Ophthalmic Emergency Visits in the Wake of the COVID-19 Pandemic: Our Experience at a Tertiary Hospital in Israel

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ABSTRACT **Background:** In response to the coronavirus disease-2019 (COVID-19) pandemic, routine clinical visits to the ophthalmic emergency department (OED) were deferred, while emergency cases continued to be seen.

Objectives: To assess the consequences of the COVID-19 pandemic for ophthalmic emergencies.

Methods: A retrospective chart analysis of patients who presented to the OED during the peak of the COVID-19 pandemic was conducted. The proportions of traumatic, non-traumatic-urgent, and non-traumatic-non-urgent presentations in 2020 were compared to those of the same time period in 2019. Duration of chief complains and best-corrected visual acuity were also assessed.

Results: There were 144 OED visits in 2020 compared to 327 OED visits during the same 3-week-period in 2019. Lower mean age of OED patients was present in 2020. Logarithmic expression (LogMAR) best corrected visual acuity (BVCA) was similar in both years. In 2020 there was a reduction in traumatic, non-traumatic-urgent, and non-traumatic-non-urgent cases compared to 2019 (15.4% reduction, $P = 0.038$; 57.6% reduction, $P = 0.002$; 74.6% reduction, $P = 0.005$, respectively). There was a higher proportion of same-day presentations at commencement of symptoms in 2020 compared with 2019 (52.8% vs. 38.8%, respectively $P = 0.006$).

Conclusions: During the COVID-19 pandemic, the number of OED visits at a tertiary hospital dropped by more than half. Although the drop in visits was mostly due to decrease in non-traumatic-non-urgent cases, there was also decrease in non-traumatic-urgent presentations with possible important visual consequences. Additional studies should elucidate what happened to these patients.

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In response to the coronavirus disease-2019 (COVID-19) pandemic, the World Health Organization recommended social distancing strategies to cope with the spread of the disease [1]. Ophthalmic associations and institutions developed ad-hoc guidelines for the triage of ophthalmology patients during the COVID-19 pandemic to maximize both patient and staff safety. According to these guidelines, routine ophthalmic visits could be deferred while patients with urgent or emergent ophthalmic conditions should be seen by an ophthalmologist [2,3]. For example, the Royal College of Ophthalmologist and the College of Optometrist in the United Kingdom suggested that emergency eye care may be required for recent onset distressing eye condition that may present an imminent threat to vision or general health [4]. However, true emergencies are often unpredictable and occur suddenly. They may have sight/life-threatening consequences and that may need immediate attention to prevent irreversible damage [5]. Accordingly, delaying therapy for several urgent ophthalmic pathologies was previously associated with substantial visual consequences [6-8].

Stagg and colleagues [9] performed a nationwide analysis of emergency department usage for ophthalmic conditions in the United States and reported that about one-quarter of emergency visits were non-urgent. They cited factors such as younger age, male gender, and lower socioeconomic status to be associated with non-urgent use of the emergency department. An increasing proportion of non-urgent ophthalmology cases in the ophthalmic emergency department (OED) was also reported to match increasing amounts of third-party payers [10].

Here we evaluate the influence of the COVID-19 pandemic on the OED. We assessed the case load and presenting symptoms mixture during the pandemic compared with normal periods.

PATIENTS AND METHODS

DATA SOURCE

Data were extracted from the electronic medical records of all patients consulted at the OED at the Hadassah Medical Center between 15 March and 4 April 2020. These specific dates were

studied to fit the lockdown measures that were widely implemented in Israel due to the COVID-19 pandemic. Data were also collected for all OED visits during the same time period in 2019. For each patient, we recorded demographic information such as age and gender, presenting complaint and its duration, presenting best-corrected visual acuity, final diagnosis, and mode of financial coverage. The research was approved by the institutional ethics committee of the Hadassah Medical Center and the study was conducted according to the tenets of the Helsinki declaration.

- Ocular conditions were sorted according to the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes into 1 of 3 categories:
- Traumatic presentation: penetrating and non-penetrating eye injuries, including all forms of burns
- Non-traumatic-urgent presentations: sudden health problems that are sight/life-threatening and require immediate action
- Non-urgent-non-traumatic presentations: recent-onset distressing condition to the patient, not posing an immediate threat to vision.

This scheme was adapted from the case definition of the Royal College of Ophthalmologists and College of Optometrists on urgent and true ophthalmic emergencies [4,5]. This approach is comparable to that used in previous studies [9-11]. In cases in which the decision was unclear, (e.g., immediate postoperative patients) two of the authors collaborated and reviewed the history to determine aspects of urgency

For patients with more than one diagnosis, if any diagnosis was for an urgent or traumatic case, the visit was classified as such, even if there were other non-urgent diagnoses. If the same patient made more than one visit to the OED within the study period, each visit was considered separately if the diagnosis was different.

Best corrected visual acuity (BCAV) was measured in the OED using the standard Snellen chart. BVCA of the eye involved was converted to logarithmic expression (LogMAR) values [12]. LogMAR VA of 2, 2.3, 2.8, and 3 were used to represent counting finger, hand movement, light perception, and no light perception, respectively [13]. The BCVA from the eye with the worse value was used if bilateral eyes were involved as described [14]. We categorized the duration of the chief complaints into three time periods starting from the time of presentation to the OED: same day (24 hours), 1 to 7 days, or more than 7 days [14].

DATA ANALYSIS

Statistical analyses were performed using IBM Statistical Package for the Social Sciences statistics software, version 25 (SPSS, IBM Corp, Armonk, NY, USA). Descriptive statistics were reported as mean and standard deviations for continuous variables and as numbers and percentages for categorical variables. The chi-square test was used to compare the frequency of the various categories occurring in 2020 with those from 2019, the Wilcoxon signed paired test and two-sample independent *t*-test to compare means where appropriate. A $P < 0.05$ was considered statistically significant.

RESULTS

During the 3-week period from 15 March to 4 April, a total of 327 OED visits were made in 2019 compared to 144 OED visits in 2020. The mean patient age in 2020 (34.7 ± 22.4 years) was lower than in 2019 (42.1 ± 24.0), $P = 0.001$. There was an almost equal gender distribution in both years (n=154 females (47.1%) and n = 67 (46.5%) for 2019 and 2020, respectively, $P = 0.921$). Essentially all patients had health insurance coverage (323 (98.8%) and 143 (99.3%) for 2019 and 2020 respectively, $P = 1.00$). The mean LogMAR BCVA of patients who presented in 2020 (0.41 ± 0.81) was similar to those who presented in 2019 (0.37 ± 0.67), $P = 0.205$.

The mean weekly number of consultations in each category is shown in Table 1.

Table 1. Characteristics of patients who presented to the ophthalmic emergency department with ophthalmic complaints in 2019 and 2020

	2019	2020	*P* value
Number of weekly visits (mean ± SD)	109 ± 7.8	48 ± 3.6	0.010
Age (mean ± SD)	42.1 ± 24.0	34.7 ± 22.4	0.001
Number of females	154 (47.1%)	67 (46.5%)	0.921
Third party payers	323 (98.8%)	143 (99.3%)	1.000
LogMAR BCVA (mean ± SD)	0.37 ± 0.67	0.41 ± 0.81	0.205
Patients with < 24 hours duration of symptoms	127 (38.8%)	76 (52.8%)	0.006
Number of weekly traumatic presentations (mean ± SD)	21.67 ± 4.51	18.33 ± 3.51	0.038
Number of weekly non-traumatic-urgent presentations (mean ± SD)	44.00 ± 3.00	18.67 ± 1.15	0.002
Number of weekly non-traumatic-non-urgent presentations (mean ± SD)	43.33 ± 3.00	11.00 ± 2.65	0.005

BVCA = best corrected visual acuity, LogMAR = logarithmic expression, SD = standard deviation

While there was a decrease in the number of patients who presented in each of the categories in 2020 compared with 2019, the number of patient presenting for non-traumatic-non-urgent conditions showed the largest drop. Only one-quarter of these visits which, occurred in 2019, took place in 2020.The number of patients presenting to the OED with sight-threatening conditions such as retinal detachment, corneal ulcer, and acute rise in intraocular pressure was lower in 2020, with potential severe visual consequences for individuals who delayed therapy for such conditions [Table 2].

Table 2. Examples of some specific non-traumatic, urgent conditions seen in 2019 and 2020

	2019	2020
Corneal ulcer	8	4
Acute intraocular pressure rise	7	3
Uveitis	7	3
Vitreous hemorrhage	6	2
Retinal tear	4	2
Retinal detachment	6	1
Retinal vein occlusion	1	0
Papilledema	5	3

The duration of the main complaints before OED presentation was shorter in 2020 compared to 2019. This manifested in increase proportion of same day (< 24 hours) presentations to the emergency at the start of symptoms in 2020 compared with 2019 (52.8% vs. 38.8%, $P = 0.006$). Comparison of the duration of symptoms prior to presentation to the OED within each category is shown in Figures 1 and 2.

The details of the characteristics of patients who presented to the emergency in 2019 compared to 2020 are shown in Table 2.

Figure 1. Patient duration of symptom prior to presentation to the ophthalmic emergency department in 2019

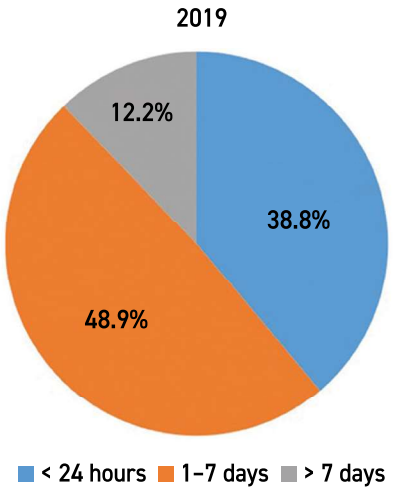
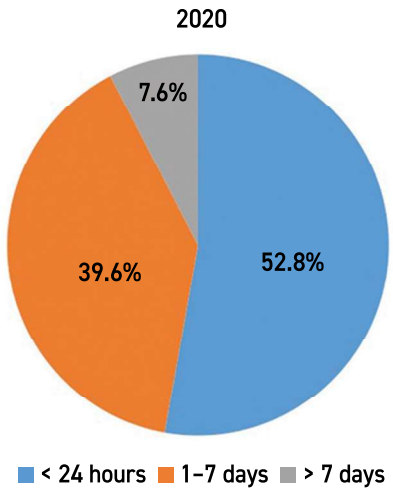


Figure 2. Patient duration of symptom prior to presentation to the ophthalmic emergency department in 2020



DISCUSSION

We compared the number and cause for OED visits during the peak of the COVID-19 pandemic, while lockdown measures were instituted across Israel, to the same 3-week period in 2019. An overall decrease of 56% in OED presentations was observed in 2020 compared with 2019. In terms of absolute numbers, the decrease in emergency department visits seen in our clinic was mostly noted for by a decrease in non-traumatic-non-urgent cases. Yet, decrease presentation of patients with ophthalmic conditions; which mandate urgent intervention to avoid visual loss such as corneal ulcers, uveitis, and retinal detachment; was also observed. The patients presenting to the OED in 2020 were also younger than those in 2019, potentially reflecting the concerns of older patient to leave home during the pandemic.

Thornton and colleagues reported a 25% drop in attendances at the general emergency department in England one week after the government announced lockdown measures compared to a week before, suggesting that the public may refrain from presenting to the emergency department despite suffering from truly urgent conditions [15]. Similar trends have also been reported elsewhere, with drops of up to 96.5% OED visits reported in India [16] and more than 50% drop in rhegmatogenous retinal detachments reported in Scotland [17]. This observation was not only in ophthalmology clinics as Guo et al. [18] reported a 70% decrease in non-urgent dental consultations in a clinic in Beijing at the wake of the COVID-19 pandemic. These data are comparable to our findings. Salti and colleagues [10] described an increase in the proportion of non-urgent ophthalmology consultations in parallel with an increase in the proportion of third-party payers in the Lebanese population over 15 years. In our study, almost all patients had medical insurance. This finding could imply that the decrease in emergency department

visits for non-traumatic non-urgent cases in 2020 was likely due to the pandemic and not due to insurance related factors.

The proportion of non-traumatic-non-urgent visits seen in 2019 and 2020 in our study was 39.8% and 22.9%, respectively. The proportion of non-urgent ophthalmology consultations seen in 2019 is well within the range of 25–70% of non-urgent ophthalmic presentations as reported in studies conducted elsewhere [9,11,19], while that of 2020 falls slightly below this range. This confirms that the proportion of non-traumatic-non-urgent ophthalmic presentations seen in 2019 is representative of the general trend in Israel. However, in 2020 an additional factor set in.

Interestingly, there was no difference in the mean visual acuity of the patients who presented to the OED in both years. Kang and co-authors [14] reported that true ophthalmic emergencies had lower visual acuity where a logMAR BCVA cutoff of 0.45 on the receiver operating characteristic (ROC) curve could be used to predict ophthalmologic intervention or admission. An eye dedicated training system (RESCUE) was proposed by Rossi et al. whereby loss of vision, redness, and pain is used in triage centers to predict urgency [20,21]. Although visual acuity could provide a clue about the urgency of an ophthalmic presentation, it does not exclude all potentially blinding ophthalmic conditions such as macula on retinal detachment or retinal breaks where patient could present with initially good vision [22]. On the other hand, poor visual acuity such that may be caused for example by mature cataract does not compose an indication for an urgent treatment. Thus, baseline BCVA may not necessarily predict the need for urgent care.

A higher proportion of patients who visited the OED did so within 24 hours of commencement of their chief complaint in 2020 compared with 2019. In accordance with this finding, a higher proportion of same-day visits to the OED among patients with truly emergent presentations had been reported [14] suggesting that patient with truly urgent conditions were more likely to approach the OED during the pandemic.

LIMITATIONS

Caveats of the study include its retrospective nature and short recruitment period. Yet, the nature of the pandemic did not allow us to perform prospective studies with longer recruitment period.

CONCLUSIONS

The peak of the COVID-19 pandemic was associated with decrease in the number of OED visits. While the majority of the decrease was related to non-traumatic-non-urgent cases, a substantial decrease in non-traumatic-urgent cases was also observed. The visual consequences of refraining from presentation to the OED in such cases may be critical; therefore, additional studies should conducted to determine what happened to these patients.

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