

Clinical and epidemiological profile of infants admitted to an intensive care unit for acute viral bronchiolitis in Brazil

Abstract

Acute viral bronchiolitis (AVB) is a frequent respiratory disease in infants, responsible for high morbidity and high hospitalization rates. It has an epidemic pattern prevalent in winter and spring. The most common pathogen is the respiratory syncytial virus. The decision for intensive care unit admission depends on indicators of disease severity, which include: severe dehydration, tachypnea with exertion, wheezing, cyanosis or hypoxemia, altered neurological status. In some cases, bronchiolitis may complicate respiratory failure and require ventilatory support. Another important consideration at the time of admission decision is the presence of comorbidities such as heart disease, extreme prematurity, immunodeficiency, and neuropathy that often lead to unfavorable outcomes. In addition to paying attention to young infants younger than 3 months, who have a worse prognosis and higher mortality rate.

In such cases, close medical attention should be sought, with supportive measures necessary for a better outcome of the case. In an intensive care unit in Brazil, after the establishment of a therapeutic protocol for bronchiolitis, favorable results were observed with the use of hypertonic saline, infrequent use of corticosteroids and antibiotics, even in infants who required ventilatory support.

Keywords: prematurity, immunodeficiency, wheezing, cyanosis, hypoxemia, dehydration

Volume 9 Issue 5 - 2019

Bárbara Neffá Lapa e Silva, Danielle Bulkool, Gustavo Guimarães, Natália Neto, Daniela Peyneau, Leonardo Nese

Complexo Hospitalar de Niterói, Rio de Janeiro, Brazil

Correspondence: Bárbara Neffá Lapa e Silva, Complexo Hospitalar de Niterói, Rio de Janeiro, Brazil, Email barbaraneffa@yahoo.com.br

Received: August 28, 2019 | **Published:** September 13, 2019

Abbreviations: AVB, acute viral bronchiolitis; RSV, respiratory syncytial virus

Introduction

Acute viral bronchiolitis (AVB) is a disease caused by a lower respiratory tract viral infection in infants (especially in the first year of life), commonly referring to the first episode of wheezing. The most common virus involved is respiratory syncytial virus (RSV), which accounts for more than 60% of cases. Other viruses involved are Influenzae, metapneumovirus, bocavirus, rhinovirus, adenovirus, among others. It is the most common cause of lower respiratory tract infection in children up to two years of age, and is the main reason for hospitalization for respiratory causes in infants. However, the involvement of the lower airways and, consequently, the severe forms of the disease predominate in the primary infection. Bronchiolitis usually presents during the winter months after 2 to 4 days of low fever, nasal congestion and rhinorrhea, with symptoms of lower respiratory tract involvement that include cough, tachypnea and increased respiratory effort. It may eventually have apnea, especially in preterm infants within the first 2 months of life. The variable course of bronchiolitis and the inability to predict whether supportive care will be needed often result in hospitalization even when symptoms are not severe. However, some infants, in the severe form of the disease, need ventilatory support (noninvasive ventilation, invasive ventilation, other types of ventilation), and due to unclear characteristics, persist with respiratory symptoms in childhood. A variety of potential clinical markers have been proposed for use in identifying infants at risk for severe disease and the permanence of chronic lung disease.

Infants under six months of age, especially preterm infants,

children with chronic lung disease of prematurity and heart disease, represent the groups most at risk for developing more severe bronchiolitis, requiring hospitalization in 10% to 15% of cases. In this population, conditions associated with the development of severe disease are due to the immature immune system, reduced transfer of maternal antibodies and smaller airway caliber; added to the low energy reserve, frequent early weaning, anemia, recurrent infections and use of corticosteroids, making them more susceptible to RSV action.

The decision for intensive care unit admission depends on indicators of disease severity, which include: severe dehydration, tachypnea with exertion, wheezing, cyanosis or hypoxemia (saturation less than or equal to 92%), alteration of neurological status. In about 10-20% of cases, bronchiolitis can complicate respiratory failure and require ventilatory support.

Goals

Report results of children admitted to a pediatric ICU in Brazil in 2018, diagnosed with bronchiolitis, after adherence to therapeutic protocol in the unit.

Methods

This is a cross-sectional and analytical study of patients aged 1 to 24 months, admitted to an intensive care unit in Niterói (Rio de Janeiro, Brazil), diagnosed with acute viral bronchiolitis. The study was conducted from February to August 2018, corresponding to the seasonality of the disease. A therapeutic protocol was instituted upon admission, consisting of the use of hypertonic saline (three times a

day) and oxygen therapy (If saturation less than 92%), demonstrated in the main worldwide consensus as scientific evidence for bronchiolitis. Infants who had evidence of associated bacterial infection or who previously used corticosteroids were excluded from the study. The variables analyzed in the study were recorded in: epidemiological variables (gender, age, comorbidities), use of ventilatory support (invasive or noninvasive ventilation), duration of oxygen therapy, complications associated with the disease (presence of atelectasis, pneumothorax), virus identified by immunofluorescence, and the evolution of these patients.

Results

During the period, 106 children were hospitalized diagnosed with AVB. Males were predominant in hospitalizations (54.6%). Of the comorbidities found in 22 patients (20.7%), 10 were premature (45.4%), 7 had lung disease (31.8%) and 2 had heart disease (0.9%). Other comorbidities were found in 3 (13%) patients. Among the immunofluorescence studies carried out (in 36% of cases), 64% patients tested positive for RSV. Other results found: Rhinovirus (10%), Parainfluenza (7.8%), Adenovirus (2.6%) and Coronavirus (2.6%), Influenza type B (2.6%). Among patients requiring ventilatory support, the main indication was respiratory failure / hypoxemia, with a total of 18 patients (16.9%). Only 3 required orotracheal intubation, with an average of 4.5 days on mechanical ventilation. Most inpatients required oxygen therapy (65% of cases), with an average duration of 3 days. After instituting a protocol for AVB, antibiotic use at the unit reduced from approximately 30% (in 2017) to 3.8% of cases in 2018. Only 2 patients received short-term systemic corticosteroids and 2 patients received oseltamivir.¹⁻⁸

At hospital admission, 12 children were diagnosed with atelectasis, with greater involvement of the right upper lobe (41%) and the middle lobe (25%). The treatment consisted of the use of hypertonic saline, oxygen therapy and therapeutic bronchodilator test, with an average length of stay between 2 and 3 days in those who did not require ventilatory support. In addition, 29 (27.3%) children required enteral feeding due to difficulty in sucking, breathing effort and cyanosis. No child died.

Conclusion

After establishing a protocol for care and management of patients admitted for AVB, we observed a reduction in the use of systemic corticosteroids, antibiotics and bronchodilators, reported in the literature as the main reasons for prolonged hospitalization. In addition, the use of hypertonic saline is in agreement with the literature in reducing hospitalization time.

Acknowledgments

None.

Conflicts of interest

The authors declared there is no conflicts of interest.

Funding details

None.

References

1. Nair H. Global burden of acute lower respiratory infections due to respiratory syncytial virus in young children: a systematic review and meta-analysis. *Lancet*. 2010;375(9725):1454–1455.
2. Meissner HC, Ingelfinger JR. Viral bronchiolitis in children. *N Engl J Med*. 2016;374(1):62–72.
3. Florin TA. Viral bronchiolitis. *Lancet*. 2017;389:211–224.
4. Helfaer MA, Roger MC. Textbook of pediatric intensive care. 4th ed. 2012.
5. Ralston SL, Lieberthal AS. Clinical Practice Guideline: the diagnosis, management, and prevention of bronchiolitis. *Amer Acad of Pediatrics*. 2014;134(5):1474–1502.
6. Ganu SS, Gautam A. Increase in use of non-invasive ventilation for infants with severe bronchiolitis is associated with decline in intubation rates over a decade. *Intensive Care Med*. 2012;38:1177–1183.
7. Zhang L. Nebulised hypertonic saline solution for acute bronchiolitis in infants (review). *Cochrane*, 2017.
8. Heikkilä P, Renko M. Hypertonic saline inhalations in bronchiolitis. *Ped Pulmonol*. 2018;53(2):233–242.