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Children with congenital heart disease: Case of appearance of bronchiolitis

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Abstract

Usually harmless in infants less than a year, the viral respiratory infection known as bronchiolitis can be life-threatening in youngsters with preexisting cardiac conditions. Our goal was to explain the connection between bronchiolitis and cardiovascular disease from every angle possible: Epidemiological, clinical, therapeutic, and evolutionary. Over the course of 5 years, from 2018 to 2023. There were 87 cases and 165 controls in all. One percent of all hospitalizations were due to bronchiolitis caused by cardiac defects. Isolated septal defect of the ventricular was the most common kind of cardiac disease seen during a bronchiolitis episode. About 54% of the cases were really serious. The presence of cardiopathy was linked to a number of factors, including the degree of seriousness of bronchiolitis with odds ratio 2.72, the use of oxygen therapy (odds ratio 24.28), the length of time spent in the hospital (odds ratio 7.1), the presence of a progressive course, and the severity of the cardiopathy itself (odds ratio 26.72). The death rate was 15.2 percent. Bronchiolitis is prevalent among kids who have congenital heart disease. Therefore, consider the likelihood of congenital heart disease when dealing with an episode of bronchiolitis, especially in the severe forms.

Keywords: Bronchiolitis, congenital heart disease, ventricular septal defect

Introduction

Children younger than a year old frequently fall victim to the respiratory viral infection known as bronchiolitis^[1, 2]. One third of all Paediatric consultations and hospitalizations are now for this pathology. Bronchiolitis is most common in babies between the ages of 2 and 8 months, with an epidemic peak at 4 months^[1]. In most cases, this condition is not harmful and has a good prognosis^[4, 5]. Understanding the indicators of seriousness in bronchiolitis is crucial. Certain risk factors, however, would put the infant at a higher chance of acquiring a severe form, and these considerations are especially important for susceptible children who already have cardiac disease^[6, 7]. Most cases of congenital cardiac disease in Madagascar are detected early on, under the age of 12 months, with an estimated prevalence of 8.65 percent in hospitals in 2018^[8]. RSV infection is particularly dangerous for children with congenital cardiac problems. There was a greater mortality incidence among hospitalised patients (3.4% had an ICU stay). The primary goal is to identify the impact of congenital heart disease upon bronchiolitis in hospitalised children, and the secondary goal is to provide an epidemiological, clinical, therapeutic, and evolutionary characteristics of bronchiolitis in these children.

Methods

This study is a 5-year retrospective case-control investigation beginning in January 2018 and ending in January 2023. Children younger than 12 months old who are hospitalised with an indication of bronchiolitis make up the study population. The following standards were applied: All infants younger than 12 months old having a hospital admission indication of bronchiolitis and congenital heart disease were considered cases. Patients admitted with bronchitis but no heart problems were considered controls. Thus, for each case, there were two controls of the same age and gender.

Children who were 12 months or older, who had a third episode of bronchiolitis, who were admitted to the hospital for the same reason a second time, who were suspected of having congenital heart disease but whose diagnosis was not verified by cardiac ultrasound,

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Who were discharged against medical advice, who were transferred to another hospital, and who had an incomplete medical observation form were not included. The data was analyzed using the Chi-square and student's t tests at a significance level of $p < 0.05$.

Results: During the time period of our investigation, a total of 14835 children required hospitalisation; of these, 3192 (or 28%) had bronchiolitis. Over the course of the study's five years, 145 children (1%) were hospitalized with bronchiolitis related to congenital heart disease; 58 of these were not included in the analysis (refer Figure 1).

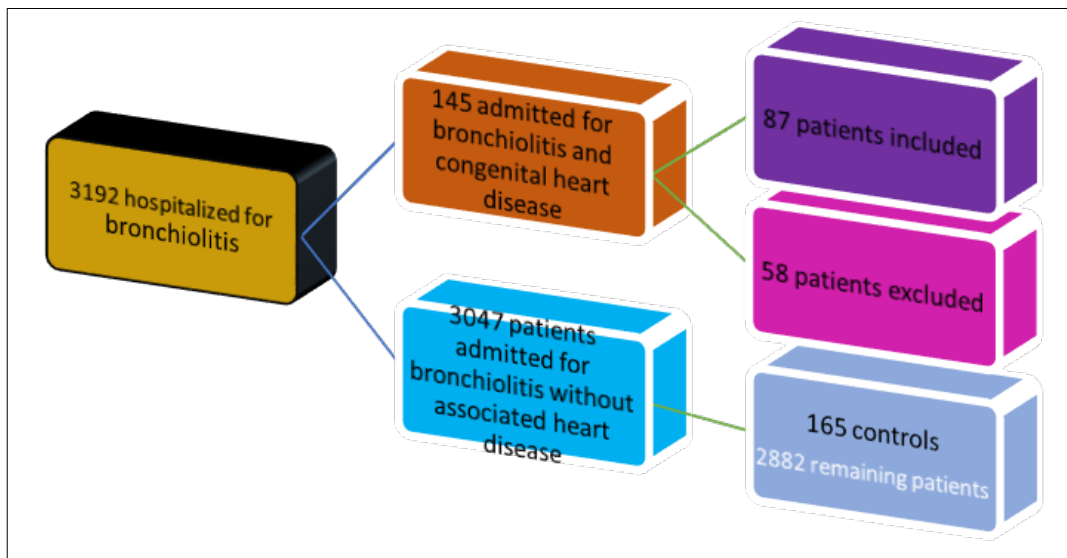


Fig1: Selection of Study Data

Socio-demographic data

The mean age of our population is 3.63 ± 3.75 months. The average age of the children was less than six months.

Clinical data

The most prevalent reason for hospitalization (78% of patients) was respiratory problems, followed by unwillingness to breastfeed (20%). Neither of the people we treated got the RSV vaccine.

Acute bronchitis was the most common presenting symptom that led to the diagnosis of congenital heart dysfunction.

There were 52.21% of cases with solitary ventricular septal defect (VSD), 32% of persistent left atrial appendage (ACP), and 7.9% atrial septal defect (ASD). Figure 2 shows that 12.84% had related lesions; the most common were VSD and ASD, each accounting for 9.5%.

In 56.8% of instances, the severity of the bronchiolitis was high and in 98.21% of cases, the oxygen saturation was lower than 90%. Antibiotic treatment constituted the majority (90%) and oxygen therapy was used in 98% of patients. Cases required oxygen therapy for an average of 6.45 ± 9.10 days. The fatality rate was 15.2 per cent.

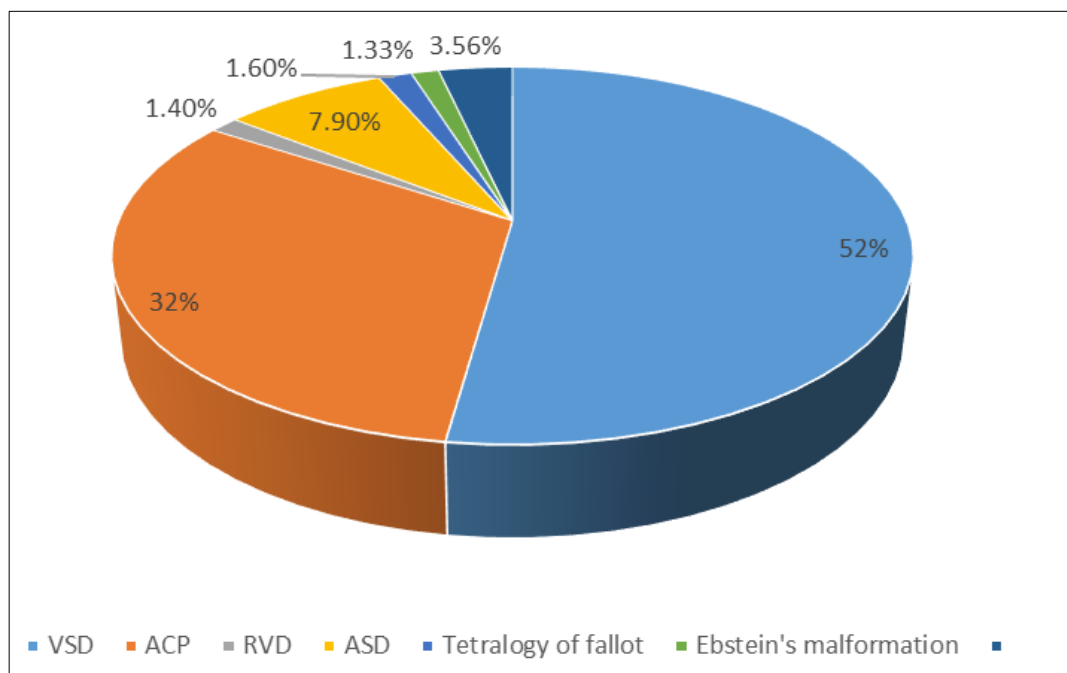


Fig 2: Different types of Cardiopathy

Analytical data: The link among congenital heart disease and bronchiolitis is demonstrated in Table 1.

Table 1: Factors affecting course of bronchiolitis

Factors	Odds Ratio	P Value
Severe Bronchiolitis	2.72	$p < .001$
Oxygenotherapy	24.28	$p < .001$
Length of hospital Stay	17.1	$p < .001$
Death	26.72	$p < .001$
Length of stay	6.48	$p < .001$

Discussion

In this study, 29 percent of hospitalised patients had bronchiolitis. The 1% rate of connection between bronchiolitis and CHD was significantly lower than the the US [9] and the Austria [10]. Our limited sample size is one possible explanation for this discrepancy, but another is that heart disease is being underdiagnosed due to a lack of funding. Our analysis found that the average age of children with bronchiolitis was 3.63 ± 3.75 months, which is younger as identified by Bogne, *et al.*, exhibiting a peak in infants between 2 and 4 months [11], but similar to the 2 months reported by Resh, *et al.* Bronchiolitis was most common between the ages of 3 and 6 months. In 55.7% of instances, the bronchitis was quite severe. This was lower than the found in Korea and the USA, respectively [9, 12, 13]. This can be explained by the fact that a tiny newborn with bronchiolitis already has a high preexisting risk factor for developing congenital heart disease [1], especially if the heart condition has not yet been operated on. The majority of children in our study (98%), who required oxygen therapy for an average of 6.45 ± 9.10 days (much longer than the literature's mean length of 1 day), benefited from this treatment [10]. This distinction may be attributed to the fact that parents typically do not take their children home until the condition has progressed, at which point oxygen therapy is severely limited. During bronchiolitis epidemic seasons in Korea, a protocol of prevention using Palivizumab was introduced for fragile children like recipients of congenital heart disease, leading to a death rate in our study of 15.2%, three times higher than the rate found by Jon WJ, *et al.* [12].

Conclusion

Bronchiolitis is typically a way of detection of congenital heart disease. Having heart disease also increases the need for more oxygen. Bronchiolitis was acute in over fifty percent of the patients. The number of fatalities was not small. Palivizumab is a type of medication known as a monoclonal antibody. Antibodies are specialised immune cells that help ward off pathogens. Preventing respiratory syncytial virus (RSV) infections, which can be fatal, is the primary indication for using palivizumab. Premature infants, those with heart or lung illness, and other children at high risk for severe RSV lung infection receive this vaccine.

Conflict of Interest: Not available

Financial Support: Not available

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