

Anti-SARS-COV-2 humoral immunity in ULSNE healthcare professionals

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Abstract

The detection of specific antibodies can provide information on the immunity achieved against SARS-CoV-2 infection. The new coronavirus-2 S protein is the main target used in COVID-19 vaccine development. Infection and vaccination in COVID-19 induce an antibody response against the Spike (S) glycoprotein. The administration of the vaccine appears to be an effective prophylactic strategy and there is scientific data showing that vaccination is responsible for reducing the number of infections, severe symptoms and COVID-19 associated deaths.

Problem and research issues | Objectives

Higher values of anti-S/RBD IgG antibodies seem to provide protection, specially against more severe symptoms of the disease. However, the level of antibodies that we can consider as protectors and the factors underlying their variation need further investigation.

The main objective of this study was to evaluate the humoral immunity generated by COVID-19 vaccination in health professionals from the ULSNE. Bragança, before the administration of the booster dose ("3rd dose") of the COVID-19 vaccine, and identify factors that could explain the inter-individual variation. associated

Methodology

For the participant's recruitment, a questionnaire was applied to survey the sociodemographic and clinical characteristics related to vaccination and SARS-CoV-2 previous infection. Blood collections were performed in November 2021, before the booster dose. Serological testing was performed on serum samples using a CMIA immunoassay, SARS-CoV-2 IgG II (anti-S/RBD IgG), and SARS-CoV-2 IgG Quant (anti-N:) on the ARCHITECT i1000SR Instrument (Abbott).

Presentation and discussion of results

- Almost all healthcare professionals (98.8%) had an immunological reaction to vaccination. This reaction could have a protective role in future contacts with the virus;
- The immune response to vaccines is usually reduced in older adults due to immune senescence. Our findings also showed that antibody levels decrease with age;
- One of the factors associated with a higher humoral response was the presence of SARS-CoV-2 infection, before or after the vaccination period. The humoral response was substantially stronger in subjects who became infected after full vaccination. This is a recurring observation in previously published studies.

Results

A total of 427 health professionals participated in the study, 338 (79.2%) women and 89 (20.8%) men, with a mean age of 45.7±11.4 years. Most participants (n=422; 98.8%) showed reactivity to anti-S/RBD IgG was detected. Significant differences in anti-S levels were identified between groups according to age and the presence or absence of SARS-CoV-2 infection ($p<0.001$).

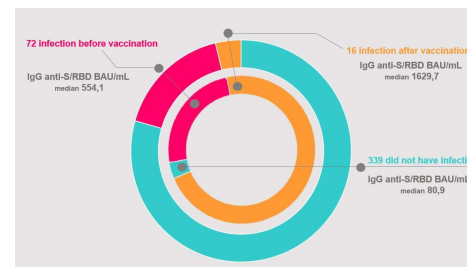


Fig.1 - Quantitative analysis of IgG anti-S/RBD BAU/mL in relation to infection SARS-COV-2.

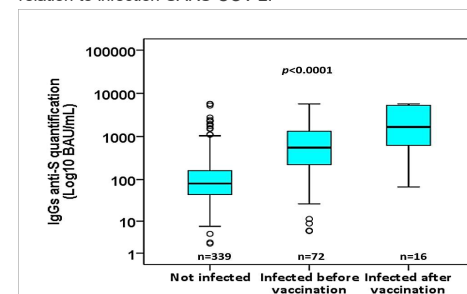


Fig.2- Quantitative analysis of anti-S/RBD antibodies (log10 of antibody binding units: BAU), according to the status of infections diagnosed by the RT-PCR technique from March 2020 to November 2021).

Conclusion

Vaccination remains a key preventive measure to reduce the burden of the disease in COVID-19 and to mitigate future outbreaks. The knowledge that the scientific community currently has about immunity in the post-vaccination period is the result of several studies on the quantification of specific antibodies in the context of clinical trials and epidemiological studies.

The assessment of humoral immunity before the booster dose (3rd dose) showed that most healthcare professionals were reactive to anti-S antibodies, leading to the conclusion that there was a humoral response to the vaccine.

The interindividual variation in antibody levels is mainly explained by differences in age and the presence of infection.

We present here the preliminary results of this study, which will continue with a new serological analysis before administering the second booster dose (4th dose) of the COVID-19 vaccine.

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