BRIEF RESEARCH COMMUNICATION

Veterans Health Administration COVID-19 Index to Risk Stratify the Geriatric Population with COVID-19 Infection

Ashima Sharma1, Aravind Ranjan2

ABSTRACT

The risk for severe illness with coronavirus disease-2019 (COVID-19) increases with age, with older adults at highest risk. Adults 65-years-old and older who were fully vaccinated with an mRNA COVID-19 vaccine had a 94% reduction in risk of COVID-19 hospitalizations, and vaccination was 64% effective among those who were partially vaccinated. Single dose of vaccination was also found to be 64% effective.1

Keywords: Charlson comorbidity index, COVID-19, Vaccination, Veterans Health Administration COVID-19 (VACO) Index.

Indian Journal of Critical Care Medicine (2022): 10.5005/jp-journals-10071-24176

HIGHLIGHTS

The risk for severe illness with coronavirus disease-2019 (COVID-19) increases with age, with older adults at highest risk. It is observed that adults above 65 years of age who were fully vaccinated with an mRNA COVID-19 vaccine had a 94% reduction in risk of COVID-19 hospitalizations. Single dose of vaccination was also found to be 64% effective.1

INTRODUCTION

Multiple studies have identified risk factors for mortality associated with (COVID-19) in inpatients.2,3 Lockdown has been very successful during the first wave in preventing infection for senior citizens. However, as the authorities relaxed the guidelines, we witnessed an unprecedented number of deaths in elderly population especially during the second wave. There is a strong need for a reliable means of identifying those at greatest risk should they become infected to inform personal choice and public policy.

The Veterans Health Administration COVID-19 (VACO) Index incorporates age, sex, and preexisting illnesses to predict 30-day all-cause mortality in patients infected with SARS-CoV-2. VACO Index was developed based on 3,681 SARS-CoV-2-positive patients’ records from Veterans Healthcare Administration national electronic health records. It was prospectively internally and externally validated in 9,642 veterans. VACO Index includes age, sex, and comorbidity quantified with the Charlson comorbidity index derived from International Classification of Diseases 10th edition. In this study, we applied VACO Index to patients above 60 years presented to our emergency department who tested reverse transcription polymerase chain reaction positive for SARS-CoV-2 infection during the period December 1–December 31, 2020.

The primary aim was to validate VACO Index and 30-day mortality in the geriatric cohort of COVID-19-positive hospitalized patients. The secondary aims were to find out the correlation between specific comorbidities especially hypertension and alcoholism with 30-day mortality as these were most commonly seen in our patients.

METHODOLOGY

The data of 58 patients were retrieved from their medical records. The study investigators were involved in the initial triage and emergency resuscitation of these patients and had no influence on the COVID treatment given to patients in this study. The VACO Index was calculated using MDCalc software that is available online on MDCalcalc solutions.3 Patients were telephonically interviewed to assess the 30-day mortality. We also evaluated the effect of hypertension and alcoholism on COVID mortality that was not included in the original VACO Index.

All statistical analyses were performed using PSPP version 1.2.0 software. The variables underwent multivariate logistic regression. We assessed the VACO Index and its association with 30-day mortality using logistic regression. A p-value of ≤0.05 was considered significant. Area under the curve (AUC) was calculated for the parameters that achieved high statistical significance.

RESULTS

Forty-eight point twenty-seven percent of our study population succumbed to the disease; 41 patients had moderate to severe COVID infection and 58.62% of deaths happened in males. The early signs of severe infection, i.e., tachycardia, mean arterial pressure, tachypnea, poor oxygen saturations, and rate pressure product. As compared to non-survivors, survivors had better mean pulse rates (101.35 vs 95.06), higher mean arterial pressures (78.78 vs 88.33), less tachypnea (28.28 vs 24.43), better SpO2 (85.71 vs 89.79), and higher rate pressure product (10515.71 vs 11100.33). The need for O2 therapy (i.e., >10 L/minute) and early institution of vasopressor therapy (noradrenaline) was seen in 21/28 and 19/28 patients who didn’t

© The Author(s). 2022 Open Access This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (https://creativecommons.org/licenses/by-nc/4.0/), which permits unrestricted use, distribution, and non-commercial reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The Creative Commons Public Domain Dedication waiver (http://creativecommons.org/publicdomain/zero/1.0/) applies to the data made available in this article, unless otherwise stated.
Further, the same group of authors have verified their score in 428,531 patients for predicting short-term mortality. They concluded that among COVID-19-positive individuals, the VACO Index accurately estimates risk of early death among a wide variety of patients. Recent trials have shown overestimation of the risk of short-term mortality using VACO Index, however, it is consistent in identifying the elderly with greatest relative risk.7

Our study had a small sample size due to less number of elderly patients admitted to our center with proven infection. The score was developed in the early phase of pandemic. The mortality rates have come down now as the testing and treatment algorithms have improved significantly. As a single parameter, age did not show statistically significant correlation for 30-day mortality in our study as all the participants were more than 60 years of age. The limitation of the score is that it does not help to differentiate mortality risk for patients with variable severity of infection. Patients who were hypoxic and had severe COVID at the onset did not change the score if they got more sick.

CONCLUSION

VACO Index can help the policy makers at hospital and government levels in identifying and alerting patients who are at high risk so that they should take measures to avoid exposure, even though the numbers of infected cases is presently decreasing. It can also guide the healthcare workers to provide admission and inpatient monitoring for patients with high scores. Most importantly, it can help the public to understand the need for definitive prioritization of vaccines for the senior citizens in every home.

ORCID

Ashima Sharma @ https://orcid.org/0000-0001-9646-9695
Aravind Ranjan @ https://orcid.org/0000-0003-2560-1753

REFERENCES

1. www.cdc.gov>need-extra-precautions>older-adults-and-covid19 [Last updated July 3, 2021].
2. Mohan A, Tiwari P, Bhatnagar S, Patel A, Maurya A, Dar L, et al. Clinico-demographic profile & hospital outcomes of COVID-19 patients admitted to a tertiary care centre in north India. Indian J Med Res 2020;152:61–69. DOI: 10.4103/ijmr.IJMR_1788_20.
3. www.mdcalc.com> covid-risk [Last updated March 22, 2021].
4. Bairwa M, Kumar R, Ajmal M, Bahrupuri Y, Kanth R. Predictors of critical illness and mortality based on symptoms and initial physical examination for patients with SARS-CoV-2: a retrospective cohort study. J Infect Public Health 2021;14(8):1028–1034. DOI: 10.1016/j.jiph.2021.06.010.
5. Suresh S, Tiwari A, Mathew R, Bhaskarayuni J, Sahu AK, Aggarwal P, et al. Mortality and the need of mechanical ventilation in confirmed COVID-19 patients presenting to the emergency department in North India. J Family Med Prim Care 2021;10(1):S42–S49. DOI: 10.4103/jfpmc.jfpmc_1775_20.
6. King JT Jr, Yoon JS, Rentsch CT, Tate JP, Park LS, Kidwai-Khan F, et al. Development and validation of a 30-day mortality index based on pre-existing medical administrative data from 13,323 COVID-19 patients: the Veterans Health Administration COVID-19 (VACO) index. PLoS One 2020;15(11):e0241825. DOI: 10.1371/journal.pone.0241825.
7. King JT Jr, Yoon JS, Bredl ZM, Habboushe JP, Walker GA, Rentsch CT, et al. Accuracy of the Veterans Health Administration COVID-19 (VACO) index for predicting short-term mortality among 1,307 Yale New Haven Hospital inpatients and 427,224 medicare patients. medRxiv 202101.01.20249069. DOI: 10.1101/202101.01.2024906.