

Firecracker injuries during Deepawali

Dr Jitendra Kumar¹, Dr. Anjali², Dr. samya singh³

¹Associate Professor & Head, Dept. of ophthalmology, MLB Medical College Jhansi, India.

²Junior Resident, Dept. of ophthalmology, MLB Medical College Jhansi, India.

³Junior Resident, Dept. of ophthalmology, MLB Medical College Jhansi, India.

Corresponding author: Dr. Jitendra Kumar

Abstract

We report a large series of ocular injuries caused by fire-crackers. This study was a hospital-based, single center, retrospective case series in which the records of 51 patients with ocular injuries were analyzed. Injuries were classified according to Birmingham eye trauma terminology system (BETTS). Visual outcomes before and after the intervention were recorded. Ten patients were admitted for further management. As ocular firecracker injuries result in significant morbidity, public education regarding proper use of firecrackers may help in reducing the incidence of ocular injuries.

Keywords: Deepawali, firework, firecracker injuries

Firecracker injuries can cause serious and irreparable damage to vision. In India, firecracker injuries are common during the festival of 'Deepawali' where traditionally, firecrackers form an essential part of the celebrations.

Date of Submission: 29-04-2021

Date of Acceptance: 13-05-2021

I. Method And Material

Subject-

This was a retrospective case series. All patients with firecracker injuries who attended the emergency of maharani laxmibai medical Jhansi. Duration of study from September 2020 -february 2021 the patients underwent a detailed examination ultrasonography A and B, gonioscopy and fundus photography and X-ray orbit was done as and when indicated.....

This injury were classified according to Birmingham eye trauma terminology system {BETTS}

Glossary of terms used in classification of injuries

Although patients with closed eye injuries were treated on an outpatient basis, most cases with open eye injury were advised admission for further management and observation. Admitted cases included patients with corneal and scleral tears, traumatic iridodialysis with hyphema, suspected intraocular foreign body (IOFB), and globe rupture.

II. Results

Of the 51 patients seen, 40 were males. The age range of these patients was 3 to 70 years (mean of 19 years). Thirty-one patients were less than 20 years of age. The most common cause of ocular injuries were bombs (37%), followed by sparklers (19%) [Fig. 1]. Bottle rockets and bombs were responsible for the most serious ocular injuries observed in our patients.

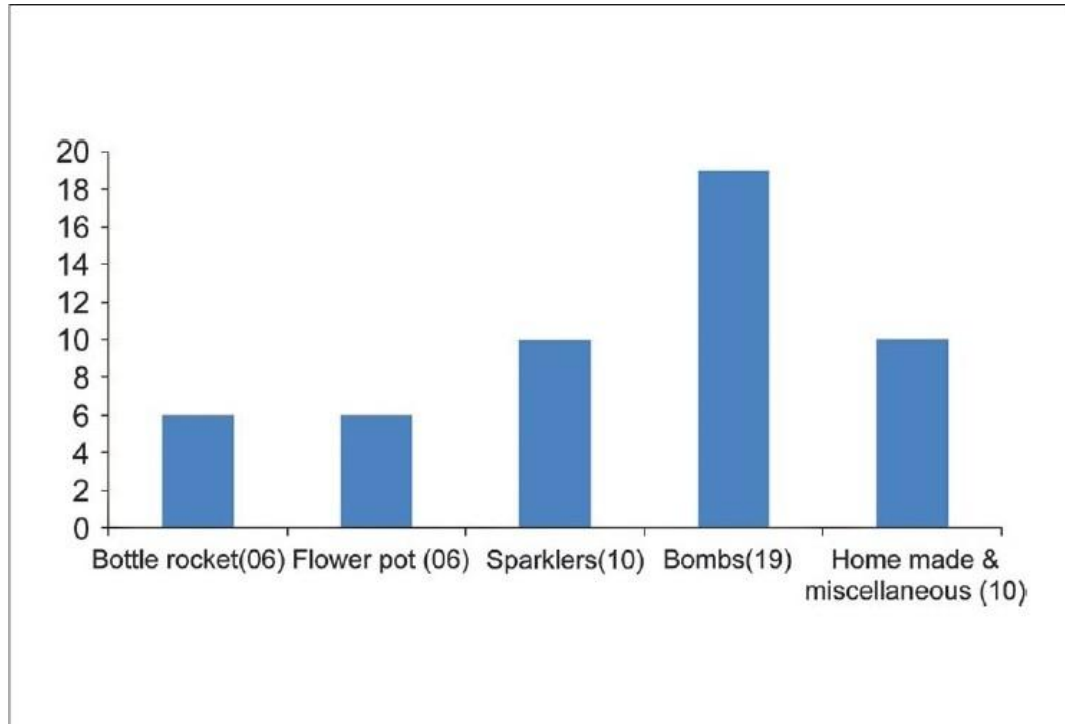


Figure 1 :Type of fireworks causing injury

Twenty-nine patients were onlookers and 22 patients were actively involved in igniting the firecrackers. None of the firecracker victims reported using any protective eye wear at the time of injury. The right eye was involved in 31 cases and left eye in 27 cases. According to the initial assessment of vision at the time of presentation to the hospital two eyes of two patients had no perception of light (PL negative), 13 eyes of 11 patients had visual acuity of hand movement to perception of light (PL positive) while eight patients had counting fingers to 20/200 vision. Twenty-nine patients were onlookers and 22 patients were actively involved in igniting the firecrackers. None of the firecracker victims reported using any protective eye wear at the time of injury. The right eye was involved in 31 cases and left eye in 27 cases. According to the initial assessment of vision at the time of presentation to the hospital two eyes of two patients had no perception of light (PL negative), 13 eyes of 11 patients had visual acuity of hand movement to perception of light (PL positive) while eight patients had counting fingers to 20/200 vision.

Vision of five patients was not recorded (all were less than seven years of age and not cooperative for vision assessment at initial presentation). The distribution of severe eye injury (hand movement-PL negative) was nearly equal in bystanders and actively involved individuals. According to BETTS, nine cases were open globe injuries and 49 cases were closed globe injuries [Figs. [

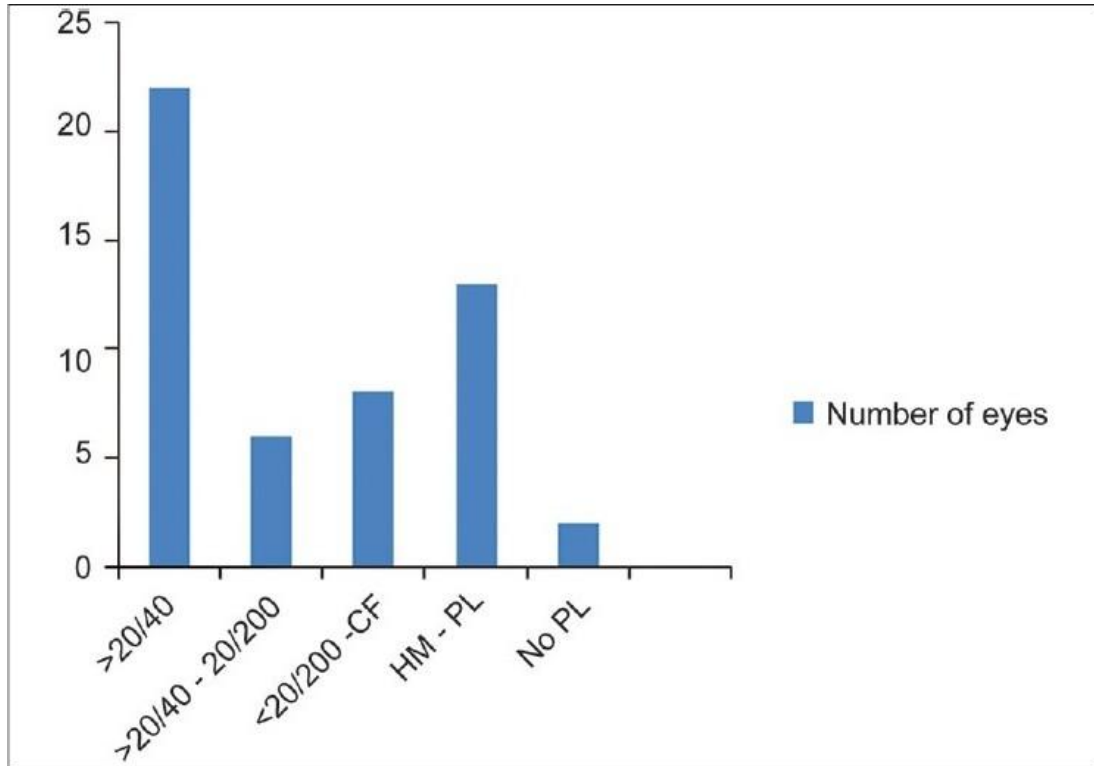


Figure 2 :Initial visual acuity of the patients attending ophthalmology department emergency at Jhansi
CF-Counting finger ,HM-hand movement PL-perception of light

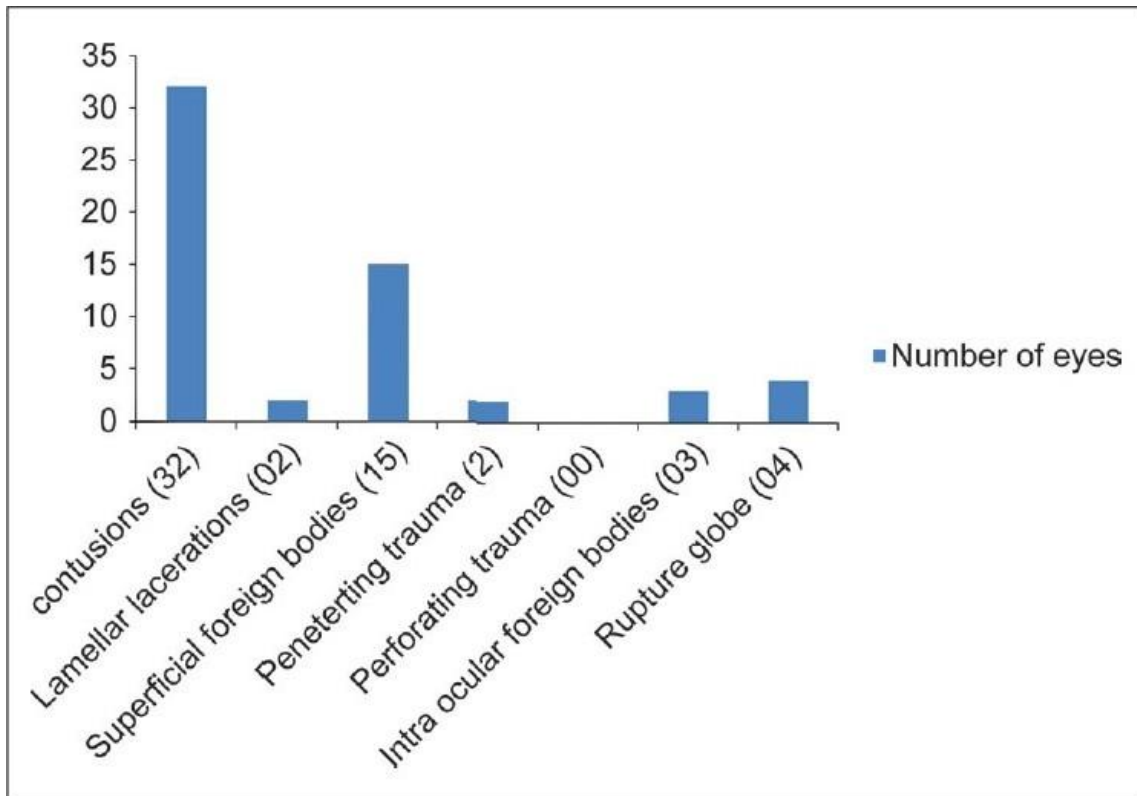


Figure 3:Distribution of eye trauma according to Birmingham eye trauma terminology system



Figure 4:clinical photoghaph of a patient with fire cracker injuries showing upper lid oedema following firecracker injury and fluorescent staining showed epeithelial defect.



Figure 5 and 6:clinical photograph showing mild upper eyelid oedema and soot particles over eyelids and fluorescent staining showing no epithelial defect .



Figure 7:clinical photograph showing seething of eyelashes and superficial burns and fluorescent staining showing extensive epithelial defect .

In all, 10 patients were admitted to our hospital with firecracker injuries. All patients except one had visual acuity of hand movement or worse at the time of initial evaluation. Three of these patients underwent surgical repair for scleral tear. Two patients underwent surgery for corneoscleral tear repair. One patient required amniotic membrane graft and autologous serum drops for non-healing epithelial defects . Visual outcome in all these cases was poor (three patients had no PL and two patients had only PL). One patient with total hyphema had visual recovery following anterior chamber wash from visual acuity of hand movements at presentation to 20/40 Snellen at discharge. Four others were treated conservatively as per the standard treatment protocol for ocular burns and chemical injuries. Injured eyes were irrigated with copious amount of normal saline and particulate matter and soot particles were removed with forceps under local anesthesia; pH was monitored before and after ocular irrigation. Patients were prescribed antibiotic steroid eyedrop
 Visual outcome of 12 eyes of 10 admitted patient average number of days of stay of admitted patients was seven days (median = six days). Though three patients ended up with no PL, most had a moderate visual recovery

Vision	At admission (number of eyes)	At discharge (number of eyes)
>20/40	0	2
20/40 - 20/200	1	2
<20/200 - CF	1	2
HM+	5	1
PL+	4	2
PL-	1	3

III. Discussion

This study was a hospital-based, single-center, retrospective case series of firecracker injuries. The injuries reported ranged from conjunctival or corneal burns to globe rupture with interventions ranging from ocular wash to repair of globe perforation. Most of the patients were below the age of 20 years. The most common firecracker causing injury in our study were bombs followed by sparklers and homemade devices. Even though sparklers were reported to cause minimal injuries in one of the studies, were not found to be innocent in our study.[5] Most bottle rocket injuries were of a serious nature.

Many of the injuries were caused as a result of negligence of those igniting the firecrackers. Some of the severely injured patients reported device malfunction as the cause of their injury. In three cases, the attempt to reignite or recover a failed device was the cause of injury. In one instance, the patient suffered severe facial

and bilateral ocular injuries when he attempted to ignite a homemade device made up of unburnt firecracker powder

Ocular injuries by firecrackers are common during 'Deepawali'. Lack of knowledge about safety measures or not following them was a reason for eventualities. Absence of parental supervision, and failure to maintain safe distance from firecrackers were contributory in some cases of injuries. The other major cause of injury is the common practice of igniting firecrackers in the streets thus exposing passersby to injury.

The fact that so many cases were seen in a single center highlights the enormous health importance of regulating firecracker use and enforcing safety precautions. The single most effective measure may be to restrict the fireworks to public open spaces (such as parks or playgrounds). Regulating the quality of firecrackers and promoting safe use via schools and media will also have a positive impact.

Go to:

References

- [1]. Kuhn FC, Morris RC, Witherspoon DC, Mann L, Mester V, Modes L, et al. Serious fireworks-related eye injuries. *Ophthalmic Epidemiol.* 2000;7:85–6. [[Google Scholar](#)]
- [2]. Lee RT. Firecracker injury to the eyes in Hong Kong. *Br J Ophthalmol.* 1966;50:666–9. [[PMC free article](#)] [[PubMed](#)] [[Google Scholar](#)]
- [3]. Arya SK, Malhotra S, Dhir SP, Sood S. Ocular fireworks injuries. Clinical features and visual outcome. *Indian J Ophthalmol.* 2001;49:189–190. [[PubMed](#)] [[Google Scholar](#)]
- [4]. Shingleton BJ, Hersh PS, Kenyon KR. Eye trauma, part 2. St Louis: MO: Mosby Year Book; 1991. pp. 63–184. [[Google Scholar](#)]
- [5]. Puri V, Mahendru S, Rana R, Deshpande M. Firework injuries: A ten-year study. *J Plast Reconstr Aesthet Surg.* 2008;62:1103–11. [[PubMed](#)] [[Google Scholar](#)]
- [6]. Sacu S, Segur-Eitz N, Stenng K, Zehetmayer M. Ocular firework injuries at New year's eve. *Ophthalmologica.* 2002;216:55–9. [[PubMed](#)] [[Google Scholar](#)]
- [7]. Witsaman RJ, Comstock RD, Smith GA. Pediatric fireworks related injuries in the United States: 1990-2003. *Pediatrics.* 2006;118:296–303. [[PubMed](#)] [[Google Scholar](#)]
- [8]. Smith GA, Knapp JF, Barnett TM, Shields BJ. The rockets' red glare, the bombs bursting in the air: Fireworks related injuries to children. *Pediatrics.* 1996;98:1–9. [[PubMed](#)] [[Google Scholar](#)]
- [9]. Vassilia K, Eleni P, Dimitrios T. Firework related injuries in Greece: A national problem. *Burns.* 2004;30:151–3. [[PubMed](#)] [[Google Scholar](#)]
- [10]. Mansouri MR, Mohammadi SF, Hatf E, Rahbari H, Khazanehdari MS, Zandi P, et al. The Persian Wednesday Eve Festival "Charshanbe-Soori" Fireworks Eye Injuries: A Case Series. *Ophthalmic Epidemiol.* 2007;14:17–24. [[PubMed](#)] [[Google Scholar](#)]

Dr. Jitendra Kumar, et. al. "Firecracker injuries during Deepawali." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 20(05), 2021, pp. 18-23.