Respiratory Syncytial Virus in Lower Respiratory Tract Infections

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Acute lower respiratory infections (ALRI) are a major cause of morbidity and mortality amongst children in developing countries. We evaluated the extent of respiratory syncytial virus (RSV) infection in children with ALRI using a rapid and sensitive enzyme immunoassay for the antigen detection directly from the nasopharngeal aspirate. The immune response to the virus was determined by detecting the virus specific antibody levels in subjects with and without ALRI.

Material and Methods

The study was conducted on children admitted to the pediatric ward of Lok Nayak Jai Prakash Narain Hospital, New Delhi for a period of 1 year from July 1990 to June 1991. Forty five children below the age of 2 years suffering from ALRI were investigated. Based on their clinical and radiological findings, the cases were categorized into two groups. Group I were cases diagnosed as bronchiolitis. Children in this group had a preceding history of rhinorrhea, followed by cough, wheezing and fever of low to moderate grade and were dyspneic with bilateral rhonchi. Radiograph of the chest was normal or hyperinflated. Group II included cases of bronchopneumonia with a history of high grade fever, cough, dyspnea and chest retraction. On examination the children were toxic with bilateral rales and occasional rhonchi. The radiological picture was suggestive of consolidation or patchy infiltrates. Twenty five healthy age, and sex-matched children were selected as controls from those attending the Well Baby Clinic.

Nasopharyngeal aspirates (NPA) were added to 3 ml of Hanks Balanced Salt Solution supplemented with antibiotics. The specimen was 'transported on ice to the laboratory. The contents were vortexed and stored at -70°C till they were tested for RSV antigen by the solid phase enzyme immunoassay (EIA) using Abbot Laboratories reagent. Appropriate positive and negative controls were used.

Blood was collected from all the patients at the time of illness and the second sample was collected 2-3 weeks later. Serum separated was tested for IgG antibodies to RSV by indirect fluorescent antibody test (IF AT) using Virgo TM Reagent with appropriate positive and negative controls.

Results

Forty five cases of acute lower respiratory infection comprising of 18 cases of bronchiolitis and 27 cases of bronchopneumonia were included in

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this study. Forty children with ALRI were below 1 year of age. The overall detection rate of RSV was 26.7%. Virus infection was higher among the bronchiolitis cases compared to bronchopneumonia ($p > 0.05$) Ten children with RSV infection were below 1 year of age *(Table I)*.

There was no significant difference between .the presence and absence of different clinical features namely, subcostal recession, wheezing crepitations and cyanosis in cases of ALRI due to RSV and non RSV infection.

RSV specific IgG was present in 32 patients (71%) with ALRI and 18 (72%) children belonging to the control group at a titre of 1 : 8. All the children above one year and 66.67% children below one year possessed antibody at this titre. Nine out of 22 children showed a detectable antibody in the initial serum sample at a titre of 1 : 256. A four fold increase in the antibody titre in initial and follow up sample was seen in 7 children. All these 7 children also showed the presence of RSV antigen. Six children testing positive for RSV antigen did not have a detectable level of RSV specific IgG antibody.

Discussion

The present study was hospital based in which children below 2 years were selected. The prevalence of ALRI cases in the first year of life was 87.5% which is similar to the pattern seen elsewhere in India(1). A quarter of children had detectable antigen of RSV in the nasopharyngeal aspirates. Other studies from India have reported corresponding figures of 6-30%(1-3). A higher rate of detection of the RSV has been attributed to the selection of nasopharyngeal aspirates as clinical specimen and the use of EIA for antigen detection(4). As reported previously(5), the reason for RSV isolation from more cases of bronchiolitis (38.8%) compared to bronchopneumonia (18.5%) could be due to mainly a bacterial etiology of pneumonia in developing countries. Maximum cases with RSV infection occurred in the winter months of October to March. A similar winter preponderance of the infection has been reported earlier(6).

The presence of virus-specific TgG in all the children above 1 year and 66.7% below one year was suggestive of RSV infection being virtually a universal experience of childhood(7).

A high titre of antibody (1:256) in 18.7% children having no RSV antigen in the nasopharyngeal aspirate was suggestive of a recent viral infection in which antibodies persist at high levels

TABLE I - *Distribution of RSV Positive Cases*

Condition	RSV positive cases			RSV negative cases		
	<1 year	>1 year	Total	<1 year	>1 year	Total
Bronchiolitis	7	0	7	10	1	11
Broncho-pneumonia	3	2	5	20	2	22

after 30 days of infection when antigen is no longer detected. The presence of viral antigen and a fourfold rise in antibody titre in seven children indicated a current infection. However, six children testing positive for virus antigen did not have detectable virus specific antibody probably due to maternal antibody masking the IgG response in the infants(8).

It is concluded that RSV is an important etiological agent causing bronchiolitis and bronchopneumonia. Exposure to RSV was virtually universal since almost all children above one year had antibodies against RSV. Early viral diagnosis by rapid tests like enzyme immunoassay could help in reducing the unnecessary use of antibiotics.

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Cerebritis in Typhoid Fever

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Among, the various complications of typhoid fever, shock and encephalopathy are commonly seen. Cerebritis as a complication of typhoid fever has not been reported in children to the best of

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