Angiotensin-converting enzyme inhibitors and angiotensin-receptor blockers and the risk of COVID-19 infection or severe disease: Systematic review and meta-analysis

IJC Heart & Vasculature, Volume 31, December 2020, 100627

Daniel Caldeira, Mariana Alves, Ryan Gouveia e Melo, Pedro Silvério António, Nélson Cunha, Afonso Nunes-Ferreira, Luisa Prada, João Costa, Fausto J Pinto

Abstract

Objective

Animal studies suggested that angiotensin-converting enzyme inhibitors (ACEi) and angiotensin-receptor blockers (ARB) facilitate the inoculation of potentially leading to a higher risk of infection and/or disease severity. We aimed to systematically evaluate the risk of COVID-19 infection and the risk of severe COVID-19 disease associated with previous exposure to (ACEi) and/or ARB).

Methods

MEDLINE, CENTRAL, PsycINFO, Web of Science Core Collection were searched in June 2020 for controlled studies. Eligible studies were included and random-effects meta-analyses were performed. The estimates were expressed as odds ratios (OR) and 95% confidence intervals (95%CI). Heterogeneity was assessed with I2 test. The confidence in the pooled evidence was appraised using the GRADE framework.

Results

Twenty-seven studies were included in the review. ACEi/ARB exposure did not increase the risk of having a positive test for COVID-19 infection (OR 0.99, 95%CI 0.89–1.11; I2 = 36%; 5 studies, GRADE confidence moderate). The exposure to ACEi/ARB did not increase the risk of all-cause mortality among patients with COVID-19 (OR 0.91, 95%CI 0.74–1.11; I2 = 20%; 17 studies; GRADE confidence low) nor severe/critical COVID-19 disease (OR 0.90, 95%CI 0.74–1.11; I2 = 55%; 17 studies; GRADE confidence very low). Exploratory analyses in studies enrolling hypertensive patients showed a association of ACEi/ARB with a significant decrease of mortality risk.

Conclusions

ACEi/ARB exposure does not seem to increase the risk of having the SARS-CoV-2 infection or developing severe stages of the disease including mortality. The potential benefits observed in mortality of hypertensive patients reassure safety, but robust studies are required to increase the confidence in the results.

Keywords: Coronavirus, SARS-CoV-2, Angiotensin-converting enzyme inhibitor, Angiotensin-receptor blocker, Acute respiratory distress syndrome, Acute lung injury