ORIGINAL RESEARCH

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Clinical Characteristics and Outcomes of Patients Admitted to the Ophthalmology Department Through the Emergency Department: A Tertiary Hospital Experience

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Abstract

Objective: To analyze the clinical characteristics, indications for hospitalization, surgical requirements, and visual outcomes of patients admitted from the emergency department to the ophthalmology department of a tertiary hospital, with a particular focus on ocular trauma and hospitalization patterns.

Materials and Methods: This retrospective study included 105 patients admitted from the emergency department to the ophthalmology department between April 2022 and April 2025. Demographic and clinical characteristics, admission diagnoses, ocular examination findings at admission and discharge, length of hospital stay, surgical interventions, and systemic steroid use were recorded. Patients were categorized according to trauma status (trauma vs. non-trauma), trauma type (blunt, penetrating, or chemical), and length of hospital stay.

Results: The mean age was 50.4±22.9 years, and 66% of patients were male. The median hospital stay was 3 days, with 46.6% of patients hospitalized for >3 days. Ocular trauma accounted for 53.4% of admissions, with blunt trauma (54.5%) being the most common injury type, followed by penetrating trauma (38.2%). The leading admission diagnoses were retinal detachment, penetrating ocular trauma, and eyelid laceration. Trauma patients were significantly younger and more likely to have left-eye involvement than non-trauma patients. Surgical intervention was required in 69.9% of all cases. Visual acuity improved in both the trauma and non-trauma groups, with greater improvement observed in blunt trauma than in penetrating trauma. Longer hospitalization was associated with poorer baseline visual acuity.

Conclusion: Ocular trauma was the leading cause of hospitalization from the emergency department, with blunt trauma representing the most common injury type. Retinal detachment was the most frequent non-traumatic indication for hospitalization, and nearly 70% of patients required surgical intervention.

Keywords: Emergency department, hospitalization, ocular trauma, retinal detachment, visual acuity

Introduction

Ophthalmic emergencies are a group of diseases that can cause permanent vision loss and affect quality of life if not diagnosed and treated early [1]. Retinal detachment, endophthalmitis, and traumatic ocular injuries are among such diseases. For these patients, immediate referral from the emergency department to an ophthalmologist is important [2,3]. Timely diagnosis and appropriate management are essential to optimize visual outcomes [4,5].

Ocular trauma is one of the leading causes of monocular blindness worldwide [6,7]. Ocular injuries account for 10–15% of all ophthalmic diseases and represent an important preventable cause of visual impairment. Ocular trauma includes blunt, penetrating, chemical, and thermal injuries and is particularly common in young males following work-related, traffic, and sports accidents [8]. Visual prognosis after ocular trauma is associated with the type and severity of injury, as well as the timing of treatment, with both blunt and penetrating trauma carrying a substantial risk of permanent visual loss [9]. Furthermore, ocular trauma results not

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only in individual disability but also in significant socioeconomic losses.

Ophthalmic emergency services may be influenced by global health crises such as the COVID-19 pandemic. During the pandemic, changes in healthcare utilization and restrictions on access to medical services altered the epidemiology of ophthalmic emergency presentations [10–12]. To minimize the influence of these temporary changes and better reflect routine clinical practice, the present study included only patients admitted after this period. The aim of this study was to evaluate the reasons for admission from the emergency department to the ophthalmology department of a tertiary hospital, as well as trauma characteristics, visual outcomes, surgical requirements, and the impact of trauma presence and type on clinical outcomes.

Materials and Methods

This retrospective, single-center, hospital-based observational study was approved by the Ethics Committee of Göztepe Prof. Dr. Süleyman Yalçın City Hospital (approval no. 20205/0014). The study was conducted in accordance with the principles of the Declaration of Helsinki.

The study included 105 patients aged 1–80 years who presented to the emergency department of a tertiary hospital and were subsequently hospitalized in the ophthalmology department between April 2022 and April 2025. Patient information was obtained from the hospital automation system. Patients with incomplete medical records and those requiring hospitalization after previous ocular surgery were excluded from the study. In cases of multiple hospital admissions, only the first admission was included.

Patients presenting to the emergency department with ocular complaints were initially evaluated by an emergency physician and subsequently referred for ophthalmology consultation. The patients were examined by an ophthalmology resident using the Snellen chart to determine best-corrected visual acuity (BCVA) and underwent intraocular pressure (IOP) measurement, slit-lamp biomicroscopy, and a detailed dilated fundus examination. Following evaluation by an ophthalmologist, patients requiring surgery or those unsuitable for outpatient follow-up were admitted to the ophthalmology department. Demographic characteristics, trauma types, ocular diagnoses, and data regarding surgical treatment and systemic steroid therapy were retrieved from the hospital database. Patients were categorized according to trauma status, trauma type (blunt, penetrating, or chemical), and length of hospital stay (≤3 days or >3 days).

Statistical Analysis

Research data were analyzed using SPSS version 26.0 (Statistical Package for the Social Sciences, Chicago, IL, USA). The normality of the data was assessed using the Kolmogorov–Smirnov and Shapiro–Wilk tests. Continuous variables were compared using the independent-samples t test or Mann–Whitney U test, categorical variables using the chi-square or Fisher's exact test, and admission and discharge values using the paired t test or Wilcoxon signed-rank test, as appropriate. A p value of <0.05 was considered statistically significant.

Results

A total of 105 patients were included, with a mean age of 50.4±22.9 years, and 66% were male. The median hospital stay was 3 days, and 46.6% of patients were hospitalized for >3 days. Ocular trauma accounted for 53.4% of admissions, with blunt trauma representing the most common injury type. The leading

Table 1. Demographic and clinical characteristics of hospitalized ophthalmology patients

Age (years) (mean±SD)	50.4±22.9
Male gender (n, %)	68 (66%)
Duration of hospitalisation, days, median (range)	3 (1-80)
Duration of hospitalisation >3 days (n, %)	48 (46.6%)
Left eye (n, %)	61 (59.2%)
Surgical intervention (n, %)	72 (69.9%)
Systemic steroid therapy (n, %)	10 (9.7%)
Ocular trauma (n, %)	55 (53.4%)
Blunt trauma	30 (54.5%)
Penetrating trauma	21 (38.2%)
Chemical trauma	4 (7.3%)
Admission diagnoses (n, %)	
Retinal detachment	20 (19.4%)
Perforation	18 (17.5%)
Eyelid laceration	15 (14.6%)
Rupture	11 (10.7%)
Keratitis/Corneal abscess	10 (9.7%)
Endophthalmitis	6 (5.8%)
Corneal oedema	4 (3.9%)
Uveitis	4 (3.9%)
Non-arteritic ischaemic optic neuropathy	4 (3.9%)
Preseptal/orbital cellulitis	3 (2.9%)
Intraocular foreign body	2 (1.9%)
Retinitis	2 (1.9%)
Hyphaema	2 (1.9%)
Orbital myositis	1 (1%)
Orbital inflammatory syndrome	1 (1%)
Retinal artery occlusion	1 (1%)
Orbital compartment syndrome	1 (1%)

SD: Standard deviation.

Table 2. Comparison of demographic and clinical features between patients with and without ocular trauma

Variables	Ocular Trauma (+) (n=55)	Ocular Trauma (-) (n=48)	p
Age (years) (mean±SD)	45.6±23.6	55.8±21.1	**0.024**
Male gender (n, %)	39 (70.9%)	29 (60.4%)	0.262
Hospitalisation duration, days, median (range)	3 (1-58)	3.5 (1-80)	0.114
Hospitalisation period >3 days (n, %)	24 (43.6%)	24 (50%)	0.518
Left eye (n, %)	39 (70.9%)	22 (45.8%)	**0.010**
Surgical intervention (n, %)	48 (87.3%)	24 (50%)	**<0.001**
Systemic steroid therapy (n, %)	3 (5.5%)	7 (14.6%)	0.119
BCVA (logMAR) (mean±SD) At admission At discharge Change Within-group p value	 1.5±1.13 1.3±1.11 -0.2±0.58 **0.019**	 1.7±1.02 1.45±1.08 -0.24±0.92 **0.049**	 0.556 0.456 0.831
IOP (mmHg) (mean±SD) At admission At discharge Change Within-group p value	 14.1±6.1 14.0±2.4 -0.02±5.62 0.681	 18.1±8.2 16±4.3 -2.02±7.63 0.105	 **0.001** **0.031** 0.293

Values are presented as mean±SD, median (range), or n (%). Between-group comparisons were performed using the independent-samples t-test, Mann–Whitney U test, chi-square test or Fisher's exact test, as appropriate. Within-group comparisons of BCVA and IOP were performed using the Wilcoxon signed-rank test. BCVA: best-corrected visual acuity; IOP: intraocular pressure; SD: standard deviation.

admission diagnoses were retinal detachment, penetrating ocular trauma, and eyelid laceration. Overall, 69.9% of patients required surgical intervention (Table 1).

Compared with non-trauma patients, trauma patients were significantly younger (p=0.024), more frequently had left-eye involvement (p=0.010), and underwent surgical intervention more often (p<0.001). Visual acuity improved significantly in both

Table 3. Comparison of demographic and clinical parameters between blunt and penetrating ocular trauma

Variables	Blunt trauma (n=30)	Penetrating trauma (n=21)	p
Age (years) (mean±SD)	50.1±25.1	41.3±21.9	0.202
Male gender (n, %)	18 (60)	18 (85.7)	0.047
Hospitalisation duration, days, median (range)	3 (1-16)	2 (1-23)	0.923
Hospitalisation period >3 days (n, %)	14 (46.7)	8 (38.1)	0.543
Left eye (n, %)	22 (73.3)	14 (66.7)	0.607
Surgical intervention (n,%)	26 (86.7)	21 (100)	0.134
Systemic steroid therapy (n, %)	1 (3.3)	2 (9.5)	0.561
BCVA (logMAR) (mean±SD) At admission At discharge Change Within-group p value	 1.43±1.22 1.27±1.14 -0.16±0.4 0.012	 1.60±1.07 1.52±1.09 -0.09±0.65 0.645	 0.685 0.434 0.582
IOP (mmHg) (mean±SD) At admission At discharge Change Within-group p value	 15.3±6.9 14±2.7 -1.33±6.29 0.080	 12±4.9 14.1±2.2 2.10±4.36 0.039	 0.036 0.930 0.026

Values are presented as mean±SD, median (range), or n (%). Between-group comparisons were performed using the independent-samples t-test, Mann–Whitney U test, chi-square test, or Fisher's exact test, as appropriate. Within-group comparisons of BCVA and IOP were performed using the Wilcoxon signed-rank test. BCVA: best-corrected visual acuity; IOP: intraocular pressure; SD: standard deviation.

Table 4. Comparison of visual acuity and intraocular pressure according to length of hospital stay

Variables	Hospitalisation period ≤ 3 days (n=55)	Hospitalisation period >3 days (n=48)	p
BCVA (logMAR) (mean±SD)			
At admission	1.34±1.05	1.88±1.05	0.006
At discharge	1.30±1.10	1.45±1.09	0.169
Change	-0.04±0.72	-0.42±0.74	0.057
Within-group p value	0.523	<0.001	
IOP (mmHg) (mean±SD)			
At admission	16.1±6.8	15.8±8.1	0.142
At discharge	15.6±3.4	14.3±3.7	0.045
Change	-0.47±6.77	-1.5±6.58	0.326
Within-group p value	0.911	0.260	

Values are presented as mean±SD. Between-group comparisons were performed using the Mann–Whitney U test. Within-group comparisons were performed using the Wilcoxon signed-rank test. BCVA: best-corrected visual acuity; IOP: intraocular pressure; SD: standard deviation.

groups, whereas intraocular pressure was lower in trauma patients at both admission and discharge. The comparison between trauma and non-trauma patients is presented in Table 2.

Among trauma patients, visual acuity improved significantly in the blunt trauma group (p=0.012), whereas no significant improvement was observed in the penetrating trauma group (p=0.645). Penetrating trauma was more common in males (p=0.047) and was associated with a statistically significant increase in intraocular pressure from admission to discharge (p=0.039). The demographic and clinical characteristics of patients with blunt and penetrating trauma are summarized in Table 3.

Patients hospitalized for >3 days had poorer baseline visual acuity (p=0.006) and showed significant visual improvement by discharge (p<0.001). No significant changes in intraocular pressure were observed during hospitalization in either group (p=0.911 and p=0.260, respectively). The comparison according to length of hospital stay is shown in Table 4.

Discussion

In this study, we evaluated the epidemiological and clinical characteristics of patients admitted to the ophthalmology department from the emergency department of a tertiary hospital. Ocular trauma was the leading cause of hospitalization, with blunt trauma representing the most common injury type. Retinal detachment was the most frequent non-traumatic indication for admission, and approximately 70% of patients required surgical intervention. These findings highlight the broad spectrum of ophthalmic emergencies requiring inpatient management and emphasize the substantial burden of trauma-related conditions on ophthalmic emergency services.

The predominance of ocular trauma, particularly among young males, is consistent with previous studies. Agrawal et al. [13] and Omotoye et al. [5] similarly reported a higher risk of ocular trauma in males. Likewise, Krishnaiah et al. [14] demonstrated that ocular trauma occurs more frequently in males and represents an important cause of visual impairment. Pandemic-related studies have shown that, although healthcare utilization and emergency attendance patterns changed substantially during the COVID-19 pandemic, ocular trauma remained one of the leading reasons for emergency ophthalmic care [10–12]. Similar to these reports, ocular trauma was the leading cause of hospitalization in our post-pandemic cohort. However, unlike the pandemic-era study by Şahin Vural et al. [10], which reported pandemic-related changes in injury mechanisms and shorter hospital stays without significant differences in clinical characteristics or surgical outcomes, our study reflects routine post-pandemic emergency practice and demonstrates that ocular trauma continues to constitute the major indication for ophthalmic hospitalization. The higher risk observed in males is likely related to greater occupational exposure and participation in outdoor activities. In addition, the more frequent involvement of the left eye in our cohort may reflect the tendency of individuals to protect their dominant eye, as suggested in previous studies [8,15].

Blunt trauma was the most common trauma subtype, accounting for 54.5% of all ocular trauma cases. This proportion was comparable to the 54% reported by Maurya et al. [8] but higher than the 28% reported by Rahman et al. [16]. Consistent with the generally more favorable prognosis of blunt trauma, significant visual improvement was observed after treatment in this group, whereas improvement was limited in patients with penetrating trauma. The poorer visual recovery associated with penetrating trauma is likely attributable to more extensive damage to intraocular structures at presentation. Chemical injuries accounted for only 7.3% of trauma cases in our cohort, indicating that they represented a relatively uncommon cause of hospitalization.

Approximately 70% of patients in our cohort required surgical intervention. This rate is comparable to the 77% reported by May et al. [17] in a cohort of 8,952 trauma patients in the United States but higher than the 43% reported by Sahu et al. [9] in a prospective study involving 180 patients. The high proportion of patients requiring surgery underscores the severity of ophthalmic conditions necessitating hospitalization and highlights the importance of timely surgical management, particularly in vision-threatening conditions such as retinal detachment and penetrating ocular trauma. Likewise, the timing of presentation and treatment is an important determinant of visual outcomes in ophthalmic emergencies, and previous studies have shown that earlier intervention is associated with a better visual prognosis [5,18]. However, owing to the retrospective design of our study, we were unable to determine the interval between symptom onset and treatment or the duration of patients' stay in the emergency department before ophthalmology evaluation. This should be considered when interpreting our findings.

Non-traumatic conditions also represented an important indication for hospitalization, with retinal detachment being the most common non-traumatic diagnosis in our cohort. Previous studies have similarly identified retinal detachment, ocular infections, and uveitis as the leading non-traumatic causes requiring emergency ophthalmic admission [19,20]. These findings emphasize that, in addition to ocular trauma, non-traumatic ophthalmic emergencies constitute a substantial proportion of inpatient admissions and require timely recognition and management. Patients hospitalized for more than 3 days had poorer baseline visual acuity but demonstrated significant visual improvement during follow-up. This finding is consistent with previous studies reporting that initial visual acuity is an important prognostic factor for visual outcomes [5,18,21,22]. Similarly, Kang et al. [23] reported that visual acuity may predict the need for hospitalization among patients presenting to the emergency department.

Study Limitations

The main limitations of this study include its retrospective design, single-center setting, relatively small sample size, and variability in hospitalization indications and duration according to clinician judgment. In addition, only patients requiring hospitalization were included; therefore, our findings may not be generalizable to all ophthalmic emergency presentations. As a tertiary referral center, the distribution of diagnoses may also have been influenced by referral patterns. Despite these limitations, our study provides real-world data on the epidemiological and clinical characteristics of patients requiring hospitalization from the emergency department to an ophthalmology service and contributes contemporary evidence to the existing literature.

Conclusion

In conclusion, ocular trauma was the leading cause of hospitalization, predominantly affecting young males, with blunt trauma representing the most common injury type. Retinal detachment was the most frequent non-traumatic indication for admission, and a high proportion of patients required surgical intervention, reflecting the severity of conditions requiring inpatient ophthalmic care. These findings provide contemporary data on patients requiring hospitalization for ophthalmic emergencies and may help guide emergency ophthalmic care.

Main Points

- Ocular trauma was the leading cause of hospitalization from the emergency department, with blunt trauma representing the most common injury type.
- Retinal detachment was the most frequent non-traumatic indication for hospitalization and, together with ocular trauma, accounted for most emergency admissions.
- Approximately 70% of hospitalized patients required surgical intervention, highlighting the severity of ophthalmic emergencies requiring inpatient care.
- Poor baseline visual acuity was associated with longer hospitalization, suggesting its potential value as a marker of clinical severity.

Ethics

Ethics Committee Approval: This study was approved by the Ethics Committee of Göztepe Prof. Dr. Süleyman Yalçın City Hospital (decision date: 29 May 2025; approval no. 20205/0014).

Informed Consent: Written informed consents were obtained from patients who participated in this study.

Conflict of Interest: The authors declare that there is no conflict of interest.

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