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Clinical Features of SARS-COV-2 Infection After Full Vaccination in Health Care Workers of a COVID Hospital

To the Editor:

SARS-COV-2 infection has affected more than 170 million people, including many health workers of whom many have died while caring for patients. Since the introduction of vaccines, prioritizing vaccination of health care workers has been advocated, and in italy, almost all health professionals completed the vaccination cycle with both doses between January and February 2021.

The BNT162b2 (Pfizer-BioNTech) was one of the first messenger-RNA (mRNA) vaccine to be available, and pivotal studies had been shown to reduce the risk of infection by 95%, and the risk of serious disease by 100%.[1] Currently there are still few data on vaccine effectiveness among health care workers in real-world settings and on the clinical features of SARS-CoV-2 infection among vaccinated subjects.[2–4] Furthermore, many doubts remain regarding the possibility that people fully vaccinated with mRNA vaccine are less likely to transmit SARS-CoV-2 to others even when asymptomatic.[5]

In this letter, we describe the clinical and radiological characteristics of seven fully vaccinated (BNT162b2 [Pfizer- BioNTech]) healthcare workers of our COVID-19 Respiratory Unit, infected by SARS-COV-2.

In May 2021, one nurse presented with fever and tested positive at the swab for COVID-19, in the following days, all staff were screened and others six health care workers (nurses and assistants) of the same ward, tested positive for COVID-19 (three female). The positive diagnostic swab (RT-PCR) was performed between 83 and 105 days after the second dose of BNT162b2 vaccine, except for one worker, who was infected approximately 1 week after the second dose.

In all subjects, RT-PCR on swab, showed a positivity for the three genes *(RdRp, E,* and *N)* with a cT between 19.72 and 29.77. Positivity was confirmed at a second molecular analysis at a Biosafety lvl-3 laboratory, where a culture analysis was performed on Vero E6 cells, as well as genetic variants strain identification. At the culture examination all the samples showed the presence of live and viable virus with cytopathic effect on the cell substrate and all identified as VOC 202012/01 lineage B.1.1.7 (alpha).

At diagnosis, and throughout the course of the disease, none of the patients reported signs and symptoms of acute respiratory failure so all subjects were classified as mild COVID- 19 according to the criteria CDC (center for disease control) and they did not required hospitalization until negative test.

Patients were young (23 to 46 years). They reported in about 50% of cases a duration of symptoms greater than 1 week, two subjects reported symptoms for 2 to 3 days and the others less than 7 days. The most frequent symptoms were nasal congestion (6 out of 7), altered taste/smell and osteoarticular pain (5 out of 7) and fever in three cases. Only one experienced nausea and vomiting and conjunctivitis.

We followed up these workers on our post-Covid-19 outpatient for approximately 1 month after diagnosis, when they became negative. They underwent medical examination, blood chemistry, lung function tests (spirometry, DLCO and 6-minutes-walking-test) and chest CT scan.

At the visit, all of them were asymptomatic: the inflammatory biomarkers (white blood cells, CRP, IL-6) were negative, respiratory function tests were normal and no signs of lung involvement were detected at CT scans. The IgG antibody titres (RBD-S1 and S2) were 742 to 2400 AU/mL (nv<12), about three times higher than in non-vaccinated subjects at 1 month after hospitalization in the same period (usually <500 AU/mL).

In conclusion, it is interesting to note how the outbreak developed among nurses and operators who worked together in the same ward and period. This could suggest that infected subjects may have contracted the virus from a single hospitalized patient in that period but it does not allow us to exclude a possible transmission among workers in the work setting. This hypothesis is reinforced by the finding on the culture analysis of live and viable virus, therefore capable of transmitting infection among people.

Our data confirms that SARS-COV-2 infection is possible in fully vaccinated individuals, who typically have few or no symptoms. However, our experience can suggest that these subjects infected after vaccination did not show pneumonia, and they did not show signs of lung involvement as demonstrated by the CT performed.

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