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Original Research Article

Epidemiology and clinical course of bronchiolitis in hospitalized children in tertiary care hospital in Kashmir

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ABSTRACT

Background: Bronchiolitis is the commonest lower respiratory tract infection in children < 2 years of age and is responsible for the majority of their pediatrician visits and hospital admission during the winter season. The aim of this study was to describe the epidemiological data, seasonal trends, clinical characteristics, and outcomes of children admitted with bronchiolitis in pediatric hospital GMC Srinagar.
Methods: This was a retrospective observational study in children less than 2 years of age admitted in department of pediatrics in GMC Srinagar. Data were collected through review of the medical records of patients with a diagnosis of bronchiolitis on discharge and analyzed through SPSS 20.
Results: A total of 228 infants were enrolled in the study. The majority were males (60.08%). The median age on admission was 5.5 months, exclusive breastfeeding was the mode of feeding in majority and 8.77% were ex-preterm. Respiratory syncytial virus (RSV) was identified in majority (103) and admission peak was from October to March. Most of the patients presented on day 3 of the illness. Most patients 45.17% were having feeding difficulties and chest auscultation was normal in about 22% of the children. Oxygen supplementation was administered to 85.52% of the children. The 32 children (14.03%) required admission to PICU. Mechanical ventilation was required in 6 children (18.75%). No death occurred in infants while in the hospital.
Conclusions: RSV has been found to be the main responsible virus. Management of bronchiolitis is usually symptomatic as recommended by most of the guidelines.

Keywords: Bronchiolitis, Winter, RSV

INTRODUCTION

Acute bronchiolitis is a diagnostic term used to describe the clinical picture produced by several different viral lower respiratory tract infections in infants and very young children.

Bronchiolitis is the commonest lower respiratory tract infection in children < 2 years of age and is responsible for the majority of their pediatrician visits and hospital admission during the winter season.[1,2]

The infection is mostly caused by RSV in approximately more than 50% of cases.[3] Other causative viruses include influenza, parainfluenza, adenovirus and metapneumovirus.[4,5] The most severe cases occur mainly in previously healthy term infants. Young age, prematurity, chronic lung disease, congenital heart disease, immune deficiency and low socioeconomic status are the risk factors for severe illness.[6]

Usual symptoms are running nose, proceeding over 2 to 4 days to a characteristic harsh moist cough with pyrexia

that is typically below 39°C.[7] The time to peak symptoms of 4 days is associated with the peak in viral load varying from infant to infant.[8] Physical findings include an increased respiratory rate, chest retractions, use of accessory muscles, wheeze, crackles, and reduced oxygen saturations. In younger infants' apnea may be a presenting sign, sometimes in the absence of other features of bronchiolitis.[9]

Aim

The aim of this study was to describe the epidemiological data, seasonal trends, clinical characteristics, and outcomes of children admitted with bronchiolitis in pediatric hospital GMC Srinagar.

METHODS

This was a retrospective observational study in children less than 2 years of age admitted in department of Pediatrics in GMC Srinagar. Data were collected through review of the medical records of all patients with a diagnosis of bronchiolitis on discharge within one year (January 2022 December 2022).

Inclusion criteria

Inclusion criteria involved children≤ 2 years admitted with the clinical diagnosis of bronchiolitis on the admission made by the attending pediatrician based on the history of cough or running nose and cough, tachypnea, hypoxia subcostal or intercostal retractions, nasal flaring, grunting, with wheezing and/or crackles on examination. Indications for admission included worsening of the respiratory status, decreased oral intake, and the requirement for oxygen or parenteral therapy. Only those with a discharge diagnosis of bronchiolitis were analyzed.

Exclusion criteria

Children with bacterial co-infections (meningitis, bacteremia, pyelonephritis, or pneumonia). Children with history of chronic cardiac, respiratory, endocrine disease or cystic fibrosis, renal and neurologic problems

Statistical analysis

The data was collected in Microsoft excel and analyzed through SPSS 20. Proportions were compared with the Chi-squared test/ the Fisher exact test when appropriate. The student t-test was used to compare the means of normally distributed variables between 2 groups.

RESULTS

Clinical and demographic characteristics

A total of 228 infants were enrolled in the study. The majority were males (60.08%). The median age on admission was 5.5 months. Exclusive breastfeeding was the mode of feeding of 119 infants (52.2%), twenty infants (8.77%) were ex-preterm, of whom four were born before 30 weeks of gestation. None of the patients had received palivizumab prophylaxis. Ten children had a medical history suggestive of reactive airway disease (4.38%) as shown in Table 1.

Table 1: Clinical and demographic data.

Variables		N (%)
Total no. of patients		228
Gender	Male	137 (60.08)
	Female	91 (39.92)
Median age on admission (Months)		5.5
Exclusive breast feeding		119 (52.2)
Ex-preterm		20 (8.77)
Reactive airway disease		10 (4.38)

Viral detection

RSV was identified in 103 infants (45.2%), adenovirus in 27 (11.85%), influenza in 27 (11.85%), coronavirus in 25 (10.96%) and other viruses were isolated in <3% patients. No viruses were identified in 40 patients (17.5%).

Seasonality

Admissions with bronchiolitis occurred throughout the year with a significant peak from October to March (Table 2).

Table 2: Monthly distribution of bronchiolitis patients.

Months	N
January	45
February	41
March	25
April	10
May	4
June	8
July	3
August	7
September	5
October	12
November	20
December	48

Clinical characteristics

Most of the patients presented on day 3 of the illness (range 2-5 days). On admission, 45.17% were having feeding difficulties, with associated vomiting in 40.35%. Fever was present in 31.14% of the infants, 28.07% had evidence of dehydration, 85.52% respiratory distress, 32.45% retractions, 2.19% grunting and cyanosis. Chest auscultation was normal in about 22% of the children (Table 3).

Table 3: Frequency (%) of the clinical features at presentation (by descending order of frequency) of 228 infants admitted to hospital for bronchiolitis.

Variables	Percentages (%)
Respiratory distress	85.52
Abnormal chest auscultation	78
Feeding difficulties	45.17
Hypoxemia (O_2 saturation < 92% in air)	41.6
Vomiting	40.35
Chest retractions	32.45
Fever (temperature more than 38^0C)	31.14
Dehydration	28.07
Cyanosis and grunting	2.29

Laboratory investigations

On admission, 16.66% of children had hyponatremia, with the lowest sodium conc. being 125 mmol/L. Mean serum urea-10 mm/l. 71.5% of children had normal white cell count, CRP positive in 63.15% of patients (Table 4).

Table 4: Percentage of abnormal investigation results in 228 infants admitted to hospital for bronchiolitis.

Variables	Percentages (%)
Hyponatremia (serum Na <135 mEq/l)	16.66
Abnormal total leucocyte count	28.5
Abnormal CXR	44.29
Repeat CXR	14.03 (32 infants)
Positive CRP	63.15

Radiological findings

Chest X-ray was performed in 100% of the patients. It was abnormal in 43.29% on presentation. A repeat CXR was required in 32 infants because of clinical worsening, at a median of 2 days after admission (range 0.5 to 9 days), and it was abnormal in 75%.

Management

Oxygen supplementation administered to 85.52% of children, 83.33% received hypertonic saline nebulization. Beta 2 agonist nebulization was given in 25%, IV Antibiotics were also administered to 15.78% (Table 5).

Table 5: Management in decreasing order of frequency expressed as percentage.

Variables	Percentages (%)
Oxygen administration	85.52
Hypertonic saline nebulization	83.33
Maintenance IV fluids	44.29
Beta 2 agonist nebulization	25
IV antibiotics	15.78

Severity of illness and complications

Complications during hospitalization included apneas in 7 patients (3.07%), and encephalopathy in 5 infants. 17infants had pneumonia (7.45%), 13 had acute otitis media (5.70%) (Table 6).

Table 6: Complications observed in 228 infants admitted in hospital (expressed as percentage).

Variables	Percentages (%)
Apnea	3.07
Encephalopathy	2.19
Pnemumonia	7.45
Otitis media	5.70

The 32 children (14.03%) required admission to PICU. Additional oxygen administration by high flow nasal cannula was administered to 22 children (68.75%). Mechanical ventilation was required in 6 children (18.75%). No death occurred in infants while in the hospital.

DISCUSSION

This study focused on previously healthy infants and all of those with other co-morbidities were excluded from the study.

In our study, RSV was the main responsible organism. Other causative viruses included influenza, parainfluenza, coronavirus, adenovirus, metapneu movirus, and rhinovirus. Similar findings were reported in studies from different parts of the world.[10-22]

RSV positive disease is usually associated with a more severe course, which occurs at a lower age, requires frequent oxygen administration, and is associated with a longer hospital stay.

Male predominance (60.08% of patients) that we found in our study was the same as in reports on different age groups and from different countries.[23] Reason for this might be the narrower peripheral airways in the younger males.[24]

The infection occurred throughout the year, with peaks during the winter months. This is in with other studies from this region.[25]

Respiratory distress was the most common presenting complaint similar to described in previous literature, abnormal chest auscultation was found in 78% of patients in our study.[26,27] Hyponatremia was found in 16.66% of the patients.

The sensitivity and specificity of immunofluorescence for the diagnosis of RSV infection have been reported to be in the range of 70-90%.[28] The lack of identified viruses in 17.55 percent of our patients could be explained by faulty

sample collection and late sample collection in the course of the illness when the viral load had already decreased.

There are several predictors of disease severity that have been described in the literature, such as male sex, young age, daycare attendance, lack of breastfeeding, chronic medical conditions, smoke exposure, and household crowding.[29]

Management of bronchiolitis is usually symptomatic as recommended by most of the guidelines; however, most of our patients received supplemental oxygen and 3% saline nebulization. No therapies have received support across all guidelines except for the use of supplemental oxygen. Chest physiotherapy does not speed up recovery. Antibiotics, though still widely used, are of no benefit in bronchiolitis.[30]

Some of our patients received different treatment modalities like bronchodilators. Bronchodilators are less likely to be recommended in more recent guidelines, and the theory that they may be of greater benefit in infants more likely to develop asthma has been refuted.[31,32]

Complications during hospitalization included apneas in 7 patients (3.07%), and encephalopathy in 5 infants, 17 infants had pneumonia (7.45%), 13 had acute otitis media (5.70%).

The 32 children (14.03%) required admission to PICU. Additional oxygen administration by high flow nasal cannula was administered to 22 children (68.75%). Mechanical ventilation was required in 6 children (18.75%). No death occurred in infants while in the hospital.

The limitation of our study is its retrospective nature.

CONCLUSION

Bronchiolitis remains a common reason for admission to hospitals with significant morbidity RSV has been found to be the main responsible virus. Management of bronchiolitis is usually symptomatic as recommended by most of the guidelines. No therapies have received support across all guidelines except for the use of supplemental oxygen. Antibiotics, though still widely used, are of no benefit in bronchiolitis.

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