COVID-19 Testing Recommendations prior to Elective Ophthalmic Surgeries

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This guidance was developed based on international and local recommendations to date with the COVID-19 pandemic and expert clinical and system-level advice. However, as the pandemic situation is evolving day to day and information may change rapidly, these recommendations should not be considered as rigid guidelines and are not intended to supplant clinical judgement or institutional policies.

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ABSTRACT

With the resumption of elective surgeries during this COVID-19 pandemic, surgeons and facilities should implement infection prevention and control measures to ensure the safety of patients and health care workers. This advisory highlights the key principles, risk stratification considerations, and recommended approach regarding Covid-19 testing prior to elective ophthalmic surgeries.

Keywords: COVID-19, elective surgery, pre-operative testing, ophthalmic surgery

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In response to the COVID-19 pandemic, health care facilities have cancelled elective surgical procedures across the country. However, once the first wave of this pandemic is over and localities begin to stabilize, surgeons and facilities should be prepared to resume elective surgery. The objective of this advisory is to highlight key principles, risk stratification considerations and recommended approaches regarding COVID-19 testing prior to elective ophthalmic surgeries while ensuring the safety of patients and health care workers.

There are three categories of the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) tests: 1) real-time reverse transcription polymerase chain reaction (RT-PCR) test that detects the virus itself through its ribonucleic acid (RNA); 2) rapid antibody-based test that detects the host's response to the virus as serological antibodies; and 3) antigen test, which detects the presence of specific viral proteins.

RT-PCR is the confirmatory test and the gold standard for acute illness. The sample quality influences test accuracy because RNA may degrade over time. The sensitivity of SARS-CoV-2 testing is approximately 70% to 90%, so there can be up to 30% false negatives. Since SARS-CoV-2 can infect anyone and result in transmission prior to the onset of symptoms or even without ever developing symptoms, testing or screening of asymptomatic patients has been considered.[1,2] According to the recommendations of the Philippine Society for Microbiology and Infectious Diseases *et al.*, nasopharyngeal specimens are preferred over oropharyngeal and saliva specimens because of the higher specificity and sensitivity of the RT-PCR assay when using nasopharyngeal swab samples.[3]

The rapid antibody-based test is dependent on the development of an antibody response to infection, which includes detecting IgM, IgA, IgG, or total antibodies. It is host dependent and patients usually develop antibodies in 7 to 11 days after exposure to the virus.[1] A joint statement from the American Society of Anesthesiologists (ASA) and Anesthesia Patient Safety Foundation (APSF) declared that antibody testing is not recommended in perioperative screening and risk stratification because of its potential for cross-reaction with other coronaviruses that may yield false-positive results.[4]

Antigen tests make use of nasopharyngeal and nasal swab samples and are processed at the point of care. The test kit is a lateral flow immunofluorescent assay that detects the viral antigen expressed when the virus is actively replicating.[3]

CONSIDERATIONS FOR COVID-19 TESTING PRIOR TO ELECTIVE OPHTHALMIC SURGERIES

1. SARS-CoV-2 RNA in the pre-ocular tear film

Although the conjunctiva shares the same receptor with the respiratory tract for SARS-CoV-2, it is still a subject of research whether or not the conjunctiva is a major COVID-19 portal like the respiratory tract.[5,6,7,8] Conjunctivitis has been observed in COVID-19 patients, but in these eyes, rarely have SARS-CoV-2 RNA been detected in tears and conjunctival secretions. Due to low positive detection rate in the conjunctival sac of patients with SARS-CoV-2, it is suggested that eyes are not the main transmission routes of SARS-CoV-2.[8]

Tears and ocular secretions are body fluids that are potentially infectious which we as ophthalmologists should always be aware of, not only during the COVID-19 pandemic. Taking prudent precautions on exposure to tears and conjunctival secretions could possibly lower the risk of transmission of COVID-19 while providing care to ophthalmic patients.

2. Efficacy of Povidone-Iodine in eliminating SARS-CoV-2 from the ocular surface

Povidone-iodine efficacy against SARS-CoV was tested during the aftermath of the epidemic in China and Singapore. A study published in 2006 proved that povidone-iodine products have strong virucidal activity against SARS-CoV at concentrations typically used in clinical practice.[9] Since the genome of SARS-CoV-2 is very similar to SARS-CoV, it is reasonable to assume that the use of 5% povidone-iodine as a surgical prep is effective in reducing SARS-CoV-2 from the ocular surface.

3. SARS-CoV-2 replication in the intraocular fluid

To date, viral RNA replication in the intraocular fluid has not been demonstrated. However, angiotensin converting enzyme 2 (ACE2), the receptor needed by SARS-CoV-2 to infect host cells, has been found in the aqueous humor, suggesting the possibility of viral replication in the intraocular fluid.[10]

4. Aerosol transmission of SARS-CoV-2 during phacoemulsification and vitrectomy

Chodosh, *et al.* presented some logical propositions: *"In phacoemulsification, the procedure begins with filling up the anterior chamber with viscoelastic, which is replaced by balanced saline solution (BSS) from the phaco tip. Aerosolization probably occurs when the ultrasound is engaged, but it would be the BSS that is aerosolized and not the patient's aqueous. Based on this logic, the risk of aerosolized virus during phacoemulsification would be extraordinarily low."*[11]

"In pars plana vitrectomy, however, the entire vitreous is not replaced by viscoelastic. The virus can be neuro-invasive, so intraocular virus is theoretically possible. And yet, there is not a single case report of uveitis or retinitis associated with COVID-19. Vitrectomy is also performed under a closed surgical system. For these reasons, it is unlikely that there would be a significant viral load and aerosolization during pars plana vitrectomy to infect a surgeon or scrub nurse."[11]

5. Risk of transmission from asymptomatic patients

A negative RT-PCR test does not necessarily mean a truly COVID-19 negative patient. In a study by Lauer, *et al.*, the incubation period (IT) of the SARS-CoV-2 was 5.1 days (mean IT: 5.5 days).[12] In most of the patients who became symptomatic, symptoms appeared at 11 or 12 days after the exposure. Fewer than 2.5% were symptomatic within 2.2 days and the vast majority were symptomatic within 14 days. It is known that patients who remain asymptomatic or mildly symptomatic can transmit the infection. In view of this, patients who are scheduled for surgery should always be assumed to be potential carriers of the virus, throughout the duration of their hospital stay, even if they pass the pre-assessment triage including normal temperature, no history of exposure or travel, and no respiratory symptoms.[1]

6. Facility capability

A joint statement from the American College of Surgeons, *et al.* proposed the following:[13]

Facilities should use available testing to protect staff and patient safety whenever possible and should implement a policy addressing requirements and frequency for patient and staff testing. Facility COVID-19 testing policies should account for:

1) *Availability, accuracy, and current evidence regarding tests, including turnaround time for test results.*

2) *Frequency and timing of patient testing (all/selective).*

   - *Patient testing policy should include accuracy and timing considerations to provide useful preoperative information as to COVID status of surgical patients, particularly in areas of residual community transmission.*

   - *If such testing is not available, consider a policy that addresses evidence-based infection prevention techniques, access control, workflow and distancing processes to create a safe environment in which elective surgery can occur. If there is uncertainty about patients' COVID-19 status, personal protective equipment (PPE) appropriate for the clinical tasks should be provided for physicians and nurses.*

3) *Indications and availability for health care worker testing*

4) *How a facility will respond to COVID-19 positive worker, COVID-19 positive patient (identified pre-operative, identified post-operative), "person under investigation" (PUI) worker, PUI patient.*

PAO RECOMMENDATIONS ON COVID-19 TESTING PRIOR TO ELECTIVE OPHTHALMIC SURGERIES

While the possibility of transmitting SARS-CoV-2 from the ocular surface in common ophthalmic procedures is regarded as low risk, the evidence to support non-testing of patients for elective ophthalmic surgery is weak.

In theory, testing surgical patients by RT-PCR could lower the chances of inadvertent exposure and contracting COVID-19 from asymptomatic patients. And because surgery in general can potentially

transmit respiratory infections and induce fatal patient outcomes where a COVID-19 diagnosis is overlooked and/or diagnosed later,[12,14] the following recommendations are given:

1. Patients for elective surgery should be considered for RT-PCR testing[13]:

    a. within 72 hours of a scheduled procedure to ensure COVID-19 negative status; and

    b. must undergo self-quarantine after being tested until the day of surgery.

2. If a patient is positive for SARS-CoV-2, elective surgical procedure should be delayed until the patient is no longer infectious and has demonstrated recovery from COVID-19, based on current recommendations of local governing institutions.[13]

RAPID ANTIGEN TESTING (AgT) AS PRE-OPERATIVE SCREENING TOOL

According to the Department of Health (DOH) Memorandum No. 2020-0439 dated October 6, 2020, entitled "Omnibus Interim Guidelines on Prevention, Detection, Isolation, Treatment, and Reintegration Strategies for COVID-19," the current gold standard for confirmation of COVID-19 infection remains to be the RT-PCR.[15] With a worldwide shortage of testing kits and supplies related to them, the judicious and rational use of available tests is recommended.

DOH Memo No. 2020-0439 allows the use of rapid antigen testing (AgT) as a substitute for RT-PCR under certain conditions. On page 4, under General Guidelines, Section L, Number 2, it states "The use of the AgT as a substitute for RT-PCR shall be allowed for diagnostic testing of suspect, including symptomatic and asymptomatic close contacts who fit the suspect case definition, and probable cases (a) in the community of hospital setting when RT-PCR capacity is insufficient, (b) in the hospital setting where the turnaround time is critical to guide patient cohort management, or (c) in the community during outbreaks for quick case findings, provided that in any setting, only Food and Drug Administration (FDA)-certified antigen tests with sensitivity and specificity in conformity with Health Technology Assessment Council specifications are used."

Ideally, asymptomatic patients scheduled for elective ophthalmic surgeries should undergo RT-PCR prior to surgery.[16] However, when test availability and turnaround time of test results prevent or hinder a timely performance of RT-PCR, such as but not limited to emergency procedures, a less sensitive point-of-care tests, such as the AgT, are used by some institutions to determine the COVID status of patients.

Presently, there is limited data on the utility of AgT as a screening test for asymptomatic patients to detect or exclude COVID-19. There is also substantial variability in the performance of the different manufacturers of AgT.[17] Hence, the clinician should be cognizant of the limitations of AgT and interpret the results in the context of the patient's history and physical examination.[18] AgT helps to know with an important degree of uncertainty, if the patient has been in contact with the virus and may give a notion of the natural history of the disease (Figure 1).

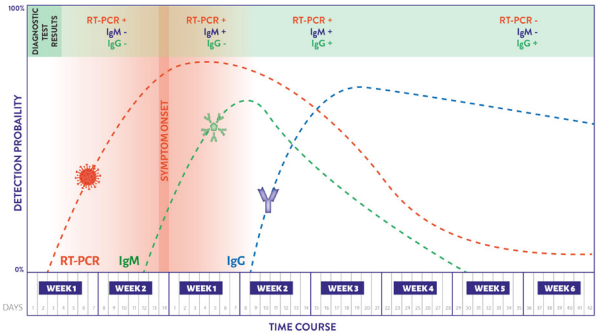

Figure 1: Chronological estimate of diagnostic test probability to detect SARS-CoV-2 in the COVID-19 natural history. (Credits: Salica JP, Potilinski C, Querci M, *et al. Clin Ophthalmol.* 2021;15:261-278)

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