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Ophthalmologic emergencies in pediatric patients aged 0–2 years

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Abstract

Ophthalmologic emergencies (OE) in the pediatric age group are classified as traumatic or nontraumatic, potentially causing partial or total visual loss. These emergencies, which are significant contributors to acquired visual impairment or loss, hold a prominent position in emergency department visits globally. This retrospective study aimed to analyze the demographic, etiological, and clinical characteristics of patients aged 0–2 years who were brought to the Emergency Department (ED) with ophthalmologic emergencies and requested ophthalmologic consultation. Age (month), sex, complaint etiology, affected eye (right or left), diagnosis, examination findings, treatment, and clinical progression were analyzed. Of the patients, 26 who met the inclusion criteria were included in this study. The median age was 20 (14.75–24) months; 5 (19.2%) children were aged less than 1 year and 21 (80.8%) were aged more than 1 year. Three of the patients (11.5%) were refugees. When the cases were grouped as infective and noninfective eye emergencies, the diagnosis of conjunctivitis was statistically significant between refugee and nonrefugee children ($p=0.032$). Traumatic injuries were more common in children aged 13–24 months, which was statistically significant ($p=0.029$). Only a small proportion of children brought to emergency departments with ocular complaints actually have a genuine emergency necessitating consultation. Early pediatric patients, in particular, should undergo a more meticulous systemic examination. It is crucial to explore the presence of severe emergencies that could lead to vision loss, one of our most vital senses, in every patient.

Keywords: Pediatric, eye, emergency, ophthalmology, consultation

Introduction

Ophthalmologic emergencies (OE) in the pediatric age group are classified as traumatic or nontraumatic, potentially causing partial or total visual loss [1,2]. These emergencies, which are significant contributors to acquired visual impairment or loss, hold a prominent position in emergency department visits globally [3,4]. Visual loss in children leads to psychosocial problems and adversely affects the mental development of the child [5]. Although pediatric ocular trauma is common in emergency departments (ED), details on its epidemiology and ED clinical management are limited [6]. In the pediatric population, approximately 30% of ocular traumas are blunt and 70% are open globe injuries [7]. Most OE are stabilized and treated by emergency physicians without consulting an ophthalmologist [8]. The causes of ocular injuries in children differ from those

in adults. Although the cause in adults is usually occupational injuries, injuries in children often result from the penetration of sharp objects such as glass, scissors, and knives [9,10]. Existing literature includes studies investigating the epidemiology, etiology, and prognosis of ocular injuries in different age groups in childhood [11,12]. However, to the best of our knowledge, OE in children aged 0–2 years have not been reported earlier. This study aimed to analyze the demographic, etiological, and clinical characteristics of pediatric patients aged 0–2 years who were brought to an ED with OE and requested ophthalmologic consultation.

Material and Methods

This retrospective study was conducted in accordance with the principles of the Declaration of Helsinki. The study was approved by the Non-Interventional Ethics Committee of the Niğde

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University Faculty of Medicine. It included pediatric patients aged 0–2 years who were brought to the ED of the Niğde Ömer Halisdemir University Training and Research Hospital between September 1, 2022, and September 1, 2023, with OE.

Age (month), sex, complaint etiology, affected eye (right or left), diagnosis, examination findings, treatment, and clinical progression were analyzed. The data were obtained from the hospital automation system (KarMed) and recorded using Microsoft Excel 2021.

Patients were categorized into two groups: 0–12 months and 13–24 months. The causes of eye emergencies were compared between these age groups.

Etiological factors were classified as traumatic (fall, foreign body penetration, toy trauma, and contact with corrosive substances) and nontraumatic (conjunctivitis and cellulitis). Traumatic eye emergency cases were categorized as indoor–outdoor and fall–other cases.

The exclusion criteria included patients whose data could not be obtained due to retrospective screening, individuals aged 0–2 years who experienced ophthalmologic emergencies with treatment organized by the emergency physician and subsequent discharge, and patients outside the 0–2 years age range.

Statistical Analyses

The qualitative data (sex, complaint etiology, right or left affected eye, diagnosis, examination findings, treatment, and clinical prognosis) were expressed as numbers and percentages. The quantitative data (age) were expressed as median and interquartile range. The groups with qualitative data were compared with each other using the Pearson's Chi-square test. A P-value of <0.05 was accepted as statistically significant. The data were analyzed using Windows IBM® SPSS® (SPSS Inc., Chicago, IL, USA) software.

Results

Of the patients, 26 who met the inclusion criteria were included in this study. The median age was 20 (14.75–24) months; 5 (19.2%) children were aged less than 1 year and 21 (80.8%) were aged more than 1 year. Of these children, 18 (69.2%) were male. Further, 12 (46.2%) presented to the ED with complaints in the left eye, 7 (26.9%) in the right eye, and 7 (26.9%) in both eyes. The ophthalmologic examination revealed that 11 (42.3%) children had conjunctival hyperemia, 9 (34.6%) had periorbital soft tissue trauma, 3 (11.5%) had conjunctival edema and hyperemia, 1 (3.8%) had corneal penetration, 1 (3.8%) had corneal laceration, and 1 (3.8%) had sixth nerve damage and strabismus. The etiologies of ED admission were as follows: eight cases (30.8%) resulted from falls from own level, conjunctivitis and contact with chemicals (bleach) accounted for four cases (15.4%) each, periorbital–orbital cellulitis secondary to upper respiratory tract infection occurred in three cases (11.5%) each, falls from a height (2 m or more) and penetrating sharp instrument injuries (plastic

toy) were observed in two cases each (7.7%), and foreign body penetration in the eye (glass particle) and retinoblastoma each accounted for one case (3.8%) (Table 1).

Table 1. Demographic data, affected eye , eye examination findings, emergency department admission etiologies

Parameters	Values n=26 (%)
Age, month	20 (14.75-24)*
Sex	
Boy	18 (69.2)
Girl	8 (30.8)
Age groups, month	
0-12	5 (19.2)
13-24	21 (80.8)
Affected eye	
Left	12 (46.2)
Right	7 (26.9)
Left+right	7 (26.9)
Examination findings	
Hyperemia	11 (42.3)
Periorbital soft tissue trauma	9 (34.6)
Conjunctival edema and hyperemia	3 (11.5)
Corneal penetration	1 (3.8)
Corneal laceration	1 (3.8)
Strabismus	1 (3.8)
Emergency department admission etiologies	
Falls from own level	8 (30.8)
Conjunctivitis	4 (15.4)
Contact with chemicals	4 (15.4)
Cellulitis	3 (11.5)
Falls from a height	3 (11.5)
Penetrating sharp instrument	2 (7.7)
Foreign body penetration	1 (3.8)
Tumor	1 (3.8)

*Age is expressed as median and interquartile range (IQR,25-75), other data are expressed as numbers and percentages

Sixth nerve damage and strabismus developed secondary to head trauma in one case. Of the patients, seven (26.9%) were hospitalized, three with cellulitis were hospitalized to receive intravenous antibiotic therapy, and three underwent emergency surgery. In addition, 1 patient developed postoperative permanent visual loss, 1 was hospitalized and treated for bleeding secondary to the tumor, and 19 were treated and discharged as outpatients.

In the study, three (11.5%) of the patients were refugees. When the cases were grouped as infective and noninfective eye emergencies, the diagnosis of conjunctivitis was statistically significant between refugee and nonrefugee children (p=0.032). Eye traumas after falls were more common in children aged 13–24 months; however, this was statistically insignificant

($p=0.062$). In addition, regarding the places of traumas, most of the cases were found to have occurred in an indoor environment; however, this was not statistically significant ($p=0.054$). Further, traumatic injuries were more common in children aged 13–24 months, which was statistically significant ($p=0.029$) (Table 2).

Table 2. Relationship between the presence of infection and nationality/age

		Infection n (%)		p*
		+	-	
Nationality	Turkish	8 (34.8)	15 (65.2)	0.032
	Refugee	3 (100)	0	
Age (month)	0-12	3 (60)	2 (40)	0.029
	13-24	3 (14.2)	18 (85.8)	

*Chi-square test

Discussion

Similar to other studies in the literature [13,14], trauma was the most common reason for consultation in patients aged less than 2 years in the present study. The higher number of patients aged more than 1 year might be attributed to the fact that they started to walk and fall during this process, their affinity for the environment increased, and they could not understand situations that might be harmful and dangerous for them.

Studies reported that the incidence of eye traumas was higher among boys, and the left eye was more affected considering ED visits [15,16]. The data of the present study were compatible with the published findings. This might be attributed to boys playing with harder toys, being more energetic, and fathers, brothers, or uncles playing harsher with boys than with girls. The higher number of left eye injuries might be due to the reflexive protection of the right half of the face due to the dominant use of the right hand in the general population.

Infective eye emergencies are extremely common in ED admissions [17]. Preseptal and orbital cellulitis occur especially in childhood, often after untreated or delayed treatment of paranasal sinus and oral cavity infections. It may lead to decreased eye movements, proptosis, and severe neurologic complications [18]. In the present study, more than 25% of the participants were diagnosed with conjunctivitis and preseptal and orbital cellulitis. Children diagnosed with cellulitis were hospitalized and treated. It is essential to diagnose these patients early, initiate appropriate treatment, and consult with the consultant ophthalmologist for hospitalization.

The lack of attention to hygiene rules by pediatric patients and the challenges in fulfilling the basic health needs of immigrant children, such as housing, cleanliness, medical care, and social services, can lead to significant health issues [19]. In the present study, nontraumatic eye emergencies were found to be more common among migrant children; also, the incidence of infective emergencies was found to be statistically significantly higher. This might be attributed to crowded living spaces and poor hygiene conditions.

Eye injuries in indoor environments are more common in pediatric patients [9]. In the present study, the incidence of domestic trauma was high; however, it was not found to be statistically significant. Simple precautions should be taken to prevent domestic trauma, metal and sharp objects should be kept out of the reach of children in crowded families, and soft toys should be preferred. This can reduce the incidence of trauma. It should be kept in mind that sharp objects and toys may cause permanent visual loss, especially by causing penetrating trauma in early childhood.

Corrosive and caustic incidents related to corrosive substances are common presentations among ocular emergencies. The accessibility of cleaning materials containing corrosive substances and sold in packages with eye-catching colors stored in easily reachable locations for children, such as beneath counters in kitchens or bathrooms, and the lack of adequate safety measures taken by families contribute to accidents [20]. Although the contact with bleach as a chemical substance was found in three cases in the present study, this was not statistically significant. This was attributed to the very limited number of such cases in the study.

Retinoblastoma (RB) is the most common primary intraocular malignancy in childhood. Common indications of RB include leukocoria and strabismus. While the primary goal of treatment is the child’s survival, the secondary goals involve maintaining the eyeball and preserving visual function. Ocular hemorrhage is a common reason for presenting to emergency departments [21]. In the present study, one patient was diagnosed with RB and ocular hemorrhage. It is essential to consider the possibility of RB in the differential diagnosis for patients presenting with symptoms such as leukocoria, strabismus, and ocular hemorrhage in the ED.

The primary cause of increased intracranial pressure (ICP) during infancy is traumatic brain injury, which may lead to sixth nerve damage as a secondary effect to ICP [22]. In the present study, one patient fell from the couch at home. Upon examination, strabismus was identified in the right eye of the patient, indicative of sixth nerve damage. Consequently, the patient was referred to a higher-level medical facility. A detailed neurologic and ophthalmologic examination should be performed in children brought to the ED with ocular trauma to identify conditions like sixth nerve damage.

Limitations

This study had some limitations. The data for this study spanned 1 year, and the hospital where the study was conducted was located in a relatively small province with a population of 365,000. Ophthalmology consultation was not requested for every pediatric ophthalmology emergency case that arrived at the emergency department; patients were primarily evaluated by an emergency medicine specialist. Therefore, the number of pediatric ophthalmology emergency cases was relatively low in this study. Further multicenter, longer-term, and prospective studies are needed to validate the findings of this study.

Conclusion

Pediatric eye emergencies encompass a broad range of conditions. Only a small proportion of children brought to ED with ocular complaints actually have a genuine emergency necessitating consultation. Early pediatric patients, in particular, should undergo a more meticulous systemic examination. It is crucial to explore the presence of severe emergencies that could lead to vision loss, one of our most vital senses, in every patient.

Conflict of Interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that they have received no financial support for the study.

Ethical Approval

The study was commenced after receiving the Non-Interventional Ethics Committee of the Niğde University Faculty of Medicine approval (Date:14.12.2023, No:2023/99).

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