

RESPIRATORY SYNCYTIAL VIRUS INFECTION AMONG YOUNG CHILDREN WITH ACUTE RESPIRATORY INFECTION

M. Milani*

Department of Pediatrics, Children Medical Center Hospital, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran

Abstract- Respiratory syncytial virus (RSV) is the major cause of lower respiratory tract infections in infants, and also an important factor for hospitalization during the winter months. To determine the prevalence and importance of RSV as a cause of acute lower respiratory tract infection, we carried out a prospective study during 5 months period from November to March 1998 in 6 pediatric hospitals. A nasopharyngeal aspirate was obtained for detection of RSV in all cases. Sociodemographic data, clinical signs, diagnosis and hospital admissions were documented. During this study period, 365 young infants (51.5% male, 48.5% female) with respiratory tract infection were visited in 6 hospitals. The median age of patients was 24 months (range: 1 month to 5 years). RSV infection was found in 70 out of 365 patients (19.18%). Among the 70 children with RSV infection, 29 patients (41.42%) were under 12 months of age. The main clinical manifestations of RSV infection were cough (88.57%) and coryza (78.57%). There were no significant differences between patients who were tested positive for RSV and those who were tested negative with regard to demographic variables and clinical diagnoses. This study indicates that RSV is an important cause of respiratory tract infection in infants and young children. Distinguishing RSV from other respiratory infection is difficult because of the similarity in clinical presentation among children.

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Key Words: Respiratory syncytial virus, respiratory tract infection, risk factors

INTRODUCTION

Respiratory Syncytial Virus (RSV) is the leading cause of lower respiratory tract infections among infants and children worldwide (1-3). Little is known about the epidemiology of respiratory syncytial virus infection in tropical and developing countries (4-6). Although RSV infection is the most important viral cause of severe acute lower respiratory tract infection, only a small proportion of children infected with this virus develop severe disease. Risk factors for severe RSV infection have been identified in some studies (7,8). RSV infection is associated with more than 100,000 pediatric hospitalizations each year in the United States (8). Infants who are premature, have chronic lung disease, congenital heart disease, or immunodeficiency disorders or have underlying metabolic or neuromuscular disorders are at increased risk for developing especially severe RSV disease (8).

Treatment of children hospitalized with RSV disease is primarily supportive, with administration of supplemental oxygen and fluid replacement therapy. Bronchodilators may benefit at least a subset of such patients. No effective treatment for RSV lower respiratory tract infection exists. Ribavirin is the only antiviral therapy available against RSV. The results of small trials showed that ribavirin reduced length of mechanical ventilator support and might reduce days of hospitalization (9), but a large randomized controlled trial of ribavirin for ventilated and other high-risk patients is indicated.

MATERIALS AND METHODS

Children younger than 5 years of age referred to one of the 6 hospitals (in different parts of Tehran) with acute upper and lower respiratory tract infections during 5 months period (November to March) in 1998 were included in our study.

A questionnaire was developed to contain all the patient's demographic information including sociodemographic data, age at the time of study, season of presentation, first clinical presentation, physical examination and diagnosis.

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*** Corresponding Author:**

M. Milani, Department of Pediatrics, Children Medical Center Hospital, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran
Tel: +98 21 6112793
Fax: +98 21 2085583
E-mail: sm-milani-md@yahoo.com

A nasopharyngeal aspirate for detection of RSV was obtained in all patients. Immunofluorescence methods (Bartels .RSV .Direct Fluorescent Antibody test. Baxter Diagnostic INC. USA) in all patients and cell culture in some patients were used for detection of RSV

RESULTS

In this study during 5 months period a total of 365 children were studied for detection of RSV. There were 188 males (51.5%) and 177 females (48.5%). The median age of patients at the time of study was 24 months (0-5 years). Thirty three percent of children (n=115 patients) were under 12 months of age (Table 1). Among the 365 patients, RSV was detected in nasopharyngeal aspirate of 70 patients (19.18%). Of 70 children with RSV infection, 31 patients (44.29%) were referred to Pediatric clinics during the first month of winter (Table 2).

Twenty nine out of 70 children (41.42%) with RSV infection were under 12 months of age. The main clinical manifestations of RSV infection were cough (88.57%) and coryza (78.57%) followed by fever, sneeze and wheezing (Table 3). In study done by Raphael Dolin, in infants, 25% to 40% of infections resulted in lower respiratory tract involvement including pneumonia, bronchiolitis and tracheobronchitis (10). The clinical pattern of RSV infection included pneumonia in 7.14% of cases, acute bronchitis in 2.86% and bronchiolitis in 1.43% (Table 4). One of our patients had aseptic meningitis who was admitted to hospital. On physical examination, in 13 out of 70 patients (18.57%) wheezing were detected, and all these patients were admitted to hospital. Fifty six out of 70 of our patients (80%) had mild disease, not requiring admission to hospital, and 20% of our patients (n= 14) had moderate to severe infection requiring admission to a general ward or intensive care unit (ICU).

DISCUSSION

RSV has a worldwide distribution and can cause serious lower respiratory tract illness. Furthermore there is mounting interest in the hypothesis that RSV infection in the early childhood is an important risk factor for the subsequent development of recurrent wheezing and asthma (11). Although primary infection is usually most severe, reinfection

throughout life is common. RSV shows no prejudice toward country or climate but does have a particular preference for very young in every area of the world (12). When RSV infection is established, the host immune response includes the production of virus-neutralizing antibodies and T-cell-specific immunity. The humoral immune response normally results in the development of anti-RSV neutralizing-antibody titers, but these are often suboptimal during an infant's initial infection. Reinfection during subsequent seasons is common. The cellular immune response to RSV infection is also important for the clearance of virus. This immune response, vital for host defense against RSV, is also implicated in the immunopathogenesis of severe lower respiratory tract RSV bronchiolitis. In our study 365 children (51.5% males and 48.5% females) were studied for detection of RSV. The median age of patients was 24 months (0-5 years). RSV was detected in nasopharyngeal aspirate of 70 patients (19.18%). Despite the presence of maternal antibodies, most hospitalizations occurred among infants aged <6 months, and nearly all children were infected by age 2 years. In our study twenty nine (41.42%) out of 70 children with RSV infection were under 12 months. Results of our study showed that with increased age of patients, the rate of RSV infection was reduced. Study done by Uduman and his colleagues (3) in UAE showed that 90% RSV of positive patients were under 12 months age.

RSV infections occur primarily during annual outbreaks, with peaks during winter months as reported by Frank and colleagues RSV is responsible for a large number of hospital admissions during winter and spring (13) and as we observed in our study, out of 70 children with RSV infection, 31 patients (44.29%) were referred to hospital during the first month of winter. Cough and coryza were the main clinical manifestations of RSV infection. The clinical pattern of RSV infection included pneumonia in 7.14% of cases, acute bronchitis in 2.86% and bronchiolitis in 1.43%. RSV is the major cause of lower respiratory tract infections, leading to hospital admission during the winter months. As we observed, thirty out of 70 patients (18.55%) had wheezing requiring admission to hospital. Fifty six out of 70 of our patients (80%) had mild disease, not requiring admission to hospital, and 20% of our patients (n= 14) had moderate to severe infection requiring admission to a general ward and intensive care unit (ICU).

RSV infection was more common in children who came from more crowded areas (south of Tehran) than other areas. Increased risk was particularly associated

with greater numbers of members living in one family. In conclusion, RSV is a significant cause of lower respiratory tract infection in young children in Tehran, and in the world (14), causing epidemics of bronchiolitis. It poses a significant burden on the health system, especially through the demand for supplementary oxygen. The clinical spectrum of RSV disease in Iran is similar to that seen in developed countries, and concomitant bacterial infections are uncommon.

Table 1. Age group of studied patients

Total patient no	Male	Female
29 (41.43%)	16	13
16 (22.86%)	10	6
14	12	2
5	5	0
6	1	5
70 (100%)	44 (62.86%)	26 (37.14%)

Table 2. Months and duration of study

Age group	Pat. no	Nov.	Dec.	Jan.	Feb.	Mar.
0-12 months	29	1	5	13	6	4
1-2 years	16	2	5	4	5	0
2-3 years	14	1	1	6	6	0
3-4 years	5	0	0	4	1	0
4-5 years	6	1	1	4	0	0
Total	70	6	12	31	18	4
		(17.14%)	(17.14%)	(44.29%)	(25.71%)	(5.71%)

Table 3. signs and symptoms observed in studied patients

Symptoms and signs	Patients no	Percent
Cough	62	88.575%
Coryza	55	75.71%
Fever	53	75.71%
Sneeze	35	50%
Wheezing	13	18.57%
Vomiting	10	14.29%
Diarrhea	10	14.29%

Table 4. Diagnosis made in studied patients

Diagnosis	Patient no	Percent
Common cold	53	75.71%
Pharyngitis	6	8.57%
Pneumonia	5	7.14%
Acute bronchitis	2	2.86%
Brochiolitis	1	1.43%
Aseptic meningitis	1	1.43%

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