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mRNA Vaccines Induce a Higher Antibodies Response in Children With Previous COVID-19

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BACKGROUND

mRNA vaccines trigger an higher magnitude and durability of humoral response to SARS-CoV-2 in adults after a previous infection compared to infection-naïve people. However, data are lacking in the pediatric population.

This study aimed to evaluate the early and long-term immune response after the BNT162b2 monovalent vaccine in children aged 5-11 years with or without a previous SARS-CoV-2 infection.

METHODS

Multi-centre, prospective, observational study evaluating the immune response to SARS-CoV-2 in children aged 5-11 years attended the Pediatric Departments at the University of Padua and Bambino Gesù Children's Hospital in Rome (Italy);

Volunteers underwent three immunological follow-up (pre-vaccination and 1 month (mo), and 6 mo after the second dose); a blood sample was collected during each visit for the characterization of the immune profile;

Neutralizing antibodies (Nabs) and anti-S-RBD IgG titers were analyzed through Plaque Reduction Neutralization Test (PRNT) and chemiluminescent immune-enzymatic assay (CLIA), respectively. B and T cell phenotypes were analyzed by flow cytometry;

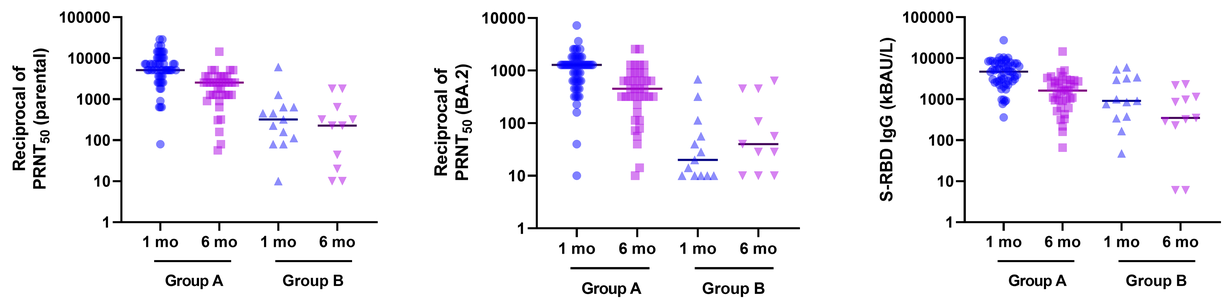
Geometric mean titers (GMTs) and 95% CI and median and IQR of variables were evaluated according to pre-existing confirmed COVID-19.

RESULTS

Eighty-two children (mean age 8.6±3.5 years) were studied between Dec-2021 to Dec-2022; 60 with a molecular-documented previous COVID-19 (**Group A**) and 22 without previous infection defined as the absence of antigen-specific antibodies before the vaccination (**Group B**).
Overall, 44 were healthy children (HC), 20 were immune compromised (IC), and 18 had a previous diagnosis of MIS-C (MIS-C).

mRNA vaccine elicits a higher humoral response in children with a previous COVID-19 with an overall median S-RBD IgG, Parental, and Omicron NAbs in Group A 5, 18, and 28-fold higher than Group B (p<0.0001) (Fig.1)

Fig.1



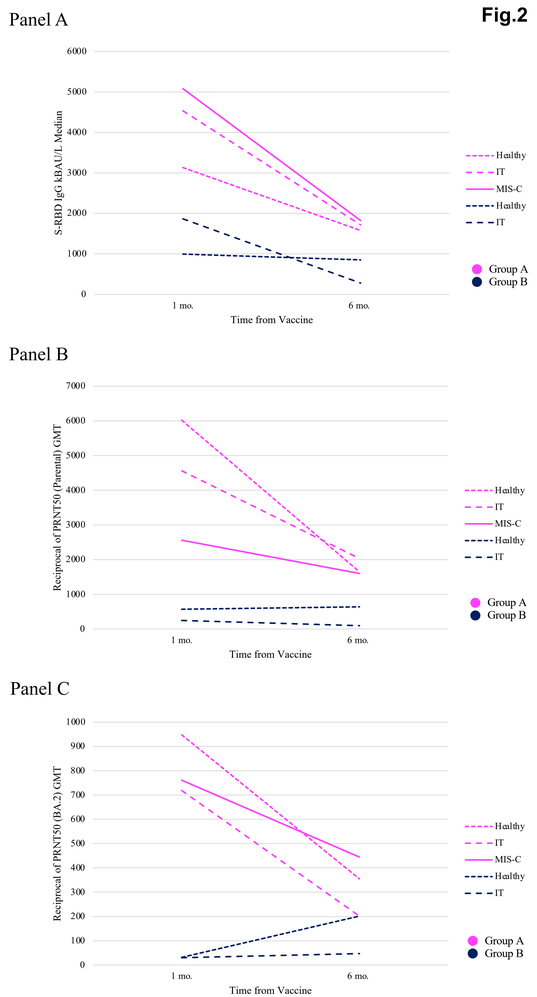
Similarly, T-regs and B-regs were higher in Group A than B at 1 (p<0.01) and 6 months (p<0.02).

Among HC, IC, and MIS-C in Group A, comparable antibodies titers at 1 mo (S-RBD p=0.37, Parental NAbs p=0.38, Omicron NAbs p=0.83) and antibodies decay of 50-70% between 1 and 6 mo were observed. Similarly, an analogous decrement of antibodies was recorded among HC and IC in Group B (S-RBD p=0.60, Parental NAbs p=0.71, Omicron NAbs p=0.42) (Fig.2).

CONCLUSIONS

We observed that mRNA vaccination triggers a higher humoral response in children with a previous history of COVID-19, regardless of the immune deficiency or previous MIS-C, providing insight into boosting preexisting immunity with mRNA vaccines.
Moreover, antibodies declined from 1 to 6 mo after vaccination in both groups.

Fig.2



ADDITIONAL KEY INFORMATION

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