IVD_06 - Determination of neutralizing antibodies to SARS-COV-2 by recombinant pseudovirus methodology in a cohort of patients with mild to moderate infection and/or vacinnated

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Introduction: In the current situation of the COVID-19 pandemic, with the circulation of a potentially lethal virus, obtaining information related to host immunity is essential to develop strategies for prevention and therapeutic approaches. The determination of neutralizing antibodies, nAb, for SARS-CoV-2 is of great importance for evaluating possible protection against new infections, immunity status and prognosis in case of infection, in addition to providing epidemiological information.

Objective: In this work, samples were selected from a cohort of patients infected with SARS-CoV-2 (n=50) with mild to moderate symptoms, and from volunteers without a history of infection vaccinated with Coronavac (n=5) or Astrazeneca (n=4), followed longitudinally, to determine the presence of neutralizing antibodies using pseudovirus as detection methodology.

Methodology: The construction of a pseudovirus was performed, based on the expression of protein S in the envelope of the modified lentiviral vector, for specific inhibition of the entry of the viral particle in 293T(ACE2). Reading the luminescence emitted by the cells after infection allowed the quantitative determination of the serum neutralization capacity by IC50.

Results: High correlations of IC50 values with PRNT were obtained, with some variations in individual results. In infected individuals, the production of neutralizing antibodies is more intense at the beginning of the infection, with a reduction over time, but constancy justified by the potency, specialization, and maturation of the immune response. Coronavac vaccination in infected patients has the effect of maintaining nAb constancy, acting as a reinforcement and preventing decay. For vaccinated patients without a history of infection: Coronavac showed lower comparative efficiency in inducing a robust and lasting immune response, within the aspects analyzed in this work; Astrazeneca indicated that it is an immunizing agent with a greater comparative capacity to boost the adaptive system.

Conclusion: Infected vaccinated by coronavac have a higher average IC50 compared to other groups, followed by infected. Volunteers without a history of infection vaccinated with coronavac and astrazeneca, despite having similar maximum mean, the viral vector vaccine indicates greater potency and duration of effective antibodies in the long term compared to both vaccination-induced and infection-induced immunity.

Keywords: SARS-CoV-2; Neutralizing antibodies; Immunity