

# THE ETIOLOGY AND TREATMENT OF BRONCHIOLITIS IN CHILDREN (A REVIEW)

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**Abstract:** - Respiratory syncytial virus (RSV) is the main cause of bronchiolitis in infants, and it is commonly the main cause of epidemics. The main cause of bronchiolitis is generally viral, including RSV, human metapneumovirus, influenza virus, human parainfluenza viruses, adenoviruses, and rhinovirus. From among the bacterial causes, pertussis has been introduced as the one making bronchiolitis symptoms. As the age increases, the prevalence rate and severity of diseases arising from RSV decreases. This virus brings about 90,000 hospitalization cases and 4500 deaths in the United States. This virus has been observed in at least 20% of the children hospitalized. The treatment of bronchiolitis is a supportive one, and it includes monitoring, fever control, proper hydration, upper airway suctioning, and oxygen prescription. The main treatment of bronchiolitis is oxygen prescription; patients feeling worse tend to be hypoxic. The oxygen saturation percentage needs to be at the level of 92% or higher. For this purpose, the prescription of lukewarm and wet oxygen (30% to 40%) through mask or nasogastric tube is sufficient. Bronchiolitis complications include apnea, dehydration, electrolyte disorders (usually hyponatremia), added bacterial infection, myocardial dysfunction, Myocarditis, and respiratory failure. Most of the children hospitalized in the hospital will recover significantly only through a supportive treatment within 2-5 days. After the recovery, wheezing or coughing lasted for several weeks or months in less than 20% of the patients. Older children and adults produce an antibody against RSV. However, the immunity is not complete and reinfection can occur at any age.

**Key words:** - Etiology, treatment, Bronchiolitis, children

## Etiology:

Respiratory syncytial virus (RSV) is the main cause of bronchiolitis in infants, and it is commonly the main cause of epidemics. The main cause of bronchiolitis is generally viral, including RSV, human metapneumovirus, influenza virus, human parainfluenza viruses, adenoviruses, and rhinovirus (1). From among the bacterial causes, pertussis has been introduced as the one making bronchiolitis symptoms. As the age increases, the prevalence rate and severity of diseases arising from RSV decreases (2). This virus brings about 90,000 hospitalization cases and 4500 deaths in the United States. This virus has been observed in at least 20% of the children hospitalized. This virus is possibly either chronic or recurrent, and it is commonly associated with gastroesophageal reflux disease (also known as acid reflux), and the patient is likely to report a

history of repeated vomiting. Cystic Fibrosis is associated with poor growth, chronic diarrhea, and positive family history (3). The existence of a local region in lung radiography that is not filled and emptied (with air) by breathing introduces the foreign body. In distinguishing bronchiolitis from pneumonia, it needs to be taken into account that in bronchiolitis, the crackles are coarse, and they can be heard both during inhaling and exhaling. This indicates that the disease is more frequently seen in respiratory tracts than alveoli. However, in pneumonia, the crackles are fine and they are usually heard at the end of inhaling (4).

## Treatment:

The treatment of bronchiolitis is a supportive one, and it includes monitoring, fever control, proper

hydration, upper airway suctioning, and oxygen prescription. The main treatment of bronchiolitis is oxygen prescription; patients feeling worse tend to be hypoxic. The oxygen saturation percentage needs to be at the level of 92% or higher (5). For this purpose, the prescription of lukewarm and wet oxygen (30% to 40%) through mask or nasogastric tube is sufficient. The application of oxygen tent is not recommended; it makes the child anxious and conducting treatment will be more difficult by using this tent. Moreover, due to the child's fever, using cold nebula is likely to result in shivering and increased need for oxygen (6). Furthermore, since some patients are likely to suffer from asthma, cold nebula is likely to aggravate bronchospasm. Given the intensity of the hypoxia, some of the patients are likely to require oxygen with high concentrations and even 100% oxygen (13, 15). The patients hospitalized in the hospitals need a mechanical ventilation of 5% to 1. In patients suffering from bronchiolitis, the continuous application of pulse oximetry can be problematic in children that do not need oxygen; the transient courses of saturation drop is a normal phenomenon in children (7). The children suffering from bronchiolitis may suffer from dehydration due to tachypnea, fever, and inappropriate nutrition arising difficult breathing or nasal discharges. Dehydration is a main problem in children suffering from bronchiolitis. During the treatment process, one needs to be careful about water retention in these patients; edema is a fundamental process in the pathology of bronchiolitis, and the extra water is likely to result in airway obstruction. Moreover, due to the negative intrathoracic pressure, these patients are prone to pulmonary edema (8). The minor cases are commonly monitored by parents at home. The parents need to be warned about the symptoms of disease worsening including irritability, lack of appetite, tachypnea, and cyanosis. Most of the hospitalized patients suffering from bronchiolitis will quickly recover by prescribing oxygen and sufficient liquid therapy with no need for further interventions. One of the relative changes in bronchiolitis is the spasm of smooth muscles around bronchioles (9). Thus, for moderate and severe cases of the disease, it is recommended to use inhaled bronchodilator (0.15 mg/kg/dose salbutamol) through a peak flow nebulizer to create relative changes in the disease. If there is no appropriate response for its reuse, using inhaled Epinephrine

(1:1000 solution, 0.01 ml/kg) 15 to 20 minutes a day (three times a day) will result in virus release and improved oxygenation (in case of RespiGam). However, determining its effect calls for further studies. Nowadays, using palivizumab-specific antibody has been recommended to prevent bronchiolitis in 5 monthly doses during RSV prevalent season in the first year of life of infants suffering from heart diseases associated with hemodynamic disorders, infants with chronic pulmonary diseases, premature infants younger than 32 weeks in need of 21% oxygen in the first 28 days of birth (10).

### **Prognosis complications:**

Bronchiolitis complications include apnea, dehydration, electrolyte disorders (usually hyponatremia), added bacterial infection, myocardial dysfunction, Myocarditis, and respiratory failure. Most of the children hospitalized in the hospital will recover significantly only through a supportive treatment within 2-5 days. After the recovery, wheezing or coughing lasted for several weeks or months in less than 20% of the patients. Older children and adults produce an antibody against RSV. However, the immunity is not complete and reinfection can occur at any age (11). After recurrent infections, an increasing decrease was observed in the severity of the disease; this indicates the role of immunity in reducing the severity of the disease. Except for children suffering from underlying cardiac or pulmonary diseases, the total mortality rate arising from bronchiolitis is low. However, even in these cases, the mortality rate does not exceed 1%.

The relationship between bronchiolitis and the disease progress toward asthma needs to be investigated. As many as 50% of the patients suffering from bronchiolitis experience the repeated attacks of chest wheezing (12). However, this rate is not likely to exceed than that of the ordinary population. After suffering from bronchiolitis, the repeated attacks of wheezing are likely to bring about a hereditary tendency to asthma. Some studies suggest a strong relationship between the family history of atopy and chest wheezing after suffering from bronchiolitis. RSV infection at the beginning of infancy is likely to hurt evolving airways and make them prone to obstruction in the future (13). The investigation of pulmonary function tests 12 years after the bronchiolitis attacks indicates the

increased sensitivity of airways in response to stresses such as sports and chemicals. Moreover, the proportion of the remaining volume to the total pulmonary volume and expiratory flow will decrease. Some studies have indicated that although bronchiolitis attacks arising from RSV is not likely associate with long-term pulmonary dysfunction, two attacks from the lower respiratory tract occurring before the age of 2 are likely to bring about pulmonary dysfunction (14).

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