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Corneal Wounds In Children: Diagnostic And Therapeutic Aspects

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Abstract:
Purpose: *To describe the diagnostic and therapeutic characteristics of corneal wounds in children.*
Introduction:
Eye trauma is responsible for a third of the causes of blindness in children aged 0 to 10 years. Studies have shown that 90% of trauma can be prevented. Eye trauma in children accounts for 20 to 59% of cases. The treatment of eye lesions is surgical, carried out as soon as possible in order to prevent the occurrence of complications.
Materials and method:
We conducted a retrospective and descriptive observational study in the pediatric ophthalmology department from January 1 to October 30, 2023 on 57 children aged 0 to 15 years. Data collection was based on medical observations. The following parameters were analysed: demographics, circumstances of occurrence of the trauma, data from the ophthalmological examination, therapeutic modalities.
Results:
The incidence of open-globe eye trauma in the pediatric ophthalmology department was 23.2% and the incidence of corneal wounds was 17.6%. The predominance was male (73.7%) (n=42). The most common vulnerabilities were metallic (42.1%) and vegetal (26.3%). The average time to consult was 37.36 hours extreme 2 and 168 hours.
Trauma was unilateral in all children, with a predominance of the right eye (57.9% (n=33). Baseline visual acuity was less than 5/10 in 70.2% (n=40). The wound was located in the visual axis in 28.1% (n=16). The most common associated eye lesions were hyphema (35.1%), iris hernia (66.7%), cataract (35.1%).
Treatment was surgical followed by appropriate medical treatment and amblyopia treatment.
Conclusion:
Eye trauma in children is a frequent reason for consultation in the ophthalmological emergency department. Thus, the prevention of trauma is very important and consists of raising awareness among the child and those around him.

Keywords: *Pediatric ocular trauma-Cornea wound-Open globe injuries*

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I. Introduction :

Eye trauma is responsible for a third of the causes of blindness in children aged 0 to 10 years [1]. Trauma most often occurs in the family home [2]. Studies have shown that 90% of trauma can be prevented [3,4]. Ocular trauma in children accounts for 20-59% of cases [4,5]. They occur more often during games and the predominance is male [6]. Studies [6,7] report that several objects are incriminated, in particular metal objects, plant thorns or wooden objects, broken glass, pieces of stone. The treatment of eye lesions is surgical, carried out as soon as possible, supplemented by appropriate medical treatment, in order to prevent the occurrence of complications such as: infection, inflammation, anterior and/or posterior synechiae. The treatment of amblyopia has a significant place in the continuation of care.

The objective of the study is to describe the diagnostic and therapeutic characteristics of corneal wounds in children.

II. Materials And Method:

We conducted a retrospective and descriptive observational study in the pediatric ophthalmology department of the 20 August 1953 hospital in Casablanca from January 1 to October 30, 2023 (10 months).

A total of fifty-seven (57) children aged 0 to 15 years were collected. Data collection was based on medical observations. The following parameters were analysed:

- Demographic parameters: age, gender.
- The circumstances of the occurrence of the trauma: place, nature of the vulnerable agent.

- The data of the ophthalmological examination: initial numerical visual acuity for children of verbal age (Snellen's E test and Pigassou's image test), examination of the anterior segment with the characteristics of corneal wound (axial or non-axial location, shape, size), associated ocular lesions, examination of the posterior segment when it was accessible.
- The data from the radiological examinations.
- Therapeutic modalities (surgical technique and adjuvant treatment) and evolution (final visual acuity, complications), treatment of amblyopia.

The Birmingham Eye Trauma Terminology System (BETT) classification [8] was used to define the type of trauma.

The statistical analysis and the development of the graphs were done using the Excel version 2021 software.

III. Results:

The incidence of open-globe eye trauma in the pediatric ophthalmology department was 23.2% and the incidence of corneal wounds was 17.6%. The average age 6.97 +/- 3.55 years with a peak of occurrence between 10 and 15 years of age, in 61.4% (Figure1). The predominance was male, 73.7%, with a sex ratio of 2.8 (42/15). The most common vulnerable agent (Table 1) was metallic (42.1%) and Vegetable thorn (26.3%). The trauma occurred at home in 88% of cases and during the summer period, in 36.0%. The average time to consult was 37.36 hours extreme 2 and 168 hours. The mean length of hospital stay was 7.77 days +/- 4.52. The context in which the trauma occurred was by far represented by a playful accident, in 93% (Figure 2).

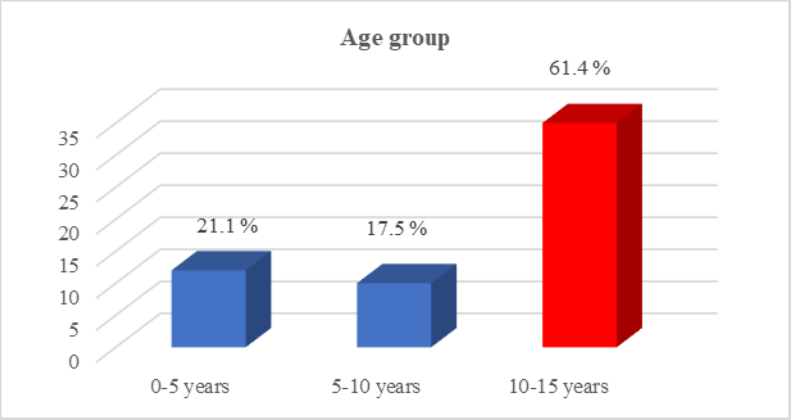

Figure 1: Distribution of children by age group

Table 1: Vulnerable agents implicated in ocular trauma

Vulnerable agents	Effective	Percentage (%)
Metallic	24	42.1
Vegetable thorn	15	26.3
Stone	12	21.1
Glass breakage	5	8.8
Pen	1	1.8
	57	100

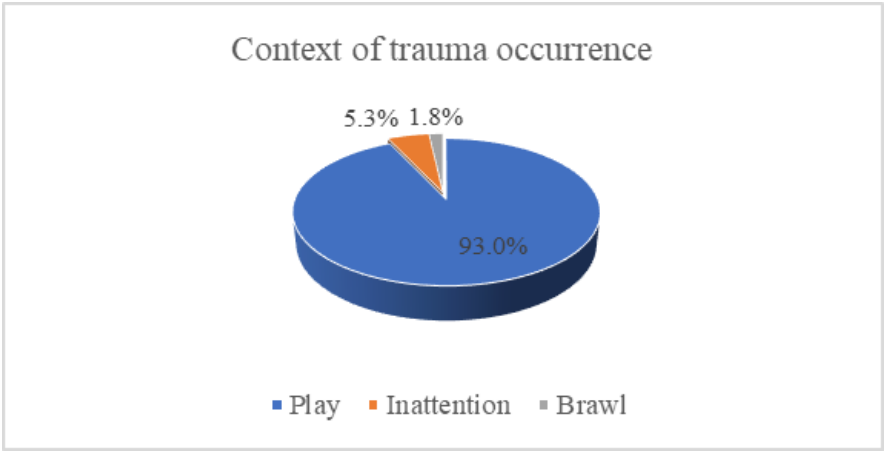

Figure 2 : Context of trauma occurrence

Trauma was unilateral in all children, with a predominance of the right eye (57.9% (n=33). Baseline visual acuity was less than 5/10 in 70.2% (n=40). The wound was located in the visual axis (Figure 3) in 28.1% (n=16). It was oblique in shape in 35.1% and arciform in 21.1% (Table 2). The mean wound size was 4.3 mm +/- 2.0 mm. The most common associated eye lesions (Table 3) were hyphema (35.1%), iris hernia (66.7%), cataract (21.1%).

Figure 3: Axial corneal wound with iris hernia

Table 2: Different forms of corneal wounds

Corneal wound forms	Effective	Percentage
Oblique	20	35.1
Arciform	12	21.1
Horizontal	10	17.5
Vertical	8	14.0
In V	5	8.8
In S	1	1.8
In X	1	1.8
Total	57	100.0

Table 3: Eye Injuries Associated with Corneal Wound

Associated eye lesions		Effective	Percentage
Annexes	Eyelids	2	3.5
	Lacrimal canaliculus	1	1.8
Anterior segment	Hyphema	20	35.1
	Inflammatory reaction	10	17.5
	Foreign body	4	7.0
	Herniated iris	38	66.7
	Cataract	12	21.1
Posterior segment	Intravitreal haemorrhage	4	7

The orbital X-ray was performed in all the children and did not objectify a radiopaque foreign body. Post-operative ocular ultrasound after obtaining wound tightness in all children within an average time of 3.36 days +/- 1.79 days.

Tetanus vaccination status was checked and adjusted in all children. After careful wound debridement, the corneal wounds were sutured with Nylon 10.0. Cataract surgery was performed in a second phase, with an average time of 34.6 +/- 18.8 days depending on the degree of lens opacification (Figure 4).

Postoperative treatment consisted of systemic and local antibiotic therapy in all children, oral corticosteroid therapy in 26.3% (n=15). Corticosteroid therapy and dilation with local atropine were given in all children; and hypotonic treatment in 14% of cases (n=8). Treatment for amblyopia was offered to all children because they all had lower than normal visual acuity. Prevention was carried out in the cooperating child and his or her entourage.

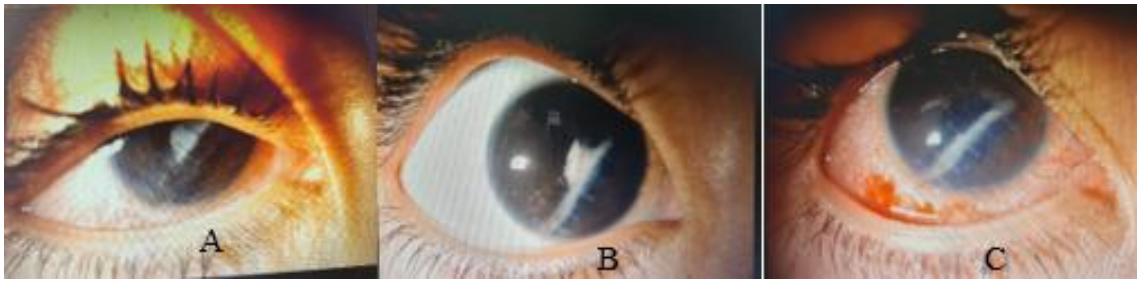

Figure 4: A: Sutured axial cornea wound; B: Corneal Opacity, 360° iridocrystalline synechiae and post-traumatic cataract; C: Day 1 post-traumatic cataract surgery

Final visual acuity was less than 5/10 in 56.1% (n=32). Early postoperative complications were dominated by the inflammatory reaction in 21.1% and late complications by corneal opacities in all cases and anterior and posterior synechiae in 35.1% (Table 4).

Table 4 : Postoperative complications

Post-operative complications		Effective	Percentage
Early complications	Inflammatory reaction	12	21.1
	Corneal abscess	2	3.5
Late complications	Corneal opacities	57	100.0
	Anterior and posterior synechiae	20	35.1
	Secondary cataract	1	1.8
	Aphakia	1	1.8

IV. Discussion :

In the global population, it is estimated that there are approximately 1.6 million cases of blindness, 2.3 million cases of low vision and 19 million cases of monocular blindness due to trauma [1]. Studies have shown that 90% of them can be prevented [3,4]. Eye trauma in children accounts for 20 to 59% [4,5].

In literature [6; 9-12], the predominance is male, with a peak in adolescence for some authors [6], this could be explained by the turbulence of boys. In our series, the most incriminated vulnerable agent was metallic in nature (42.7%). This result is similar to that of the study published by Maaloul et al. in Tunisia in October 2023 [9]. The majority of accidents occur at home, in 88% of cases, which is similar to the results of several studies [8 ;13-14]. The game is by far the most represented context of the accident [9].

The consultation time in our study was long, averaging 37.36 hours extreme 2 and 168 hours. Parija S et al. found in their series a consultation time of more than 24 hours in 52.6% of cases [15].

Unilateral ocular involvement was found in almost all studies [16-18]. In several studies [16,17], wound-associated lesions are dominated by iris hernia, cataract, and hyphema.

The surgical treatment aims to obtain a waterproof globe with structural integrity. The management of traumatic cataracts is carried out secondarily if necessary.

Visual recovery depends on the associated complications (axial corneal opacities, synechiae) that compromise the treatment of amblyopia. In our study, the final visual acuity was less than 5/10 in 56.1% of cases.

V. Conclusion:

Eye trauma in children is a frequent reason for consultation in the ophthalmological emergency department and is a real public health problem. The final result is compromised by several factors and remains mediocre in the majority of cases. Thus, the prevention of trauma is very important and consists of raising awareness among the child and those around him.

Conflict of interest:
No conflict of interest has been declared.

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