LETTER TO THE EDITOR / EDİTÖRE MEKTUP

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Do We Still Need to Vaccinate Patients Against Flu After the Flu Infection?

Grip Geçiren Hastaları Yine de Gribe Karşı Aşılamalı mıyız?

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Dear Editor,

We are writing to highlight the vital role of influenza vaccination, particularly for high-risk groups, considering the recent observations in seasonal influenza patterns and patient outcomes. Influenza, an acute and contagious respiratory disease, is caused by diverse influenza viruses. Influenza frequently elicits seasonal epidemics in temperate climate regions, particularly during the winter, resulting in a substantial disease burden[1]. Although influenza can affect all age groups, children aged under five years, adults over the age of 65 years, pregnant women, individuals with chronic diseases, and immunocompromised patients are at an especially high risk of morbidity and mortality[2].

Following the onset of the Coronavirus disease-2019 pandemic, the implementation of social distancing, mask use, and infection control measures has resulted in an abrupt reduction in influenza and other seasonal respiratory virus infections[3]. However, following the 2021-2022 influenza season and a heightened burden in 2022-2023, influenza viruses appear to have rebounded. The lack of adequate protective immunity that results from a prolonged absence of exposure to a pathogen renders a significant fraction of the population susceptible to the disease, referred to as "immunological debt"[4]. In this context, those at a higher risk for influenza and its complications might experience a more severe disease course.

Influenza-related pneumonia patients commonly develop viral and bacterial co-infections and secondary infections, which are linked to a more severe disease course and an elevated mortality risk[5]. While *Streptococcus pneumoniae* and *Staphylococcus aureus* are frequently isolated among bacterial pathogens, various other bacterial agents can exacerbate seasonal influenza[6].

Influenza vaccination is a safe and effective method for safeguarding individuals and communities against severe influenza outcomes and sequelae. As the antigenic match with the circulating virus strain improves, protection against the infection increases[7]. The immunity acquired through vaccination is temporary (6-12 months), and prior influenza infections or vaccinations do not confer lifelong protection. Therefore, the World Health Organization (WHO) and the Advisory Committee on Immunization Practices advocate for an annual vaccination. In Turkey, the Ministry of Health recommends that all individuals receive the annual flu vaccine, regardless of their history of previous flu vaccinations or flu illness[2].

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This recent case underscores the severe implications of influenza infections in high-risk individuals.

A 79-year-old female patient with chronic obstructive pulmonary disease (COPD), hypertension, and type 2 diabetes mellitus presented to the emergency department with complaints of an increasing shortness of breath, cough, and productive sputum for the past week. She used an oxygen concentrator for eight hours per day at home and was on bi-level positive airway pressure therapy. The patient had not previously received any pneumococcal or annual influenza vaccines; however, she had received two doses of the inactivated Severe acute respiratory syndrome-Coronavirus-2 (SARS-CoV-2) vaccine. Upon presentation, her body temperature was 38.2 °C, and her respiratory rate was 32 per minute. She was administered 3 liters of oxygen per minute through a nasal cannula. A physical examination demonstrated the presence of widespread rales in both lungs. Laboratory tests revealed a white blood cell count of 5.33×10^3/µl ($4.49\text{-}12.68\times10^3$/µl), a lymphocyte count of 0.78×10^3/µl ($1.26\text{-}3.35\times10^3$/µl), and a neutrophil count of 4.13×10^3/µl ($2.1\text{-}8.89\times10^3$/µl). The lower lobes of both lungs were identified to exhibit consolidation areas on a chest computed tomography scan, which suggested the presence of an infection. The patient's nasopharyngeal swab samples were submitted for multiplex polymerase chain reaction (PCR) testing for respiratory pathogens, including SARS-CoV-2. Given no history of hospitalization but recent antibiotic usage, the patient was diagnosed with community-acquired pneumonia and administered ceftazidime, doxycycline, and oseltamivir to cover atypical pathogens additionally. Upon evaluation, the patient exhibited a CURB-65 score of 2, necessitating hospitalization and closely monitored care. The multiplex PCR test revealed an influenza A (H1N1) infection. Hence, ceftazidime and doxycycline administration were discontinued, and oseltamivir treatment was completed over five days. After a four-day hospitalization, the patient's condition significantly improved, and she was discharged in good condition. However, approximately two weeks later, she returned to the emergency department with a recurrence of previous symptoms. Another multiplex PCR test was conducted, and this time, influenza A (H3N2) and *S. pneumoniae* were identified. The patient was readmitted and administered piperacillin, tazobactam, and oseltamivir. The patient was discharged on oral amoxicillin-clavulanic acid following a five-day hospital stay.

This example illustrates that influenza imposes a disease burden that extends far beyond a simple respiratory infection, particularly in individuals with underlying chronic diseases who may require respiratory support and hospitalization.

As this case illustrates, influenza infection is frequently followed by both viral and secondary bacterial infections, with approximately 3/4 of cases of post-influenza pneumonia exhibiting bacterial co-infection[8]. Among the most frequently isolated bacterial pathogens, *S. pneumoniae* stands out and has historically contributed to higher mortality and morbidity rates throughout multiple influenza epidemics and pandemics[6].

Unfortunately, this patient was not vaccinated with either the influenza or pneumococcal vaccines, despite being in the high-risk group for these infections. As evident with this patient, infection with one influenza A virus strain does not prevent subsequent infection with another influenza A strain within the same season.

The frequency of COPD exacerbations is indicative of the deterioration of general health status, exercise capacity, increased hospitalizations, and even mortality, and each exacerbation has significant effects on the remaining pulmonary and physical capacity. In these patients, particularly older adults, the most probable explanation for hospital admissions due to exacerbations is the presence of sarcopenia, loss of function, and increased frailty. There are various interactions between influenza and COPD, as the viral infection can induce airway inflammation, impair respiratory function, and exacerbate pre-existing lung conditions[9].

Annual vaccination significantly reduces influenza-related complications in high-risk groups of individuals. In its 2022 Influenza Vaccine Position Paper, the WHO prioritized vaccination for healthcare workers, individuals with comorbidities, older adults without an age limit, individuals admitted to long-term care facilities, pregnant women, and children[10].

In conclusion, influenza infections, particularly in older adults and individuals with chronic diseases, cause frequent and protracted hospital stays, bacterial co- or secondary infections, and an elevated risk of hospital-acquired infections. The significance of prevention through vaccination is underscored by the fact that contracting influenza A during a specific season does not preclude infection with another strain. Vaccinating high-risk patients against influenza and its complications will contribute to lowering antimicrobial resistance by preventing secondary bacterial infections, in addition to preventing influenza. Moreover, it will enhance the efficiency of healthcare resource allocation within the system.

Ethics

Authorship Contributions

Surgical and Medical Practices: D.Y.K., M.D.T., Concept: D.Y.K., Design: D.Y.K., Data Collection or Processing: M.D.T., Analysis or Interpretation: D.Y.K., M.D.T., Literature Search: M.D.T., Writing: D.Y.K., M.D.T.

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