-inflammatory effects. Dexamethasone is the preferred corticosteroid because it is given as a single dose and can be given orally, intramuscularly, or intravenously. Although the optimal dose is unclear, 0.6 mg per kg is the most used dose.
- EPINEPHRINE is thought to improve symptoms in patients with croup through arteriole vasoconstriction in the upper airway mucosa, which eventually leads to decreased edema. Epinephrine is typically used in conjunction with corticosteroids because it has a quick onset of action but a short half-life, whereas corticosteroids have a slower onset of action but a longer half-life<sup>3</sup>.

## ALGORITHM FOR MANAGEMENT



## KEY RECOMMENDATIONS FOR PRACTICE

- Diagnosis of croup is based on clinical findings of barking cough, stridor, and hoarseness. Diagnostic testing is typically not necessary.
- Humidified air inhalation does not improve symptoms in patients with moderate croup.
- Corticosteroids should be administered to patients with croup of any severity.
- Epinephrine should be administered to patients with moderate to severe croup.

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1. Smith DK, McDermott AJ, Sullivan JF. Croup: diagnosis and management. *American family physician*. 2018 May 1;97(9):575-80.
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3. Bjornson C, Russell K, Vandermeer B, Klassen TP, Johnson DW. Nebulized epinephrine for croup in children. *Cochrane Database Syst Rev*. 2013;(10):CD006619.

## Our Centres

- Kukatpally : JNTU, Hitech City Rd, KPHB Colony
- Banjara Hills : ICICI Bank Lane, Road No. 12, Banjara Hills
- AS Rao Nagar : Beside ICICI Bank, AS Rao Nagar
- Boduppal : Opp. Big Bazaar, Boduppal
- Madinaguda : Opp. Maangalya Shopping Mall, Madinaguda
- Balanagar : Opp. IDPL Colony, Adarsh Nagar, Balanagar
- Mehdipatnam : Opp. Pillar No. 34, Rethibowli, Mehdipatnam
- LB Nagar : Opp. Pillar No. 1643, Kothapet, LB Nagar
- Vijayawada : Besides Lalithaa Jewellery,  
Pinnamaneni Polyclinic Road, Vijayawada
- Khammam : Balaji Nagar, Khammam, Telangana
- Tirupati : Korramenugunta, Renigunta Road, Tirupati



**9053 108 108**