Editorial

EJO European Journal of Ophthalmology

Early impact of COVID-19 outbreak on eye care: Insights from EUROCOVCAT group

European Journal of Ophthalmology
2021, Vol. 31(1) 5–9

DOI: 10.1177/1120672120960339
journals.sagepub.com/home/ejo
SAGE

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Abstract

The recent outbreak of coronavirus disease 2019 (COVID-19) has been declared a public health emergency worldwide. The scientific community has put in much effort and published studies that described COVID-19's biology, transmission, clinical diagnosis, candidate therapeutics, and vaccines. However, to date, only a few data are available on the impact of COVID-19 pandemic on ophthalmological care in different health care systems, its future consequences in terms of disability, and access to sight-saving cures for many patients. To reduce human-to-human transmission of the virus and also ensure supply of infrastructures, human resources, and disposable medical devices to many regions, it is crucial to assess risks and postpone non-essential outpatient visits and elective surgical procedures, especially in older patients and those with comorbidities. This delay or suspension in essential eye procedures may cause significant and rapid vision impairment to irreversible blindness. Determining the risk-benefit profile of treating these ocular pathologies is a public health issue of supreme priority, even though many patients benefiting from therapeutic treatments are elderly, who are more vulnerable to COVID-19. If not reversible, this process could lead to a dramatic increase in disability and unsustainable social costs for many Governments.

Keywords

COVID-19 pandemic, cataract surgery, glaucoma, retinal detachment surgery, intravitreal injection, cornea transplantation, irreversible blindness, ophthalmology

Date received: 27 May 2020; accepted: 27 August 2020

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Introduction

SARS-CoV-2, which causes COVID-19 disease (COVID-19), is the third novel coronavirus in the last 17 years and was first reported in Wuhan, China, on 31st December 2019.[1–3] COVID-19 can be potentially fatal if it escalates to severe acute respiratory syndrome.[4] Since the World Health Organization declared COVID-19 to be a pandemic on 11th March, 2020, more than 4.16 million cases of COVID-19 and 285,000 deaths have been reported in over 187 countries and territories, with numbers continuing to climb.[5,6] Although several published studies have described the biology of COVID-19, its transmission and diagnosis, its clinical features, and the development of candidate therapeutics and vaccines,[7] only limited data are available on the impact of COVID-19 on National Health Systems. In particular, the impact of lockdown on ophthalmological care and its future consequences in terms of disability and access to sight-saving cures for many patients needs to be elucidated.

We have agreed to create a group of surgeons and experts from 10 different European countries, called European COVID-19 Cataract Group (EUROCOVCAT). We have organized call conferences and shared experiences and perspectives on the current scenario. An in-depth analysis of the current situation in eye care has been merged with updated literature and available recommendations from scientific ophthalmic societies and healthcare institutions. Data regarding the impact on different eye cares from the ophthalmological departments involved in the coauthorship and actual trends of recovery, are reported in Table 1.

Discussion

Ophthalmologists are at a high-risk category because they have close contact with patients during their examination (conjunctival, tear secretions, and aerosol secretions).[8,9] Thus, many national ophthalmology societies have recommended that any treatment other than urgent or emergent care should be avoided in order to reduce virus transmission from humans to humans.[8] In addition, in response to COVID-19 pandemic, several ophthalmology departments have been converted into COVID-19 units.[10] It is now crucial to assess risk and delay or suspend non-essential outpatient visits and elective surgical procedures involving older patients and those with comorbidities. It has been reported that patient encounters have drastically decreased by 57% in cardiology-related cases and by 55% in breast health-related cases with a 37% decline in cancer care.[11] Moreover, ophthalmology lost 81% of annual patient volume for 2-week volumes in March and April 2020 versus the same period in 2019.[11] This includes a 97% reduction in cataract surgery volume – the largest reduction of any surgical routine procedure – up to its total blockage and a delay of urgent ones due to the need for prioritizing emergencies.[8–9,11]

With a global prevalence of about 50% in adults over 50 years of age, cataract surgery is the most common operative procedure performed in developed countries.[12] In 2010, of the total reported 32.4 million blind and 191 million vision-impaired cases, 10.8 million people were blind and 35.1 million were visually impaired due to cataract.[13] In Italy, one of the most affected countries by COVID-19 in the world, more than half million cataract surgeries are performed every year. It is easily estimable that each month of lockdown causes a reduction of about 50,000 cataract operations. These results may be explained by the need to prioritize urgencies/emergencies, the social difficulties in reaching the hospitals or the risk of virus infection in nosocomial environments experienced by older people.

By 2010, 1 out of 15 blind people was blind due to glaucoma, and 1 of 45 visually impaired people was visually impaired due to glaucoma, highlighting the increasing global burden of glaucoma.[14] It is shown that a delay of weeks or months in the treatment of patients requiring a filtering procedure can lead to an irreversible vision loss.[15–17] Glaucoma patients, especially with advanced damage, are often not completely conscious of the consequence of a delayed surgery. Patients are used to medications, are scared about surgical procedure and their complications, and believe that the correct administration of drops could be enough to prevent damage progression. Unfortunately, the correct management of glaucoma patients requires scheduled controls of intraocular pressure and of the visual field to promptly intervene in case of damage progression. Patients with advanced loss of function or younger patients with manifest glaucoma require more aggressive treatment and tighter control intervals and methods than patients with low or even no risk (e.g. patients with ocular hypertension or elderly patients with low visual field loss and low internal pressure values).[16] Moreover, the correct timing of surgery is fundamental to achieving a successful tonometry control. Thus, a delay in ophthalmic treatment (range: 2 days–5½ years), may determine a permanent visual reduction in 72% of patients; 42% of these suffered from glaucoma.[17–19] Due to the COVID-19 pandemic, many departments have postponed 57% to 100% of glaucoma treatments (see Table 1), resulting in a public health emergency of international concern with an expected cost of $2,511 per year for each patient with end-stage disease.[11,20] Higher costs seem related to younger age, concomitant diagnosis with pseudophakia or aphakia, or cataract surgery within the first 2 years from glaucoma diagnosis. These patients comprise approximately 5% of the population with glaucoma, but they use nearly 24% of direct treatment charges.[21,22]

Data regarding rhegmatogenous retinal detachment (RRD) treatment could be even more impressive. The

Table 1. Percentage of main ophthalmological procedures contraction after first month of local lockdown (M1) due to COVID-19 pandemic, when compared to the same period of 2019 as referral value (100%), and on July 2020 (today).

Procedure		Phacoemulsification		Glaucoma-surgery		PPV		IVT		KP	
Period		M1	Today	M1	Today	M	Today	M	Today	M	Today
Departments	Poland[1]	−100%	−15%	−100%	−20%	−80%	−5%	−85%	−30%	−63%	−15%
	France[2]	−100%	−10%	−95%	−10%	−75%	−10%	−50%	−10%	−97%	−10%
	Ireland[3]	−100%	−20%	−95%	−10%	−75%	−10%	−35%	−5%	−99%	−10%
	Turkey[4]	−100%	−60%	−95%	−70%	−90%	−45%	−90%	−35%	−97%	−30%
	Russia Federation[5]	−95%	−20%	−97%	−37%	−90%	−24%	−93%	−17%	−100%	−47%
	Portugal[6]	−100%	−50%	−90%	−30%	−80%	−20%	−80%	−10%	−100%	−90%
	Spain[7]	−100%	+10%	−100%	+25%	−70%	+50%	−40%	+30%	−100%	−50%
	Italy[8]	−88%	−41%	−57%	−57%	−50%	+38%	−87%	+24%	−100%	+100%
	Finland[9]	−85%	44%	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	N/A**	N/A**
	Italy[10]	−100%	−22%	−90%	+4%	−70%	−7%	−88%	−20%	−100%	+10%
Average		–97%	–18%	–91%	–23%	–76%	–4%	–72%	–8%	–95%	–16%
Recovery			78%		68%		72%		64%		79%

PPV: vitrectomy; IVT: intravitreal injection; KP: keratoplasty; SD: standard deviation; M1: first month of lockdown.
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*N/A: no lockdown according to local legislation.
**Not routinely performed.

annual incidence of RRD is about 10 per 100,000 persons. If untreated, most RRD will progress to a complete detachment and subsequently result in vision loss of the affected eye.[23] The risk factors for low functional and anatomic outcomes after primary RRD repair are as follows: more than 6 days of visual loss, macular involvement and the size of detachment area, and independency from surgical procedures (buckling or vitrectomy) chosen to repair the detachment.[24–26] As all these factors are dependent on the time interval between the first symptoms noted by the patient and the timing of surgery, a delay in providing the surgical treatments for retinal diseases (expected from 50% to 90% of all kind of procedures, Table 1) maybe produce dramatic consequences on disability due to irreversible blindness.

Since 2006, the amount of intravitreal injections has increased to a point of being the second most common treatment for several ophthalmic diseases in most tertiary ophthalmic centers with a significant prognostic improvement for many of them.[27] Long-term prognosis derives from proper timing of treatment and numbers of injections.[28–30] In case of neovascular age-related macular degeneration (nAMD) it has been shown that functional prognosis worsened when scheduling problems delayed intravitreal injection, and it correlates strongly with visual acuity at the time of the first injection.[31] Two months delay for initial injection results in one line loss after one year the difference is even bigger, gaining two lines if initial visual acuity was 20/25 Snellen.[31] Recently, an overall drop from 35% up to 93% in the number of monthly intravitreal injections administered for macular disorders and with different regimens (pro re nata or treat-and-extend) is recorded when compared to the same period of 2019. The inability to adhere strictly to therapeutic protocols for several months might lead to very poor functional outcomes for those undertreated patients because of the restrictions in eye care due to the COVID outbreak. Korobelnik et al. have recommended to prioritize and maintain treatment in patients with nAMD (especially those in the first 2 years of treatment), neovascular glaucoma, new cases with significant vision loss, new central retinal vein occlusion cases and monocular or quasi monocular patients (only one eye >20/40 Snellen).[32] It also suggests that patients with diabetic macular oedema (DMO) and branch retinal vein occlusion (BRVO) are less likely to suffer irreversible vision loss in the short term and postponement of appointments for non-monocular patients may be considered (except for patients with significant vision loss from recent DMO and patients in the acute phase of retinal vein occlusion).[32] For these reasons, maculopathies especially if secondary to choroidal neovascularization, could be classified as urgent ophthalmological states, since they cause irreversible blindness in case of postponed treatments.

Corneal blindness is the fourth leading cause of blindness worldwide. Nevertheless, nearly 80% of all corneal blindness is avoidable and reversible. To date, keratoplasty is the most commonly performed and the most successful allogenic transplant worldwide with a 90% to 95% success

rate. Thus, the treatment of acute corneal diseases, mainly trauma or infectious keratitis, is an urgent or emergent care that can require aggressive surgical treatment and availability of optimal eye-banking tissues by trained human resources.[33]

Concurrently, in many countries, we have witnessed a dramatic reduction in the access to Emergency Care Unit for diseases, such as ocular trauma, as well as cornea donations (almost 60% less than in the same period of 2019 at the Eye Bank of Lublin, Poland). The latter has resulted in an early reduction of transplantation, down to complete suspension in almost all departments (Table 1).

So far, we have limited data to strictly predict the course of the COVID-19 pandemic in the next future. Even if many Governments have already started to ease the current stringent lockdown measures, it is predictable that this intermediate phase (phase-two) will still last over several months. Given these circumstances, the scientific community's efforts to better understand the immunity gained by people recovered from infection, together with the development of effective therapies and vaccines, are key-variables that could affect the return to normal life and provide effective responses to a potential COVID-19 resurgence. Blindness and vision impairment affect at least 2.2 billion people around the world. Of those, 1 billion have a preventable vision impairment or one that is yet to be addressed. Reduced or absent eyesight can have major and long-lasting effects on all aspects of life, including daily personal activities, interacting with the community, school, and work opportunities and the ability to access public services.[34]

Although COVID-19 can be potentially life-threatening, most of the ocular conditions usually progress over a longer time and are not life-threatening. Nevertheless, due to the pandemic, some pathologies like nAMD, RRD and glaucoma, may cause irreversible loss of visual function if treatments are not administered on time. Thus, achieving a balance between infection control and the supply of ophthalmology services is strongly demanded.

Conclusion

Substantial changes to social and sanitary practices have included significant issues in access to eyecare during COVID-19 pandemic. Although some ophthalmological treatments are elective, with scheduled visits or surgeries, and may be easily postponed without any impact on public health, the other treatments are not. It is shown that any delay or suspension in essential eye procedures may cause significant and rapid vision impairment to irreversible blindness. Determining the risk-benefit profile of treating these ocular pathologies is of extreme importance, particularly in the elderly, who are more vulnerable to COVID-19. This could also lead to dramatic future consequences in terms of disability and unsustainable social costs for many health care systems.

Acknowledgements

The work study has been supported by the "Foundation to support the development of Ophthalmology," Lublin, Poland. The Foundation had no role in the interpretation of data or in the decision to publish the results.

Author contributions

Conceptualization: all authors; writing – original draft preparation: M.D.T.; writing – review and editing: all authors; all authors have read and agreed to the published version of the manuscript.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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