Post Vaccination COVID-19 Infections: A big challenge

Raza Ullah1, Shahida Naz[2], Aamir Ahmad[1], Haleema[3]

[1]Intensive Care Unit (ICU Pulmonology), Hayatabad Medical Complex MTI Peshawar - Pakistan
[2]Peshawar Institute of Medical Sciences (PIMS), Peshawar - Pakistan
[3]Khyber Medical College, Peshawar – Pakistan

Address for correspondence
Raza Ullah
Intensive Care Unit (ICU Pulmonology),
Hayatabad Medical Complex MTI Peshawar - Pakistan
E-mail: dr.raza127@gmail.com

This editorial may be cited as: Ullah R, Naz S, Ahmad A, H. Post Vaccination COVID-19 Infections: A big challenge. Pak J Chest Med 2021; 27(01): 01-02

Corona virus is a well-recognized pathogen causing infection in human and animals. In late 2019 a cluster of infection was recognized in Wuhan, a city of china province Hubei, caused by a novel corona virus named severe acute respiratory syndrome coronavirus 2 or SARS-COV- 2. "WHO" later in February 2020 called it COVID-19.[1]

Majority of the patients manifest very mild or no symptoms at all. Incubation period for COVID-19 is 14 days following exposure but Symptoms usually appear at 4th day of infection (range of three to seven).[2] Common symptoms include cough, myalgias, and headache. Other features include diarrhea, sore throat, and smell or taste abnormalities. Pneumonia and ARDS are grave consequences of covid-19 characterized by cough, shortness of breath, respiratory failure and bilateral infiltrates.[3,4]

Vaccine is considered the leading weapon against this pandemic and are being vigorously pursued. This has led to the initiation of a race against time. A number of companies started to win this race of vaccines development. SARS-CoV-1 and Middle East respiratory syndrome coronavirus (MERS-CoV) surfaced the way for rapid development of COVID-19 vaccines.[5] Khuroo et al., stated "no drug has the power to fight the infection and bring normalcy to the utter chaos".[6] The only solution to corona pandemic is affordable, available and effective vaccine. A number of studies support the concept that vaccination is likely to prevent SARS-CoV-2 infection. experimental infection with wild-type SARS-CoV-2 virus in nonhuman studies showed protection against subsequent reinfection. This indicated that infection with SARS-COV-2 can result in protective immunity.[7]

Vaccines development needs 3 main type of approaches

1. whole virus or bacterium
2. parts that trigger immune response like different receptor proteins
3. only genetic material

COVID-19 vaccines are being developed using several different platforms.[8] Different types of vaccines available are Pfizer/Bio Ntech, Astra Zeneca, Johnson & Johnson (Janssen/Ad26. COV 2.S), Moderna, Sinopharm, Sinovac-CoronaVac.

No vaccine is 100% effective at preventing infection according to CDC rather vaccine will prevent from developing of severe and critical covid-19 infection.[9] Current data shows that almost all of the vaccine's approved for emergency authorization provides some protection against all variants of corona virus.

Recently an article published in NEJM by Bergwerk et al. shows break through infections of SARS-COV-2 among vaccinated people.[10] although the incidence is very low in this study yet further evaluation is required to establish the exact rate of post vaccination infection and risk factors associated with it. Low level of neutralizing antibodies against virus was a major risk factor. Low level of infection was observed in patients having high titer of neutralizing antibodies. The assumption that the presence of neutralizing antibodies would correlate with protection from reinfection with SARS-CoV-2 has been supported by studies comparing the incidence of infection between seropositive and seronegative individuals.[11] Although these break through infections were of mild nature or asymptomatic yet they are potential threats for other people at risk.

Post vaccination corona infection incidence is low and majority presents with either mild symptoms or

asymptomatic. Different variants of SARS-COV-2 are still a potential threat for large break through infections resulting in devastating situations. Vaccines effective against multiple immunogenic parts of virus might prove beneficial against break through infections.

References

1. World Health Organization. Director-General's remarks at the media briefing on 2019-nCoV on 11 February 2020. http://www.who.int/dg/speeches/detail/who-director-general-s-remarks-at-the-media-briefing-on-2019-ncov-on-11-february-2020 (Accessed on February 12, 2020).
2. Sakurai A, Sasaki T, Kato S, et al. Natural History of Asymptomatic SARS-CoV-2 Infection. N Engl J Med 2020; 383:885.
3. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet 2020; 395:497.
4. Chen N, Zhou M, Dong X, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. Lancet 2020; 395:507.
5. Martin JE, Louder MK, Holman LA, et al. A SARS DNA vaccine induces neutralizing antibody and cellular immune responses in healthy adults in a Phase I clinical trial. Vaccine 2008; 26:6338.
6. Khuroo, M.S.; Khuroo, M.; Khuroo, M.S.; Sofi, A.A.; Khuroo, N.S. COVID-19 Vaccines: A Race Against Time in the Middle of Death and Devastation! J. Clin. Exp. Hepatol. 2020, 10, 610–621.
7. Deng W, Bao L, Liu J, et al. Primary exposure to SARS-CoV-2 protects against reinfection in rhesus macaques. Science 2020; 369:818.
8. Krammer F. SARS-CoV-2 vaccines in development. Nature 2020; 586:516.
9. center for disease control and prevention https://www.cdc.gov/.
10. Bergwerk M et al. Covid-19 Breakthrough Infections in Vaccinated Health Care Workers: NEJM.org. 2021; 1-11.
11. Krammer F. Correlates of protection from SARS-CoV-2 infection. Lancet 2021; 397:1421-3.