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Functional, Aesthetic, and Psychosocial Outcomes of Ocular Trauma in Two Hospitals in Douala

Stève Robert Ebana Mvogo[1,2,3*], Jean Audrey de Jésus Ndongo[1,3], Hassan Aboubakar[3], Hassan Njifon Nsangou[1], Fadila Ebombe[3], Jeanne Mayouego[4], Anne Ngobo Etoa[4], Aronette Ngouanou[4], Kuntz Eric Mbassi Ndocko[4], Côme Ebana Mvogo[2]

[1]Douala Gynecology, Obstetrics, and Pediatrics Hospital, Douala, Cameroon
[2]Faculty of Medicine and Biomedical Sciences, The University of Yaoundé 1, Yaoundé, Cameroon
[3]Faculty of Medicine and Pharmaceutical Sciences, University of Douala, Douala, Cameroon
[4]Douala Laquintinie Hospital, Douala, Cameroon
Email: *nyamvoe@gmail.com

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Abstract

Introduction: Eye injuries are a public health problem in our community due to their frequency and the severity of their consequences. We aimed to study the functional, aesthetic, and psychosocial prognosis of eye injuries. **Materials and Methods:** We conducted a longitudinal study over a period of three years (1st January 2021 to 31st December 2023) at Douala Laquintinie Hospital and at Douala Gynaecology, Obstetrics and Paediatrics Hospital. The variables analysed were: age, gender, occupation, time to consultation, circumstances of occurrence, nature of the trauma, therapeutic measures, and sequelae. A quality of life assessment questionnaire was used to evaluate the psychosocial impact. We looked for factors associated with poor prognoses. The significance threshold was $p < 0.05$. **Results:** We collected data on 134 patients for a total of 268 eyes. The sex ratio was 2.43 and the average age was 31.06 ± 17.41 years. Only 16.7% of trauma patients consulted within the first 24 hours. Domestic and road traffic accidents were the most common, accounting for 28.6% and 23.14% of cases, respectively. Blindness was found in 9.32% of eyes and visual impairment in 8.20%. The main cosmetic complication was corneal scarring (9.5%). A significant psychosocial impact was found in 76.11% of patients. Age < 18 years ($p = 0.025$), globe rupture ($p = 0.008$), road traffic accident ($p = 0.036$) and organ loss ($p = 0.043$) were associated with a poor psychosocial impact. **Conclusion**: Eye injuries generally affect young males. These injuries cause aesthetic, functional, and psychosocial sequelae.

Keywords

Ocular Trauma, Prognosis, Psychosocial Impact, Douala

1. Introduction

Eye injuries cause isolated or combined damage to several anatomical structures of the eyeball. They represent a public health problem and are responsible for 2.3 million cases of visual impairment and more than 1.5 million cases of monocular blindness worldwide [1] [2]. In Africa, the prevalence of eye injuries varies depending on the series [3]-[5]. In Cameroon, eye and orbital injuries account for 2.8% and 3.5% of post-traumatic pathologies according to two hospital series. The rate of monocular blindness reported by these studies is 8.1% and 11.1% respectively [6] [7]. Depending on the severity of the injuries and the indication, the management of eye injuries may be medical and/or surgical. The outcome generally involves cosmetic [4]-[9] and functional [10] sequelae. While aesthetic and functional prognoses are widely reported in African series, these studies pay little attention to psychosocial consequences and even less to patient rehabilitation [3]-[9]. Our objective was to study the functional, aesthetic and psychosocial prognoses of eye trauma in two hospitals in the city of Douala.

2. Materials and Methods

We conducted a longitudinal study at the ophthalmology unit of the Gynaecology, Obstetrics and Paediatrics Hospital in Douala and at the ophthalmology department of Laquintinie Hospital in Douala. Our study period was three years, from 1st January 2021 to 31st December 2023. Our study included patients who had suffered eye trauma and were treated during the first two years of the study period. The last year was used to give a complete follow-up to all the patients. We did a complete clinical examination of all the patients 6 months after the trauma. Patients who did not consent, came for the follow-up or who had multiple traumas were excluded. All patients included obligatory underwent an initial ophthalmological examination, followed by other examinations, three months and six months after admission. The eye was considered visually impaired if the best visual acuity ranged from [3/10 to 1/20] and blind if it was <1/20 [11]. All mutilated eyes were considered to be blind. On a psychosocial level, patients or their parents completed a quality assessment questionnaire. For those over 18 years of age, this was the World Health Organization Quality of Life Bref (WHOQOL-Bref) questionnaire, and for those under 18 years of age, it was the Pediatric Quality of Life (PedsQL) questionnaire [12] [13]. These questionnaires (**Table 1**) assess physical health (domain 1), psychological health (domain 2), social relationships (domain 3) and environment (domain 4). We then extracted the questions related to psychosocial impact and used equivalence tables to obtain the conclusions. To create the PedsQL questionnaire's psychosocial summary score, the mean is calculated

as the sum of the items over the number of items answered in the emotional, social and school functioning scales. To find the results of the WHOQOL-Bref questionnaire, the method of converting absolute data to WHOQOL-Bref/Raw in 4 - 20 or 0 - 100 is used. The results were interpreted as follows: <70 = significant psychosocial impact, 70 - 90 = moderate psychosocial impact, 90 - 100 = no psychosocial impact. The data were collected using Kobocollect software, recorded using Microsoft Office Excel 2016 and analysed using SPSS version 25.0 software. The variables studied were grouped into socio-demographic, clinical, therapeutic, evolutionary and prognostic variables. Qualitative data were presented as numbers and percentages, quantitative data as means and standard deviations. Qualitative data were compared using the chi-square test and quantitative data using Student's t-test. Independent predictive factors were sought using the binary logistic regression model. The significance threshold was $p < 0.05$.

Table 1. Method for converting absolute data to WHOQOL-BREF.

DOMAIN 1			DOMAIN 2			DOMAIN 3			DOMAIN 4		
Raw Score	Transformed Score		Raw Score	Transformed Score		Raw Score	Transformed Score		Raw Score	Transformed Score	
	4 - 20	0 - 100		4 - 20	0 - 100		4 - 20	0 - 100		4 - 20	0 - 100
7	4	0	6	4	0	3	4	0	8	4	0
8	5	6	7	5	6	4	5	6	9	5	6
9	5	6	8	5	6	5	7	19	10	5	6
10	6	13	9	6	13	6	8	25	11	6	13
11	6	13	10	7	19	7	9	31	12	6	13
12	7	19	11	7	19	8	11	44	13	7	19
13	7	19	12	8	25	9	12	50	14	7	19
14	8	25	13	9	31	10	13	56	15	8	25
15	9	31	14	9	31	11	15	69	16	8	25
16	9	31	15	10	38	12	16	75	17	9	31
17	10	38	16	11	44	13	17	81	18	9	31
18	10	38	17	11	44	14	19	94	19	10	38
19	11	44	18	12	50	15	20	100	20	10	38
20	11	44	19	13	56				21	11	44
21	12	50	20	13	56				22	11	44
22	13	56	21	14	63				23	12	50
23	13	56	22	15	69				24	12	50
24	14	63	23	15	69				25	13	56
25	14	63	24	16	75				26	13	56
26	15	69	25	17	81				27	14	63
27	15	69	26	17	81				28	14	63

Continued

28	16	75	27	18	88	29	15	69
29	17	81	28	19	94	30	15	69
30	17	81	29	19	94	31	16	75
31	18	88	30	20	100	32	16	75
32	18	88				33	17	81
33	19	94				34	17	81
34	19	94				35	18	88
35	20	100				36	18	88
						37	19	94
						38	19	94
						39	20	100
						40	20	100

3. Results

- **Socio-demographic data**

We collected data from 134 patients for a total of 268 eyes.

- Age and gender

The sex ratio was 2.43 in favor of males. The average age was 31.06 ± 17.41 years, and the most represented age group, as shown in Figure 1, was 20 to 30 years.

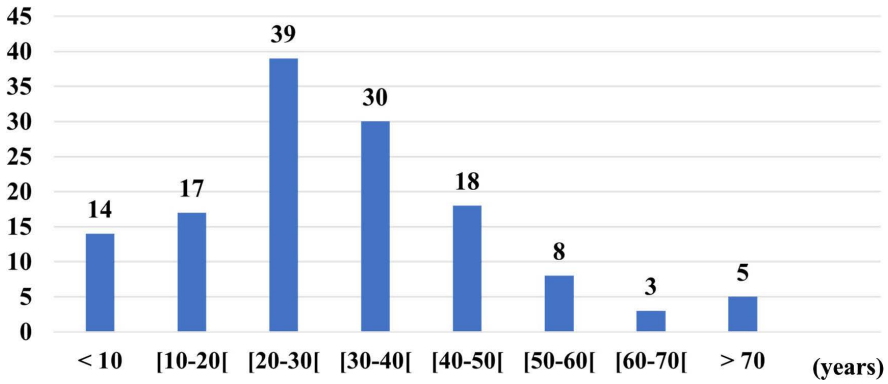

Figure 1. Distribution of patients by age group.

- Occupation

As shown in Table 2, the majority of patients were pupils (18.7%), followed by shopkeepers (11.2%) and students (10.5%).

Table 2. Distribution of patients by occupation. (n = 134)

Occupation	n	%
Students	14	10.5
Pupils	25	18.7

Continued

Shopkeepers	15	11.2
Motorcycle drivers	9	6.7
Technicians	12	8.9
Nurses	3	2.2
Retired	8	6.0
Welders	7	5.2
Office workers	14	10.5
Factory Workers	5	3.7
Unemployed	8	6.0
Others*	14	10.5

Others*: painter, housekeeper, farmer, teacher, bricklayer, seamstress, security guard, doctor.

- **Clinical data**

- Reason for consultation and time taken to seek consultation

The reasons for consultation were dominated by eye pain, eye redness, and decreased visual acuity in 53 (39.55%), 27 (20.15%), and 25 (18.65%) cases, respectively. The majority of patients (77 patients), as shown in Figure 2, consulted more than 72 hours after the trauma occurred.

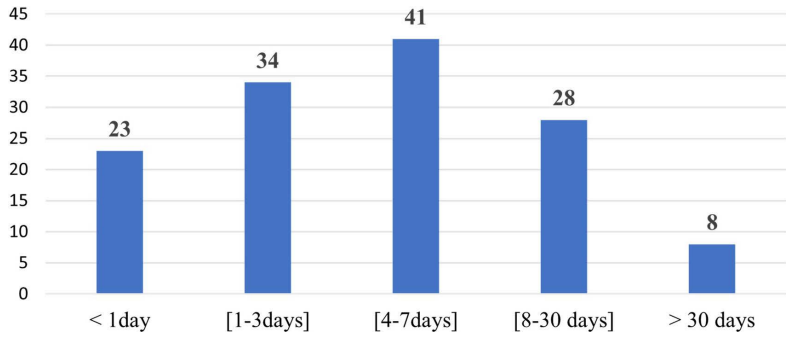

Figure 2. Distribution of patients according to consultation time.

- Medical history

Thirty-one (23.13%) of our patients wore corrective lenses, and 12 (8.96%) had a history of eye trauma. Diabetes and high blood pressure were found in 3 (2.24%) and 1 (0.75%) patients, respectively.

- Circumstances of occurrence, nature of trauma, and laterality

Domestic accidents (28.36%), followed by road traffic accidents (23.4%), were the main circumstances of trauma occurrence, as shown in Table 3. Figure 3 illustrates the distribution of the study population according to the type of injury. These injuries were dominated by contusions, followed by corneal foreign bodies and then ocular wounds. The right eye was the most commonly affected (66% or 51%), and bilateral involvement was found in 13 cases (9%).

Table 3. Circumstances surrounding the occurrence of the trauma.

Etiology	n	%
Road traffic accident	31	23.14
Accident de sport	2	1.49
Work accident	22	16.42
Domestic accident	38	28.36
Recreational accident	19	14.18
Fight	15	11.19
Assault	7	5.22

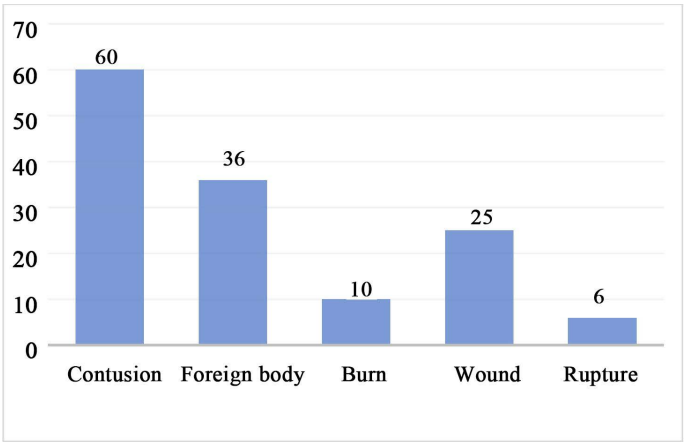

Figure 3. Distribution of patients according to the nature of the injury.

- **Therapeutic aspects and cosmetic sequelae**

Medical treatment was used in all patients. Anti-inflammatory drugs were the most commonly used medications (92.54%), followed by antibiotics (53.73%). Surgery was performed in 49 patients (36.56%). Conservative and radical evisceration surgeries were performed in 44 and 5 patients, respectively.

Cosmetic sequelae were found in 30 patients, with corneal scarring in 14 patients (9.5%). Organ loss was found in 3.4% of traumatized eyes. The difference in distribution between the two eyes was not statistically significant ($p = 0.25$).

- **Functional sequelae**

Table 4 shows the distribution of the best visual acuity 6 months after trauma. We note an 8.20% visual impairment rate and a blindness rate of 9.32%.

Table 4. Best corrected visual acuity 6 months after treatment. (n = 268)

Best Corrected Visual Acuity	Right Eye: n (%)	Left Eye: n (%)
≥3/10	109 (40.67%)	114 (42.53%)
]3/10 - 1/10]	6 (2.23%)	8 (2.98%)
]1/10 - 1/20]	4 (1.49%)	4 (1.49%)
<1/20	17 (6.34%)	8 (2.98%)

n: number; %: percentage.

- **Assessment and analysis of psychosocial impact**

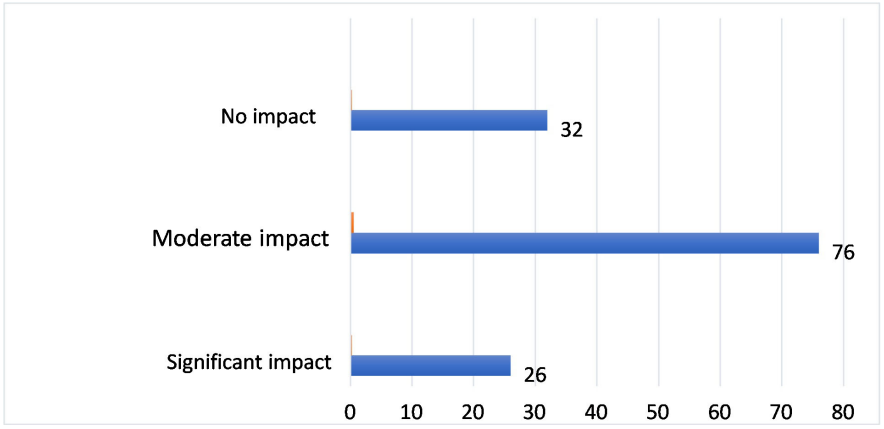

Figure 4. Distribution of the population according to psychosocial impact.

The psychosocial impact of trauma was present in 102 patients, or 76.11% (**Figure 4**). This impact was moderate in 76 (56.71%) patients (modal class of 70 to 90) and significant in 26 (19.4%) patients (modal class < 70).

- **Study of factors associated with functional and psychosocial sequelae**

The occurrence of visual impairment was associated with a consultation delay > 72 hours, ocular perforation, ocular pain, and acuity < 3/10 at the initial consultation (**Table 5**). For blindness, the factors found were a delay in consultation > 72 hours, a history of eye trauma, a wound, or even corneal perforation (**Table 6**). The presence of a significant psychosocial impact seemed to be linked, as shown in **Table 7**, to being under 18 years of age, a road traffic accident, and organ rupture or even loss.

Table 5. Factors associated with visual impairment.

Variables	OR (CI = 95%)	p-value
Initial consultation after 72 hours	2.32 (0.39 - 8.36)	**0.024**
Penetrating traumatic agent	10.50 (0.41 - 8.98)	**0.009**
Eye pain	2.09 (0.38 - 9.86)	**0.007**
Initial visual acuity was less than 3/10.	5.5 (1.68 - 18.93)	**0.0046**

OR: Odds Ratio; CI: confidence interval.

Table 6. Factors associated with blindness.

Variables	OR (IC = 95%)	p-value
Consultation time after 72 hours	3.22 (1.1 - 7.43)	**0.031**
History of trauma	4.1 (0.43 - 9.74)	**0.023**
Rupture of the eyeball	28.5 (0.41 - 9.97)	**0.034**
Eye wound	7.91 (1.56 - 5.86)	**0.018**

OR: Odds Ratio; CI: confidence interval.

Table 7. Factors associated with significant psychosocial impact.

Variable	OR (IC = 95%)	p-value
Rupture of the eyeball	12.6 (1.13 - 32.2)	0.008
Age < 18 years	2.02 (1.21 - 12.5)	0.025
Road traffic accident	2.11 (1.76 - 7.78)	0.036
Loss of organ	2.4 (1.1 - 7.3)	0.043

OR: Odds Ratio; CI: confidence interval.

4. Discussion

The young population was the most represented. Indeed, young people are the most exposed to eye injuries due to their high level of activity, both professional and in fights. These results are similar to those of Baba *et al*. in Tunisia and Ebana *et al*. in Cameroon, who reported average ages of 31.9 and 30.1 years, respectively [6] [8]. We found a predominance of males in our study. This predominance of males is reported in most African series [3]-[10]. Indeed, men are generally more involved in fights, violent sports, and driving motorbike taxis in our region. Eye pain was the most common reason for consultation in more than a third of cases, followed by eye redness and decreased visual acuity. Our results are similar to those of a previous series, which found eye pain to be the main reason for consultation (47.2%), followed by decreased visual acuity (33.3%). These symptoms are the first warning signs of eye trauma [6]. More than half of the patients came for consultation three days after the trauma. This finding is corroborated by Yaya *et al*. and Sovogui *et al*., who found that 43.7% came after two days and 54.26% after more than three days, respectively [3] [5]. This delay in consultation could be due to erratic care pathways (informal health facilities), recourse to traditional practitioners, and financial difficulties among patients without health insurance or universal health coverage. Ocular contusions accounted for nearly half of the forms of ocular trauma found. This finding has been reported in several series [5]-[7]. This may depend on the mechanism of injury, the age and occupation of the patient, who are exposed to certain types of trauma. Unilateral injury was found in 9 out of 10 patients, with trauma more frequent on the right side. This observation was also made by Sovogui *et al*. [5]. The frequency on the right side could be due to the predominance of right-handed people in the general population. Domestic accidents were the most common circumstances in which trauma occurred, followed by road traffic accidents. This distribution varies according to the series and depends on the selection methods [5]-[10]. The prevalence of road traffic accidents is thought to be linked to the increasingly frequent use of motorcycle taxis in the city of Douala. Eye injuries related to motorcycle taxi accidents have a poor prognosis due to the lack of personal protective equipment in Cameroon [6] [14]. Domestic surveillance measures and compliance with road safety measures are levers that could be used to support preventive measures to reduce the poor prognosis associated with eye trauma. Considering the high prevalence of domestic and road traffic accidents in our study, we suggest that our authorities should em-

phasise specific preventive measures, such as public awareness campaigns or advocating for protective eyewear policies. These measures could help to improve outcomes of trauma in our environment. Monocular blindness was the most common functional sequela. This result is similar to that of previous series in Douala [6] [14]. Cosmetic sequelae were dominated by corneal scarring. In contrast, Sidibé *et al.* found 45.5% of corneal scarring [15]. This difference can be explained by the fact that their study focused specifically on trauma caused by braid needles, which are more likely to cause corneal complications. Although rare, organ loss is nevertheless the most serious anatomical sequela. More than half of our patients experienced a moderate psychosocial impact after ocular trauma, but a significant psychosocial impact was found in 19.4% of cases. In Cameroon, according to Omgbwa *et al.*, patients pay a heavy psycho-emotional and social price as a result of the sequelae of ocular trauma [14]. As we observed in our series, loss of the eyeball has a negative psychosocial impact. Patients suffer from depression, anxiety, and isolation [16]. Any treatment must therefore include counseling and psychological support to ensure an improvement in quality of life.

5. Limitations

Some limitations should be considered when reading this work. The sample size may not be representative of the entire region. Working in two hospitals setting could be a source of potential recall bias from patients.

6. Conclusion

Eye trauma mainly affects young males. The circumstances in which it occurs are dominated by domestic accidents and road traffic accidents. Closed-globe eye trauma is the most common type. Corneal scarring is the main anatomical sequela, and blindness is the most common functional sequela. These eye injuries generally have a psychosocial impact. Prevention of these injuries and early treatment could improve the aesthetic and functional prognosis and thereby reduce their psychosocial impact.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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