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ORIGINAL ARTICLE

Retrospective analysis of open globe injuries during coronavirus disease-19 lockdown in Turkey

Zeynep Akgun, Cumali Degirmenci, Serhad Nalcaci, Filiz Afrashi, Cezmi Akkin

Department of Ophthalmology, Ege University Faculty of Medicine, Izmir, Turkey

Abstract

Purpose: The objective of the study was to evaluate open globe injuries and injury type, injury grade, and demographic characteristics of patients with penetrating eye injury during the coronavirus disease (COVID)-19 lockdown in Turkey.

Methods: Patients who were admitted to our clinic with a diagnosis of penetrating/perforating eye injury between March 11, 2020–June 1, 2020 (Group 1), and March 11, 2019–June 01, 2019 (Group 2), were retrospectively analyzed. Ophthalmologic examination findings, ocular trauma score (OTS), causes of injury, and mechanism of injury were recorded. Data and findings were compared with SPSS.

Results: A total of 47 (1.74%) of 2688 patients in 2019 and 21 of 1130 patients (1.85%) in 2020 referred to our clinic from the emergency department were hospitalized with the diagnosis of penetrating/perforating eye injury. There was no difference between the groups in terms of age and gender (p=0.60 and p=0.73, respectively). The mean best-corrected visual acuity (BCVA) at the first examination was 1.46±1.0.9 (0–3.5) log MAR in Group 1 and 1.09±1.05 (0–3.5) log MAR in Group 2 (p=0.19). The mean OTS was calculated as 56.00±25.96 (12–100) in Group 1 and 69.63±23.78 (13–100) in Group 2. The difference was statistically significant (p=0.05). Final BCVA was 1.31±0.91 (0–3) log MAR in Group 1 and 0.53±0.77 (0–3) log MAR in Group 2 (p=0.005).

Conclusion: During the COVID-19 lockdown, there was a significant decrease in emergency consultations and penetrating injuries. The OTS and final BCVA of patients were lower than the previous year. COVID-19 locking may have an effect on the reduction of ocular trauma.

Keywords: Coronavirus disease-19; lockdown; ocular trauma score; penetrating injury; visual prognosis.

Open globe eye injuries are a major cause of monocular vision loss. Every year, more than 500,000 injuries occur, resulting in complete vision loss and they lead to 65% of unilateral blindness cases.[1,2] The incidence of hospitalization was reported as 8.14–13.3/100,000/year.[3] In addition, open globe eye injuries cause social and economic loss. Eye injuries can occur by many mechanisms. Studies have found a higher incidence of ocular trauma occurring outside of the home.[4]

The coronavirus disease (COVID)-19 has affected more than 200 countries worldwide. The World Health Organization defined the disease as a pandemic on March 11.[5] In

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Correspondence: Zeynep Akgun, M.D. Department of Ophthalmology, Ege University Faculty of Medicine, Izmir, Turkey
Phone: +90 232 343 43 43 **E-mail:** zeyakgunn93@gmail.com
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Turkey, the first case was detected on March 11, 2020, and spread quickly.[6] As is known, personal hygiene and social isolation methods are the first steps to control the disease. [7] As in the whole world, COVID-19 lockdown has been applied in our country. Curfews, closing of social areas such as shopping malls, stopping of public transportation, closing of workplaces, and home-office working are just a few of stay home orders. These measures, like all traumas, may have an effect on decreasing the risk of ocular trauma and changing the etiology of injury. Early reports have suggested an increase in household injuries in the form of chemical exposures with quarantine-related lifestyle changes.[8]

In this study, we aimed to review patients who were accepted to our clinic with open globe injury during quarantine and compare with the previous year.

Materials and Methods

In 2019 and 2020, patients who were accepted to our clinic with open globe injury retrospectively analyzed. The period of March11, 2020–June 1, 2020, was assigned as Group 1, and the period of March 11, 2019–June 1, 2019, was assigned as Group 2. Detailed ophthalmologic findings, ocular trauma score (OTS), types of injury, and location of injury were recorded in all patients. OTS is based on five anatomical variables (rupture, endophthalmitis, perforating injury, retinal detachment, and random amplification of polymorphic DNA [RAPD]) and one functional variable (initial visual acuity). First, the raw score is calculated according to these variables, then the raw scores are converted to OTS.

Statistical Analysis

Statistical analysis was performed using the IBM SPSS Statistics 25.0 package program (IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.). Intergroup comparisons were performed using t-test, Mann–Whitney U, and demographic data were compared with the Chi-square test. Statistical significance was considered to be $p<0.05$.

The study was approved by the Institutional Ethics Review Board of Ege University, Turkey, and conducted in agreement with the tenets of the Helsinki Declaration.

Results

In Group 2, 2688 consultations were requested from the emergency department, and 47 (1.74%) patients were hospitalized with an open globe eye injury. In 2020, this rate was 21 (1.85%) patients in 1130 consultations ($p<0.001$). Male/female ratio was 14/7 in Group 1 and 36/11 in Group 2. The mean age was 38.9±21.85 (4–86) in Group 1 and 36.25±22.48 (3-88) in Group 2. There was no difference in age and gender between the groups ($p=0.60$ and $p=0.73$, respectively). In Group 1, there were 4 (19.04%) patients younger than 20 and 4 (19.04%) patients older than 65. In Group 2, there were 15 (31.91%) patients younger than 20 and 6 (12.76%) patients older than 65. There were 3 (14.28%) industrial, 6 (28.57%) judicial, and 12 (57.14%) home injuries in Group 1, and 11 (23.40%) industrial, 4 (8.51%) judicial, and 33 (70.21%) home injuries in Group 2 ($p=0.021$, $p=0.758$, and $p<0.001$, respectively). At the first examination, the mean best-corrected visual acuity (BCVA) was 1.46±1.09 (0–3.5) log MAR in Group 1 and 1.09±1.05 (0–3.5) log MAR in Group 2 ($p=0.19$). The mean OTS was 56.00±25.96 (12–100) in Group 1 and 69.63±23.78 (13–100) in Group 2, the difference was statistically significant ($p=0.05$). Final BCVA was 1.31±0.91 (0–3) log MAR in Group 1 and 0.53±0.77 (0–3) log MAR in Group 2 ($p=0.005$). Data and results are summarized in Tables 1 and 2.

Discussion

The severe acute respiratory syndrome coronavirus-2 (COVID-19) detected in China in December 2019 has soon become a global health problem. Disease spread mainly occurs by droplets. The contagiousness starts 1–2 days before the symptomatic period and continues for 14 days after symptom.[9] The main method for controlling COVID-19 is social isolation and personal hygiene. Curfews, closing

Table 2. Causes of injury in Groups 1 and 2

	Group 1 (%)	Group 2 (%)	p-value
Industrial injury	3 (14.2)	11 (23.40)	0.021
Judicial injury	6 (28.5)	4 (8.51)	0.758
Home injury	12 (57.14)	33 (70.21)	<0.001

Table 1. Demographic characteristics of two groups

	Group 1	Group 2	p-value
Male/female ratio	14/7	36/11	0.60
Mean age	38.9±21.85 (4–86)	36.25±22.48 (3–88)	0.73
Initial mean best-corrected visual acuity	1.46±1.09(0–3.5) log MAR	1.09±1.05 (0–3.5) log MAR	0.19
Final mean best-corrected visual acuity	1.31±0.91(0-3) log MAR	0.53±0.77(0–3) log MAR	0.005
Ocular trauma score	56.00±25.96 (12–100)	69.63±23.78 (13–100)	0.05

of social areas such as shopping malls, stopping of public transportation, closing of workplaces, and home-office working are just a few of precautions.[10] These measures may cause changes in etiologic and demographic parameters of ocular traumas as well as in all traumas.

Ocular traumas are classified by Birmingham Eye Trauma Terminology and Ocular Trauma Classification Group and divided into two groups as open and closed globe injuries.[11] Open globe injury is defined as a full-thickness injury to the ocular wall (full-thickness injury to the sclera, cornea, or both) and it is an important but preventable cause of permanent vision loss in world.[12] Unfortunately, open globe injuries are still very common despite prevention both in the workplace and in social life.

Factors to predicting final visual acuity after open globe injury are initial visual acuity, injury mechanism and injury type, injury site, adnexal trauma, RAPD, retinal detachment, uveal or choroidal prolapse, vitreous hemorrhage, lens damage, hyphemia, and number of operations.[13]

To predict the prognosis of open globe injuries, Kuhn et al.[14] defined the OTS. In 2002, the OTS study group analyzed more than 2000 eye injuries from the USA and Hungary to predict visual outcome OTS is based on five anatomical variables (rupture, endophthalmitis, perforating injury, retinal detachment, and RAPD) and one functional variable (initial visual acuity). First, the raw score is calculated according to the six variables (Table 3), then the raw scores are converted to OTS (Table 4). Patients with OTS = 1 have worse final visual acuity risk than patients with OTS = 5.[15]

Table 3. The ocular trauma score variables and raw points for calculating the ocular trauma score

	Raw points
A. Initial visual acuity	
No light perception	60
Light perception/hand motions	70
1/200–19/200	80
20/200–20/50	90
≥20/40	100
B. Rupture	−23
C. Endophthalmitis	−17
D. Perforating injury	−14
E. Retinal detachment	−11
E. Afferent pupillary defect	−10

There has been a change in the etiological and demographic characteristics of ocular traumas with COVID-19 lockdown.[7] Wu et al. reported that there has been a significant decrease in the number of patients presenting for emergency eye evaluations, but there has been a stable incidence of severe ocular trauma during the lockdown. They also reported that patients were more likely to travel further for medical help, present later after injury, and have ocular trauma at home.[7]

The previous studies have found the incidence of ocular trauma occurring at home to range from 34% to 48%.[16] During the COVID-19 pandemic, 52 out of 62 (84%) patients with severe ocular trauma sustained the injuries at home, and the higher incidence of at-home injuries is partly attributed to an increase in amateur home improvement projects.[7] In this study, 12 of the 21 patients diagnosed with penetrating injury during the quarantine period were reported as home injuries. Unlike the literature, there is a decrease compared to the previous year (from 70.21% to 57.14%).

In Italy, compared to the previous month, a reduction of ophthalmology consultations (58%) was reported during the quarantine.[17] In this study, compared to the same period of the previous year, a reduction of consultations was recorded (from 2688 to 1130). Pellegrini et al.[17] reported that injuries decrease in children and young adults (from 14.7% to 8.0%) and increase in the male population (66.7–75.0%). Falling and sports injuries have the highest decreasing (6.5–0.9% and 5.9–2.7%, respectively) and home injuries have the highest increasing (12.4–17.0% and 8.5–10.7%, respectively). In this study, reducing in home and industrial injuries (from 70.21% to 57.14% and from 23.40% to 14.2%, respectively) and rising in judicial injuries (from 28.5% to 18.8%) were reported. Changing of indus-

Table 4. OTS calculation

Sum of raw points	OTS	No light perception	Light perception/hand motions	1/200–19/200	20/200–20/0	≥20/40
0–44	1	74	15	7	3	1
45–65	2	27	26	18	15	15
66–80	3	2	11	15	31	41
81–91	4	1	2	3	22	73
92–100	5	0	1	1	5	94

OTS: Ocular trauma score.

trial and home injuries was statistically significant (p=0.021 and p<0.001, respectively). Pellegrini et al.[17] also reported that minor injuries that have a low risk of vision loss increase (from 93.2% to 94.6%) and major injuries that have a high risk of vision loss decrease (from 6.8% to 5.4%) during COVID-19 lockdown.

In this study, the mean OTS and the final BCVA were lower than the previous year, the difference was statistically significant (p=0.05 and p=0.05, respectively). Unlike the literature, we encountered high-grade injuries during lockdown compared to the previous year. Furthermore, in this study, it was observed that the rates of patients hospitalized with penetrating injury increased compared to the previous year (from 1.74% to 1.852%). The reason for the increase in penetrating injury rates, especially high-grade injury rates, may be that many centers were closed or stopped operating during the lockdown. As we are a tertiary eye center, we continued patient admissions and performing surgeries during this period.

Conclusion

During the pandemic period, the number of consultations and penetrating/perforating injuries decreased. There was a decrease in occupational cases and an increase in legal cases compared to the previous year. The OTS and final visual acuity of patients in the pandemic period were significantly lower than the previous year. During the COVID-19 pandemic period, stay home orders can reduce the risk of ocular trauma, like all traumas. However, the injury grade was higher, and the visual prognosis was lower.

Ethics Committee Approval: This study was approved by Ege University Medical Research Ethics Committee (date: July 8, 2020; number: 20-7T/48).

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