

Effect of Co-Infection With Intestinal Parasites on COVID-19 Severity: A Prospective Observational Cohort Study

Authors : Teklay Gebrecherkos, Dawit Wolday, Muhamud Abdulkader

Abstract : Background: COVID-19 symptomatology in Africa appears significantly less serious than in the industrialized world. Our hypothesis for this phenomenon, being a different, more activated immune system due to parasite infections contributes to reduced COVID-19 outcome. We investigated this hypothesis in an endemic area in sub-Saharan Africa. Methods: Ethiopian COVID-19 patients were enrolled and screened for intestinal parasites, between July 2020 and March 2021. The primary outcome was the proportion of patients with severe COVID-19. SARS-CoV-2 infection was confirmed by RT-PCR on samples obtained from nasopharyngeal swabs, while direct microscopic examination, modified Ritchie concentration, and Kato-Katz methods were used to identify parasites and ova from a fresh stool sample. Ordinal logistic regression models were used to estimate the association between parasite infection and COVID-19 severity. Models were adjusted for sex, age, residence, education level, occupation, body mass index, and comorbidities. Data were analyzed using STATA version 14. P-value <0.05 was considered statistically significant. Results: A total of 751 SARS-CoV-2 infected patients were enrolled, of whom 284 (37.8%) had an intestinal parasitic infection. Only 27/255 (10.6%) severe COVID-19 patients were co-infected with intestinal parasites, while 257/496 (51.8%) non-severe COVID-19 patients appeared parasite positive ($p < 0.0001$). Patients co-infected with parasites had lower odds of developing severe COVID-19, with an adjusted odds ratio (AOR) of 0.14 (95% CI 0.09–0.24; $p < 0.0001$) for all parasites, AOR 0.20 (95% CI 0.11–0.38; $p < 0.0001$) for protozoa, and AOR 0.13 (95% CI 0.07–0.26; $p < 0.0001$) for helminths. When stratified by species, co-infection with *Entamoeba* spp., *Hymenolopis nana*, and *Schistosoma mansoni* implied a lower probability of developing severe COVID-19. There were 11 deaths (1.5%), and all were among patients without parasites ($p = 0.009$). Conclusions: Parasite co-infection is associated with a reduced risk of severe COVID-19 in African patients. Parasite-driven immunomodulatory responses may mute hyper-inflammation associated with severe COVID-19.

Keywords : COVID-19, SARS-COV-2, intestinal parasite, RT-PCR, co-infection

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