

Spectrum of Clinical Presentation in Patients with Pellet Related Eye Injuries in the Indian Kashmir

Suraya Kounser¹, Senior resident, Ophthalmology department SKIMS

Khurshid Ahmad Ganaie^{2*}, Consultant Surgeon J&K Health Services.

Corresponding Author: Khurshid Ahmad Ganaie, Consultant Surgeon J&K Health Services, J&K, India.

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Abstract

Objective: Since 2016 the ongoing use of the indiscriminate pellet guns has blinded more than 1500 people in Kashmir valley. Very few studies have been conducted on this topic till date. Our aim of this study was to evaluate the clinical profile of the patients having pellet related ocular trauma.

Methods: This was a prospective study, in which 237 patients of pellet related ocular injury were included for analyses. At the time of admission to hospital we recorded the complete spectrum of their clinical findings at presentation.

Results: The mean age of our patients was 20.7 years with SD of 8.4 years. The age ranged from 10-42 years. Out of total 237 patients, 218 (92%) were males and 19 (8%) were females. Out of 237 patients, 204 (86%) of them presented to hospital on the same day of incident. Corneal injury was present in 86 (36%) of cases and scleral injury in 73 (31%) of cases. 171 (72%) of patients had penetrating eye injury. In 84 (35%) cases the vision was only defective perception of light/ray. Hyphema was noted in 141 (59%) of patients, vitreous hemorrhage in 154 (65%) patients and retinal detachment was present in 83 (35%) of patients.

Conclusion: From the present study as well as from the results of other related studies we can conclude that, pellets are extremely destructive when they penetrate the

eyes and lead to serious visual catastrophes, mainly due to vitreous hemorrhage and retinal detachment.

Keywords. Ocular pellet injury, Retinal detachment , Visual acuity, Vitreous hemorrhage.

Introduction

Shotgun pellets were first time introduced by the state police in 2010 when there was a mass uprising against civilian killings that led to a grave law and order problem in the whole valley. More than 100 people were killed during the stone-pelting protests in the Kashmir valley. According to Police officials, one cartridge of a pellet gun contains a few hundred pellets which resemble ball bearings. The moment it is fired, the cartridge bursts and immediately throws hundreds of pellet from a single point and can simultaneously involve many people. In Indian occupied Kashmir the world's most militarized territory, clinical evidence is growing every passing day to show the lethal effects like blindness of eye caused by metal pellets. Since 2016 the ongoing use of the indiscriminate pellet guns has blinded more than 1500 people in Kashmir valley. The so-called non-lethal weapon has already caused deaths since it was introduced in the valley during 2010 public agitation. Very few studies have been conducted on this topic till date ¹⁻³. One must keep in mind that pellets are very rarely used in the world to control the public agitation against any government administration except in Kashmir valley where its use is

very often. In rest of the world pellet injuries are accidental. Pellets are divided into lead and non-lead, based on the substances they are manufactured with. Several factors determine the extent of eye injury like shape and type of pellet, its velocity, tissue resistance and distance from which the pellets are fired^{4,5}. Many studies have noted that perforating injuries having extent upto posterior segment structures have very poor prognosis⁶⁻⁸. Our aim of this study was to evaluate the clinical profile of the patients having pellet related ocular trauma.

Material And Methods

This was a prospective study, in which 237 patients were included for analyses. The study was conducted in the ophthalmology department of one off the prime tertiary care hospitals of the Kashmir valley from 2013-2018. On the admission of the patients, we used to gather the information about the patients complete demographic data like age, sex, gender, time gap between incident and presentation, whether right or left eye is involved or even both eyes. After completing this, we recorded the information regarding the clinical profile of the ocular pellet injuries as follows:- site of injury (whether corneal, scleral, conjunctival, corneo-scleral, corneo-limbal or periocular) **Figure-1**, type of injury (like penetrating, perforating, rupture or avulsive) **Figure-2**, visual acuity at the time of admission to the hospital (like- defective perception of light/ray, accurate perception of light/ray, hand movement close to face, finger count close to face, >6/12, 6/12 or 6/6 vision), presence or absence of foreign body (projectiles) inside the eye, anterior segment for hyphema, iris injury, lens involvement or vitrous in anterior chamber, posterior chamber for retinal detachment, vitreous hemorrhage, macular involvement or pre-retinal hemorrhage, condition of the peri-orbital tissue was noted for whether there is peri-orbital injury present

or absent. Majority of the patients needed B-scan imaging to locate the foreign body (projectile) especially when the ocular media was not transparent enough to allow proper examination of eye. In some patients we required Computed Tomography (CT) scan, in cases who gave ocular trauma history by pellets but B-scan failed to find any intraocular foreign body. The data of all the patients was then compiled and analyzed.

Results

In this prospective study we analyzed clinical profile of 237 patients who presented to our hospital with ocular pellet injuries from 2013-2018. The mean age of our patients was 20.7 years with SD of 8.4 years. The age ranged from 10-42 years. Out of total 237 patients, 218 (92%) were males and 19 (8%) were females. Maximum number of patients, 187 (79%) were in the age group of 15-25 years. Total of 31 (13%) of cases were > 25 years of age and 19 (8%) of cases were < 15 years of age. Among 237 patients, right eye was involved in 109 (46%) patients, left eye was involved in 100 (42%) and 28 (12%) patients had involvement of both eyes. Out of 237 patients, 204 (86%) of them presented to hospital on the same day of incident. 28 (12%) cases reported after one day of incident and 5 (2%) of patients presented to hospital on second day onwards. The complete spectrum of clinical findings of all the patients with ocular pellet injuries on admission to the hospital is given in **Table-1**.

Discussion

All over the world the burden of ocular pellet injury is almost entirely on the inhabitants of Kashmir valley because of the ongoing conflict which started way back in 1947 at the time of independence of two countries, India and Pakistan. Few studies in the rest of the world have recorded the impact of accidental injuries to eye as a result of pellet guns. We can confidently say that very little

literature is available at present on pellet injuries. In the present study the mean age of patients was 20.7 years with SD of 8.4 years. Our results are almost at par with the results recorded in a study of 105 cases with ocular air gun injuries from England by Shuttleworth et al., in which they observed that 74% of patients were under 18 years of age with a mean age of 17.5 ± 9.12 years¹. In our study we have noted that 199 (84%) of cases were falling in the age group of 15-35 years of age. Similarly the age group mostly affected in the study conducted by Francis Kwasi et al.⁹ was between 10 to 35 years with a mean age of 19.9 ± 5 years. From these results we can see an increasing trend of young boys who got involved by pellets, this is obvious that young boys take part in protests against troops in war torn conflict regions.

In our study, the males were 218 (92%) and females were 19 (8%). Our results were very close to the findings recorded by Francis Kwasi et al.⁹, in their study they noted that out of 32 patients who were affected, 30 (93.75%) were males and the other 2 (6.25%) were females. In another series of 718 cases of air gun injuries from New Zealand by Langley et al.¹⁰ the male female ratio was 6:1. From these observations we can infer that it is males who take part in mob violence more as compared to females. Ocular pellet injury mostly involves one eye at one time, but it may involve both eyes simultaneously in some cases. In our study we observed that right eye was involved in 109 (46%) cases, and left eye in 100 (43%) of cases. Almost similar findings were recorded Assaf et al. in his study¹¹. Majority of our patients were admitted on the same day, 204 (86%) cases. Shuttleworth et al.¹ reported that, the majority of their cases having air gun ocular pellet injuries presented within short period of time after the incident, except two cases who presented late. Ocular pellet injuries may be either acute or chronic on

the basis of clinical presentation. Acute injuries can be any of the following: perforating injury to cornea, corneo-scleral laceration, globe rupture, hyphaema, traumatic cataract, vitreous hemorrhage, retinal detachment, macular involvement etc¹². In the present study we recorded the similar findings with vitreous hemorrhage being the most common presentation, seen in 154 (65%) patients and retinal detachment in 83 (36%) of cases. Tabatabaei SA, et al.¹³, in their study, noted that foreign body was present in the eye of 97 patients out of 116 patients (83%), and similarly 75% in the study by conducted by Shuttleworth et al.¹. In the present study, we recorded that ocular foreign body was present in 218 (92%) cases. Regarding the maximum findings which we have recorded there is almost negligible literature available at present.

Conclusion

From the present study as well as from the results of other related studies we can conclude that, pellets are extremely destructive when they penetrate the eyes and lead to serious visual catastrophes, mainly due to vitreous hemorrhage and retinal detachment. Considering its variable pattern of presentation, the management depends on the accurate diagnosis which is possible by appropriate history taking, examination and required tests. To reduce the burden of this visually alarming condition, administration should think on an alternative method which would be less lethal for humans while controlling the mob violence in the volatile regions like Kashmir valley.

References

1. Shuttleworth GN, Galloway P, Sparrow JM, Lane C. Ocular air gun injuries: a one-year surveillance study in the UK and Eire (BOSU). 2001-2002. *Eye (Lond)* 2009;23 (6:1370–1376.

2. Ramstead C, Ng M, Rudnisky CJ. Ocular injuries associated with Airsoft guns: a case series. *Can J Ophthalmol.* 2008;43 (5:584–587).
3. Kratz A, Levy J, Cheles D, Ashkenazy Z, Tsumi E, Lifshitz T. Airsoft gun-related ocular injuries: novel findings, ballistics investigation, and histopathologic study. *Am J Ophthalmol.* 2010; 149 (1:37–44).
4. Hollier L, Grantcharova EP, Kattash M. Facial gunshot wounds: a 4-year experience. *J Oral Maxillofac Surg.* 2001;59: 277–282.
5. Lee D, Nash M, Turk J, Har-El G. Low-velocity gunshot wounds to the paranasal sinuses. *Otolaryngol Head Neck Surg.* 1997;116:372–378.
6. Michels RG. Vitreous Surgery *Am Acad Ophthalmol* 1982:126p.
7. Cleary PE, Ryan SJ. Method of production and natural history of experimental posterior penetrating eye injury in the rhesus monkey. *Am J Ophthalmol.* 1979;88 (2:212–220).
8. Cleary PE, Ryan SJ. Histology of wound, vitreous, and retina in experimental posterior penetrating eye injury in the rhesus monkey. *Am J Ophthalmol.* 1979;88 (2:221–231).
9. Francis Kwasi Obeng, et al. Management of ocular injury. *Global Journal of Medical Research : K interdisciplinary* ,Vol-17, 5-2017.
10. Langley JD, Robyn NN, Alsop JC, Marshall SW. Airgun injuries in New Zealand, 1979e92. *Inj Prev.* 1996;2(2):114e117.
11. Assaf E, Emadisson H, Bendeddouche K, Forestier F, Salvanet-Bouccara A. [Pellet guns: a persistent threat to eyes] *J Fr Ophtalmol.* 2003;26 (9:960–966).
12. <https://www.reviewofophthalmology.com/article/wills-eye-resident-case-series-24966>

13. Tabatabaei SA, et al., Pellet gun injury as a source of ocular trauma; a retrospective review of one hundred and eleven cases, *Journal of Current Ophthalmology* (2018).

Table- 1. Clinical findings of patients with ocular pellet injuries on admission.

Site of entry	Cornea	86 (36%) cases
	Sclera	73 (31%)
	Cornea + limbal	30 (12.5%)
	Cornea + Sclera	21 (09%)
	Conjunctiva	14 (06%)
	Periocular	13 (5.5%)
Type of injury	Penetrating	171 (72%) cases
	Perforating	16 (07%)
	Avulsive	23 (10%)
	Rupture	27 (11%)
Visual acuity at presentation	6/6	35 (15%) cases
	>6/6	28 (12%)
	Finger count close to face	20 (8%)
	Hand movement close to face	33 (14%)
	Accurate PL/PR	37 (16%)
	Defective PL/PR	84 (35%)
Anterior segment	HypHEMA	141 (59%) cases
	Lens injury	94 (40%)
	Vitrous in A.C	26 (11%)
Posterior segment	Retinal detachment	83 (35%) cases
	Vitrous hemorrhage	154 (65%)

	Pre-retinal hemorrhage	104 (44%)
Peri-orbital injury	Lid involvement	17 (07%) cases
Intraocular foreign body	Present	218 ((92%) cases
	Absent	19 (08%)

Figure-1. Pellet injury to upper eye lid.



Figure-2. Penetrating pellet injury to sclera.

