

**A rare case of severe croup caused by streptococcus**

<sup>1</sup>Dr. Shrasta Soumya, Junior Resident, Department of Paediatrics, D.Y. Patil University and School of Medicine, Nerul, Navi Mumbai, Maharashtra, India.

<sup>2</sup>Dr. Ravi Prakash Naulakha, Senior Resident, Department of Paediatrics, D.Y.Patil University and School of Medicine, Nerul, Navi Mumbai, Maharashtra, India.

<sup>3</sup>Dr. Ipsita Vashishtha, Senior Resident, Department of Paediatrics, D.Y.Patil University and School of Medicine, Nerul, Navi Mumbai, Maharashtra, India.

<sup>4</sup>Dr. Neelu Elon, Assistant Professor, Department of Paediatrics, D.Y.Patil University and School of Medicine, Nerul, Navi Mumbai, Maharashtra, India.

<sup>5</sup>Dr. Prithi Inamdar, Associate Professor, Department of Paediatrics, D.Y.Patil University and School of Medicine, Nerul, Navi Mumbai, Maharashtra, India.

**Corresponding Author:** Dr. Shrasta Soumya, Junior Resident, Department of Paediatrics, D.Y.Patil University and School of Medicine, Nerul, Navi Mumbai, Maharashtra, India.

**Citation this Article:** Dr. Shrasta Soumya, Dr. Ravi Prakash Naulakha, Dr. Ipsita Vashishtha , Dr. Neelu Elon , Dr. Prithi Inamdar, “A rare case of severe croup caused by streptococcus.”, IJMSIR- January - 2022, Vol – 7, Issue - 1, P. No. 380 – 384.

**Type of Publication:** Case Report

**Conflicts of Interest:** Nil

**Abstract**

Croup or laryngotracheobronchitis is inflammation and edema of airways, usually secondary to viral infection, resulting in narrowing of airways. Most common virus causing croup is parainfluenza viruses. Other viruses are respiratory syncytial virus, corona virus, influenza virus, adenovirus and rhinovirus. Bacterial croup is caused by bacterial infection and is much rarer than viral croup. It is characterised by barking cough, inspiratory stridor and hoarseness of voice. Croup is usually a mild illness and has self-limited course. We report a case of severe croup caused by streptococcus in a 14-month-old female child requiring intensive care and mechanical ventilation.

**Keywords:** Croup, Barking cough, Inspiratory stridor, Bacterial tracheitis.

**Introduction**

Croup, or laryngotracheobronchitis, is a common condition of childhood characterised by subglottic inflammation commonly associated with fever, “barking” cough, and stridor<sup>18</sup>. This is a viral illness most often secondary to human parainfluenza viruses, but also associated with respiratory syncytial virus, rhinovirus, enterovirus, and others. Bacterial croup is caused by a bacterial infection. Most instances of bacterial croup are from *Staphylococcus aureus*, *Streptococcus pyogenes*, *Streptococcus pneumoniae*, *Haemophilus influenzae* and *Moraxella catarrhalis*<sup>22</sup>. This type is much rarer than viral croup and can be divided into bacterial tracheitis, laryngotracheobronchitis (LTB),

laryngotracheobronchopneumonitis (LTBP), and laryngeal diphtheria<sup>21</sup>. As a result, croup is typically seen in winter seasons, and patients usually have associated viral symptoms such as rhinorrhea and nasal congestion. The diagnosis of croup is clinical. On physical examination, patients have inspiratory stridor, which may occur at rest or only while crying. The child's degree of respiratory status and work of breathing is directly related to the severity of croup. X ray neck AP view may demonstrate subglottic narrowing or "steep sign" which is not essential for the diagnosis of croup. Viral croup is typically a self-limiting illness which resolves over period of several days but bacterial croup requires a course of antibiotics<sup>20</sup>. We report a case of severe bacterial laryngotracheobronchitis caused by streptococcus group in a 14-month-old female child requiring intensive care and mechanical ventilation.

### Case report

A 14-month-old female child presented with fever, cold, vomiting and loose stools since 3 days, barking cough and noisy breathing since 2 days and rapid breathing since 1 day. On examination she had tachycardia, respiratory distress, continuous stridor and air entry decreased bilaterally. She was restless, agitated and there was refusal to liquids. Her saturation on room air was 90 %. She was put on oxygen by non-rebreathing mask and was admitted in PICU. Diagnosis of severe croup (LTB) was made which was supported by X-ray neck AP view showing steep sign (Fig-1). Nebulised adrenaline was started and oxygen saturation was maintained with a non-rebreathing at 8 litres of oxygen. So with suspicion of viral croup syrup oseltamivir and injection Dexamethasone was started. Chest radiograph showed increased Broncho vascular markings. CRP was 73.2, ABG was suggestive of respiratory acidosis and throat

was full of purulent secretions. Patient's condition kept on deteriorating despite treatment and on day 3 of admission child was cyanotic and became unconscious so child was intubated and kept on mechanical ventilator. Throat swab was sent for culture and antibiotics were started. HRCT was done to rule out foreign body, Flexible bronchoscopy was done in operation theatre to visualise the respiratory tract but except oedema no significant finding was found. Swab culture was suggestive of diplococci most likely streptococcus group. In spite of the patient being on ventilator, lung fields remained clear, strengthening our diagnosis of laryngotracheobronchitis.

She had one episode of convulsion so was loaded on injection fosphenytoin. Her convulsions were attributed to hypernatremia, which was gradually corrected. Injection glycopyrolate was started to reduce excessive secretions. Antibiotics, nebulisations were continued and Injection dexamethasone was given for total 5 days. She was extubated after 5 days. Oral feeds started after weaning off oxygen support and gradually increased. Initially she had cough on taking feeds, which was more to liquids which then improved gradually. Patient's condition improved, she was afebrile and there was no stridor and hence was discharged from PICU.

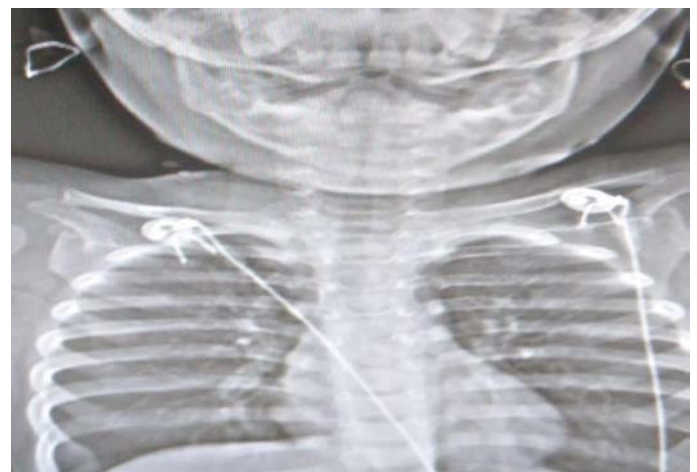


Fig. 1

## Discussion

Croup is a common respiratory tract infection characterised by barking cough, stridor and hoarseness of voice with various degree of respiratory distress. The disease usually occurs between 7 and 36 months of age<sup>2,4</sup>. The peak incidence occurs in the second year of life with 4.7 cases per 100 children<sup>8</sup>. Boys are 1.43 times more likely to develop croup than girls<sup>8</sup>.

Bacterial croup is divided into bacterial tracheitis, laryngotracheobronchitis,

laryngotracheobronchopneumonitis and laryngeal diphtheria<sup>21</sup>. The common bacterial causes are Staphylococcus aureus, Streptococcus pneumoniae, Hemophilus influenzae, and Moraxella catarrhalis<sup>22</sup>.

Croup causes swelling of the larynx, trachea, and large bronchi due to infiltration of white blood cells. Swelling results in partial airway obstruction which, when significant, results in dramatically increased work of breathing, and the characteristic turbulent, noisy airflow known as stridor. Croup is characterized by a "seal-like barking" cough, stridor, hoarseness, and difficulty breathing, which typically becomes worse at night<sup>22</sup>. Agitation worsens the stridor, and it can be heard at rest. Other symptoms include fever and dyspnea, but the absence of fever should not reduce suspicion for croup. Respiratory rate and heart rate may also be increased. Visual inspection of nasal flaring, retraction, and rarely cyanosis increases suspicion for croup.

Bacterial tracheitis, pathogenic bacteria invade the trachea and stimulate both local and systemic inflammatory responses. Locally, this results in production of thick, mucopurulent exudates, ulceration and sloughing of the tracheal mucosa. This can result in a variable degree of upper airway obstruction.

In majority of cases croup is mild illness; but significant airway obstruction leading to respiratory distress and rarely, death do occur. In our case the child had severe respiratory distress and required PICU care and even required intubation and mechanical ventilation. Repeated doses of inhaled adrenaline and multiple doses of intravenous dexamethasone were given. Treatment of croup with steroid has been extensively studied and its effectiveness has been well established. Steroids should be considered even in mild cases of croup, as use of steroids is associated with early recovery and low return rate to medical care facility compared to placebo group<sup>12</sup>. In severe cases of croup requiring mechanical ventilation, steroid use reduces the duration of mechanical ventilation<sup>13</sup>. Oral route is preferred in majority of the cases. Parenteral route should be considered if patient is not suitable for oral intake, especially in severe cases<sup>1</sup>. There is no literature which directly compares the outcomes of single-dose and multiple-doses of steroid usage<sup>2,14</sup>. The outcome is dependent on the levels of infections (airway versus parenchyma) and if secondary bacterial infections are present. The PICU equations are useful in prognostication<sup>15,16</sup>. Corticosteroid, adrenaline or bronchodilators are useful in treating airway disease whereas parenchymal disease requires positive airway pressures in the PICU.

## Conclusion

Croup is a usually a mild childhood respiratory disease, occasionally it can lead to severe airway obstruction and respiratory failure. Croup caused by streptococcus group cause severe illness rare than viral croup. Patient needed antibiotics ventilator lung field clear. Systemic corticosteroid, antibiotics and nebulisation with adrenaline is the main stay of treatment in severe Croup infection with airway compromise. Intensive care,

antiviral and antibacterial treatment may ensure good outcome of severe croup infection in children.

## References

1. Zoo rob R, Sidani M, Murray J. Croup: an overview. *Am Fam Physician* 2011;83(9):1067-73.
2. Cherry JD. Clinical practice. Croup. *New Engl J Med* 2008; 358(4):384-91.
3. Rihkanen H, Ronkko E, Nieminen T, Komsu KL, Raty R, Saxen H, et al. Respiratory viruses in laryngeal croup of young children. *J Pediatr* 2008;152(5):661-5.
4. Hon KL, Leung AK. Severe childhood respiratory viral infections. *Adv Pediatr* 2009;56(1):47-73.
5. Hon KL, Cheung KL, Wong W, Ng PC. Neonates investigated for influenza-like illness during the outbreak of pandemic H1N1 2009: trivial infections but major triage implications. *Ind J Pediatr* 2010;77(9):1033-5.
6. Hon KL, Leung TF, Cheung KL, Ng PC, Chan PK. Influenza and parainfluenza associated pediatric ICU morbidity. *Ind J Pediatr* 2010;77(10):1097-101.
7. Peltola V, Heikkinen T, Ruuskanen O. Clinical courses of croup caused by influenza and parainfluenza viruses. *Pediatr Infect Dis J* 2002;21(1):76-8.
8. Denny FW, Murphy TF, Clyde WA Jr, Collier AM, Henderson FW. Croup: an 11-year study in a pediatric practice. *Pediatrics* 1983;71(6):871-6.
9. Counihan ME, Shay DK, Holman RC, Lowther SA, Anderson LJ. Human parainfluenza virus-associated hospitalizations among children less than five years of age in the United States. *Pediatr Infect Dis J* 2001;20(7):646-53.
10. Tang JW, Lai FY, Wong F, Hon KL. Incidence of common respiratory viral infections related to climate factors in hospitalized children in Hong Kong. *Epidemiology & Infection* 2010;138(2):226-35.
11. Hon KL, Leung E, Tang J, Chow CM, Leung TF, Cheung KL, et al. Premorbid factors and outcome associated with respiratory virus infections in a pediatric intensive care unit. *Pediatric Pulmonol* 2008;43(3):275-80.
12. Bjornson CL, Klassen TP, Williamson J, Brant R, Mitton C, Plint A, et al; Pediatric Emergency Research Canada Network. A randomized trial of a single dose of oral dexamethasone for mild croup. *N Engl J Med* 2004;351(13): 1306-13.
13. Tibballs J, Shann FA, Landau LI. Placebo-controlled trial of prednisolone in children intubated for croup. *Lancet* 1992; 340(8822):745-8.
14. Bjornson CL, Johnson DW. Croup. *Lancet* 2008;371(9609): 329-39.
15. Hon KL, Leung AS, Cheung KL, Fu AC, Chu WC, Ip M, et al. Typical or atypical pneumonia and severe acute respiratory symptoms in PICU. *Clin Respir J* 2014;10.
16. Hon KL, Leung AK. Chlamydial pneumonitis: a creepy neonatal disease. *Case Rep Pediatric* 2013; 2013:549649.
17. Teasdale G, Jennett B. Assessment of coma and impaired consciousness. A practical scale. *Lancet* 1974;2(7872): 81-4
18. Flerlage J, Engorn B. *The Harriet Lane Handbook*. 20th ed.; 2015:12.
19. Mills J. The usefulness of lateral neck roentgenograms in laryngotracheobronchitis. *Arch Pediatr Adolesc Med*. 1979;133(11):1140. doi:10.1001/archpedi.1979.02130110048006

20. Thompson M, Vodicka T, Blair P, Buckley D, Heneghan C, Hay A. Duration of symptoms of respiratory tract infections in children: Systematic review. *BMJ*. 2013;347(dec11 1): f7027-f7027. doi:10.1136/bmj.f7027
21. <https://www.medicalnewstoday.com/articles/155932#signs-and-symptoms>
22. <https://www.ncbi.nlm.nih.gov/books/NBK431070/>