Letter to Editor

Positive Predictive Value of SARS-CoV-2 Spike Protein Antibody Test after COVID-19 Vaccination Policies

Dear Editor,

Mendicino and Moretti provided very useful ideas on using "tests for the detection of antibodies to SARS-CoV-2."[1] Mendicino and Moretti discussed on effect of local prevalence of coronavirus disease (COVID) on diagnostic property of the test and concluded that "knowledge about the advantages and limitations of each test will help to select the most appropriate one to each clinical and epidemiological situation, and to an adequate interpretation of the results."[1] It is agreeable that the positive predictive value (PPV) of a diagnostic test is associated with the prevalence of disease. However, in case that there is an additional confounding factor leading to the change of diagnostic sensitivity and specificity, the change of PPV test is expected.

At present, COVID-19 vaccination is the main disease prevention policy in any country. A vaccination can induce antibody generation and the generated antibody can result in a false-positive case result for an antibody diagnostic test for diagnosing COVID-19. Here, the authors tried to additionally assess the change of PPV of SARS-CoV-2 spike protein antibody test after COVID-19 vaccination policies. As noted by Mendicino and Moretti, the sensitivity and specificity of available immunoassays for diagnosis of COVID-19 are 90% and 97%, respectively.[1,2] Using an assumption that a COVID-19 vaccine is very effective and can generate 100% of antibody, the percentage of vaccine recipient population will be a determinant for false positive.

Here, the authors use those data for simulation on two scenarios as proposed by Mendicino and Moretti, giving local prevalence equal to 0.3% and 30%, respectively. Based on a clinical mathematical model, expected PPV of COVID-19 immunoassay in situation with different percentage of vaccinated population is shown in Table 1. In a setting with low prevalence, the background PPV in case with no vaccination is poor and it becomes poorer when there is an expansion of the vaccination coverage rate. Similar trend is also observed in high prevalence setting. The antibody immunoassay for SARS-CoV-2 spike protein antibody test will play very limited role when COVID-19 vaccination successfully covers population.

Table 1: Expected PPV of COVID-19 immunoassay in situation with different percentage of vaccinated population

Percentage of vaccinated population (%)	Expected PPV of COVID-19 immunoassay	
	Giving 0.3% local prevalence	Giving 30% local prevalence
0	8.3	92.8
10	2.0	69.4
20	1.2	58.8
30	0.8	51.0
40	0.6	45.1
50	0.5	40.4
60	0.4	36.5
70	0.4	33.4
80	0.3	28.6
90	0.3	28.5
100	0.3	27.8

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Pathum Sookaromdee, Viroj Wiwanitkit[1]

Private Academic Consultant, Bangkok, Thailand, [1]Department of Community Medicine, Dr. DY Patil University, Pune, Maharashtra, India

Address for correspondence:
Dr. Pathum Sookaromdee,
Private Academic Consultant, Bangkok, Thailand.
E-mail: pathumsook@gmail.com

Received: 25 Jun 21 **Accepted:** 28 Apr 22
Published: 16 Jun 23

References

1. Mendicino DA, Moretti ER. Tests for the detection of antibodies to SARS-CoV-2: Importance of the critical professional interpretation. Int J Prev Med 2021;12:61.

2. Castro R, Luz PM, Wakimoto MD, Veloso VG, Grinsztejn B, Perazzo H. COVID-19: A meta-analysis of diagnostic test accuracy of commercial assays registered in Brazil. Braz J Infect Dis 2020;24:180-7.

Access this article online

Quick Response Code:

Website: www.ijpvmjournal.net/www.ijpm.ir

DOI: 10.4103/ijpvm.ijpvm_290_21

How to cite this article: Sookaromdee P, Wiwanitkit V. Positive predictive value of SARS-CoV-2 spike protein antibody test after COVID-19 vaccination policies. Int J Prev Med 2023;14:75.