



Prevalence of Respiratory Syncytial Virus and of Human Metapneumovirus in the Hospitalized Elderly



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Abstract

Background

Human metapneumovirus (HMPV) and respiratory syncytial virus (RSV) cause respiratory illness in all age groups. The role of RSV in serious adult illness is recognized; recent studies suggest HMPV may also be a significant pathogen, especially in the elderly and those with co-morbidities. At the Regional Virology Laboratory (RVL), HMPV and RSV testing have not routinely been performed on elderly patients. To determine the prevalence of HMPV and RSV infection in this demographic, we retrospectively analyzed archived respiratory specimens from elderly inpatients admitted with a respiratory illness to the main tertiary care centre in our region, during the 2007 respiratory virus season.

Methods

NP (NPS), and throat (TS) swab specimens (Starplex Multitrans™ S160 Naso collection and transport system; Starplex Scientific Inc., Etobicoke ON) collected from >60 yr. old inpatients hospitalized with febrile respiratory or influenza-like illness collected 01/07-04/07 were analyzed. Testing for HMPV, RSV (AB), parainfluenza-3 and influenza (AB) was performed at RVL using laboratory-validated real-time RT-PCR assays. All specimens were also inoculated into tubes containing RMK (DHI Inc., Athens OH) and HFL (RVL) cells, for standard respiratory virus culture.

Results

Single specimens (244 NPS, 14 TS) from 258 patients aged 60-95 years (mean 71.9; median 80 years) were analyzed. Seventy-four patients were influenza A positive (28.6%), 2 were influenza B positive (0.8%), and 4 were parainfluenza-3 positive (1.5%). RSV was detected in 14 patients (5.4%) and HMPV in 15 (5.8%). No other respiratory virus was found in the latter 2 groups. No PCR negative specimens were cell culture positive.

Conclusion

In one representative season, 5.4% and 5.8% of elderly inpatients were found to be RSV and HMPV positive, respectively, by real-time RT-PCR. No RSV or HMPV-positive patients were co-infected with other respiratory agents. These data support the implementation of routine RSV and HMPV testing in this patient population during conventional respiratory season.

Introduction

Respiratory viruses cause significant morbidity and mortality in the elderly. In this population, the seasonal impact of influenza has long been recognized, while that of RSV and of HMPV remain incompletely understood.

At the Eastern Ontario Regional Virology Laboratory, routine testing of the hospitalized elderly for HMPV and RSV has not been performed. In order to determine if routine testing is warranted, we retrospectively analyzed respiratory specimens from this population archived during a conventional respiratory season.

Objective

To establish the prevalence of HMPV and of RSV in elderly hospitalized patients, in order to determine if routine testing is warranted in this patient population.

Methods

Nucleic acid extraction

RNA was manually extracted from thawed archived NPS and TS specimens (in Starplex Multitrans™ S160 transport medium; Starplex Scientific Inc., Etobicoke, ON) using the Qiagen QIAamp® Viral RNA Mini Kit (Qiagen Inc. Mississauga, ON).

Real-time RT-PCR

RT-PCR assays for each target were based on the following:

Virus	Reference
HMPV	Maertzdorf J, <i>et al.</i> (1)
RSV A, B	van Elden LJ, <i>et al.</i> (2)
Influenza A, B	van Elden LJ, <i>et al.</i> (3)
Parainfluenza 3	Joshi, S., Elkan, M., Hodinka R. (4)

Real-time RT-PCR

RT-PCR for each target was performed using the AgPath-ID 1-step RT-PCR Kit on the ABI 7500 Fast platform (both: Applied Biosystems, Foster City, CA).

Primers and probes were from Applied Biosystems and Integrated DNA Technologies (Coralville, IA).

Cell culture

150 µL of each specimen was added to 1 tube of RMK (Diagnostic Hybrids, Inc., Athens OH) and 1 tube of HFL (RVL) cells. Cells were incubated (33.5°C, 8 days) and examined for cpe. Upon cpe development or on day 8, cells were trypsinized and processed for DFA using standard techniques.

Results

Study period

- January 1 to April 1, 2007

Specimens

- N=258
- 144 NP swabs, 14 throat swabs

Patients

- N=258
- Age: 60-95 years (mean 71.9 years; median 80 years)
- Clinical diagnosis: febrile respiratory illness; influenza-like illness

Overall Prevalence Data (N=258)

Virus	Number positive	% Positive
HMPV	15	5.8
RSV*	14	5.4
Influenza A	74	28.6
Influenza B	2	0.8
Parainfluenza 3	4	1.5
No virus identified**	149	57.8
Co-infections	0	0

* RSV-A: 9 (3.5%); RSV-B: 5 (1.9%)

** No PCR-negative specimens yielded virus in culture

Influenza Suspected (N=211)

Virus	Number positive	% Positive
HMPV	12	5.7
RSV	9	4.3
Influenza A	67	31.8
Influenza B	1	0.5
Parainfluenza 3	3	1.4
No virus identified	119	56.4

* RSV-A: 6 (2.8%); RSV-B: 3 (1.4%)

Respiratory Viral Illness Suspected; Non-specified virus (N=47)

Virus	Number positive	% Positive
HMPV	3	6.4
RSV	5	10.6
Influenza A	7	14.9
Influenza B	1	2.1
Parainfluenza 3	1	2.1
No virus identified	30	63.8

* RSV-A: 3 (6.4%); RSV-B: 2 (4.3%)

Summary / Conclusion

- As expected, influenza A was the predominant virus detected in hospitalized patients >60 years of age admitted with a clinical diagnosis of "influenza" or "febrile respiratory illness" during the 2007 respiratory virus season (28.6%).
- RSV and HMPV were detected in 11.2% of this population (RSV 5.4%, HMPV 5.8%).
- Based on these data, routine RSV and HMPV testing of elderly patients hospitalized with an influenza-like illness or a febrile respiratory illness is warranted.

References

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