

Original Article

Comparison Of Visual Outcome Among Various Patterns of Ocular Trauma Presenting In The Tertiary Care Hospital of Quetta

Komal Arooj Malik¹, Syed Abid Hassan Naqvi², Beenish Saleem³, Tehmina Nazir⁴, Naila Obaid⁵, Asad Habib⁶

Conflicts of Interest: None

Financial Support: None to report

Potential Competing Interests: None to report

Disclaimer: This study has not been published or submitted elsewhere for publication.

AI Disclosure: The authors disclose that ChatLLM was used to assist with language editing, grammatical corrections, and improvement of the clarity and readability of the manuscript. ChatLLM was not used for data collection, data generation, statistical analysis, interpretation of results, image generation, or scientific decision-making. The authors independently reviewed and verified all AI-assisted content and remain fully responsible for the accuracy, integrity, and originality of this manuscript.

Data Availability Statement: The data generated and/or analysed during this study are not publicly available because of ethical and patient confidentiality restrictions. However, anonymised data may be available from the corresponding author upon reasonable request and subject to approval by the relevant Institutional Ethics Committee.

Institutional Review Board

Approval

CMH QTA-IRB/061

03-03-2023

CMH, Quetta

Review began 26/07/2025

Review ended 27/08/2026

Published 30/09/2026

© Copyright 2026

Malik et al. This is an open access article distributed under the terms of the Creative Commons Attribution License CC-BY-SA 4.0., which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.



How to cite this article: Malik KA, Naqvi SAH, Saleem B, Nazir T, Obaid N, Habib A. Comparison Of Visual Outcome Among Various Patterns of Ocular Trauma Presenting In The Tertiary Care Hospital of Quetta. JRM. 2026 Sep. 30;30(3).

<https://doi.org/10.37939/jrmc.2680>

Abstract

Objective: To measure the frequency and outcomes of ocular trauma in a tertiary care hospital in Balochistan.

Methodology: This cross-sectional study was conducted at the Combined Military Hospital (CMH), Quetta, from January 2022 to May 2023. A sample of 130 consecutive patients with ocular war injuries who reported to CMH Quetta from January to May 2023 was analysed prospectively. Approval from the hospital's ethics committee review board was obtained. The primary outcome was improvement in visual acuity and OTS score after the application of two types of management strategies: surgery or conservative management. Comparisons between the two groups were performed using the chi-square test.

Results: A total of 130 patients were analysed, including 81 in Group S and 49 in Group C. The baseline demographic characteristics were comparable between the groups. Post-treatment visual acuity and Ocular Trauma Score showed significant improvement, with a statistically significant difference between groups ($p < 0.001$). In Group-S, primary repair with lens aspiration and anterior vitrectomy was the most frequently performed procedure (37.0%).

Conclusion: Ocular trauma, particularly war-related ocular injuries, is a significant cause of visual morbidity among patients presenting to a tertiary care hospital in Baluchistan. The outcomes varied according to the management strategy, with the assessment of visual acuity and Ocular Trauma Score providing useful measures of treatment response.

Keywords: Accidents, Cornea, Eye, Ocular, Trauma and Visual acuity.

Introduction

Eye trauma remains a significant global health issue and a noteworthy cause of unilateral loss of visual acuity.¹ It causes significant ocular morbidity in both children and adults. Road traffic accidents are a frequent cause of ocular trauma in the general adult population, accounting for five hundred thousand new cases of unilateral vision loss each year.² Ocular trauma carries substantial social, psychological, and economic implications.³ Although there have been notable advancements in treatment, the outcomes of such injuries remain uncertain. The multifaceted nature of these lesions, often affecting both segments of the eyeball, presents a formidable challenge for ophthalmic surgeons.

Corneal tear, scleral tear, and lens damage are the most commonly observed morbidities.⁴ Corneal tears resulting from direct impact or sharp objects can cause corneal opacity and irregular astigmatism, leading to visual distortion.⁵ Scleral tears, often associated with blunt-force injuries, can increase the risk of intraocular infection and secondary retinal detachment. Damage to the lens, a frequent consequence of trauma, may lead to cataract formation, gradually compromising visual acuity if not addressed promptly.⁶ Understanding the

The prevalence and spectrum of ocular injuries resulting from trauma are vital for timely diagnosis, appropriate management, and optimising visual outcomes.

Balochistan, situated in Pakistan, holds a distinctive status as a postcolonial area on the fringes of global warfare. In this complex environment, terrorism emerges as an extreme and exceptional occurrence, coexisting with the regular social and political dynamics that characterise urban life. The juxtaposition of these two contrasting elements creates a unique and challenging context for the province and its inhabitants. Owing to its critical geographical location, the suburban cities of Baluchistan are involved in several security operations, due to which the Combined Military Hospital Quetta receives a larger proportion of injured army men either directly or after referral from other centres. The present study was an epidemiological analysis of ocular trauma and its outcomes in such patients.

Methodology

The venue of this cross-sectional study was the CMH Quetta. After approval from the hospital's ethical committee review board (CMH QTA-IRB/061), the data of 130 consecutive patients with ocular war injuries from January 2022 to May 2023 were analysed prospectively. The minimum sample size required was estimated using the WHO sample size calculator, with a confidence level of 95%, an anticipated population proportion of 0.14%,⁷ absolute precision of 0.05⁷. The sample size was 95. We included 103 patients using non-probability consecutive sampling. Patients aged 12–80 years who presented with ocular trauma were included in the study, whereas patients who were dead on arrival or who expired within 24 h of presentation, and those in whom examination could not be completed, were excluded from the study. A predesigned Performa was utilised to record the demographic details of the patients, including age, sex, cause, eye involved, nature of injury, Ocular Trauma Score (OTS) before and after management, visual acuity (before and after management), and type of management strategy: surgery or conservative management. The severity of the injury was described using the Ocular Trauma Score (OTS) Grade.⁸ Potential confounding factors were addressed by assessing and comparing relevant baseline characteristics between the conservative and surgical groups, including age, sex, eye involved, and mechanism of injury. These variables were considered during the interpretation of treatment outcomes, particularly the differences in injury characteristics between the two groups.

Table-1: Ocular Trauma Score (OTS).⁸

OTS Score	RAW POINTS
1	0-44
2	45-65
3	66-80
4	81-90
5	92-100

The data were analysed using the Statistical Package for the Social Sciences (SPSS) version 26.0. The mean and standard deviation were computed for quantitative variables. Frequencies and percentages were calculated for qualitative variables. Chi-square analysis and t-test were used wherever required to find the p-value. Statistical significance was set at $p < 0.05$.

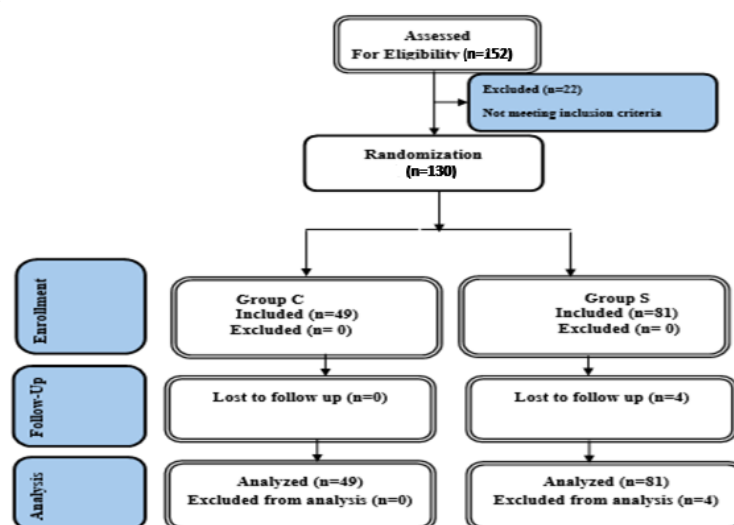


Figure 1: Flow diagram of the study

Results

A total of 130 patients were included in the analysis, comprising 81 patients in Group S and 49 patients in Group C. The mean age was 42 ± 27.47 years in Group S and 61 ± 26.73 years in Group C, with no statistically significant difference between the groups ($p=0.706$). Group S included 72 (88.9%) males and 6 (7.4%) females, while Group C included 44 (89.8%) males and 5 (10.2%) females ($p=0.210$). The right eye was involved in 34 (42.0%) patients in Group S and 20 (40.8%) patients in Group C, whereas the left eye was involved in 47 (58.0%) and 29 (59.2%) patients, respectively. The difference in laterality between the groups was not statistically significant ($p=0.522$). Regarding the nature of injury, pre-septal cellulitis was reported in 7 (8.6%) patients in Group S and 2 (4.1%) patients in Group C. Trauma with a fork occurred in 6 (7.4%) patients in Group S and 3 (6.1%) patients in Group C, while stick injury was observed in 27 (33.3%) and 11 (22.4%) patients, respectively. Splinter injury was reported in 32 (39.5%) patients in Group S compared with 1 (2.0%) patient in Group C. Road traffic accidents accounted for 1 (1.2%) case in Group S and 16 (32.7%) cases in Group C. Football injury was reported in 8 (16.3%) patients in Group C and none in Group S. Trauma with a toy occurred in 1 (2.0%) patient in Group C and none in Group S. Fingernail injury was reported in 2 (2.5%) patients in Group S and 2 (4.1%) patients in Group C. Facial burn occurred in 2 (4.1%) patients in Group C, while trauma with acid was reported in 3 (6.1%) patients in Group C. Hot-water burn was observed in 6 (7.4%) patients in Group S and none in Group C as seen in Table 2.

Table 2: The comparison of age, gender, eye involved, and nature of injury between groups (n=130)

Parameters		Group S n=81 Mean $\pm$ SD	Group C n=49 Mean $\pm$ SD	p value
Age (years)		42 $\pm$ 27.47	61 $\pm$ 26.73	0.706
Gender	Male	72(88.9)	44(89.8)	0.210
	female	6(7.4)	5(10.2)	
Eye involved	Right	34(42.0)	20(40.8)	0.522
	Left	47(58.0)	29(59.20)	
Football Injury		0(0)	8 (16.3)	
Pre-Septal Cellulitis		7(8.6)	2 (4.1)	
Trauma With Fork		6(7.4)	3(6.1)	
Stick Injury		27(33.3)	11(22.40)	
Trauma With Toy		0(0)	1(2.0)	
Splinter Injury		32(39.5)	1(2.0)	
RTA		1(1.2)	16(32.7)	
Fingernail Injury		2(2.50)	2 (4.1)	
Facial Burn		0(0)	2(4.1)	
Trauma With Acid		0(0)	3 (6.1)	
Hot Water Burn		6(7.4)	0(0)	

In Group S, primary repair with lens aspiration and anterior vitrectomy was the most frequently performed surgical procedure in 30 (37.0%) patients, followed by corneal repair in 17 (21.0%) and lid repair in 14 (17.3%) patients. Posterior chamber IOL implantation was performed in seven (8.6%) patients, while orbital floor repair with evisceration, orbital implant, and artificial eye implantation were performed in six (7.4%) patients each. Evisceration with lid repair was performed in one (1.2%) patient. None of these surgical procedures were performed in Group C, where patients were managed conservatively (Table 3).

Visual acuity before treatment was comparable between Groups C and S, with no statistically significant difference ($p=0.103$). After treatment, visual acuity improved significantly in both groups, with a significant difference between the groups ($p<0.001$). The OTS distribution before treatment was significantly different between the groups ($p=0.02$), while after treatment, a significant improvement in OTS was observed, with most patients in Group-S achieving OTS grade 5 (66, 81.5%) compared to none in Group-C ($p<0.001$), as shown in Table 4.

Table 3: Type of surgical procedures performed in Group-S (n-81)

Primary Repair (AC Repair, Lens Aspiration and Anterior Vitrectomy)	30(37.0)	NIL
Lid Repair	14(17.3)	NIL
Evisceration and Lid Repair	1(1.2)	NIL
Corneal Repair	17(21.0)	NIL
Post Chamber IOL Implantation	7(8.6)	NIL
Orbital floor repair, evisceration and orbital implant	6(7.4)	NIL
Artificial eye implantation	6(7.4)	NIL

Table 4: Visual Acuity and OTS before and after the treatment

Visual acuity before treatment (VA)	Group C n=49 Frequency (%)	Group S n=81 Frequency (%)	p value
6/6	24 (49.0)	23(28.4)	0.103
6/7.5	9 (18.4)	14(17.3)	
6/9	11 (22.4)	18(22.2)	
6/12	3(6.1)	10(12.3)	
6/24	0(0)	2(2.5)	
6/48	0(0)	1(1.2)	
CF	1 (2.0)	2(2.5)	
PL	1 (2.0)	10(12.3)	
NPL	0(0)	1(1.2)	<0.001
Visual acuity after treatment (VA)			
6/6	37 (75.5)	49(60.5)	
6/7.5	6 (12.2)	11(13.6)	
6/9	4 (8.2)	15(18.50)	
6/12	1(2.0)	1(1.2)	
6/24	0(0)	0(0)	
6/48	1(2.0)	3(3.7)	
CF	0(0)	0(0)	
PL	0(0)	1(1.2)	0.02
NPL	0(0)	1(1.2)	
OTS Before Treatment	n (%)	n (%)	
1	8(16.3)	26(32.1)	
2	6(12.2)	12(14.8)	
3	4(8.2)	1(1.2)	
4	9(18.4)	4(4.9)	
5	22(44.9)	38(46.9)	
OTS After Treatment			<0.001
1	2(4.1)	2(2.5)	
2	0(0)	7(8.6)	
3	0(0)	4(4.9)	
4	1(2.0)	2(2.5)	
5	0(0)	66(81.5)	

Discussion

Our study showed that surgical management was superior to conservative management of ocular trauma, and the OTS score correlated with ocular trauma and showed improvement along with visual acuity, indicating clinical improvement. Our study was an observational and descriptive study in which we presented the frequencies of different ocular traumas and their outcomes. Although surgical management showed better outcomes, we did not compare the treatments given because the types of injuries were multi-aetiological. We only provided insight into the reliability of the OTS score. Ocular trauma, particularly in children, is a major global cause of non-congenital monocular blindness and a significant contributor to eye-related morbidity. Ocular injuries are known to result in

substantial morbidity, including discomfort, psychological stress, and financial hardship, in addition to visual impairment.⁹ OTS was a good indicator of the ultimate visual result in this study for both blunt and penetrating injuries, producing reliable outcomes for more than a range of illnesses and injuries. Our findings were similar to those of Chaudhary A,¹⁰ who demonstrated that the OTS score correlated well with clinical outcomes. They compared it to the Paediatric Penetrating Ocular Trauma Score (POTS), which fell short of their expectations and did not correlate well with the clinical outcome. We not only measured OTS but also correlated it with visual acuity; therefore, we deemed OTS to be a trustworthy technique for evaluating the visual prognosis post-trauma.

The predictive value of the OTS score can be used to manage expectations and provide counselling to patients and their families in the future. Before pursuing complicated, occasionally costly procedures, it can help to offer advice to the practitioner, especially in the context of limited resources.¹¹ IED blasts were the most common underlying cause of ocular injuries in our patients, followed by blunt trauma and RTA. Although it is thought that this score does not hold substantial significance post-surgery,¹² according to our experience, there was significant improvement in the OTS after surgical treatment.

According to Unver et al., the OTS score is reliable for open-globe injuries and can yield accurate prognostic data. They retrospectively studied the eyes of 114 patients with open-globe injuries between January 2001 and July 2006. When examined initially, the OTS was calculated, and the OTS variables (visual acuity, rupture, endophthalmitis, perforating injury, retinal detachment, and afferent pupillary defect) were determined. They demonstrated that the probability of the final visual acuity was comparable to that of the OTS study group, and the OTS correlated positively ($p < 0.001$).¹³ In our study, the visual acuity correlated well with the OTS, as both improved in parallel.

According to Weichel et al., compared to open-globe trauma, closed-globe combat ocular trauma had better visual outcomes and higher rates of non-ocular damage. They established that the OTS was a reliable categorisation system that linked the degree of damage to the ultimate visual acuity and prognosis. They also demonstrated that the worst visual prognosis is associated with a globe paired with oculoplastic or neuroophthalmologic damage.¹⁴ We are working in a remote setting where war injuries are very frequent, and we had a large number of open globe injuries (almost 80 patients). The OTS correlated well in both blunt, stick, and splinter injuries, as there was an overall improvement in the OTS score.

In contrast to our study, a study conducted in central Maharashtra,¹⁵ found that children aged 6–10 years were the most affected. Similarly, a study conducted in Western Australia,¹⁶ found that the age group most likely to sustain injuries was 0–2 years old. We also included children in our study, but the mean age in our study was 40 years, as most of our patients were war-wounded. The OTS score still showed a reasonable correlation in all patients, irrespective of age and sex. One major source of morbidity and disability among US military personnel is combat ocular trauma (COT).¹⁷ While less severe eye injuries can cause a brief reduction in visual acuity (VA), severe ocular trauma can cause blindness. The OTS-Ocular Trauma Score, a measure created by Kuhn et al., was used in this study to assess the results of long-term treatment. It was discovered that the outcomes of battle eye injury treatment and its adnexa during the 2014–2015 study period exhibited a strong link with the estimated values of the likelihood of maintaining visual function based on the OTS scale. Six months later, nearly all patients who experienced blindness in one eye continued to be blind in that eye. While the OTS scale indicates that these patients typically stay in this group or move to another, an improvement in visual function was observed in the majority of cases (65%) in the group with light projection and hand movement close to the face.¹⁸ However, we conducted our study over six months and did not include long-term follow-up.

According to Mao et al., males predominate in mechanical ocular injuries over females. Open globe injury was the primary type of injury in their study, and it presented earlier than closed globe injury. Workplace-related injuries were the most prevalent. In comparison to OGI, the initial and final visual acuities in CGI were superior in their study. OTS determined at the time of the initial assessment could be a helpful metric for prognosis estimation.¹⁹ We performed randomisation based on the treatment given, not based on the type of injury. However, we were still able to establish that VA and OTS correlated well, and that OTS could predict the outcome and prognosis of patients with ocular trauma. Visual acuity improved alongside OTS in the patients, indicating their interconnection.

Conclusions

Ocular trauma, particularly war-related ocular injuries, is a significant cause of visual morbidity among patients presenting to a tertiary care hospital in Baluchistan. The outcomes varied according to the management strategy, with the assessment of visual acuity and Ocular Trauma Score providing useful measures of treatment response. is essential for optimising visual outcomes in patients with ocular trauma. This study had a single-centre experience. We did not include patients with the same mode of injury, as the sample size would have been very small, and it would have required a long study period to cover it. Therefore, we presented descriptive statistics and visual

outcomes before and after the treatments of different types. We only focused on the correlation between the OTS score and visual acuity. As this was an observational study, the possibility of residual confounding cannot be completely excluded. Confidence intervals were not calculated in the original analysis, and the results were reported primarily using descriptive statistics and p-values.

Author Information

¹Senior Registrar, CMH, Quetta

^{2,3,4,5,6}Consultant, CMH, Quetta.

Corresponding author: Dr. Komal Arooj Malik  drkomalarooj@gmail.com

Contributions:

KA SAN BS TN NO AH - Conception, Design

KA SAN BS TN NO AH - Acquisition, Analysis, Interpretation

KA SAN BS TN NO AH - Drafting

KA SAN BS TN NO AH - Critical Review

All authors approved the final version to be published & agreed to be accountable for all aspects of the work.

References

1. Mazharian A, Panthier C, Courtin R, Jung C, Rampat R, Saad A, et al. Incorrect sleeping position and eye rubbing in patients with unilateral or highly asymmetric keratoconus: a case-control study. *Graefes Archive for Clinical and Experimental Ophthalmology*. 2020;258:2431-2439. <https://doi.org/10.1007/s00417-020-04771-z>.
2. Kozner P, Stepankova J, Dotrellova D. Long-term evaluation of pars plana vitrectomy in children with Abusive head trauma. *European Journal of Ophthalmology*. 2022;32(1):553-558. <https://doi.org/10.1177/1120672120968760>
3. Weiss R, He C, Gise R, Parsikia A, Mbekeani JN. Patterns of pediatric firearm-related ocular trauma in the United States. *JAMA ophthalmology*. 2019;137(12):1363-1370. <https://doi.org/10.1001/jamaophthalmol.2019.3562>
4. Schornack M, Nau C, Nau A, Harthan J, Fogt J, Shorter E. Visual and physiological outcomes of scleral lens wear. *Contact Lens and Anterior Eye*. 2019;42(1):3-8. <https://doi.org/10.1016/j.clae.2018.07.007>.
5. Hakim FE, Farooq AV. Dry eye disease: An update in 2022. *Jama*. 2022 Feb 1;327(5):478-479. <https://doi.org/10.1001/jama.2021.19963>.
6. Flanagan G, Velez T, Gu W, Singman E. The relationship between severe visual acuity loss, traumatic brain injuries, and ocular injuries in American service members from 2001 to 2015. *Military medicine*;185(9-10):e1576-1583. <https://doi.org/10.1093/milmed/usaa154>
7. Ayanniyi AA, Mahmoud OA, Olatunji FO, Ayanniyi RO. Pattern of ocular trauma among primary school pupils in Ilorin, Nigeria. *Afr J Med Med Sci*. 2009 Jun;38(2):193-6.
8. Scott R. The Ocular Trauma Score. *Community Eye Health*. 2015;28(91).
9. Perez EA, Ramirez DA, Peterson JD, Binkley EM, Boldt HC, Gehrs KM, et al. The ocular trauma score underestimates visual recovery for the most severe open-globe injuries. *Ophthalmol. Retina*. 2023;15(5):23-26. <https://doi.org/10.1016/j.oret.2023.01.021>
10. Chaudhary A, Singh R, Singh SP. Prognostic value of Ocular Trauma Score and pediatric Penetrating Ocular Trauma Score in predicting the visual prognosis following ocular injury. *Rom J Ophthalmol*. 2022 Apr-Jun;66(2):146-152. <https://doi.org/10.22336/rjo.2022.29>
11. Dulz S, Dimopoulos V, Katz T, Kromer R, Bigdon E, Spitzer MS, et al. Reliability of the ocular trauma score for the predictability of traumatic and post-traumatic retinal detachment after open globe injury. *Int J Ophthalmol*. 2021;14(10):1589-1594. <https://doi.org/10.18240/ijo.2021.10.17>.
12. Shah M, Sundar G, Shah S. Ocular trauma score revisited—making sense of it all. *Latin American Journal of Ophthalmology*. 2019;4:2. https://doi.org/10.25259/LAJO_8_2019
13. Unver, Yaprak Banu MD, Kapran, Ziya MD, Acar, Nur MD, et al. Ocular Trauma Score in Open-Globe Injuries. *The Journal of Trauma: Injury, Infection, and Critical Care* 66(4):p 1030-1032, April 2009. <https://doi.org/10.1097/TA.0b013e3181883d83>
14. Weichel ED, Colyer MH, Ludlow SE, Bower KS, Eiseman AS. Combat ocular trauma visual outcomes during operations iraqi and enduring freedom. *Ophthalmology*. 2008;115(12):2235-45. <https://doi.org/10.1016/j.ophtha.2008.08.033>.