COVID-19 Antibody Testing: Facts *vs.* Fallacies

Sir,

Severe acute respiratory syndrome coronavirus 2 (*SARS-CoV-2*) made its debut towards the very end of 2019, and before long, the entire world was engulfed in the worst medical crisis of the century. *SARS-CoV-2* caused a disease called COVID-19, which was declared a pandemic by WHO in March 2020.[1] COVID-19 pandemic caused unprecedented pressures on healthcare agencies and personnel to provide appropriate care and treatment. As the number of reported cases and mortalities climbed, clinical laboratories around the world started to face increasing demand for diagnostic tests, to identify *SARS-CoV-2* infection, monitor response to treatment, patient recovery and development of adaptive immunity against COVID-19.

The gold standard for diagnosis of COVID-19 is nucleic acid amplification by real-time polymerase chain reaction (RT-PCR) using nasopharyngeal or oropharyngeal swabs.[2] Like many other viral infections, COVID-19 results in the activation of B and T cells. The humoral response is B cell-mediated immunity that produces antibodies (IgM, IgA, IgG) against several *SARS-CoV-2* associated proteins. These antibodies begin to form a few days after infection or vaccination and may be detected in serum for several months.[3]

COVID-19 antibody (serological) tests were introduced by various in vitro diagnostics manufacturers. These serological tests were initially thought to be an easier alternative to RT-PCR for diagnosis, management, and monitoring of COVID-19 patients. However, the widespread clinical utility of these tests was doubted by many experts. Data collected by various healthcare agencies raised concerns about the sensitivity, specificity, accuracy, and quality of these serological tests. There was a general lack of standardisation of assay development procedures as these testing kits only received emergency use authorisation (EUA) from leading agencies like food and drug administration (FDA), because of the massive global demand and urgency of the situation.

Many rapid antibody kits for point-of-care testing were flooded into the market which were mostly based on the lateral flow immunoassay method. These kits detected *SARS-CoV-2* IgG, IgM, or total antibodies present in the blood. Various automated laboratory tests included chemiluminescent immunoassays (CLIA) and electrochemiluminescent immunoassays (ECLIA) for quantitative measurement of antibodies against S protein, N protein or neutralizing antibodies. These serological tests must be evaluated independently for diagnostic performance using international standards for *SARS-CoV-2* antibody developed by World Health Organisation.

COVID-19 antibody testing must not be used as a replacement for RT-PCR, to detect the presence or absence of *SAR-CoV-2*. Serological testing can be used to support a diagnosis when looking for complications of COVID-19. A positive IgM usually suggests a recent infection, while a positive result for *SARS-CoV-2* IgG suggests a previous infection or vaccination. Serological testing can also be used for clinical and public health surveys. However, antibody testing is not recommended to assess the degree of protection by recent infection or vaccination.[4]

Keeping in mind the practical aspects and all the pros and cons of COVID-19 antibody tests, it is the responsibility of all healthcare providers to understand the testing techniques being offered at their laboratories and develop appropriate protocols. There is always a thin line between fact and fallacy, which can be identified by careful evaluation of real-world scenarios. This will prove to be helpful in the planning of current and future healthcare policies.

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The authors declared no competing interest.

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NA: Design and drafting of the work.

REFERENCES

1. Cucinotta D, Vanelli M. WHO Declares COVID-19 a Pandemic. *Acta Biomed* 2020; **91(1)**:157-60.doi:10.23750/abm.v91i1.9397.

2. Goudouris ES. Laboratory diagnosis of COVID-19. *J Pediatr (Rio J)* 2021; **97(1)**:7-12. doi:10.1016/j.jped.2020.08.001.

3. Abdool Karim SS, de Oliveira T. New *SARS-CoV-2* variants – clinical, public health, and vaccine implications. *N Engl J Med* 2021; **384(19)**:1866-8. doi: 10.1056/NEJMc2100362.

4. www.cdc.gov/coronavirus/2019-ncov/lab/resources/antibody-tests guidelines.

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