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Major Article

Impact of the influenza vaccine on COVID-19 infection rates and severity

Anna Conlon PhD [a,1], Carmel Ashur MD, MS [b,*,1], Laraine Washer MD [c,d], Kim A. Eagle MD [e], Marion A. Hofmann Bowman MD [e]

[a] University of Michigan School of Medicine, Ann Arbor, MI
[b] Department of Internal Medicine, University of Michigan, Michigan Medicine, Ann Arbor, MI
[c] Division of Infectious Diseases, Department of Internal Medicine, University of Michigan Medical School, Ann Arbor, MI
[d] Department of Infection Prevention and Epidemiology, Michigan Medicine, Ann Arbor, MI
[e] Division of Cardiology, Department of Internal Medicine, University of Michigan, Michigan Medicine, Ann Arbor, MI

Key Words:
COVID-19
Influenza vaccination

Background: With a unique influenza season occurring in the midst of a pandemic, there is interest in assessing the role of the influenza vaccine in COVID-19 susceptibility and severity.
Methods: In this retrospective cohort study, patients receiving a laboratory test for COVID-19 were identified. The primary outcome was comparison of positive COVID-19 testing in those who received the influenza vaccine versus those who did not. Secondary end points in patients testing positive for COVID-19 included mortality, need for hospitalization, length of stay, need for intensive care, and mechanical ventilation.
Results: A total of 27,201 patients received laboratory testing for COVID-19. The odds of testing positive for COVID-19 was reduced in patients who received an influenza vaccine compared to those who did not (odds ratio 0.76, 95% CI 0.68-0.86; $P < .001$). Vaccinated patients testing positive for COVID-19 were less likely to require hospitalization (odds ratio, 0.58, 95% CI 0.46-0.73; $P < .001$), or mechanical ventilation (odds ratio, 0.45, 95% CI 0.27-0.78; $P = .004$) and had a shorter hospital length of stay (risk ratio, 0.76, 95% CI 0.65-0.89; $P < .001$).
Conclusion: Influenza vaccination is associated with decreased positive COVID-19 testing and improved clinical outcomes and should be promoted to reduce the burden of COVID-19.

INTRODUCTION

The novel coronavirus of 2019 (COVID-19) was first identified in Wuhan, China in December 2019, and was declared a public health emergency of international concern within one month. As of February 2021, more than 106 million confirmed cases of COVID-19 and over 2.3 million deaths have been reported globally.[1] The clinical spectrum of illness caused by COVID-19 is broad, with severity of disease ranging from mild symptoms to acute respiratory distress syndrome with rapid deterioration.[2] Pre-existing cerebrovascular, liver, kidney and gastrointestinal diseases, as well as hypertension, diabetes, COPD, and age greater than 60 confer higher susceptibility to infection by COVID-19 and greater risk of mortality with infection.[3,4] Importantly, patients with pre-existing cardiovascular risk factors are more likely to experience severe disease resulting from both direct and indirect cardiovascular complications of COVID-19, including myocarditis, arrhythmias, and venous thromboembolism.[5]

Clinical trials of dexamethasone[6,7] and Remdesivir[8] have shown a reduction in complications in very ill COVID-19 patients, and while effective vaccines against COVID-19 from both Pfizer-BioNTech and Moderna have been approved for use in the United States, they are not yet broadly available, making it imperative to explore the effects of currently available medical interventions that may lessen the susceptibility to and burden of disease.

With the influenza season upon us, there is interest in exploring the relationship between influenza vaccination and COVID-19 susceptibility and disease severity. Recent studies have suggested that prior vaccination to pathogens such as tuberculosis and influenza may confer some protection against COVID-19.[9-14] An analysis of over 92,000 COVID-19 patients in a nonpeer reviewed study from Brazil found a 17% reduced odds of mortality, 8% lower odds of need for intensive care treatment and 18% lower odds of invasive respiratory support in those who received an influenza vaccine.[12] Separate

* Address correspondence to Carmel Ashur, MD, MS, Department of Internal Medicine, University of Michigan, F4323 University Hospital South, Unit 4, Ann Arbor, MI 48109.
E-mail address: acarmel@med.umich.edu (C. Ashur).
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[1] Authors contributed equally.

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institution would not be captured in our search. However, the purposes of this study was to compare COVID-19 infection rates and clinical outcomes based on influenza vaccination status within a single cohort, and not to report on absolute statistics, which we appreciate may be skewed in our population.

Finally, the search was conducted in the midst of the COVID-19 pandemic, with new cases still being reported daily. We therefore may not have captured the full extent of outcomes for those recently diagnosed with COVID-19 and cannot predict how future case rates will affect our results. However, with the peak of the influenza season encroaching, there is a sense of urgency to help healthcare providers and patients make better informed medical decisions.

CONCLUSION

In this electronic medical records based retrospective cohort study, we found a significant reduction in the odds of testing positive for COVID-19 in patients who received an influenza vaccine compared to those who did not receive the vaccine. In addition, in patients who tested positive for COVID-19, those who previously received an influenza vaccine had significantly better clinical outcomes. Future prospective studies are needed to establish a causal relationship between the influenza vaccine and COVID-19 susceptibility and severity. Until the COVID-19 vaccine becomes widely available, the influenza vaccine should be promoted to reduce the burden of disease during this pandemic.

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SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found in the online version at https://doi.org/10.1016/j.ajic.2021.02.012.

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