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Review Article

Influenza outbreaks with a focus on closed psychiatric units: A review article

Abstract

2018 is a year to remember as we passed 100 years from the most catastrophic event in recorded history: the 1918 influenza pandemic. After that, we encountered three more influenza pandemics in 1957, 1968 and 2009. In 2018, Influenza season has been worse than recent previous seasons. Influenza activity in this year is comparable to 2009 H1N1 pandemic taking a terrible toll. Influenza, an acute respiratory illness caused by different strains of influenza A or B virus that occurs in outbreaks and epidemics worldwide. Psychiatric units represent a unique challenge for influenza outbreaks because they are closed units, and hygienic measures are harder to implement due to patient mental conditions. Early diagnosis and timely interventions are essential to decrease the burden of the disease. As a general recommendation, all persons older than six months without a contraindication should receive annual influenza vaccination, especially populations at a higher risk of medical complications.

We received information from occupational health regarding vaccination reports in the psychiatry unit. In inpatient psychiatry unit, 64 out of 70 staff were vaccinated in-house, three declined due to medical necessity (these three persons were symptom-free at the time of outbreak), three provided proof of vaccination elsewhere. Compliance with this unit was 95%. In psychiatry crisis unit, 21 out of 23 vaccinated in-house, two provided evidence of immunization elsewhere, and none declined. Compliance with this unit was 100%. It is strongly recommended to get the flu vaccine even late in the season although the effectiveness is low. Though influenza A H3N2 strains are most common this season, there is a recent increase in circulating H1N1 and B. Vaccine will cover all these strains.

Influenza disease is caused by influenza A and B viruses, which are spread from person to person by respiratory droplets and fomites. It is of vital importance to take extreme precautions to prevent the infection and its spread, especially in closed units such as psychiatric wards where outbreaks may develop and cause devastating consequences. Vaccination is the primary tool to prevent and decrease the burden of the disease; however extra precautions and active measures should be in place in hospitals and closed units where infection spread much easier.

Epidemiology

According to the World Health Organization, influenza causes an estimated 444,000–553,000 deaths annually worldwide [2]. Most of these cases are related to adults >60 years, immunocompromised populations or patients with chronic

Background

According to the CDC outpatient Influenza-like Illness Surveillance Network (ILINet) during week 4 of 2018, 7.1% of patient visits were due to influenza-like illness nationwide which is well above the national baseline of 2.2% and has been the highest reported since 2009–2010 season. Except for Oregon and Hawaii, all other states reported widespread flu activity this season. Total of 63 flu-related pediatric deaths occurred so far in this season [1].

In January 2018, we had an Influenza outbreak in our hospital psychiatry unit started with two new psychiatric patients who were roommates apparently had flu symptoms at home presented to the emergency department with psychiatry related issues. Nasal swabs for flu were positive for both. These patients were immediately isolated and placed on droplets control. However, one healthcare manager and a psychiatry physician were affected. Then it spread to a total of seven psychiatry unit patients and three psychiatry unit employees.

cardiopulmonary conditions. Due to the unique characteristics of the virus called antigenic drift and shift, the virus has the capability of mutating and changing the conformation of its surface proteins and even emerges with new surface antigens, results in reassortment of human influenza type A viruses and is responsible for global pandemics [3]. In several studies conducted between 1992 and 2006 in different psychiatric units, influenza attack rates were recorded from 30.7% up to 59% in residents and 20% – 50% of staff members. The case fatality rate ranging from 0.7% to 46.7% among residents (with the highest being in a dementia special care unit in VA) and 0% of staff members [4–7] in all of these reports.

Influenza vaccine effectiveness

All persons older than six months without a contraindication should receive annual influenza vaccination including the pregnant woman and especially populations at a higher risk of transmission or medical complications, including residents of nursing homes or long-term care facilities [8]. The antigenic composition of the vaccine is adjusted every year, and its success in preventing influenza illness depends on the match between the vaccine and circulating strains. Vaccine effectiveness is highest (40–60%) when there is a close match between them, but even when the match is poor, vaccination has been shown to reduce the risk of hospitalization and death from influenza [9–11]. For the 2016–2017 influenza season, the adjusted overall effectiveness of the seasonal influenza vaccine against influenza A and B viruses was 42% [8]. Flu vaccines include a mixture of multiple strains of the killed virus. However, this standard method does not lead to a significant T cell activation because it is a killed virus. There is a theory that the vaccine strain mutates during the manufacturing process so there will be a mismatch with circulating flu strains. Two studies concluded that people who are taking statins (especially synthetic statins) mount less immune response compared to people who are not on statins. Several studies showed that when the residents and staff are vaccinated, the outbreaks have been considerably smaller in the number of affected people and with less severe consequences and even a significant impact in death ratio from influenza infection. It is recommended that all residents of psychiatric units should be vaccinated unless medically contraindicated.

Closed unit influenza

Respiratory tract infections typically account for most outbreaks in psychiatric units [12]. Outbreaks of infectious diseases in psychiatric units are different from those in other types of closed units such as intensive care units. Usually, patients in psychiatric units have fewer comorbidities than patients admitted to intensive care units or medical floors. Influenza can be introduced into the psychiatric facility by newly admitted residents, healthcare workers or by visitors. Infection control is challenging in psychiatry unit because patients are typically ambulatory, and they attend group sessions frequently. Due to altered cognitive function, psychiatric patients usually will not fully cooperate with hygienic measures. Alcohol hand rub use is limited because of concerns about alcohol ingestion, especially in patients with substance abuse history [12].

An outbreak is defined as two or more ill residents with at least one laboratory-confirmed influenza positive case. According to the CDC's *Interim Guidance for Influenza Outbreak Management in Long-Term Care Facilities*, preventing transmission of influenza viruses and other infectious agents within long-term care facilities requires a multi-faceted approach that includes: vaccination, testing, infection control, antiviral treatment and antiviral chemoprophylaxis [13].

Vaccination: All the residents and health care personnel should be vaccinated with the trivalent/ quadrivalent inactivated influenza vaccine before influenza season unless medically contraindicated.

Testing: Daily surveillance of symptoms should be conducted during flu season among all new and current residents, staff, and visitors. Ill residents, personnel, and visitors should be excluded from the facility until the illness has resolved. The recommended tests are rapid influenza diagnostic tests, immunofluorescence and reverse transcription polymerase chain reaction (RT-PCR). Due to the possibility of false negative and false positive results with rapid testing and immunofluorescence, confirmatory testing using RT-PCR or viral culture should be done in all negative results during influenza season and in all positive results during the non-influenza season [13]. Influenza testing should be regularly conducted during flu season and even in a non-influenza season when any resident has signs and symptoms of influenza-like illness.

Infection control- Implementation of standard precautions and droplet precautions such as isolating affected patients and wearing of facemasks.

Antiviral treatment: Any patient with confirmed or suspected influenza should receive antiviral treatment immediately. Therapy has demonstrated to have a more significant benefit if started within 48 hours of the symptom onset. Due to the low sensitivity of rapid testing, treatment should be started, if there is high clinical suspicion. The standard treatment is oral oseltamivir 75 mg twice daily for five days. Other options for non-oseltamivir responding illnesses include inhaled zanamivir and intravenous peramivir.

Chemoprophylaxis: All eligible residents in the facility should receive chemoprophylaxis as soon as an influenza outbreak is determined. It is essential to understand the overall condition of the unit, its available resources and have a contingency plan in place to decide starting prophylaxis or not. It is recommended to begin prophylactic treatment after the first confirmed case. The other factors to consider are the severity of the outbreak, the number of deaths due to illness, difficulties in implementing control measures, (e.g., patients with dementia), high attack rate at first intervention and the antigenic mismatch between the outbreak strain and the strain of the vaccine or low vaccine rate [14].

Additional preventive measures in closed psychiatric units

The most critical factor is recognizing when to implement

the intervention. Most studies have shown that intervention should start as early as possible when there is at least one laboratory-confirmed influenza positive case. The timing of intervention is essential since the virus has two days incubation period and index case may already be spreading the disease in the window period. Restriction of group activities is one of the most important measures to avoid spread. Visitors may be carriers of the disease and introduce the virus into the unit. So some units have either restricted or completely stopped visitations during peaks of flu season and others have implemented video visitation systems. These video systems might as well be used to monitor the units to decrease the number of exposed personnel once there is an outbreak. Also, a 2009 article in NCHC magazine that talked about how they effectively stopped H1N1 spread in Collier County (FL) jail, mentioned that one useful measure they implemented was to start checking temperatures and symptoms twice a day and immediately isolating any patient found to have a fever or flu-like symptoms [15]. If available, negative pressure isolation rooms should be used and bunking of patients that are in the same phase of the illness when no other isolation rooms are available. Lastly, the use of regular and molecular air filters has been suggested especially in common areas to diminish the viral load.

Conclusions

Influenza causes a significant number of outbreaks each year with the high mortality rate in high-risk patients. Psychiatric patients are at a higher risk of flu epidemics due to their altered higher motor function level and lack of hygiene, even though they have fewer co-morbid conditions. Although vaccination is essential to prevent infection, early detection of symptoms and isolation of the affected becomes the most crucial factor in controlling outbreaks. According to a study done in a French psychiatric hospital, the average time between the first case and the intervention was 36 hours, while the average number of affected people at the time of the intervention was 2.5 on an average. That is why immediate intervention plans should be in place when an index case is detected because the virus can spread fast and easily among exposed persons in a closed unit. If we implement interventions early, we can stop the outbreak soon, and there will be less number of mortality and morbidity. Once index case is detected, all the preventive interventions suggested here should be implemented to decrease the outbreak.

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