EDITORIAL

What COVID-19 has taught us: lessons from around the globe

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"*In the midst of chaos, there is also opportunity*" – *Sun Tzu (544–496 BC)*.

COVID-19 hit us without warning. What started out in December 2019 as an isolated outbreak of a respiratory illness, ostensibly transmitted from the horseshoe bat in a wet market in the city of Wuhan, China, led rapidly to a public health emergency of international concern on 30 January 2020 and being declared a pandemic on 11 March by the World Health Organization (WHO) [1]. In a short span, it has affected almost 6 million people worldwide, resulting in more than 355,000 deaths [2]. The world has not seen such a widespread disease since the H1N1 swine flu pandemic in 2009 [3] and the Spanish Flu in the early twentieth century [4].

The chaos of the COVID pandemic and its impact on ophthalmology

The impact of this current pandemic is much greater than more recent outbreaks such as SARS and Ebola because of globalization and ease of travel. Many countries instituted drastic and sometimes extreme quarantine measures (e.g., locking down over 60 million people in Hubei province, including the epicenter of the crisis, Wuhan) [5]. The alarming reports of ophthalmologists contracting the deadly illness from infected patients especially the 34-year-old Wuhan ophthalmologist, Li Wenliang, made ophthalmologists wary and nervous of spread of COVID through contact with their patients, either through close proximity with patients during the typical ophthalmic consultation or via diagnostic tests and surgical procedures through aerosolization and fomites [6].

COVID-19 is widespread in Asia, but mortality rates are much lower than in Western European countries and the USA. The Johns Hopkins University revealed that the death rate per 100,000 people was 82.56 in Belgium, 10.25 in Germany, and 31.42 in the USA. Across Asia, the rates were 0.33 in China, 0.7 in Japan, 0.52 in South Korea, 0.04 in Singapore, and 0.03 in Taiwan [2]. The enigma of lower death rates in East Asia cannot be explained easily. Researchers are examining many factors, including differences in genetics and immune system responses, separate virus strains, and regional contrasts in obesity levels and general health, but the results have been inconclusive so far [7].

The Taiwan experience

Taiwan has been hailed as the most successful model in the fight against COVID-19. Owing to the painful experience of SARS 17 years ago, Taiwan started advance deployment. Travel and exposure history was registered in the National Health Insurance system so that hospitals could trace and triage high-risk patients. Even though a surgical mask is not fool-proof in filtering out the virus completely, the protective effect doubled when everyone wore masks. Physicians had been asked to wear masks when checking the patients since SARS in 2003 and are now asked to wear a mask all the time inside the hospital. To facilitate the quarantine process, the hospitals developed an Integrated Hospital Quarantine System (IHQS). This was integrated with the NHI PharmaCloud System, which allowed thorough checks on the travel and medical history of pre-registered patients for all outpatient clinic visits, day

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surgery, scheduled examinations, or hospital admissions in advance [8].

The precautions taken were necessary because ophthalmologists are vulnerable to contracting infectious diseases such as COVID-19. In Taiwan, physicians consider all patients as potential COVID carriers. Measures in the clinic include plastic barrier shields mounted to slit lamps and machines; all staff are asked to wear cap, eye goggles, protective clothing, surgical mask, and glove during clinic; video calls to check the patients with fever and red eye but not yet diagnosed with COVID at the emergency department. Direct ophthalmoscopy was discouraged, and indirect ophthalmoscopy or non-mydriatic fundus photo was used as much as possible. If the surgery machine was used in a confirmed case, it needs to be sterilized overnight.

Social distancing measures and wearing of masks were the most vital measures implemented very soon after the outbreak, which have helped Taiwan beat the virus so successfully, with the help of digital and telecommunications technologies as well as discipline and wisdom. Fortuitously, COVID-19 has also opened the door to tele-ophthalmology.

Why tele-ophthalmology?

Tele-ophthalmology refers to the practice of caring for patients remotely when the ophthalmologist and patient are not physically present with each other [9]. The fact is, telemedicine has been proposed and discussed for several decades before the COVID pandemic, but the current situation where many countries have imposed lockdowns and restrictions to travel to clinics and hospitals has greatly accelerated its use and implementation [10]. This is especially important for patients at higher risk of contracting the virus, such as elderly patients, and those who are immunocompromised such as diabetic patients. On the other hand, ophthalmologists and eye care staff often need to be in close proximity to patients, whether at the slit lamp, during air puff tonometry, or performing fundus photography or an OCT. Hence, tele-ophthalmology is a logical and effective solution to reducing face-to-face encounters during this period of social distancing and self-isolation [11].

Tele-ophthalmology affords many opportunities

Tele-ophthalmology is a great tool for forward triage—sorting and prioritizing patients' needs before they actually present themselves to the clinic or hospital. But for safe and effective forward triage to happen, the following elements are required: clinical history, visual acuity, intraocular pressure, and imaging (e.g., anterior and posterior

segment photographs, OCT, and visual fields). Triage protocols may be optimized by automated decision trees such as Big Picture Medical, a cloud-based telemedicine platform linking optometrists in the community to ophthalmologists at Moorfields Eye Hospital. [12] Video eye consults suit some subspecialties more than others. Examples would be oculoplastics, strabismus, and screening for retinopathy of prematurity (ROP) and diabetic retinopathy [13–15]. Live slit lamp examination can now be streamed from a primary care facility to a tertiary level hospital for more complex cases [16]. Patients may still be required to come in for specific tests such as orthoptic assessment, biometry, perimetry, and ultrasonography, but these visits may significantly reduce time in contact with staff and other patients [17].

Barriers and pitfalls

Several important barriers to tele-ophthalmology need to be overcome as follows:

1. Lack of technology or knowledge or reluctance to use it

The widespread availability of mobile devices and ease of handphone use, even among the elderly, is making telemedicine accessible to more people. The cell phone has been called the "great equalizer." While older adults might at first be leery of telehealth, once they try it, they often become enthusiastic about it after overcoming their initial fears [10].

2. Familiarity with the regulations and laws governing the use of telemedicine in individual countries or states

Many states and countries have recognized the need for implementation of telemedicine during the COVID crisis and have thus accelerated amendments to laws governing telemedicine [18].

3. Informed consent and proper documentation

It is vital to obtain explicit permission to conduct a virtual consultation. If a commercial system is used, this consent should be a requisite for entrance into the virtual waiting room. Along with this should be clear posting of charges. Clinical note taking and entry into an electronic medical records system can ensure that the whole process and workflow may be maintained, albeit in a virtual environment [19].

4. Worries about privacy and data protection

Using platforms which use encryption technology such as Skype, FaceTime, and WhatsApp have good track records of

security can help allay fears of hacking and loss of personal data [20].

5. Proper etiquette and setting for virtual clinic

It is important to maintain a professional backdrop and environment for any virtual consultation. This would include details such as the attire of the physician, having a suitable backdrop, adequate privacy and confidentiality, preventing intrusions, good lighting, optimal positioning of the camera, looking directly at the camera, and speaking slowly and clearly [21].

6. Malpractice and litigation

The Singapore Medical Council's Ethical Code and Guidelines states clearly: "if doctors engage in telemedicine they must endeavor to provide the same quality and standard of care as in-person medical care; doctors should give patients sufficient information about telemedicine for them to consent to it and ensure that the patient understands the limitations of telemedicine that may affect the quality of their care…." [22].

7. Lack of personal touch and feeling disconnected

Ultimately, the doctor-patient relationship is based on trust and the personal touch. Having doctors face the camera during the video consult actually gives the physician an opportunity for patients to see their doctors in a better, more favorable light. Even in the absence of physical touch, some interaction might be better than none at all. More importantly, the reassurance that doctors can give their patients in their time of need is priceless.

Welcome to the (near) future

It would be a shame if the lessons learnt during this crisis are quickly forgotten, and we end up returning to our old habit of doing things [23–25]. As Paul Testa MD, chief medical information officer at NYU Langone Health in New York City, said, "there will be a transition period of months and maybe a year. People will have blended care" in which telehealth is combined with in-person office visits *when needed*. We have an unprecedented opportunity to learn from the current experience and draw lessons for the future, including the design of optimal systems of care that enhance access and quality of care as well as contain cost. Telemedicine offers capabilities to utilize these advances within networks that transcend geography. Indeed, the words of Sun Tzu, the military strategist and philosopher who lived in the Eastern Zhou period of ancient China, ring true: In the midst of chaos, there is also opportunity.

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