



Protect Healthcare Workers and Patients from COVID-19: The Experience of Two Tertiary Ophthalmology Care Referral Centers in Italy

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The novel coronavirus disease (COVID-19) is caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). This infection emerged in December 2019 in Wuhan, China, and has spread worldwide with millions confirmed infected and tens of thousands dead (current data can be found on the Johns Hopkins University website <https://coronavirus.jhu.edu/map.html>) worldwide. Outside China, the Italian outbreak was the first reported [1]. This caused a rapid increase in affected patients, leading to significant difficulty in managing this epidemic situation. This article is based on previously conducted studies and does not contain any studies with human participants or animals performed by any of the authors.

As reported by the World Health Organization (WHO) ([https://www.who.int/docs/default-source/coronaviruse/who-rights-roles-](https://www.who.int/docs/default-source/coronaviruse/who-rights-roles-respon-hw-covid-19.pdf?sfvrsn=bcabd401_0)

[respon-hw-covid-19.pdf?sfvrsn=bcabd401_0](https://www.who.int/docs/default-source/coronaviruse/who-rights-roles-respon-hw-covid-19.pdf?sfvrsn=bcabd401_0)), patients with COVID-19 may experience different respiratory symptoms, including coughing, shortness of breath, and fever. In more severe cases, this infection can cause pneumonia and severe acute respiratory syndrome and may eventually result in the patient's death. The WHO's standard recommendations to prevent the spread of COVID-19 include frequent hand cleaning using an alcohol-based hand rub or soap and water; covering the nose and mouth with a flexed elbow or disposable tissue when coughing and sneezing; and avoiding close contact with anyone who has a fever and cough (https://www.who.int/docs/default-source/coronaviruse/who-rights-roles-respon-hw-covid-19.pdf?sfvrsn=bcabd401_0).

As recommended by WHO, health workers should follow established occupational safety and health procedures, avoid exposing others to health and safety risks, and participate in employer-provided occupational safety and health training (https://www.who.int/docs/default-source/coronaviruse/who-rights-roles-respon-hw-covid-19.pdf?sfvrsn=bcabd401_0).

The Italian Government developed a quarantine regimen to contain the human-to-human transmission of SARS-CoV-2, which is mainly transmitted through droplets, aerosols, or direct contact with the conjunctiva or other mucosa as well as fomites, the latter term referring to any object that, when

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contaminated with infectious agents, can transfer disease to a new host [2, 3, 4]. Although there is no direct evidence that SARS-CoV-2 replication results in conjunctivitis, the eye is considered a potential site for virus transmission [5, 4].

Ophthalmologists may be caught off guard as conjunctivitis, though uncommon, can be the first presenting symptom of COVID-19, before the appearance of other symptoms such as cough and fever [3]. The close proximity between ophthalmologists and patients during slit-lamp examination, tonometry, direct ophthalmoscopy, or imaging acquisition may pose a risk of infection. The American Academy of Ophthalmology has issued an alert advising ophthalmologists to wear masks and eye protection when seeing conjunctivitis patients with respiratory symptoms and a history of international travel (<https://www.aao.org/headline/alert-important-coronavirus-context>).

A three-pronged strategy was suggested by Wan et al.: protecting staff with appropriate personal protection equipment (PPE); preventing spread of the virus from patients; reengineering of workflow to minimize the exposure time and/or risk of cross infections [6].

The massive wave of infections in Italy has made it necessary to implement strategic prevention measures to control the transmission in ophthalmologic outpatient clinics. The Italian Government ordered the suspension of deferred clinical and surgical activities (for all medical disciplines); in this new context, a new challenge for ophthalmologists is the daily safeguarding of the visual function of many patients suffering from ocular diseases that could potentially lead to blindness.

Here we documented the measures approved in two referral medical retina centers—IRCCS Ospedale San Raffaele in Milan, Lombardia, and IRCCS-Fondazione Bietti in Rome, Lazio—located in the northern and central regions of Italy, respectively. Importantly, these two centers are located in regions with significant differences in COVID-19 prevalence, because Milan is in Lombardy, which is one of the hottest zones (i.e., where COVID-19 cases are more concentrated and were first reported) in Europe.

Several containment measures were adopted, and a reorganization of clinical activity was made:

1. A reduction of patients' flow in the hospital environment, postponing deferrable surgical activities such as cataract surgery and other elective procedures, and suspending non-urgent appointments scheduled in specialist and non-specialist services. Patients are screened by telephone for: complaints of fever or upper respiratory symptoms; residence in one of the hot zones; contact with suspected or confirmed cases of COVID-19. Patients who fulfill any of these criteria and require urgent ophthalmology visits are redirected to a separate room. Otherwise, patients are contacted again after 14 days.
2. Patients with non-deferrable conditions are contacted by physicians by phone 2 days before the scheduled visit to recognize cases of reduced visual acuity or increase/appearance of other visual symptoms such as metamorphopsia and photopsia. In case of stable ocular conditions, a novel phone contact is scheduled and the visit is postponed. For patients with urgent conditions, a visit is scheduled. Only one accompanying person is allowed, who is denied access to the visiting room, except in exceptional cases. In addition, students and fellows are not allowed to attend the clinic. The interval time between appointments is increased to avoid too many patients being in the waiting room at one time. Trained and well-equipped personnel are dedicated to the first triage of the selected patients to exclude any symptoms related to a possible infection and invite them to wash their hands and wear surgical masks.

All visits take place in a dedicated room well-equipped with breath protectors using acrylic sheets for slit lamps. Ophthalmologists and nurses are equipped with gloves and surgical masks. Based on their availability, a filtering facepiece (FFP)-3 is also provided to health workers. The percentage of health workers wearing FFP-3 masks has been rapidly expanding as their availability has increased. Moreover,

equipment in the room such as slit lamps and imaging devices is disinfected before and after utilization.

3. Non-deferrable surgical procedures, such as intravitreal injections, retinal detachment surgery, and other procedures, are performed respecting similar rules and precautions as for visits (prolonged interval time between procedures, patient triage at arrival at the hospital, PPE for healthcare personnel, who have been trained appropriately).

In conclusion, the Italian outbreak was one of the first and biggest outside China. To date, our recommendations seem to have protected healthcare workers and patients from COVID-19 infection, while we have been able to adequately maintain ophthalmology patients' continuity of care.

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Compliance with Ethics Guidelines. This article is based on previously conducted studies and does not contain any studies with human participants or animals performed by any of the authors.

Data Availability. Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

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