

## Letter to the Editor

### Nosocomial Respiratory Syncytial Virus Infection in a Pediatric Ward

#### To the Editor:

We conducted a prospective trial to investigate the rate and the clinical repercussions of nosocomial viral infections of the lower respiratory tract in a pediatric ward. The study took place during an epidemic of respiratory syncytial virus (RSV) in São Paulo, Brazil, that happened between April and July 1996.<sup>1,2</sup> The University Hospital pediatric ward has 36 beds distributed among 6 rooms, containing 3 to 10 patients each. The patients, from newborn to 15 years old, are divided according to age (ie, infants vs older children) and the nature of the disease (ie, respiratory, diarrheic, and others).

During the study period, all children admitted from Monday through Thursday each week were screened for the presence of RSV by nasopharyngeal aspirates. Only patients who did not display RSV infection on admission and who stayed in the hospital for 5 or more days were selected as part of the study sample. Nasopharyngeal aspirates were inoculated into Hep-2, NCI-H292, and HeLa I cells, as we have previously described, the day they were collected.<sup>1,2</sup> Results were confirmed by indirect immunofluorescence assay tests using monoclonal antibodies. All selected subjects were observed by one of the authors (SEV) and clinical-

ly evaluated on a daily basis for signs of lower respiratory tract disease, namely rales and wheezing. Every 5 days, beginning on the day of admission, patients were tested for nasopharyngeal RSV using the same methods. Additional material was collected when clinical manifestations of fever or respiratory disease occurred. Thoracic x-rays of all patients were taken (1) on admission, (2) weekly (at least), (3) in cases with respiratory disease, (4) in cases with RSV on admission, and (5) when fever occurred. Cases of nosocomial infection by RSV were operationally defined as those with negative results on admission but positive results on follow-up viral evaluations.

The sample consisted of 52 cases. Four infants (7.7%) acquired RSV during their stay on the pediatric ward. These patients' clinical profiles are presented in the table. The children infected with RSV were younger than those who did not acquire RSV, with a median age of 6.5 versus 24 months, respectively (Student's *t* test, *P* < .05). This corroborates the finding that young age constitutes a known risk factor for the occurrence of RSV infection, and so pediatric wards with infants, particularly those in the first months of life, may be considered at greater risk.<sup>3,4</sup> One of these 4 patients was infected during the first week in the hospital, 2 in the second, and 1 in the third week. Other authors have previously stated that a long hospital stay is a risk factor for nosocomial viral infection, a finding that we

could not corroborate, given the small number of cases.<sup>2,3</sup>

Among the 4 infants infected with RSV, only 2 developed clinical and radiologic manifestations of lower respiratory tract infection, yielding a rate of 3.8%. In these cases, the development of the respiratory disease was concomitant with viral detection. No bacteria or fungi were detected in blood cultures obtained simultaneously. There have been reports of lower rates such as 0.6%, similar rates such as 4.2% and 6.0%, and higher rates such as 16.7%.<sup>4-6</sup> This variation in the incidence rates of nosocomial RSV infection of the lower respiratory tract found in different studies is a function of several structural and functional characteristics of hospitals and hospital units, population, and season of the year, as well as the research methodology.

Nosocomial RSV infection of the lower respiratory tract had limited clinical impact as the signs and symptoms disappeared uneventfully within 3 days. However, although treatment was restricted to thoracic physical therapy without antiviral medication, hospital stay was prolonged and costs increased.

The importance of nosocomial RSV infection of the lower respiratory tract in pediatric wards was compared with that of infections caused by other pathogens. In pediatric hospitals, viral lower respiratory tract infections, especially RSV, have sometimes been considered the most frequently occurring infections. This was the case in Toronto between 1980 and

**TABLE**  
CLINICAL PROFILES OF THE FOUR PEDIATRIC WARD PATIENTS WITH DETECTED RESPIRATORY SYNCYTIAL VIRUS

Patient No.	Age (mo)	Gender	Initial Diagnosis	Hospital Stay (d)	Respiratory Condition After RSV +	Thoracic X-Ray After RSV +	Total Hospital Stay (d)
				Until RSV +*			
60	1	M	Chronic diarrhea	22	-	N	30
93	13	F	Tubercular adenitis	11	Wheezing	Abn	16
149	10	F	Mastoiditis	6	Wheezing	Abn	20
160	2	M	Wheezy infant	11	-	N	19

RSV = respiratory syncytial virus; + = positive; Abn = abnormal, with both cases showing pulmonary hyperinflation; N = normal.  
\*Hospital day of detection of RSV in the nasopharynx.

1984, when these agents accounted for 45.9% of the etiologic agents of nosocomial viral infections of the lower respiratory tract. In that study, bacteria and fungi caused 30.2% and 22.9% of the infections, respectively, whereas other agents caused 9.8% of the infections.<sup>3</sup> Yet according to data from the National Nosocomial Infections Surveillance System in the United States, viral agents have been responsible for only 1% of nosocomial viral infections of the lower respiratory tract.<sup>7</sup> These discrepant figures about the role of viral agents in nosocomial infections of the lower respiratory tract should be interpreted with caution because they may be a result of only limited viral screening being routinely employed, and thus an effect of the methodology itself. RSV was the only etiologic agent of nosocomial viral infection of the lower respiratory tract detected during the period of our study, but it was observed in only two cases.

RSV transmission in pediatric wards results predominantly from interpersonal contact, mostly indirect, through the contaminated hands of hospital staff or family members. Infection is more easily spread where there are many patients, family members, hospital staff, and students, and when children are mobile. These conditions were present in our ward, where direct contact among children and airborne transmission were also possible.<sup>3</sup> Other hospital pediatric facilities with similar characteristics regarding sources of infection and modes of transmission have had equally high rates of nosocomial RSV infections of the lower respiratory tract.<sup>7</sup>

Hand washing, one of the most important prophylactic measures, has

been emphasized in our pediatric ward.<sup>8</sup> The use of gloves and masks while treating patients is also recommended, but difficult to implement. Isolating patients infected with RSV on hospitalization in specially designated wards during outbreaks is a solution recommended by some authors.<sup>9</sup> However, this would require a faster screening system to detect the virus, which is seldom feasible. Additionally, it would require a larger number of rooms than are currently available in this hospital because one-third of hospitalized children can be infected with RSV during the annual outbreak.<sup>1</sup> The use of a monoclonal antibody such as palivizumab is an effective prophylactic measure, but indicated only for patients with chronic pulmonary diseases and premature infants during annual RSV epidemics.<sup>10</sup> Unfortunately, the high cost of this treatment prevents more widespread use.

This study showed that nosocomial infections of the lower respiratory tract caused by RSV in a pediatric ward in São Paulo had an incidence rate similar to that observed in developed countries. The authors suggest that during the annual epidemic of RSV in developing countries, which happens between March and July in São Paulo, precautions must be taken to control nosocomial transmission.

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