Analysis of Risk Factors for Influenza in Severe Acute Respiratory Infection (SARI) Cases in Imperial County, 2012-2017

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Background

Respiratory infections are a major cause of morbidity and mortality worldwide. Influenza is estimated to cause between 9.2 and 35.6 million cases per year, with the hospitalization rate for the season 2016-17 estimated as 20.3-321.1 per 100,000. The Border Infectious Disease Surveillance program in California (BIDS-CA) has conducted enhanced surveillance of severe acute respiratory infections (SARI) in Imperial County since 2009. The data collected can help identify the risk of influenza illness in SARI patients with preexisting conditions. Influenza has been shown to be associated with premature death due to cardiovascular events and exacerbation of cardiac disease. Patients with hypertension are already at risk of developing adverse cardiac outcomes. Therefore, the BIDS-CA program assessed the risk of influenza in SARI patients with hypertension.

Objectives

Our goal was to describe the clinical characteristics of SARI patients in Imperial County and determine the association between influenza and hypertension, as well as other co-morbidities.

Methods

Data were extracted from a database of SARI cases admitted to the two acute-care hospitals in Imperial County, CA from surveillance week 40, 2012 to week 39, 2017. Molecular testing (Polymerase Chain Reaction) for respiratory pathogens was conducted by the Naval Health Research Center (NHRC) laboratory in San Diego, CA. Case report forms included patient demographic and clinical characteristics. Univariate descriptive statistics were constructed on the data for respiratory pathogens and pre-existing conditions in SARI patients. Associations were calculated with Pearson's chi-square or Fisher's exact tests with SAS 9.4 software.

Results

A total of 1,633 enhanced surveillance cases were enrolled in the surveillance project between 2012-2017. Fifty-eight percent of cases (n=948) presented with at least one pre-existing condition, including hypertension (n=470), diabetes (n=309), asthma (n=260), cardiac disease (n=231), chronic lung disease (n=172), and immunocompromised (n=50). Influenza was detected in 11% of cases (n=177). Other viruses were also detected, such as rhinovirus (n=145) and respiratory syncytial virus (RSV, n=130). Other infectious agents recovered included bacterial pathogens such as methicillin-resistant *Staphylococcus aureus* (MRSA, n=27) and *Streptococcus pneumoniae* (n=25). An association was found between hypertension and influenza (p=0.036). Influenza was also associated with cardiac disease (p=0.041), but no association was found with other pre-existing conditions such as asthma (p=0.85), chronic lung disease (p=0.14), diabetes (p=0.10), and immunosupression (p=0.056).

Conclusion

An association between influenza and hypertension was found in SARI cases in an enhanced surveillance program in Imperial County, CA. This assessment will help identify possible health disparities in this community as well as increased risk of influenza in patients with hypertension and cardiac disease. Focused vaccine campaigns and provider education efforts regarding this heightened risk could be beneficial to this region.

Learning objectives

- Describe the SARI enhanced surveillance in a border region between California and Baja California, MX.
- Describe the frequency of infectious agents associated to SARI cases in Imperial County, CA.
- Identify co-morbidities that could represent associated with influenza in SARI cases.

Target Audiences

Professionals interested in the possible role of cardiovascular disease in influenza risk. Public health officials working in influenza control and prevention. Epidemiologists conducting surveillance of influenza-like illness and severe acute respiratory infections.

Keyword(s): Surveillance, Hypertension

Learning Areas

- Epidemiology

- Protection of the public in relation to communicable diseases including prevention or control

External Funding