



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 22nd March, and 19th May respectively. Ocular trauma is an emergency where timely intervention is imperative for visual outcome. The aim is to study the changing trend of ocular trauma during Covid and pre-Covid period.

Materials and methods: This retrospective study of 60 cases during the months of March to August in the years 2019 and 2020. The patients are divided respectively in pre-covid (2019) and covid group (2020). Relevant records of history and examination were obtained from hospital database for all trauma patients. All mechanical eye injuries were divided into closed and open globe

injuries as per Birmingham Trauma Terminology classification.

Results: Out of the 60 patients involved in the study, 27 were in the pre-Covid and 33 in the Covid group. Male to female ratio was 2:1 ($p=0.276$) in pre-Covid group and 9:2 (0.131) in Covid group. There were 77.8% cases of open globe injuries in pre-Covid and 63.6% in Covid group. 33% of closed globe injuries in pre-Covid and 75% in Covid group were in patients >18 years of age. In the pre-Covid group, maximum involvement was of Zone I (43%) in open globe injuries while in closed globe injuries, Zone 3 (50%) was majorly involved. ($p=0.755$) In the Covid group, both open (43%) and closed (75%) globe injuries showed maximum involvement of Zone I.

Conclusion: There was a higher preponderance of ocular trauma in males in both groups. Open globe injuries were

more common in both groups. Closed globe injuries were more prevalent in pediatric age group in pre-COVID times, but this trend shifted to adult group in COVID times.

Key Words: Covid 19, ocular trauma, closed globe, open globe

Introduction

Ocular trauma remains a leading cause of monocular vision loss and blindness in both young and old individuals. The vision loss caused by ocular trauma not only affects a person's quality of life but also imposes an enormous socioeconomic and psychological impact on patients and their families. By now, great advances have been made in the management of ocular injuries under the guidelines based on the uniform categories and outcome assessment system for ocular trauma. Global data on ocular trauma shows it to be an emergency where timely intervention is imperative for visual outcome.^{1, 2, 3} The demography influences the nature and cause of trauma in both developed and developing countries.^{4, 5} COVID -19, a highly contagious respiratory tract infection was declared a pandemic on March 11, 2020. Government of India ordered nationwide lockdown as a preventive measure to contain the spread of Covid-19. Indian Government implemented early and strict nationwide lockdown that began on March 25, 2020. The first two phases of complete lockdown extended from March 25, 2020 to May 3, 2020. During lockdown periods, emergency health services were allowed along with varied restricted transport facilities in partial lockdown. We are a tertiary care centre in the capital of Uttarakhand, that catered to majority of ocular emergencies in our area during lockdown period owing to conversion of other tertiary centres to COVID dedicated hospitals accompanied with restricted

functioning of smaller setups. The pandemic had lead to a change in the social setup which can cause a change in the trnd of ocular injuries. Aim of our study is to see the change in the profile of ocular trauma during this period and compare it with the pre-covid period at our tertiary centre.

Material and Methods

This is an analytical, observational, retrospective hospital-based study of 60 cases during the months of March to August in the years 2019 and 2020. Patients were divided into two comparison groups based on the period of presentation. First group of patients admitted in 2019 represented the cases in pre-COVID period. Second group represented cases during COVID period, with all patients admitted in 2020.

The period in the year 2020 was marked by nationwide COVID-19 lockdown. Inclusion criteria comprised all patients presenting with mechanical ocular trauma requiring hospitalization for medical/surgical intervention to our tertiary care hospital. Standard protocol was followed for examination and admission of patients in COVID era (2020) based on guidelines issued by the Ministry of Health and Family Welfare, Government of India and the All-India Ophthalmological Society (AIOS). The Institutional Ethics Committee approved the study and it was conducted in full accord with the tenets of the Declaration of Helsinki.

Relevant records of history and examination were obtained from hospital database for all trauma patients. All mechanical eye injuries were divided into closed and open globe injuries as per Birmingham Trauma Terminology classification.⁶ Furthermore, open and closed globed injuries were graded into anatomical zones.⁷

Statistical Analysis: Programme SPSS software was used for data analysis along with Chi square test for p Value, with less than 0.05 being significant RESULT

Out of the 60 patients involved in the study, 27 were in the pre-COVID and 33 in the COVID group. Male to female ratio was 2:1 ($p=0.276$) in pre-COVID group and 9:2 (0.131) in COVID group. 51.9% ($n=14$) of patients in Group I and 39.4% ($n=13$) in Group II were <18 years of age. 48.1% ($n=13$) of patients in Group I and 60.6% ($n=20$) in Group II were >18 years of age. (Table 1)

From March to August, the maximum patient turnover in pre-COVID group was in August (40.8%; $p=0.170$) and in COVID group in May and June (57.6%; $p=0.163$; 0.016). Overall p value ($p<0.05$) for monthly distribution of trauma patients was also significant between both groups. ($p=0.005$) (Table 2)

In pre-COVID group, 77.8% patients ($n = 21$) presented with open globe injury, while 22.2% ($n=6$) patients presented with closed globe injury. 52.3% ($n=11$) of open globe injuries and 33% ($n=2$) of closed globe injuries belonged to adult age group. ($p=0.410$) (Table 3) 67% of patients with closed globe injury belonged to the pediatric age group.

In the COVID group 63.6% ($n=21$) presented with open globe injury, while 36.4% ($n=12$) patients presented with closed globe injury. 52.3% ($n=11$) of open globe and 75% ($n=9$) of closed globe injuries were > 18 years of age. ($p=0.201$) (Table 3)

In both pre-COVID and COVID groups, there was a majority of outdoor injuries: 67% in pre-COVID group and 57.6% in COVID group. There was a decrease in outdoor injuries, but it was statistically insignificant. ($p=0.471$) (Table 4)

In the pre-COVID group, maximum involvement was of Zone I (43%) in open globe injuries while in closed globe

injuries, Zone 3 (50%) was majorly involved. ($p=0.755$) In the COVID group, both open (43%) and closed (75%) globe injuries showed maximum involvement of Zone I. ($p=0.1654$) (Table 5)

Lower Visual status (<6/60 to No PL) was documented in 66.67% of patients in pre-COVID times but only in 45% of patients in COVID times. ($p=0.392$) (Table 6)

Discussion

Ocular injury is a quotidian antecedent to ocular morbidity in children as well as adults.

In our study, out of 27 pre-covid and 33 covid time patients, male dominance was witnessed in both pre-COVID and COVID groups. Higher preponderance of ocular trauma in males under conventional circumstances is well-established, as they are more frequently exposed to outdoor work like working in factories and fields. They are also known to indulge more in rash driving resulting in road traffic accidents than females and hence more prone to injuries.^[8,9] However, this trend experienced an ascent in COVID group despite lockdown conditions, as the fraction of males increased from 66.67% in the pre-COVID group to 81.8% in the COVID group. This is in concordance with multiple studies including Pellegrini et al., a study conducted in Bologna, Italy, where proportion of males increased from 66.7% to 75, and Samia-Aly et al, which displayed an increase from 62 to 79%.^[10, 11, 12] We can hypothesize that outdoor sustentative activities were largely done by males during lockdown, in conjunction with a relative decrease in outdoor activities for females.

In stipulated time period, the maximum patient turnover in pre-COVID group was in August (40.8%) whereas in COVID group it was in the months of May and June (57.6%). The difference in number of patients presenting was statistically significant for the months of

March($p=0.008131$) and June($p=0.016669$), with a ratio of 8:1 Pre-COVID to COVID cases in March, and 1:10 in June. This can be attributed to the fact that the nation was under complete lockdown in March, which was then eased into a partial lockdown during May. This is in concurrence with Agarwal et al who observed a gradual increase in patients presenting with ocular trauma in the months of May, June and July.^[10] The overall variation in monthly distribution was statistically significant as well with a p value of 0.005.

Contrary to pre-existing literature, both pre-COVID and COVID groups demonstrated a prevalence for open globe injuries.^[13,14] The fraction of closed globe injuries increased from 22.2%(pre-COVID) to 36.3% (COVID group), but the increment was statistically insignificant. The increment witnessed was owing to a surge in closed globe injuries in adult age group from 15% to 45%. This is in concurrence with Agarwal et al. where fraction of closed globe injuries increased from 16.9% to 33.8% from pre-COVID to COVID era.^[10] 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.

Outdoor injuries accounted for majority of cases in the pre- COVID group (66.67%). This trend continued in the COVID-era; however, the fraction reduced to 57%, this can be attributed to restriction in outdoor activities owing to lockdown.

In the pre-COVID group, maximum involvement was of Zone I in open globe (43%) and Zone 3 (50%) in closed globe injuries. In the COVID group, maximum involvement was of Zone I in both open (43%) and closed (75%) globe injuries. While similar percentage of Zone 1 was observed in open globe injuries (42.8%), it increased from 33.34% to 75% in closed globe injuries,

indicating a decrease in severity of closed globe injuries in COVID times. It can be attributed to decreased incidence of RTA because of decreased outdoor activities. However, no correlational data was available for the same in previous literature.

Lower Visual status (<6/60 to No PL) was documented in 66.67% of patients in pre-COVID times but only in 45% of patients in COVID times, but the difference was statistically insignificant. This correlates with the observed decrease in severity of injury in COVID times. This is in contrast with a study done by Samia-Aly et al that documented considerably lower median visual status during COVID times than in pre-COVID times.^[12]

Hence, via retrospective analysis of ocular trauma statistics at our centre, this study has endeavoured to gauge the impact of change in social milieu on prevalence of ocular trauma in adult as well paediatric population.

The limitations and possible biases in the present study are that it was performed in a single institution and was retrospective in nature. We did not explore the barriers to accessing eye care services in patients visiting the hospital. Duration between patient incurring the injury and presenting to emergency was not accounted for in this study, and follow up visual acuity was not documented due to covid.

Conclusion

Based on this study, we conclude that there was a higher preponderance of ocular trauma in males in both groups. Open globe injuries were more common in both groups. Closed globe injuries were more prevalent in pediatric age group in pre-COVID times, but this trend shifted to adult group in COVID times.

References

1. Acar U, Tok OY, Acar DE, Burcu A, Ornek F. A new ocular trauma score in pediatric penetrating eye injuries. Eye (Lond) 2011; 25:370-4.
2. Négrel AD, Thylefors B. The global impact of eye injuries. Ophthalmic Epidemiol 1998; 5:143-69.
3. Pizzarello LD. Ocular trauma: Time for action. Ophthalmic Epidemiol 1998; 5:115-6.
4. Narang S, Gupta V, Simalandhi P, Gupta A, Raj S, Dogra MR, et al. Paediatric open globe injuries. Visual outcome and risk factors for endophthalmitis. Indian J Ophthalmol 2004; 52:29-34.
5. McCormack P. Penetrating injury of the eye. Br J Ophthalmol 1999; 83:1101-2.
6. Kuhn F, Moris R, Witherspoon CD. Birmingham Eye Trauma Terminology (BETT): terminology and classification of mechanical eye injuries. Ophthalmol Clin North Am. 2002; 15 (2): 139-143.
7. Pieramici DJ, Sternberg P Jr, Aaberg TM Sr, et al. A system for classifying mechanical injuries of eye (globe). Ocular Trauma Classification Group. Am J Ophthalmology.1997;123(6):820-31
8. <https://www.who.int/news-room/fact-sheets/detail/road-traffic-injuries>
9. Das S, Rana M. Patterns of Ocular Trauma Presenting to the Tertiary Eye Care Centre in the Islands of Andaman and Nicobar.DJO 2020;30:20-26
10. Agrawal D, Parchand S, Agrawal D, Chatterjee S, Gangwe A, Mishra M, et al. Impact of COVID-19 pandemic and national lockdown on ocular trauma at a tertiary eye care institute. Indian J Ophthalmol 2021; 69:709-13.
11. Pellegrini, M., Roda, M., Di Geronimo, N. et al. Changing trends of ocular trauma in the time of COVID-19 pandemic. Eye 34, 1248–1250 (2020).
12. Samia-Aly, E., Moussa, G. & Ch'ng, S.W. The impact of COVID-19 on traumatic eye emergencies needingsurgery. Eye (2021).<https://doi.org/10.1038/s41433-021-01565-3>
13. Smith AR, O'Hagan SB, Gole GA. Epidemiology of open- and closed-globe trauma presenting to Cairns Base Hospital, Queensland. Clin Exp Ophthalmol. 2006 Apr;34(3):252-9.
14. Puodžiuvienė E, Jokūbauskienė G, Vieversytė M, Asselineau K. A five-year retrospective study of the epidemiological characteristics and visual outcomes of pediatric ocular trauma. BMC Ophthalmol. 2018 Jan 18;18(1):10.

Legend Tables

Table 1: Age and Gender-Wise Distribution of Patients with Ocular Injury During Pre-Covid and Covid Times.

	Pre-COVID			COVID		
	Male	Female	Total	Male	Female	Total
<18 years	8	6	14	9	4	13
>18 years	10	3	13	18	2	20
Total	18	9	27	27	6	33
P value	0.27597			0.13066		

Table 1 Depicts That P-Values for Gender Distribution in Both Pre-COVID And COVID Times Is Insignificant.

Table 2: Monthly Distribution of Trauma Patients.

Month	Pre-COVID	COVID	Total	p-value
March	8	1	9	0.008131
April	3	4	7	0.909269
May	3	9	12	0.163734
June	1	10	11	0.016669
July	1	2	3	0.684609
August	11	7	18	0.169454
Total	27	33	60	
P value	0.005019			

Table 2 displays significant p-values for monthly distribution of patients between pre-COVID and COVID groups in March and June. Overall p-value($p < 0.05$) for monthly distribution of trauma patients was also significant between both groups.

Table 3: Type of Injury.

Age	Pre-COVID			COVID		
	Open	Closed	Total	Open	Closed	Total
<18 years	10	4	14	10	3	13
>18 years	11	2	13	11	9	20
Total	21	6	27	21	12	33
P Value	0.410214			0.20082		

Table 3 depicts that p-value between open and closed globe injuries were insignificant in both pre-COVID and COVID groups.

Table 4: Place of Injury.

	Pre-COVID	COVID	Total
Indoor	9	14	23
Outdoor	18	19	37
Total	27	33	60
P value Combined	0.471194		

Table 4 shows that 33% of injuries in pre-COVID times were indoor, while 66.67% were outdoor. 43% of injuries were indoor, while 57% were outdoor in COVID phase, but this difference was statistically insignificant.

Table 5: Grading of Injury.

Zones	Pre-COVID				COVID			
	Open	Closed	Total	p-value	Open	Closed	Total	p-value
I	9	2	11	0.747203	9	9	18	0.229102
II	5	1	6	0.743421	7	1	8	0.160581
III	7	3	10	0.554113	5	2	7	0.668235
Total	21	6	27		21	12	33	
P-value	0.755391				0.165394			

Table 5 shows that 54% of injuries in COVID times were in Zone 1, whereas only 40% of injuries fell in Zone 1 in pre-COVID times. Pre-COVID times reported 37% of Zone 3 injuries, this number decreased to 21% in COVID times, but the p value was insignificant in both groups.

Table 6: Visual Status at Presentation.

Visual Acuity	Pre-COVID	COVID	Total	p-value
>6/12	4	8	12	0.416584
6/12-6/60	5	10	15	0.363747
6/60-cf	5	2	7	0.159869
Hm-pl	11	12	23	0.785288
No Pl	2	1	3	0.450647
Total	27	33	60	
P value Combined	0.392172			

Table 6 indicates that difference in visual status at the time of presentation was statistically insignificant between both groups. Lower Visual status (<6/60 to No PL) was documented in 66.67% of patients in pre-COVID times but only in 45% of patients in COVID times.