

# Ocular trauma during COVID-19 at a tertiary care hospital.

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## Abstract

**Introduction:** COVID-19 pandemic resulted in stringent measures from government of India. Full and partial lockdown were initiated from 22<sup>nd</sup> March, and 19<sup>th</sup> May respectively. Ocular trauma is an emergency where timely intervention is imperative for visual outcome. The aim is to study the trend of ocular trauma during COVID period.

**Method:** This is a prospective hospital based study of 17 referred cases of mechanical ocular trauma during COVID-19 lockdown time at tertiary care hospital. After detailed evaluation, the injuries were classified as per Birmingham trauma terminology classification.

**Results:** Out of total 17 eyes, 59% were closed globe and 41% had open globe injury. In both the groups, majority of the patients were male ( $p=1.00$ ). Out of total patients, 71% presented in partial lockdown. In complete lock down 100%, while in partial lockdown, 33.3% were below 18 years. Complete lockdown had 80% open globe while partial lockdown recorded 75% closed globe trauma. Indoor location was noted in 86% of open globe injury while outdoor activities resulted in 60% closed globe trauma. Presentation within 24 hours of trauma was 66.7% in partial lockdown and just 20% in total lockdown.

**Conclusion:** Through this study, we learn the impact of sudden changes in the environment on human behaviour and society at large. Also, even with such limited numbers of studied subjects, it shows the susceptibility groups to ocular trauma. It also reflects the need for awareness in society regarding problems related to lockdown.

**Keywords:** COVID 19, Ocular trauma, Closed globe, Open globe.

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## Introduction

COVID-19 spread in India is part of the worldwide pandemic. Government of India ordered lockdown as a preventive measure to contain the spread of COVID-19. During lockdown periods, emergency health services were allowed along with restricted transport facilities in partial lockdown. Global data on ocular trauma shows it to be an emergency where timely intervention is imperative for visual outcome. The demography influences the nature and cause of trauma in both developed and developing countries. The aim of present study is to assess the trend of ocular trauma during the lockdown period in COVID pandemic [1,2].

## Materials and Methods

This is a prospective hospital based study of 17 cases who sustained mechanical ocular trauma during COVID-19 lockdown, referred to tertiary care hospital. Duly approval was taken from ethical committee to conduct the study. Patients were divided into two groups based on the period of presentation-Full lockdown period from 24<sup>th</sup> March to 18<sup>th</sup> May and Partial lockdown from 19<sup>th</sup> May to 5<sup>th</sup> June 2020. A detailed history of every patient including age, gender, nature, site of injury, mode of injury, time lag between injury and time

of presentation was recorded [3]. All patients underwent complete ocular examination that included visual acuity assessment and slit lamp examination. Posterior segment evaluation with radiological investigations was done as per requirement. All mechanical eye injuries were divided into closed and open globe injuries as per birmingham trauma terminology classification. Furthermore, classification of open globe and closed globed injuries was done as per zone I, II, III and visual acuity at the time of presentation.

## Statistical analysis

Programme medcalc software was used for data analysis along with fisher's exact test for p Value, with less than 0.05 being significant [4,5].

## Results and Discussion

Out of the total of 17 patients studied, 59% had closed globe while 41% had open globe injury. There was male preponderance in both the groups, with 86% males in open globe and 80% males in closed globe injury, the difference with P value=1.00, being statistically non significant (Table 1) [6].

**Table 1. Gender distribution of injuries.**

Total no. of cases (17)			
Open globe injury n=7 (41%)		Closed globe injury n=10 (59%)	
Male	Female	Male	Female
6 (86%)	1 (14%)	8 (80%)	2 (20%)
<b>Note:</b> P value is 1.0 (insignificant)			

Male predominance (86% and 80%) in both types of injury respectively [7]. Out of the total 17 patients, 5 (29%) cases presented during the complete lockdown while 12 (71%) cases were reported in partial lockdown. Almost all the patients who incurred trauma were in age group below 18 years in complete lockdown, thus shows the high susceptibility of pediatric population in such times [8]. However, during partial lockdown 66.6% of the patients were more than 18 years

implying adults were subjected to trauma during times of partial lockdown. During the full lockdown, 80% of eyes sustained trauma due to sharp objects as compared to just 33.3% during partial lockdown, the difference being non significant with P=0.13 (Table 2).

**Table 2. Age distribution of injuries.**

No of cases in total lockdown (N=5)				No of cases in partial lockdown (N=12)			
<18 Years (100%)		>18 Years		<18 Years (33.3%)		>18 Years (66.6%)	
5		0		4		8	
Blunt (20%)	Sharp (80%)	Blunt	Sharp	Blunt (25%)	Sharp (75%)	Blunt (87.5%)	Sharp (12.5%)
1	4	0	0	1	3	7	1

No of cases were more during partial lockdown (71%) and paediatric trauma was more during total lockdown (100%). Full lockdown witnessed 80% open globe injury while partial lockdown recorded 75% closed globe trauma, although the difference was not found to be statistically significant with p=0.10 The location of trauma was indoor in 86% of eyes with open globe injury whereas in outdoor activities, more eyes (60%) sustained closed globe trauma, but this difference was statistically non significant with P=0.13 Such result co relates

with the age distribution that shows pediatric age group sustained open globe trauma indoors and adults presented with closed globe during outdoor activities. 70% of the closed globe injuries were found to be in zone I while 71.5 % of open globe injuries were noted in zone II, thereby implying that severity was more in open globe type (Table 3) [9,10].

**Table 3. Type of injury during lockdown.**

Total lockdown (5)		Partial lockdown (12)	
No. of open globe injury (80%)	No. of closed globe injury (20%)	No. of open globe injury (25%)	No. of closed globe injury (75%)
4	1	3	9
<b>Note:</b> Value is 0.1 (insignificant)			

No of open globe injury was more during total lockdown and close globe injury was more during partial lockdown. During complete lockdown 80% of patients presented after 24 hrs of injury whereas during partial lockdown 66.7% of patients presented within 24 hrs of injury, the difference being non significant with P=0.13. Visual acuity at the time of presentation was found to be better than 6/12 in 50% of closed globe trauma cases in contrast to open globe injury where 57% cases had poor visual status [11,12]. This coincides with the severity and delay in the presentation of open globe trauma. Ocular injury is one of the common causes of ocular morbidity

in children and adults. In our study there is a male preponderance of 82.4% in both paediatric and adult age group which concurs with results shown by many studies on ocular trauma. Higher preponderance of ocular trauma in males can be explained by their increased outdoor activities like working in factories and fields [13]. They are also known to indulge more in rash driving resulting in road traffic accidents. In case of children, boys are at more liberty than girls in developing country because of social system (Table 4).

**Table 4.** Place of injury.

Open globe injury (7)		Close globe injury (10)	
Indoor	Outdoor	Indoor	Outdoor
6	1	4	6
<b>Note:</b> Value is 0.13 (insignificant)			

Indoor injuries are more in open globe injuries and outdoor injuries are more in closed globe injuries. Out of the total 17 cases, 9 (53%) belong to paediatric age group. All 5 cases which presented during full lockdown were pediatric and none aged more than 18 years [14]. However, during partial lockdown, just 4 out of 12 cases were pediatric. In our study, among paediatric age group, penetrating open globe injury was noted in 8 out of 9 trauma cases while doing indoor activities. This can be explained by limited outdoor activities and extended indoor stay during lockdown. Previous studies have reported open globe injuries more common in paediatric ocular trauma. UK Paediatric ocular trauma study also shows open globe injury is more common in children [15]. In Scotland, injuries necessitating admission were blunt trauma cases that occurred most frequently at home (51%) when children indulged in sporting activities. This is similar to our study with

respect to location. But in our study, where children suffered penetrating open globe trauma. This lockdown period can also be compared with certain studies describing incidence relative to different seasons. Reported ocular injuries peaking during summer months. In summer, when days are longer, and vacations are scheduled by school, students get involved in outdoor games, while shorter days, and cold, foggy climate limits the outdoor activities during winter season [16,17]. The condition of full lockdown was a myriad of the long days of summer with restricted outdoor activities like that in winters. Children are more susceptible to ocular trauma because of their physical vulnerability, lack of coordination, and curiosity/desire to explore, which may lead to serious hazards (Table 5).

**Table 5.** Grading of ocular injury.

Zones	Closed globe injury (10)	Open globe injury (7)
I	7 (70%)	2 (28.5%)
II	NIL	5 (71.5%)
III	3 (30%)	NIL

Most of the closed globe injuries are in zone I (70%) and maximum no of open globe injuries are in zone II (71.5%). In our study 41% were open globe injuries and 59% were closed globe. Majority of cases of closed globe injury arrived in the partial lockdown period. This is in accordance who reported majority of all ocular injuries as closed globe, whereas Kaur and Agrawal revealed 78.94% of injuries as open globe injury. During partial lockdown, most of the injuries were closed globe type, due to outdoor activities of adults [18]. This was

found to be in contrast to full lockdown period where most cases were of open globe category engaging in indoor activities. In an epidemiological, on ocular injuries in patients with major trauma in the UK, blunt trauma was found in 96.7% injuries and 3.3% injuries were the result of penetrating trauma in adults (Table 6).

**Table 6.** Time lapsed between ocular injury and presentation to hospital.

	Total lockdown	Partial lockdown
<24 hrs	1 (20%)	8 (66.6%)
24 hrs to 1 week	3 (60%)	4 (33.3%)
>1 week	1 (20%)	0
<b>Note:</b> Value is 0.13 (insignificant)		

60% Patients reported to the hospital (>1 day-1 week) in total lockdown while in partial lockdown 66.6% within 1 day from the time of injury. Maximum no of cases (57.1%) in open globe injury had poor vision (HM-PL+) while in close globe injury more cases (50%) had good vision (>6/12) at the time of presentation. Ghana epidemiological study supports that open globe injuries were by far the most common and were 4.7 times more likely to produce poor visual outcome. The poor vision in open globe cases may be attributed to severity of injury which was less in close globe type. Our findings suggest

that vision at presentation is a reflection of the extent of damage caused due to trauma with reference to size of corneal tear, uveal tissue involvement, traumatic cataracts, and posterior segment involvement. Majority of cases had reported to hospital within 24 hrs of incidence during partial lockdown whereas in total lock down all the cases reported after 24 hrs which can be attributed to restricted availability of transport and health care services [19]. There are various observations made like in a study by the final visual acuity was significantly poor in eyes due to delay in primary beyond 24 hours.

However, a study from Ghana showed that only one third of the cases reported within 24 hours while 21% reported after one week of their injuries. These delayed periods of reporting showed no statistically significant relationship with the distances travelled to the hospital nor the eventual visual outcome achieved following treatment. Limitation of our study was that it was time bound and based on observations made

during the lockdown period of COVID 19. We saw an increase in shift towards closed globe injuries, as times resumed to anew normal after full lockdown was lifted. We have drawn comparisons from studies conducted in pre COVID times. How such a propensity towards closed globe trauma as a trend would continue in post COVID times of new normal, is yet to be seen (Table 7).

**Table 7.** Grading of injuries according to visual status at time of presentation.

Visual status		
Visual acuity	Open globe injury (7)	Close globe injury (10)
>6/12	1 (14.2%)	5 (50%)
6/12-6/60	2 (28.5%)	3 (30%)
6/60-CF	0	0
HM-PL	4 (57.1%)	1 (10%)
NO PL	0	1 (10%)

At the time of presentation, 57% cases has poor visual status in open globe injuries and 50% cases has visual acuity better than 6/12 in close globe injuries.

### Conclusion

This study is one of its kind to be conducted in the pandemic of COVID lockdown period, and likely to serve as a milestone and reference for future studies. Through this study, we learn the impact of sudden changes in the environment on human behaviour and society at large. Also, even with such limited numbers of studied subjects, it shows the susceptibility groups to ocular trauma. It also reflects the need for awareness in society regarding problems related to lockdown.

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