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Prevalence of Human Metapneumovirus in Central Illinois in Patients Thought To Have Respiratory Viral Infection▽

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Studies suggest that by age 5 years nearly all people have been exposed to metapneumovirus. To determine its prevalence in central Illinois, we tested respiratory secretions by direct immunofluorescence staining from December to March. Metapneumovirus was detected in 11/391 specimens. The distribution of metapneumovirus was bimodal, with the split being between children aged ≤4 years and adults.

Human metapneumovirus was discovered in 2001 and is classified as an RNA virus of the paramyxovirus group (6). Seroepidemiologic studies suggest that by age 5 years, nearly all individuals have been exposed to metapneumovirus. It is worldwide in distribution, and several studies suggest that it may be responsible for ~10% of viral respiratory infections in which the common respiratory viruses are not found (5, 9).

Metapneumovirus is thought to cause both upper and lower respiratory tract infections in children and adults and causes disease most closely mimicking the disease produced by respiratory syncytial virus (RSV), with symptoms of cough, dyspnea, wheeze, hypoxia, fever, and exacerbation of asthma. It may have a seasonal distribution, most likely peaking at the end of the winter respiratory season (January to April). The detection and investigation of metapneumovirus have been impaired partly because (i) it does not replicate in continuous or commonly used cell lines, (ii) it requires trypsin for in vitro growth, and (iii) it has very slow replication kinetics in vitro (1, 7).

The purpose of this study was to determine the prevalence of metapneumovirus in specimens submitted to Memorial Medical Center in Springfield, IL, from patients suspected of having respiratory viral infection.

This study was conducted from 2 December 2006 to 23 March 2007 with respiratory secretions from both inpatients and outpatients in central Illinois which were either (i) nasal washings with orders for RSV testing which screened negative by an immunochromatographic sandwich assay (X/pect RSV; Remel, Inc., Lenexa, KS) or (ii) respiratory specimens with requests for respiratory viral screening. (It should be noted that the samples were somewhat prescreened, because samples with requests only for RSV screening which tested positive by the RSV immunochromatographic sandwich assay were not included in this study.)

For samples with requests for RSV screening (which were negative by the RSV immunochromatographic sandwich assay), immunofluorescent testing for RSV and metapneumovirus was performed with cytopsun samples with reagents from Diagnostic Hybrids Inc. (Athens, OH) (2). For specimens with requests for other respiratory virus testing, immunofluorescent screening with cytospun samples and/or culture with R-Mix

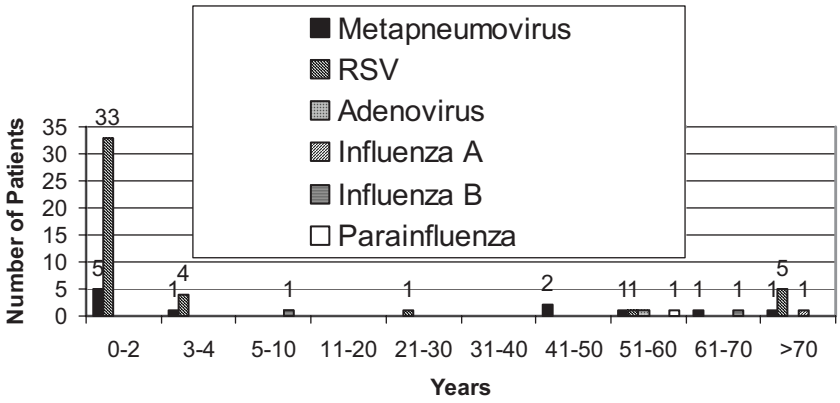

FIG. 1. Distribution of patients positive for virus by age.

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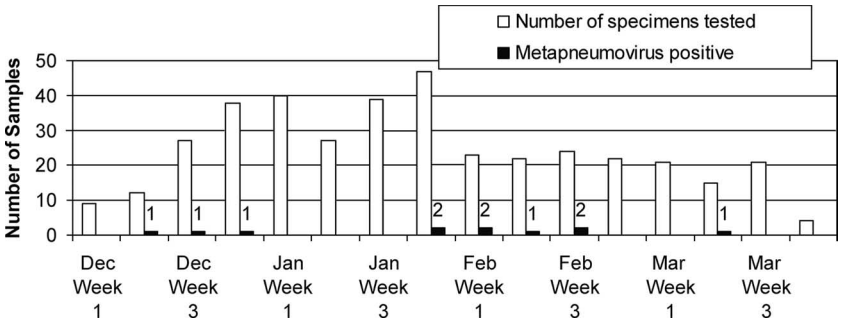

FIG. 2. Prevalence of human metapneumovirus in central Illinois in patients thought to have respiratory viral infection.

cells (reagents and supplies from Diagnostic Hybrids, Inc.) was performed (3).

Immunofluorescent testing for metapneumovirus was done with 391 cytospun specimens (78% nasal washes, 20% samples obtained at bronchoscopy, and 2% sputum samples). Of these 391 cultures, just over half (206/391, or 53%) of the specimens came from children ≤4 years of age. Forty-four specimens were positive for RSV, and 11 specimens were positive for metapneumovirus (Fig. 1). Other viruses detected included influenza B virus (two patients) as well as parainfluenza virus (types 1 to 3), influenza A virus, and adenovirus (one patient each). No dual infections were found.

The age distribution of the patients testing positive for metapneumovirus was bimodal, with the distribution roughly split between children ≤4 years of age and adults over 40 years of age. The proportion of adults (>20 years of age) who tested positive for metapneumovirus was 5/161 (3.1%), which was slightly greater than the proportion of children (≤20 years of age) who tested positive for metapneumovirus, which was 6/230 (2.6%). One of the metapneumovirus-positive children was 4 months of age, two were 8 months of age, two were 1 year of age, and one was 4 years of age. Only one of the children who tested positive for metapneumovirus was hospitalized, but all of the adults were hospitalized. Generally, the adults were hospitalized because of suspected viral exacerbation of chronic obstructive lung disease.

The distribution of metapneumovirus detection over the testing period is shown in Fig. 2. First detected in the third week in December for an approximately 2-week period, the prevalence of metapneumovirus was followed by a slightly longer 4-week peak starting on 20 January.

This study documents 11 metapneumovirus-positive samples from patients suspected of having a respiratory viral illness in central Illinois. Excluding RSV, metapneumovirus was seen more frequently than many of the other common respiratory viruses, which were detected in a cumulative total of five patients (influenza A and B viruses, adenovirus, and parainfluenza virus). The sensitivity of immunofluorsecent testing for metapneumovirus done directly with samples is less than that of molecular methods, such as PCR (4, 8). Therefore, it is possible that the prevalence of metapneumovirus is even higher than that determined by our immunofluorescent testing.

Metapneumovirus was seen in adults as well as in children aged ≤4 years. No dual infections were found in the 391 samples examined for metapneumovirus, but these samples were not reflective of the total number of respiratory samples submitted to the virology laboratory. (Those samples with requests only for testing for RSV which were positive by the RSV immunochromatographic sandwich assay were not included among the 391 samples.) Therefore, it is possible that the actual prevalence of metapneumovirus may be higher if metapneumovirus was involved in a dual infection with RSV. This newly discovered virus should be considered in the differential diagnosis of common respiratory viral diseases, especially in adults with chronic obstructive pulmonary disease suspected of having viral exacerbation. In the outpatient setting, metapneumovirus was seen in the clinical setting where RSV is usually detected. Since the patients infected with metapneumovirus outnumbered those infected with the other common respiratory viruses (excluding RSV), clinical microbiologists should consider including it in their routine testing for respiratory viruses in the future. However, currently, there is no FDA-cleared device, and laboratories must self-validate the available analyte-specific reagents that are available.

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