

Elective surgeries in the “new normal” post-COVID-19 pandemic: to test or do not test?

Cirurgias eletivas no “novo normal” pós-pandemia da COVID-19: testar ou não testar?

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ABSTRACT

The new coronavirus (SARS-CoV-2) pandemic has been wreaking havoc all over the planet. In a precautionary measure, populations have been forced and kept under quarantine to contain the outbreak of the COVID-19 disease. The quarantine primary goal is to avoid the overload to the hospitals, which should be available for the care of COVID-19 patients. However, the virus does not have a uniform spread throughout the planet, and Brazil is no different. Although all the world's attention is now on the COVID-19 pandemic, there is no similar pattern of spread, and other diseases are still a real problem. Given the risks of transmission between patients and healthcare providers, there is a great challenge for healthcare institutions who must balance resources to assure safe care to patients and professionals while they take care of other disease patients, and perform surgical procedures that need to be carried out. Under such circumstances, as COVID-19 can also present pre- or asymptomatic transmission, it can be challenging to identify patients who are carrying and spreading the virus. Studies and information on mandatory testing for who are candidates to undergo elective surgery are scarce. Thus, the authors have reviewed the literature, and discuss the need to test these patients under the current context.

Keywords: Elective Surgical Procedures. Coronavirus. Pandemics.

CORONAVIRUS OUTBREAK IMPACT

The accelerated worldwide spread of the new SARS-CoV-2 pandemic has resulted in individual freedom restrictions, and has had a severe impact on the global economy. It has generated significant heated debates among governments around the world. The main issues are based on how to control the viral transmission and how to mitigate the negative impacts on the economy^{1,2,3}. Those actions aim to contain the spread of the new coronavirus and its consequences on public and private health systems¹⁻⁴.

Most hospitals and health services have been made available to treat potential COVID-19 patients, thus limiting surgical care to emergency procedures only. Nevertheless, during the pandemic, people continue suffering from diseases not linked to the COVID-19⁵.

The non-homogenous distribution of the pandemic throughout Brazil, has exposed stark contrasts for the use of medical and hospital resources, even in cities within the same State. There are regions with underutilized resources while others amid chaos, due to the lack of proper funding. Unquestionably, the pandemic has exposed the fragility of the public health system, and in some areas of worse performance, problems are significantly more evident.

According to the law, State and Municipal governments have the autonomy to define when and how to resume the so-called “new normal,” easing the possibility of elective medical procedures⁶.

Consequently, health services are planning alternatives to start a new phase of the pandemic to mitigate the possibility of person-to-person viral transmission. Notably, it is important to avoid the

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contagion of patients without previous infection who will undergo non-emergency procedures and potential SARS-CoV-2 transmission from asymptomatic patients.

In this scenario, the diagnostic tests may be useful, with several drawbacks, aiming to guide epidemiological measures. There is no consensus on when and which test should be used for those patients. The differences in financial resources and control programs carried out by local governments, along with insufficient knowledge of the epidemiology of SARS-CoV-2 is crucial and determines considerable inaccuracy when interpreting the tests⁷.

Broad testing capability delivers the implicit message that people should be tested, raising anxiety, and an urgent need for testing. However, in this context, what is the reason for COVID-19 testing? Anyone who has mild signs and symptoms of COVID-19 should seek medical advice. The recommendation will probably be standard, regardless of testing: stay home for two weeks or be fever-free for 72 hours, unless the person belongs to a risk group⁸.

COVID-19 is community transmitted in Brazil; thus, if one has flu symptoms such as cough, shortness of breath, fever, anosmia, sore throat, and runny nose, probably the diagnosis is COVID-19, until proved differently⁹.

Furthermore, it is also necessary to consider the information on the sensitivity and specificity of the different currently available tests. This information gives an understanding of the risks of false negatives amid community transmission. In line with the previous idea, information on false positives is essential for public health officials, clinicians, and patients to understand the true scope of COVID-19, in a given region. So far, none of the available tests carries robust proof of diagnosis or immunity, and any strategy regarding public health measures may be challenged, considering the limitations of any testing capability^{7,10}.

There is a worldwide pressure, and in Brazil, it is no different, in limiting the economic damage by sending the population back to work, based (or not) on the presence of immunity supported by diagnostic tests. This balance between the sensitivity and specificity of SARS-CoV-2 diagnostic tests, and the return to the "new normal," is the greatest challenge for governments. This

fact has generated pressure from the community and politicians for tests to be carried out, which is a challenge considering the lack of good scientific data.

In Brazil, with its continental characteristics, some health services were legitimately authorized to resume elective operations, after local epidemiological flexibilization¹¹.

Consequently, a new approach to COVID-19 has emerged: the possibility of hospital contamination of elective surgical patients. Similarly, the risk of infection of "false negative" patients in the in-hospital environment has raised concerns.

The period of exception and spread of the pandemic has been a major global problem. It has forced the release and use of non-validated tests and, consequently, a large number of false negatives and false positives with unclear proportions. The unfamiliarity of the situation has caused significant uncertainty and inevitable confusion of how to evaluate elective and asymptomatic patients, aiming to mitigate the misinterpretation of diagnostic tests for SARS-CoV-2^{12,10}.

The pandemic has led to a lot of exceptions and scarce answers. Therefore, a literature review aiming to formulate solutions for one hypothesis regarding elective surgical patients, in this period of resuming to the "new normal," has been carried out. The main goal was to answer if there is a need for systematically testing all candidates undergoing elective surgery.

HOW BIG IS THE OUTBREAK?

According to the World Health Organization guidelines, in the general population, clinical and epidemiological factors of infectious conditions should guide the decision to test the individuals. Still, they should be adapted to local epidemiological control policies¹³. Asymptomatic or slightly symptomatic contacts may be considered for individuals who have had contact with a COVID-19 case¹⁴. In this regard, most patients infected with SARS-CoV-2 are asymptomatic, and clinical screening is critical in choosing those to be tested.

Recent SARS-CoV-2 publications suggest that from one to three days before the onset of symptoms, patients may already have been infected. Forty to 50% of SARS-CoV-2 infections may be attributable to the

transmission of asymptomatic or pre-symptomatic persons¹⁵. Thus, the approach of pre- or asymptomatic is an enormous challenge in controlling viral dissemination^{9,16,17}.

To date, asymptomatic infections do not have a clear epidemiological significance. Some current studies indicate that individuals without symptoms can transmit the disease^{12,17,18}. Under such circumstance, the uncertainty of whether asymptomatic carriers can transmit SARS-CoV-2 remains. Therefore, is it worth testing all asymptomatic candidates who will undergo elective operations? Can the time between the onset of symptoms and contact with the virus be a point against regularly checking candidates? To help respond such questions, an analysis of the commonly available tests in public and private health systems in Brazil is done.

TESTS FOR COVID-19

There is no question that the tests mirror the pandemic and express its spreading behavior. Testing may help with accuracy of identifying infected persons, and decrease the rate of under-reported cases and deaths^{19,20}. However, there is substantial uncertainty regarding the importance and value of tests for patients in authorized regions where elective procedures can be done, mitigating cross-infection between health professionals and patients, or vice versa.

Test results depend not only on accuracy but also on the individual estimated risk of contracting the disease before the test. In a community dissemination environment, the precise incubation time for pre- or asymptomatic patients is uncertain. It can directly interfere with the sensitivity of all tests because each method has a higher probability based on the contamination time. The temporal lack of contagion can be a problem to be considered in the interpretation of test results¹⁰.

Currently, there are two types of tests for COVID-19. Viral diagnostic tests assessing whether the patient has an ongoing infection and antibody tests that show whether the patient has had a previous infection, not revealing whether there is an infection because it can take one to three weeks for the antibodies to appear. It is not known whether the fact of producing antibodies can also reveal that the patient is protected from a new infection.

Considering that all patients who are candidates for elective operations, in this period, should be asymptomatic, they are the focus of this review. Patients with the mildest flu-like clinical sign or symptoms should have their procedures canceled^{10,19}.

The most accurate test for SARS-CoV-2 detection is reverse transcriptase-polymerase chain reaction (RT-PCR). The RT-PCR is a commonly used and highly specific messenger RNA detection and quantification technique that can detect the presence of SARS-CoV-2 in a biological sample. Currently, RT-PCR is the recommended test for the diagnosis of acute cases, determining an active SARS-CoV-2 infection^{7,19}.

In most symptomatic individuals, viral RNA from nasopharyngeal swab becomes detectable as early as the first day of symptoms peaking in the first week of the onset. RT-PCR detection begins to decrease in the third week and subsequently becomes undetectable. A "positive" RT-PCR reflects only the detection of viral RNA and does not necessarily indicate the presence of viable viruses¹⁸. However, RT-PCR has a hazy benefit in the first days after SARS-CoV-2 contamination. RT-PCR is similar to HIV and hepatitis C behavior, possibly because of the window between contagion and detectability^{21,22}. SARS-CoV-2 investigators have observed a window of three to five days, although the false-negative RT-PCR risk is minimized one week after the exposure. False-negative RT-PCR may be due to a lower viral load. However, inaccuracy between the date of sample collection and the onset of the disease has been considered the primary cause. Technical failures and reagent contamination are a secondary reasons of false-negative RT-PCR. The specificity of most RT-PCR tests is 100%^{10,20,23,24}.

ELISA is an accessible alternative to the indirect immunofluorescence to screen antibodies against SARS-CoV. The recombinant SARS-CoV ELISA and indirect immunofluorescence seroconversion time were similar. The median times of IgG, IgM, and IgA conversion were the same, 17 days after the disease onset. The antibodies against SARS-CoV-2 can be detected in the middle and later stages of the illness. However, serological tests are becoming more attractive due to the delay in diagnosis, severe scarcity of tests, and laboratory capacity. ELISA-based SARS-CoV recombinant nucleocapsid antibody tests for SARS-CoV pneumonia and the prevalence of non-

pneumonic SARS-CoV infections have been described²⁵. Although serological tests are not adequate for the diagnosis of the acute cases, they have been used as a criterion to consider if a patient is fit for elective surgical procedures, which is a critical inaccuracy.

The determination of specific antibodies (IgM, IgA, and IgG) is useful to confirm SARS-CoV-2 in COVID-19-positive PCR patients. These antibodies may be essential in infected, but asymptomatic individuals, those COVID-19 positive patients who were examined weeks after the onset of the disease, and those with low viral load. Moreover, using serological tests without proper validations on safety and quality increases the possibility of false negatives and positives¹⁰.

The host's immune response to SARS-CoV-2 infection can also be detected indirectly by serological tests. A critical point in acute infections is that serological tests are not useful, within the first week of the disease, due to the fact that IgM and IgG antibodies are only detectable about six to 15 days after the onset of the disease⁷.

The assessment of IgM, IgA, and IgG kinetics for SARS-CoV-2 antibodies in patients with confirmed infection (RT-PCR) seems to be a more potent, early, and durable response of IgA to IgM²⁶. Corroborating this finding, and as previously mentioned, total antibodies are the most sensitive and early serological markers. From the second week of symptom onset, their levels rise¹⁰. Thus, antibody tests are especially necessary for detecting previous infections in patients with few or no symptoms. The presence of positive IgM or IgG does not imply that the patient carries the new coronavirus. It only indicates that patients have already developed antibodies to a previous infection, whether symptomatic or not^{7,10,16,27}. This fact reinforces its uselessness for the evaluation of acute and possible positive SARS-CoV-2 infection patients who are candidates for elective surgeries.

In a recent publication, Gao et al. concluded that some asymptomatic carriers SARS-CoV-2 may be more vulnerable to be infected. They state that there should be no concern about asymptomatic patients during the COVID-19 pandemic. Also, excessive detection of the virus is unnecessary, which can relieve pressure over the public health resources¹².

Amidst so many uncertainties, there are several

differences in sensitivity and even specificity of the available serological tests, in Brazil. Reports range from 40 to 93% sensitivity, which demonstrates a wide variety of unpredictability regarding safety and effectiveness^{7,8,10}.

DISCUSSION

The "new normal" related to the COVID-19 pandemic has caused permanent changes in medical and hospital protocols worldwide. There have been proposed modifications to control in-hospital contagion between healthcare providers and patients, considering that the virus is in the community. In this sense, patients with diseases not related to COVID-19 are being allowed to undergo operations in legally allowed areas, where the hospitals' occupancy rate is low, and there is no need to admit COVID-19 patients. It is also important to emphasize that asymptomatic cases are the preferential candidates to for elective operations. Personal protective equipment has become the surgeon's armor against SARS-CoV-2. COVID-19 is caused by SARS-CoV-2, which is a respiratory infection^{4,28}. Thus, personal protection inherent to the respiratory contagion is at the heart of the discussion²⁹. It is known, as well, that most individuals with SARS-CoV-2 are asymptomatic, which poses more problems to identify them, as their lack of symptoms in the community prevents them from being identified. The lack of knowledge regarding the possible contagion and the moment of the operation makes the probability of false negatives considerable²⁴.

Similarly, there may be pre-symptomatic patients in the incubation period, and they possibly can develop the disease while in-hospital or shortly after the operation. Analyzing the differences related to the incubation time and the test results, regardless of the employed method, it is unsure the screening for the genuinely negative patients at the time of the examination is appropriate.

RT-PCR low sensitivity has been a subject of debate since the emergence of COVID-19. It should also be considered the elapsed time between the RT-PCR test performance and the time of surgery, a period when the patient may become infected^{3,10,12,14,24}. RT-PCR for SARS-CoV-2 is being used as a standard to "rule out" the infection. However, when the patient is negative, this can lead to easing the standards of protection and safety with

a significant potential of being "false-negative".

Elective patients should always be asymptomatic and the window between contagion and RT-PCR testing is surely the major problem in its sensitivity. The probability of "false-negative" RT-PCR on the days preceding the onset of symptoms ranges from 68% to 100%, varying according to the swab sampling day. The "false-negatives" decrease eight days after the infection, on an average of three days after the onset of symptoms²⁴.

Adding to the everything that has been discussed, there are variations between the quality and sensitivity of the serological tests, which, even if they were 100% sensitive, are inadequate for the evaluation of an active infection. Another point of paramount importance is the false positive or inappropriate tests, the immunological window, or the technical flaw³⁰. These patients may transmit a false impression that they are virus-free, and thus may favor medical and hospital flexibility and consequently cross-infection¹⁰. Therefore, under this pandemic that has plagued the world, health care providers have been challenged to relearn prior knowledge. The preoperative elective patient testing seems to be a fluke, due to the

false positives or especially the false negatives, which can lure both professionals and patients.

CONCLUSION

Under the SARS-CoV-2 community dissemination, before resuming electives operations, the provision of PPE to all healthcare providers and workers is crucial. The analysis of the available data on diagnostic tests in asymptomatic patients supports that a thorough clinical evaluation and detailed epidemiological questionnaire is far superior than any lab test for screening elective operation candidates. The agreement between the health care provider and the patient is mandatory, with correct informations regarding the SARS-CoV-2 diagnostic tests and their potentially equivocal results. If there is any understanding on the performance of any diagnostic test, the preference should lie on RT-PCR, no later than 72 hours before the procedure. However, under specific situations, depending on the local protocols, IgA/IgM serology could be used, provided that its results may not indicate whether a person has COVID-19 or is transmitting due to the test limitations.

R E S U M O

A pandemia do novo coronavírus (SARS-CoV-2) vem causando estragos em todo o planeta. As populações estão sendo forçadas a quarentena – e assim mantidas – como medida de precaução para conter o surto da doença COVID-19. O principal objetivo da quarentena é evitar a sobrecarga dos hospitais, o que pode ser determinante para o atendimento aos pacientes COVID-19. O vírus não tem propagação uniforme pelo planeta, e no Brasil não é diferente. Contudo, as pessoas continuam a adoecer por outras causas não relacionadas ao SARS-CoV-2, demandando atendimento médico-hospitalar. Assim, os governos estão avaliando e liberando regiões para a realização de cirurgias eletivas em Estados e Municípios onde a COVID-19 está sob controle. Nesse contexto, há preocupação inerente à transmissão SARS-CoV-2 entre pacientes e prestadores de serviços de saúde, uma vez que há poucas informações sobre testes obrigatórios a serem realizados em pacientes com indicação cirúrgica. Esse problema é causado principalmente porque todos os pacientes durante o período de incubação são assintomáticos e, portanto, difíceis de serem avaliados. Assim sendo, os autores avaliam a literatura pertinente à microbiologia do SARS-CoV-2 e discutem a necessidade de testar esses pacientes com testes mais utilizados até o momento.

Palavras chave: Procedimentos Cirúrgicos Eletivos. Coronavírus. Pandemia.

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