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

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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 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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