1327. Human Rhinovirus Infection in Multiple Myeloma Patients: Effect on Morbidity and Mortality

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Session: P-74. Respiratory Infections - Viral

Background. Human Rhinovirus (hRV) causes mild, primarily upper respiratory tract symptoms in immunocompetent hosts. However, in immunocompromised patients, it often progresses to a lower respiratory tract infection. Multiple myeloma (MM) patients are immunocompromised due to inherent immunodeficiency and exposure to biologic and chemotherapeutic agents. The complications of hRV infection in MM patients are not well known. In this study, we aim to identify the morbidity and mortality associated with hRV in MM participants.

Methods. This was a retrospective study, using Arkansas Clinical Registry Database, which identified all MM patients diagnosed with hRV infection by nasopharyngeal multiplex polymerase chain reaction (PCR) in January-December 2019. Duplicates within 30 days were excluded. Patients were followed for 30 days after diagnosis. We assessed the need for hospitalization, intensive care unit (ICU) admission, oxygen administration, mechanical ventilation, and death. We collected their absolute neutrophil (ANC) and lymphocyte count (ALC) within three days of diagnosis and compared values using Mann-Whitney U test.

Results. We identified 217 MM patients with hRV. Ninety (41%) had prior autologous stem cell transplant, 148 (68%) had received chemotherapy within 30 days. Ninety (41%) had chest imaging, with 11 (12%) having infiltrates. Out of the 217, 69 (31.9%) were admitted, with a mean length of stay of 3 days. 13% of the admitted patients were transferred to the ICU. 65.5% of the admitted patients needed oxygen, and two required mechanical ventilation. The mean ANC and ALC for the admitted group was 3.88 cells/μL and 1.22 cells/μL respectively, compared to 3.57 cells/μL and 1.07 cells/μL in the outpatient group, p=0.6 and 1. Five participants died.

Conclusion. Human Rhinovirus infection in MM patients was associated with significant morbidity, including hospitalization, ICU care, supplemental oxygen requirement, and even mechanical ventilation in 2 patients. Death was observed within 30 days, although rarely. The mean ALC and ANC were not predictive of the severity of the disease. Recognizing hRV effects on morbidity and mortality could lead to earlier recognition and management of complications in MM patients.

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1328. Risk Factors for Severe Influenza Outcomes Among Infants Born Between 2011 and 2019

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Session: P-74. Respiratory Infections - Viral

Background. Influenza in infancy can cause significant morbidity and mortality. This study aimed to characterize influenza outcomes in infants < oρ = 12 months and identify risk factors for severe infection.

Methods. A retrospective cohort of infants ≤ 12 months born between 2011-2019 who received longitudinal ambulatory and inpatient care within a multi-facility hospital system and had laboratory-confirmed influenza were included. Perinatal, medical and illness characteristics were described. Risk factors for severe influenza (hospitalization, intensive-care unit (ICU) admission, secondary bacterial infections) were analyzed using Chi-square analysis and multivariate logistic regression.

Results. Among 421 infants with influenza, 134 (32%) were < 6 months (m), 28 (6.5%) were born prematurely (< 35 weeks gestational age), and 41(10%) had chronic medical conditions (CMC). 62 (15%) required hospital admission, 13 (21%) of which required ICU care. No deaths were reported. Secondary bacterial infections were diagnosed in 101 (24%) including acute otitis media (84%), pneumonia (15%) and sinusitis (3%). Prematurity (OR 3.6, 95%CI:1.5-8.3), age < 6m (OR 3.4, 95%CI:1.9-5.9), and CMC (OR 7.6, 95%CI 3.8-15.3) were significantly associated with hospitalization. Prematurity, age < 6m, and CMC were also associated with ICU admission. Infants > 6m (OR 2, 95%CI:1.2-3.5) were more likely to be diagnosed with a secondary bacterial infection than younger infants. Among infants > 6m, complete influenza vaccination (2 doses) was associated with lower rates of antibiotic use (OR 0.5, 95% CI:0.3-0.9) compared to partial or no vaccination, but did not significantly affect hospitalization, ICU admission, or frequency of secondary bacterial infections. Adjusting for prematurity, age < 6m remained associated with hospitalization (aOR 4, 95%CI: 2.1-7.3) as did presence of CMC (aOR 7.3, 95%CI 3.3- 15.7). For ICU admission, age < 6m (aOR 6.3, 95%CI:1.6-24.1) and CMC (aOR 19.7,95%CI:4.9-79.5) were also independent risk factors.

Conclusion. Younger age and chronic medical conditions were independent risk factors for severe influenza infection. Complete influenza vaccination in eligible age groups was associated with decreased antibiotic use.

Disclosures. **John V. Williams, MD, GlaxoSmithKline** (Advisor or Review Panel member, Independent Data Monitoring Committee)**Quidel** (Advisor or Review Panel member, Scientific Advisory Board) **Judith M. Martin, MD**, **Merck Sharp and Dohme** (Consultant)

1329. Burden of Respiratory Syncytial Virus (RSV) Infection among Hospitalized Older Adults and Those with Underlying Chronic Obstructive Pulmonary Disease (COPD) or Congestive Heart Failure (CHF)

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Session: P-74. Respiratory Infections - Viral

Background. The burden of Respiratory Syncytial Virus (RSV)-associated hospitalization in adults is incompletely understood. The COVID-19 pandemic has resulted in multiple public health measures (e.g., social distancing, handwashing, masking) to decrease SARS-CoV-2 transmission, which could impact RSV-associated hospitalizations. We sought to compare RSV-associated hospitalizations from 2 pre- and one mid-COVID-19 winter viral respiratory seasons.

Methods. We conducted an IRB-approved prospective surveillance at two Atlanta-area hospitals during the winter respiratory viral seasons from Oct 2018–Apr 2021 for adults ≥ 50 years of age admitted with acute respiratory infections (ARI) and adults of any age with COPD or CHF-related admissions. Adults were eligible if they were residents of an 8 county region surrounding Atlanta, Georgia. Those with symptoms > 14 days were excluded. Standard of care test results were included. Asymptomatic adults ≥ 50 years of age were enrolled as controls in Seasons 1 and 2. Nasopharyngeal swabs from cases and controls were tested for RSV using BioFire® FilmArray® Respiratory Viral Panel (RVP). We compared the demographic features and outcomes of RSV+ cases and controls.

Results. RSV was detected in 71/2,728 (2.6%) hospitalized adults with ARI, CHF, or COPD and 4/466 (0.9%) controls. In Season 1, RSV occurred in 5.9% (35/596 patients), in Season 2 3.6% (35/970 patients), but in only 0.09% (1/1,162 patients) in Season 3 (P < 0.001 for both seasons). RSV detection in Season 3 was similar to RSV detection among controls during Seasons 1 and 2 (P=0.6). Median age of cases and controls was 67 years (Table 1). Of cases with RSV 11% were admitted to the ICU and two required mechanical ventilation. The majority of hospitalized patients were discharged home (95.8%) with a median length of hospitalization of three days (IQR 2-7).

Table 1. Demographic Features and Outcomes Among RSV-Positive Hospitalized Adults.

		RSV positives	
		Cases	Controls
		S 1,2, and 3	S 1&2
Demographics			
Total Enrolled		2,728	466
RSV positive, n (%)		71 (2.6%)	4 (0.9%)
Age in years, median [IQR]		67 [57,78]	67 [62, 78]
Sex	Female	49 (69.0)	2 (50)
Race	White	19 (26.8)	2 (50)
	African American	50 (70.4)	2 (50)
	Unknown	2 (2.8)	0 (0)
Ethnicity*	Hispanic	1 (1.4)	0 (0)
	Non-Hispanic	69 (98.6)	4 (100)
Outcomes			
ICU admission	Yes	8 (11.3)	
Mechanical ventilation among those admitted to the ICU	Yes	2 (25.0)	
Discharge location	Home	68 (95.8)	
	Death	1 (1.4)	
	Hospice	2 (2.8)	
Length of hospital stay, median days [IQR]		3 [2, 7]	

*Cases missing response for 1 patient

Conclusion. Over 3 seasons, RSV was detected in 2.6% of adults admitted to the hospital with ARI, CHF or COPD. The rate of RSV dramatically declined during the

2020-21 winter respiratory viral season, likely due to public health measures implemented in response to COVID-19.

1330. Clinical Associations and Trajectory of "Long COVID"

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Session: P-74. Respiratory Infections - Viral

Background. Persistent symptoms after acute COVID-19 are being increasingly reported. To date, little is known about the cause, clinical associations, and trajectory of "Long COVID".

Methods. Participants of an outpatient clinical trial of Peginterferon-Lambda as treatment for uncomplicated SARS-CoV-2 infection were invited to long term follow-up visits 4, 7, and 10 months after initial COVID-19 diagnosis. Ongoing symptoms and functional impairment measures (work productivity and activity index (WPAI), NIH toolbox smell test, 6-minute walk test) were assessed and blood samples obtained. "Long COVID" was defined as presence of 2 or more typical symptoms (fatigue, hyposmia/hypogeusia, dyspnea, cough, palpitations, memory problems, joint pain) at follow up. Associations between baseline characteristics, initial COVID-19 clinical course, and presence of "Long COVID" during follow-up were assessed using generalized estimating equations accounting for repeated measurements within individuals.

Results. Eighty-seven participants returned for at least one follow-up visit. At four months, 29 (34.1%) had "Long COVID"; 19 (24.7%) met criteria at 7 months and 18 (23.4%) at 10 months (Figure 1). Presence of "Long COVID" symptoms did not correlate significantly with functional impairment measures. Female gender (OR 3.01, 95% CI 1.37-6.61) and having gastrointestinal symptoms during acute COVID-19 illness (OR 5.37, 95% CI 1.02-28.18) were associated with "Long COVID" during follow-up (Figure 2). No significant associations with baseline immunologic signatures were observed.
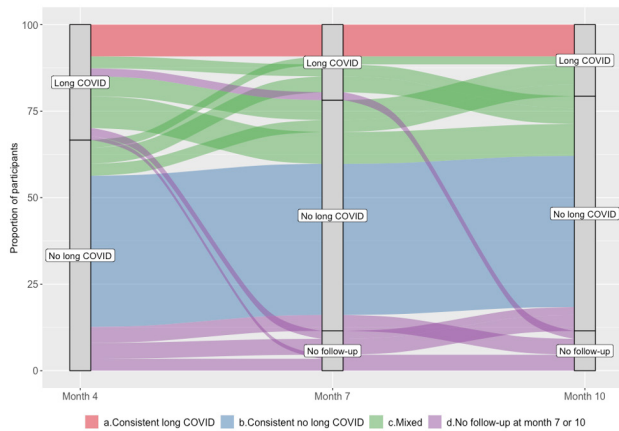

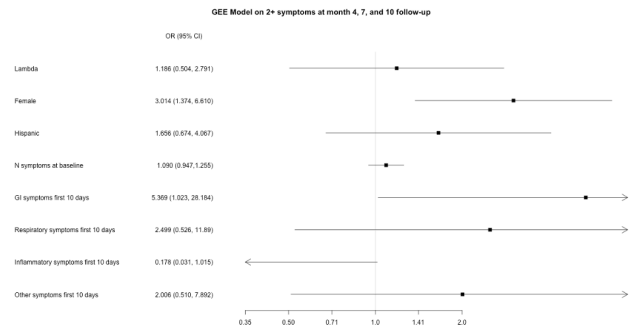Figure 1. Alluvial plot of long term follow-up participants showing outcomes of symptoms at each visit.

Figure 2. Generalized Estimating Equations Model showing associations with "Long COVID" (presence of 2+ symptoms) at month 4, 7, and 10 following acute infection using unstructured correlation matrix.

Conclusion. "Long COVID" was prevalent in this outpatient trial cohort and had low rates of resolution over 10 months of follow up. Female sex and gastrointestinal symptoms during acute illness were associated with "Long COVID". Identifying modifiable risk factors associated with the development of persistent symptoms following SARS-CoV-2 infection remains a critical need.

1331. Seasonality of Common Human Coronaviruses in the United States, 2014-2021

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Session: P-74. Respiratory Infections - Viral

Background. The four common human coronavirus (HCoV) types, including two alpha (NL63 and 229E) and two beta (HKU1 and OC43) coronaviruses, generally cause mild, upper respiratory illness. Common HCoV seroprevalence increases rapidly during the first five years of life and remains high throughout adulthood. HCoVs are known to have seasonal patterns, with variation in predominant types each year, but more defined measures of seasonality are needed.

Methods. We describe laboratory detection, percent positivity, and seasonality of the four common HCoVs during July 2014 to May 2021 in the United States reported to the National Respiratory and Enteric Virus Surveillance System (NREVSS). We also describe age, sex, and co-detection with other respiratory viruses for a subset of specimens available through the Public Health Laboratory Interoperability Project (PHLIP). We used a method previously validated for respiratory syncytial virus, characterized by a centered 5-week moving average and normalization to peak, to define seasonal inflections, including season onset, peak, and offset.

Results. Any HCoV type was detected in 96,336 (3.4%) of 2,487,736 specimens. Predominant common HCoV types fluctuated by surveillance year (Figure 1) and were generally consistent across geographic regions. In a subset of 4,576 specimens with a common HCoV detection, those with type 229E had a higher median age compared to other HCoV types (30.8 versus 24.8 years, p< 0.001), but there were no differences by sex. Influenza was the most commonly co-detected virus. In the last six complete HCoV seasons, onsets ranged from October to November, peaks from January to February, and offsets from April to June; >95% of all HCoV detections occurred within these ranges. The 2020-2021 common HCoV season onset, dominated by types NL63 and OC43, was delayed by approximately two months compared to prior seasons.
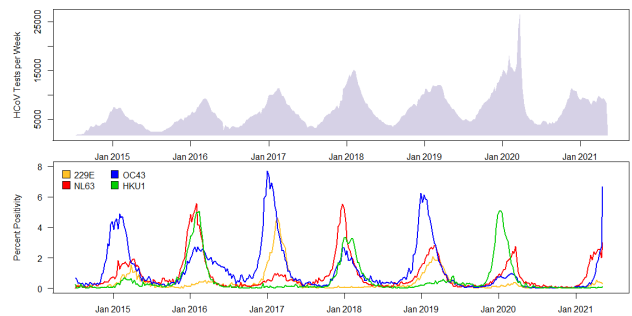

Figure 1. The top panel represents total specimens tested and the bottom panel shows percent positivity of the four common human coronavirus (HCoV) types by week starting July 5, 2014 through May 8, 2021. Data are from the National Respiratory and Enteric Virus Surveillance System (NREVSS).

Conclusion. Common HCoVs demonstrate relatively consistent seasonal patterns. The delayed onset of the 2020-2021 season may be attributable to mitigation