

Acute Bronchiolitis In Children

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Acute bronchiolitis is one of the common acute respiratory infections in children less than 2 years of age. It is a major cause of morbidity and mortality among children of this age group. It is an inflammatory injury occurring to the bronchioles usually caused by a virus infection usually Respiratory syncytial virus. Though this condition may occur in any age group it is more severe in younger infants as the older airways of older children can better accommodate the mucosal edema.

Bronchiolitis usually affects infants less than 2 years of age, peaking between 3 - 6 months. It is usually a self-limited condition caused by RSV. The aim in the treatment of bronchiolitis will be more standardized care, fewer hospitalizations, better management of resources, and shorter length of hospital stays without increasing readmission rates or decreasing family satisfaction.

Bronchioles are small airways less than 2mm in diameter and do not have cartilage or submucosal glands. The effects of bronchiolar injury may begin 18 to 24 hours after the infection. Increased mucus secretion, Atelectasis, Air trapping, Bronchial obstruction and constriction, Reduced ventilation that leads to ventilation-perfusion mismatch can be seen 18-24 hours after the infection.

Type 1 allergic reactions involving IGE are implicated in bronchiolitis. Babies who are breast fed receiving colostrum and IgA are protected from bronchiolitis. A necrosis of respiratory epithelium occurs. Also there is proliferation of goblet cells with increased mucus production. Epithelial regeneration with non ciliated cells results in impaired elimination of secretions. Lymphocytic infiltration results in mucosal edema. Small bronchiole epithelium was circumferentially infected but basal cells were spared. Both type 1 and type 2 alveolar pneumocytes were also infected. Airway obstruction was due to epithelial and inflammatory cell debris mixed with fibrin, mucus, and edema fluid but not to bronchial smooth muscle constriction. Neutrophil inflammation, but not eosinophil inflammation, is related to the severity of a first infection in infants.

Most cases of bronchiolitis result from a viral pathogen, such as RSV, rhinovirus, human metapneumovirus (hMPV), parainfluenza virus, adenovirus, coronavirus, influenza virus or human bocavirus. Risk factors for the development of bronchiolitis include the following, Age less than 3 months (two thirds of all infants hospitalized with RSV infection are younger than 5 months of age), Severe congenital or acquired neurologic disease, Gestational age (infants born at <29 weeks of gestation are at a particularly higher risk for hospitalization from RSV infection), Congenital or acquired immune deficiency diseases, Hemodynamically significant congenital heart disease (CHD) e.g, with pulmonary hypertension, Airway anomalies and Parental smoking.

According to the WHO 2015 Global Health Observatory data repository, acute lower respiratory infection in children younger than 5 years of age remains a leading cause of childhood mortality in the world.

Bronchiolitis is an infectious, self-limited disease. Therapy is based on supportive care,

oxygenation, hydration, and fever control. With early recognition and treatment, prognosis is usually very good. Most children with bronchiolitis, regardless of severity, recover without sequelae. The course of disease is usually 7-10 days, but a few remain ill for weeks. Some infants who recover from acute bronchiolitis have an increased frequency of recurrent wheezing.

In most older children and adults RSV infection is confined to the upper airways and does not progress to the lower airways. In younger children it progresses to the lower airways. Children have a low grade fever, some coryza and congestion. They remain fussy for a few days and do not take feeds well.

Over a period of 2-5 days, RSV infection progresses from the upper to the lower respiratory tract, and this progression leads to the development of cough, dyspnea, wheezing, and feeding difficulties. When the patient is brought to medical attention, the fever has usually resolved. Infants younger than 1 month may present as hypothermic.¹ Severe cases progress to respiratory distress with tachypnea, nasal flaring, retractions, irritability, and, possibly, cyanosis.

On examination the children have tachypnea, tachycardia, fever, fine rales and wheezing. Hypoxia is the best predictor of severe illness and correlates best with the degree of tachypnea (>50 breaths/min). The degree of wheezing or retractions correlates poorly with hypoxia. First-time infections are usually most severe; subsequent attacks are generally milder, particularly in older children.

Apnea occurs early in the course of disease especially in those are born prematurely.

Nonrespiratory manifestations of RSV infections include otitis media, myocarditis, supraventricular and ventricular dysrhythmias, and the syndrome of inappropriate antidiuretic hormone secretion (SIADH).

Some complications of bronchiolitis include Acute respiratory distress syndrome, myocarditis, chronic lung disease, secondary infection, myocarditis and bronchiolitis obliterans.

RSV infections have been associated with the development of asthma later in life, with an odds ratio of 4.3 in children aged 11 years or younger.

The differential diagnosis of bronchiolitis includes, bronchomalacia, bronchial cleft, cardiac disease, congenital heart disease, gastroesophageal reflux, tracheal ring, vascular ring etc.

The diagnosis of bronchiolitis is based on clinical presentation, the patient's age, seasonal occurrence, and findings from the physical examination. Tests are typically used to exclude other diagnoses (eg, bacterial pneumonia, sepsis, or congestive heart failure) or to confirm a viral etiology

Chest radiographs are not routinely necessary. If clinically indicated, they should include anteroposterior (AP) and lateral views. Chest radiography is most useful in excluding unexpected congenital anomalies or other conditions ; it may also yield positive evidence of alternative diagnoses (eg, lobar pneumonia, congestive heart failure, or foreign body aspiration).

- The management of these infants should be directed toward symptomatic relief and maintenance of hydration and oxygenation. Bronchodilator therapy to relax bronchial smooth muscle, is commonly used. Corticosteroids have clearly failed to show a significant benefit in improving the clinical status of patients with bronchiolitis. Beta-agonists and ipratropium bromide, an aerosolized anticholinergic agent, have not shown effectiveness in the management of infants with RSV and wheezing. Nebulized hypertonic (3%) saline may improve symptoms of bronchiolitis when length of stay is expected to exceed 3 days. Palivizumab prophylaxis should only be administered to selected children.

Clinical improvement, no apnea, acceptable oxygen saturation, no tachycardia the child can be discharged.

RSV is transmitted via direct contact with secretions of infected patients. Droplets and fomites play a less important role. Meticulous attention to hand washing between patient contacts should reduce the likelihood of hospital staff acquiring RSV infection from patients and of spreading infection by carrying RSV on their hands.

References :

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- [2] Acute bronchiolitis Andrew Bush, professor of paediatric respirology¹ and Anne H Thomson, consultant in paediatric respiratory medicine
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