Is it essential to perform COVID-19 testing prior to ophthalmic procedures?

The preoccupation of the medical community in the management of the COVID-19 crisis has resulted in the neglect of non-COVID-19 medical conditions. The limitation in the number of surgical cases to maintain the social distancing guidelines and deferred operations have added to the surgical backlog considerably.[1] To reverse this downturn the world is struggling to bounce back by adopting the "new normal." Resumption of health care services poses a challenge due to the safety concerns for the medical and paramedical personnel. More importantly, in presymptomatic cases, the signs and symptoms of COVID-19 may manifest in the postoperative period, culminating in adverse patient outcomes.[2]

The patients undergoing surgery may be presymptomatic or asymptomatic COVID-19 cases. The reported transmission efficiency of an asymptomatic carrier is one-third of that of symptomatic cases.[3] Real-time reverse transcriptase–polymerase chain reaction (RT-PCR) of the nasopharyngeal swab is thus recommended prior to intervention, especially in procedures involving aerosol generation.[4,5] However, the probability of detection of SARS-CoV-2 nucleotide by RT-PCR peaks on day 3 of symptoms, and the sensitivity in asymptomatic cases is not known.[6,7]

To evaluate the rationale for preoperative COVID testing, we performed a retrospective analysis of RT-PCR of nasopharyngeal samples of patients posted for elective ophthalmic surgery from July 26, 2020, to August 25, 2020, at Guru Nanak Eye Center, New Delhi. Institutional ethics committee clearance was obtained for data analysis.

Due to the diversion of anesthetists and reservation of hospital beds for management of critically ill COVID-19 patients, all ophthalmic surgeries were performed under local anesthesia on a daycare basis. The patients with signs or symptoms/positive lab-confirmed COVID-19 cases in the prior 2 weeks, uncontrolled diabetes, hypertension, heart disease, pregnancy, chronic lung/liver disease, or immunocompromised status were not included. All patients planned for elective ophthalmic surgery underwent RT-PCR for SARS COV-2 from the nasopharyngeal swab a day prior to the procedure. The RT-PCR testing was performed at the advanced virology laboratory, Maulana Azad Medical College, New Delhi, using an Indian Council of Medical Research approved kit.[8-10]

In the patients with a positive nasopharyngeal swab, cycle threshold (Ct) values of *E* gene, ORF1b/N gene, and *RdRp* gene were determined from the amplification curves. [Fig. 1a-c] Ct value of the *E* gene was used to study the viral load. These patients were also contacted telephonically to ascertain the development of signs and symptoms related to COVID-19 until 3 weeks after the test.

In the 1-month period, 355 asymptomatic patients planned for cataract, squint, lid, lacrimal, and retinal surgery underwent RT-PCR testing. Thirty cases, with ages ranging from 18 years to 64 years and male:female ratio 8:7 tested positive [Table 1]. None of these patients developed COVID-19 symptoms in the 21 days after the test. The average Ct value of the *E* gene of the positive cases was 27.63 and in nine cases being <24 (15-22).

Asymptomatic COVID-19 cases are common in young and middle-aged population, the median age being 32.5 years and 49 years, respectively.[11,12] The median age in our study also was 36.5 years.

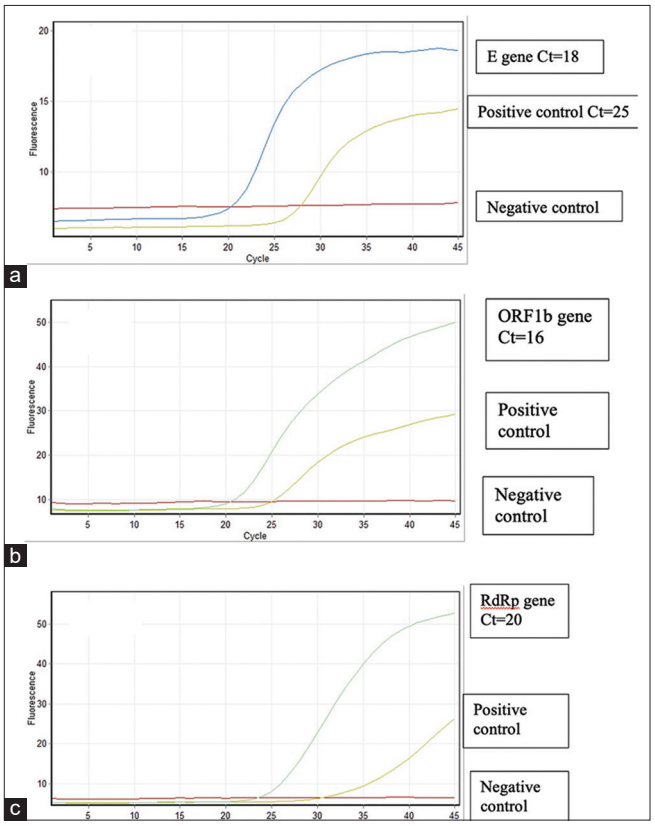

Figure 1: Real-time reverse transcriptase–polymerase chain reaction amplification curves of case number 12 (a) *E* gene (b) *ORF1b* gene (c) *RdRp* gene

The reported population prevalence of active COVID-19 cases in Delhi in the study period was 10.47%.[13] This included both symptomatic as well as asymptomatic laboratory-confirmed cases. The incidence of asymptomatic COVID-19 infections has been reported to vary from 1.6% to 56.5%.[11,13-16] We observed RT-PCR positivity of 8.4% in the nasopharyngeal samples of preoperative ophthalmic surgery cases. The absence of systemic symptoms in these patients could be attributed to the innate immune response.[17] The median period reported for an asymptomatic patient to become negative for viral nucleic acid is 9.5 days and the longest is up to 21 days.[18] All the positive patients were informed, quarantined for 14 days and the surgeries were deferred.

The major drawback of RT-PCR is its inability to demonstrate infectivity. The viral nucleic acid positivity, merely indicates that the viral load in a sample reaches a certain limit.[19] Definitive proof of the potential for viral transmission can be obtained by *in-vitro* infectiousness on cell lines, but is labor-intensive and requires containment level three facilities. Bullard *et al*. demonstrated that infectivity as evidenced by the growth in cell culture was significantly reduced when RT-PCR values were >24 and the odds ratio for infectivity decreased by 32% for every 1 unit increase in Ct value.[20] In our study, nine cases (30% of the positive samples; 2.53% of total tested samples) had Ct values <24, which could have been infective. Their age groups varied from 18 to 51 years. The remaining 19 cases though positive, had Ct value more than 24, chances of infectivity being less. The infectivity has been observed to decrease when the duration of symptoms is more than 8 days. In asymptomatic

Table 1: Demographic profile and cycle threshold values of *E* gene, *ORF1b/N* gene, and *RdRp* gene in patients with positive reverse transcriptase-polymerase chain reaction of nasopharyngeal swab

Age	Gender	Cycle threshold values			Kit used
		E gene	*ORF1b/N* Gene	*RdRp* Gene	
63	M	26	26	ND	ICMR-NIV Protocol
60	F	35	35	NA	Cepheid
18	F	25	27	NA	Cepheid
28	F	15	17	NA	Cepheid
45	F	30	35	NA	Cepheid
35	F	35	25	NA	Cepheid
45	F	17	15	19	ICMR-NIV Protocol
40	M	22	20	24	ICMR-NIV Protocol
23	M	31	30	ND	ICMR-NIV Protocol
60	M	19	18	22	ICMR-NIV Protocol
64	M	33	30	35	ICMR-NIV Protocol
38	M	18	16	20	ICMR-NIV Protocol
35	M	20	22	ND	ICMR-NIV Protocol
27	F	33	32	ND	ICMR-NIV Protocol
42	F	16	15	18	ICMR-NIV Protocol
50	F	34	32	ND	ICMR-NIV Protocol
32	M	18	28	30	ICMR-NIV Protocol
25	F	32	31	32	ICMR-NIV Protocol
60	F	30	33	NA	Cepheid
32	M	35	37	NA	Cepheid
32	M	29	32	NA	Cepheid
51	M	22	24	NA	Cepheid
35	F	34	35	NA	Cepheid
53	M	32	28	ND	ICMR-NIV Protocol
60	M	30	28	ND	ICMR-NIV Protocol
21	M	25	27	NA	Cepheid
21	F	30	33	NA	Cepheid
55	F	35	39	NA	Cepheid
34	M	33	37	NA	Cepheid
35	M	35	38	NA	Cepheid

ND=Not detectable, NA=Not applicable

cases, it is not possible to predict the infectivity in terms of duration of illness as the time of exposure is not known. Though RT-PCR is a qualitative test, the Ct value can thus serve as a guide to determine the infectiousness of the patient.

An asymptomatic apparently healthy patient undergoing elective ophthalmic surgery could be a source of COVID-19 transmission to the health care workers. With the ease of availability and emphasis on more testing, RT-PCR for COVID should form a part of the standard operating protocol, prior to all ophthalmic procedures. We hope that our experience in this evolving public health challenge would help in strategic planning to enable the provision of safe surgical care.

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