Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

Vaccine 39 (2021) 2489–2490

Contents lists available at ScienceDirect

Vaccine

journal homepage: www.elsevier.com/locate/vaccine

Commentary

Anti-SARS-CoV-2 RBD IgG responses in convalescent versus *naïve* BNT162b2 vaccine recipients

Lorenzo Azzi [a,b], Daniele Focosi [c], Francesco Dentali [b,d], Andreina Baj [b,e,*], Fabrizio Maggi [b,e]

[a] *Unit of Oral Medicine and Pathology, ASST dei Sette Laghi, Varese, Italy*
[b] *Department of Medicine and Surgery, University of Insubria, Varese, Italy*
[c] *North-Western Tuscany Blood Bank, Pisa University Hospital, Pisa, Italy*
[d] *Department of Medicine, ASST dei Sette Laghi, Varese, Italy*
[e] *Laboratory of Microbiology, ASST dei Sette Laghi, Varese, Italy*

ARTICLE INFO

Article history:
Received 8 February 2021
Received in revised form 24 March 2021

Accepted 26 March 2021
Available online 30 March 2021

Keywords:
BNT162b2
mRNA-1273
COVID-19
SARS-CoV-2

Vaccination campaigns with the recently approved SARS-CoV-2 mRNA vaccines (BNT162b2 and mRNA-1273) have been recently launched worldwide to prevent COVID-19. Registration trials have been limited to SARS-CoV-2 *naïve* adults [1,2], and both vaccine schedules recommend 2 doses 3 or 4 weeks apart, respectively. Nevertheless, most countries are invariably vaccinating convalescents and *naïve* subjects with the same schedule.

In the current manufacturing bottleneck, most health systems are suffering shortages of vaccines, so that usage optimization of the existing stockpiles has been hypothesized [3].

To investigate whether vaccine administration could be prioritized based on the serostatus, we compared the IgG responses 14 days after administration of the first and second dose of the BNT162b2 vaccine in 12 COVID-19 convalescents (defined as having had a previous nasopharyngeal swab positive for SARS-CoV-2 RNA, followed by a negative swab) and in 54 *naïve* subjects matched for age and sex (ethical protocol number 165/2020). Immune responses were measured using the Liaison® SARS-CoV-2 S1/S2 IgG chemiluminescent immunoassay the day of vaccination (t0), 14 days after the first dose (t1), and 14 days after the second dose (t2) (Fig. 1). Fig. 1 shows that COVID-19 convalescents are already positive for IgG when the vaccine is administered and that 14 days after the first dose they show higher absolute anti-S1/S2 IgG levels (mean ± standard error: 220 ± 42 vs. 37 ± 3 AU/ml; Mann-Whitney test, $p < 0.0001$) compared to *naïve* vaccinees. Moreover, IgG levels of COVID-19 convalescents 14 days after the first dose are very similar to that of *naïve* vaccinees after the second dose. At regression analysis, the increment in IgG levels correlated with past SARS-CoV-2 positivity ($p < 0.0001$) but not with the recipient's age and gender.

In this study we didn't evaluate the quality of antibody response, but Liaison® SARS-CoV-2 S1/S2 IgG levels higher than 80 AU/ml have been previously shown to predict neutralizing antibody titers in 92% of cases [4]. Only 2% of *naïve* vaccinees, but 75% of COVID-19 convalescents showed IgG levels higher than 80 after the first dose of vaccine (mean ± standard error 355 ± 93).

Our findings suggest that a single dose of BNT162b2 could be enough for convalescents to achieve anti-S1/S2 IgG levels comparable to those achieved in *naïve* subjects after the regular 2-dose schedule. While defining the serostatus in candidate vaccinees would slow vaccine deployment, the convalescent status can be easily defined by consulting electronic health records. The saved

* Corresponding author.
E-mail address: andreina.baj@uninsubria.it (A. Baj).

https://doi.org/10.1016/j.vaccine.2021.03.086
0264-410X/© 2021 Elsevier Ltd. All rights reserved.

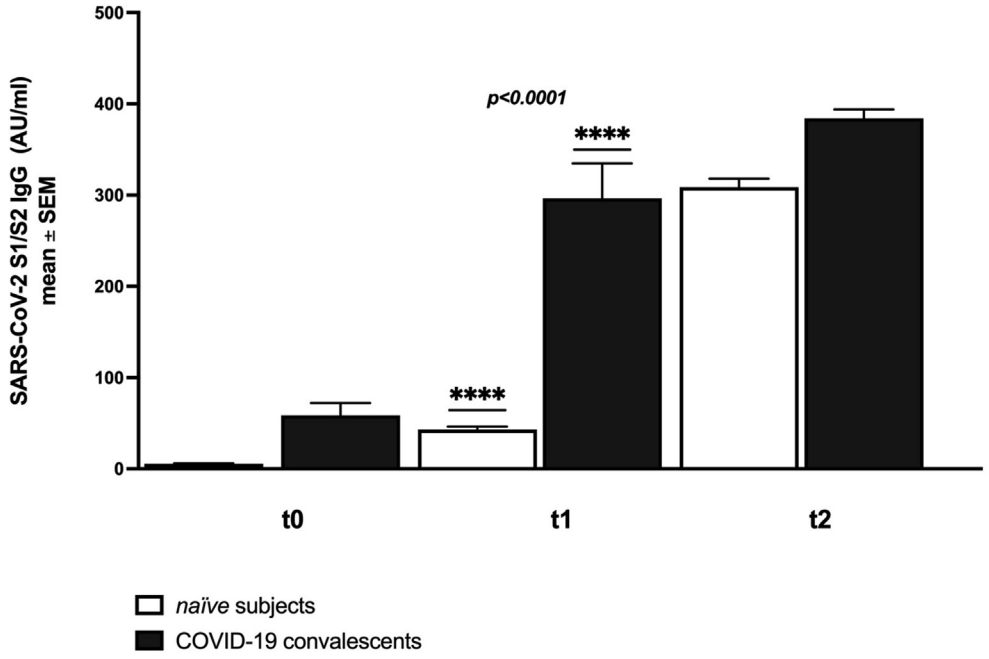

Fig. 1. Anti-S1/S2 IgG levels at the day of vaccination (t0), 14 days after the first dose (t1), and 14 days after the second dose (t2) of BNT162b2 vaccine in convalescent versus *naïve* vaccinees.

doses could be retargeted to the waiting list, [5] contributing to reaching herd immunity faster.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

[1] Polack FP, Thomas SJ, Kitchin N, et al. Safety and efficacy of the BNT162b2 mRNA Covid-19 vaccine. New Engl J Med 2020;383:2603–15.

[2] Widge AT, Rouphael NG, Jackson LA, et al. Durability of responses after SARS-CoV-2 mRNA-1273 vaccination. New Engl J Med 2020;384(1):80–2.

[3] Ayoub HH, Chemaitelly H, Makhoul M, et al. Epidemiological impact of prioritizing SARS-CoV-2 vaccination by antibody status: mathematical modeling analyses. 2021; 2021.01.10.21249382.

[4] Bonelli F, Sarasini A, Zierold C, et al. Clinical and analytical performance of an automated serological test that identifies S1/S2-neutralizing IgG in COVID-19 patients semiquantitatively. J Clin Microbiol 2020;58(9):e01224–e1320.

[5] WHO. SAGE roadmap for prioritizing uses of COVID19 vaccines in the context of limited supply. Version 1.1.; 2020.