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**Session:** 139. Adult Viral Infection

**Friday, October 6, 2017: 12:30 PM**

**Background.** Crimean–Congo hemorrhagic fever (CCHF) is a potentially fatal disease caused by a tick-borne virus from the Bunyaviridae family. Cytokines play an important role in the pathogenesis of viral, bacterial, and immunologic diseases. This study aimed to investigate the role of TNF-alpha, IL-6, IL-10, and IFN-gamma levels in the severity of infection and clinical outcome of patients with CCHF.

**Methods.** Patients with confirmed CCHF were divided into two groups (severe cases: Patients who exhibited hemorrhage during their hospital stay, and mild/moderate cases: Patients who displayed no hemorrhage during their hospital stay). Demographic characteristics, laboratory tests on admission of all patients with CCHF were investigated, and serum TNF-alpha, IL-6, IL-10, and IFN-gamma levels were measured.

**Results.** A total of 154 patients with confirmed CCHF were investigated. Forty-six (29.9%) of these patients were in the severe group. In patients with severe CCHF, significantly higher serum levels of TNF-alpha (68.2 ± 23.5; P = 0.008) and IL-6 (73.1 ± 41.6; P = 0.003) were detected, compared with cytokine levels in patients who had mild/moderate CCHF (Table 1). No differences in serum IL-10 and IFN-gamma levels between patients who had severe CCHF and those who had mild/moderate CCHF were detected (P > 0.05).

**Table 1: Cytokine levels, demographic and laboratory characteristics in patients with severe and mild/moderate cases with CCHF.**

<table>
<thead>
<tr>
<th>Features</th>
<th>Severe cases</th>
<th>Mild/moderate cases</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>50.8 ± 20.3</td>
<td>31.6 (74.4)</td>
<td>0.001</td>
</tr>
<tr>
<td>Female gender, n (%)</td>
<td>31 (67.4)</td>
<td>63 (83.3)</td>
<td>0.291</td>
</tr>
<tr>
<td>TNF</td>
<td>68.2 ± 23.5</td>
<td>413 ± 174</td>
<td>0.008</td>
</tr>
<tr>
<td>IL-6</td>
<td>73.1 ± 41.6</td>
<td>38.0 ± 19.5</td>
<td>0.003</td>
</tr>
<tr>
<td>IL-10</td>
<td>6.2 ± 1.3</td>
<td>6.21 ± 1.4</td>
<td>0.753</td>
</tr>
<tr>
<td>IFN-gamma</td>
<td>156 ± 96</td>
<td>126 ± 92</td>
<td>0.664</td>
</tr>
<tr>
<td>WBC</td>
<td>27.86 ± 5,602</td>
<td>2.275 ± 1,286</td>
<td>0.280</td>
</tr>
<tr>
<td>PLT</td>
<td>53,564 ± 36,520</td>
<td>98,065 ± 42,768</td>
<td>0.001</td>
</tr>
<tr>
<td>CRP</td>
<td>3.2 ± 2.6</td>
<td>1.1 ± 1.4</td>
<td>0.005</td>
</tr>
<tr>
<td>ALT</td>
<td>521 ± 482</td>
<td>208 ± 320</td>
<td>0.044</td>
</tr>
<tr>
<td>AST</td>
<td>869 ± 1,182</td>
<td>256 ± 215</td>
<td>0.016</td>
</tr>
<tr>
<td>CPK</td>
<td>1,138 ± 970</td>
<td>676 ± 835</td>
<td>0.007</td>
</tr>
<tr>
<td>LDH</td>
<td>1,800 ± 1,254</td>
<td>589 ± 271</td>
<td>0.002</td>
</tr>
</tbody>
</table>

**Conclusion.** Cytokines, chemokines, and other inflammatory mediators function in a manner, acting on many different cell types to regulate the host's immune response. When cytokines present in high concentrations, they might toxic or even lethal effects. In accordance with this view, we have detected increased serum TNF-alpha, IL-6 levels in the patients with severe CCHF.

**Disclosures.** All authors: No reported disclosures.

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**1036. Risk Factors for Herpes Zoster: A Systematic Review and Meta-Analysis**

**Kousuke Kawan, ScD and Barbara P Yawn, MD, MSc, MSHP, FAAP**

**Session:** 139. Adult Viral Infection

**Friday, October 6, 2017: 12:30 PM**

**Background.** Well-recognized risk factors for herpes zoster (HZ), commonly known as shingles, are age and immunosuppression. Numerous studies have investigated other various risk factors for HZ in recent years. The objective of our study is to systematically review studies examining risk factors for HZ and discuss implications based on the updated evidence.

**Methods.** We performed a literature search using PubMed, Embase, and Web of Science and included studies that examined risk factors for HZ. Random effects model was used to summarize the risk ratio (RR) or odds ratio (OR) and 95% confidence interval (CI).

**Results.** Of the 3450 studies screened, we included 84 studies in the systematic review and conducted meta-analysis in 62 studies. Women are at increased risk of HZ compared with men (pooled adjusted RR = 1.31; 95% CI: 1.27, 1.34). Black individuals have almost half the risk of HZ than White individuals (pooled RR = 0.54; 95% CI: 0.47, 0.63). Family history was found to be a risk factor for HZ (pooled OR = 3.39; 95% CI: 2.39, 5.40). Autoimmune diseases, including rheumatoid arthritis (pooled RR = 1.67; 95% CI: 1.41, 1.98) and systemic lupus erythematosus (RR = 2.10; 95% CI: 1.40, 3.15), were associated with an elevated risk of HZ. Other comorbidities were associated with an increased risk of HZ, with the pooled ORs ranging from 1.25 (95% CI: 1.13, 1.39) for asthma to 1.30 (1.17, 1.45) for diabetes mellitus, and 1.31 (95% CI: 1.22, 1.41) for chronic obstructive pulmonary disease. Statin use was also
associated with a modest increased risk of HZ (pooled RR = 1.14; 95% CI: 1.11, 1.17). Recent physical trauma increased risk of HZ by almost two-fold (pooled RR = 2.56; 95% CI: 1.97, 3.33).

Conclusion. In addition to age and immunocompromised conditions, our review shows that female sex, race/ethnicity, family history, and comorbidities are risk factors for HZ. Efforts are needed to better understand risk factors and to increase the uptake of zoster vaccination.

Disclosures. B.P. Yawn, GSK: Consultant and Scientific Advisor, Consulting fee

1037. Herpes–Zoster Infection in a Tertiary Hospital in Brazil
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Background. Herpes zoster (HZ) is a common infection with potential complications requiring hospital care, especially for patients with multiple comorbidities. However, there is little information on HZ from hospital registries.

Methods. We searched for hospital-based records of ICD-10 between March 2000 and January 2017 at Hospital de Clinicas de Porto Alegre, a tertiary, university hospital in south Brazil. To avoid misclassifications, we considered clinical evaluation for the diagnosis of cutaneous HZ and postherpetic neuralgia (PHN), ophthalmological evaluation for ophthalmic HZ and the combination of clinical, radiological and cerebrospinal fluid analysis for HZ meningo-encephalitis (ME). We analyzed conditions associated with immune dysregulation, complications, length of hospital stay, and mortality. Chi-square test and Kaplan-Meier estimator were used for statistical analyses. P < 0.05 was considered statistically significant.

Results. There were 847 records for this period, of which 801 were confirmed according to our criteria and included in the analysis. Most patients were women (n = 448; 60%), with an average of 48.8 years, standard deviation of 22.2. There were more diagnoses in the inpatients group (74.4%), and fewer in the emergency room (22.4%) and outpatient (3.3%). The median length of hospital stay was 7 days (2-10, IQR 7-15) when HZ was the main reason for admission. Most patients presented cutaneous HZ (n = 743; 92.8%). There were fewer cases of PHN (6.1%), ophthalmic HZ (7.6%) and ME (4.1%). Seventy percent had some kind of immune dysregulation, more frequently AIDS (31%), use of immunosuppressive agents (18.7%) and malignant disease (16.2%). We followed the subjects for a median of 28.2 (2.8-77.5) months. During this period, there were 105 (13.1%) deaths. Five were related to HZ ME. The 30-day overall mortality rate was 1.5%. There was no statistical difference in cumulative survival (graph 1, P = 0.05) or incidence of complicated forms for patients with or without immune dysregulation.

Conclusion. Our sample was characterized by a majority of inpatient diagnoses. The 30-day mortality rate was lower than reported in similar studies, but there was a relevant impact of complicated forms in mortality and sequelae.

Disclosures. All authors: No reported disclosures.

May Elsherif, MD; Todd Hatchette, MD FRCP(C); Jason Lohbanc, PhD; Lingyun Ye, MSc; Melissa K Andrew, MD, PhD; Arthid Ambrose, RN; Guy Boivin, MD, MSc;

Session: 139. Adult Viral Infection
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Background. Influenza virus activity varies seasonally and within season. Epidemiology of serious influenza outcomes is contingent on the prevalent circulating strain/s and susceptible age group/s. Given the strain variability over the years, influenza research in Canada is needed to understand the clinical and epidemiological profiles of different influenza strains causing adult hospitalizations.

Methods. During these three influenza seasons, the Serious Outcomes Surveillance (SOS) Network of the Canadian Immunization Research Network (CIRN) enrolled adults hospitalized with acute respiratory illness across Canada. Nasopharyngeal swabs (NPS) from influenza cases were tested for strain characterization using real-time reverse transcriptase polymerase chain reaction (rtRT-PCR). A primary assay strategy was used for influenza A viruses whereas H1N1 and H3N2, influenza B isolates were differentiated as Victoria or Yamagata. Laboratory results were compared with patient demographic data and clinical outcomes.

Results. Over three consecutive influenza seasons, 3394 cases of hospitalized acute respiratory illness were laboratory-confirmed as influenza. At 72.4%, influenza A was predominant across all seasons, while influenza B caused 27.6%. Of the influenza A cases were due to H3N2 (58.7%), while H1N1 accounted for 41.3%. For influenza B, the Yamagata lineage represented at 88.8% whereas the Victoria lineage accounted for 11.6%. Outcome analyses are presented for each influenza A subtype and influenza B lineage, overall and per season. Considering serious outcomes in patients ≥65, higher proportions of patients hospitalized with the H1N1 strain experienced intensive care unit (ICU) admission and need for mechanical ventilation, while higher proportions of patients hospitalized with B/Yamagata and H3N2 died within 30 days of admission.

Conclusion. Comprehensive collection of surveillance data paired with NP specimens by the CIRN SOS Network was conducive to broader understanding of influenza strain activity and associated outcomes at the subtype and lineage level. This data is important to make informed recommendations for the use of multicomponent influenza vaccines.


1039. Co-circulation of Influenza A and B During the 2016–2017 Influenza Season at Rush University Medical Center
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