

## Research Article

# Ocular Trauma During Public Road Accidents: Epidemiological, Clinical, Therapeutic and Prognostic Aspects at the Abass Ndao University Hospital Center

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**Abstract**

**Purpose:** To determine the epidemiological, clinical, therapeutic and prognostic characteristics of eye injuries following a public road accident.

**Methodology:** This was a retrospective, descriptive study covering the files of patients followed for ocular trauma by a public road accident, over a period of 3 years. We collected using a collection sheet to collect epidemiological, clinical, paraclinical and therapeutic data. Data were entered and analyzed using SPSS 20.0 software.

**Results:** The frequency of ocular trauma overall was 9.47%. The sex ratio was 2.64/1. The mean age was  $29.12 \pm 16.15$ . Pupils and students represented 27.5%. The complaints were blindness (3.92%), eye pain (31%), eye redness (25.4%). Conjunctival lesions were noted in 23.36%, followed by eyelid wounds in 17.75%. Corneal lesions represented 3.70%. On the fundus examination we noted optic atrophy in five patients or 9.25%. The orbito-cerebral CT showed an orbital fracture in 13 patients (22.41%). Among our patients, 51% had not received any previous treatment and 49% had already received medical treatment. Patients seen between D0 and D1 represented 47.1%. In 45.1% of our patients the treatment was medical- surgical. A final visual acuity (VA) greater than 3/10 was noted in 54.90% of cases.

**Conclusion:** Ocular trauma from PRA constitutes a frequent reason for consultation. Pupils and students were the most affected. PRAs constitute a public health problem. Prevention is essential.

**INTRODUCTION**

A public road accident (PRA) is an unwanted, unforeseen and poorly anticipated collusion which takes place on the road network between a machine on the one hand and any other thing or person, fixed or mobile on the other hand which causes human injuries and/or material damage [1]. It can be the cause of multiple organic lesions, including ocular ones.

Nowadays, with the increasing modernization of road traffic, we are witnessing an exponential increase in the number of road accidents. Thus, they are increasingly becoming a subject of concern, particularly in developing countries.

The severity of eye trauma caused by PRA, is very variable and their functional prognosis depends on the site of the trauma, the precocity of therapeutic management and the complications [2].

Our objective was to determine the epidemiological, clinical, therapeutic and prognostic characteristics of eye injuries following a public road accident.

**METHODOLOGY**

This was a retrospective and descriptive study covering the files of patients followed for ocular trauma by PRA, over a period of 3 years (January 1, 2020 to December 31, 2022).

We collected using a collection sheet to collect epidemiological, clinical, paraclinical and therapeutic data. Data were entered and analyzed using SPSS 20.0 software. Continuous variables were compared using the ANOVA test and non-continuous variables using the Chi-square test or Fisher test. The Student's "t" test was performed for comparisons of means and percentages, the Chi-square or Fischer test for comparisons of categorical variables; the Fischer Exact test was used when the number in certain groups was less than 5. The significance threshold p was 0.05.

## RESULTS

During the study period, we received 538 cases of ocular trauma, 51 of which were following an PRA, i.e. a frequency of 9.47%. The frequency of ocular trauma by PRA compared to all patients received was 1.108%. The sex ratio was 2.64/1. The age group between 20 and 39 years represents 56.5% with an average age of  $29.12 \pm 16.15$ . Pupils and students represented 27.5%, followed by those without a profession 17.6%. Patients complained of blindness (3.92%), eye pain (31.0%), and eye redness in 25.4%. Patients were referred and or initially seen in consultation in 70.6% and emergencies represented 29.4%. Among our patients, 51% had not received any previous treatment and 49% had already received medical treatment. In 82.4% of patients the vaccination status was up to date. Patients seen between D0 and D1 represented 47.1% and those seen beyond 5 days represented 21.6%. The right eye was affected with a rate of 47.1%. We noted blindness (distance visual acuity  $<1/10$ ) in the traumatized eye in 3.92% on admission. The visual acuity could not be evaluated in 13.72% and it was greater than 3/10 in 60.78 % of the traumatized eyes. Conjunctival lesions (conjunctival hyperemia and subconjunctival hemorrhages) were noted in 23.36%, followed by eyelid wounds with a frequency of (17.75%). Corneal damage (corneal edema) represented 3.70%. At the fundus examination we noted optical atrophy in 9.25% of eyes and it could not be performed in 35.18%.

The associated lesions were dominated by cranioencephalic trauma with the notion of initial loss of consciousness, i.e. a rate of 45.45%, followed by polytrauma (27.27%). The orbito-cerebral CT showed an orbital fracture in 13 patients (22.41%). The majority of our patients had received medical-surgical treatment, i.e. 45.1%, and 39.2% had received medical treatment. A final visual acuity greater than 3/10 was noted in 54.90% of cases. The evolution was good in 76.5% of eyes and complicated in 13.7% and we had noted after-effects in 9.8 %.

## DISCUSSION

The frequency of ocular trauma by PRA compared to all ocular trauma received was 9.47%. In a bibliographic study from 1991 to 2005 on ocular trauma in children aged 0 to 15 years in Senegal, LAM et al. [3], report a frequency of 3.0%.

According to the World Health Organization (WHO) report in 2004 in Geneva on the prevention of injuries due to road traffic accidents, two-wheeled vehicles are involved in a large proportion of road accidents [4].

Despite these variations in rates, ocular trauma by PRA remains a problem because it is a source of amblyopia or unilateral blindness in young subjects.

Consequently, this state can be explained by the fact that the majority of roads in our regions are type B2; also the scarcity of cycle paths, the frequency of motorcycles and vehicles in traffic and the ignorance and non-compliance with the highway code and also the non-compliance with basic safety rules including wearing a helmet.

This is confirmed in our study by the annual frequency of ocular trauma decreased during the covid 19 confinement period in 2020 with a frequency of 3.78%.

We found a large predominance of the male sex with a frequency of 72.5% and a sex ratio of 2.6 4.

It is in agreement with the study carried out by Omgwa Eballé [5], who finds also a male predominance with a frequency of 80.7%.

These could be explained by the fact that men are more active users than women; men drive more quickly than women.

The age group most affected was that between 20 and 40 years old (56.5%). In fact, 65% of patients were aged less than 40 years. These results corroborated those of Omgwa Eballé A [5], of which 65% of patients were under 40 years old. These results can be explained by the fact that this age category constitutes the able-bodied arms of the population and therefore carries out more activity than the other age categories and by the additional fact that their means of travel are generally vehicles on two wheels.

Pupils and students were the most represented socio-professional class with 14/51 cases (27.5%) followed by those without professions (17.6%).

These results differ somewhat from those of Meda [6], in Burkina Faso and those of Tchabi [7], in Benin which find a majority student population. These results could be explained by the fact that the means of transport of this professional group is essentially motorcycles and coaches and the most frequent victims of public road accidents due to ignorance of the Highway Code.

Treatment is relatively early in our series, 47.1% of our patients consulted within 24 hours. In Burkina Faso, Meda [6], found an average delay of 11 days; relatively long delay which would be attributed to limited financial means, the use of health centers and traditional medicine as first intention. This delay in the treatment is noted to varying degrees. In developed countries, treatment is early, greater than 90% within 24 hours. The treatment deadlines in our study, although significantly improved, are still far from those achieved by the West. This relative speed of treatment in our series is probably due to the proximity of the hospital and the geographical origin of our patients. In fact, almost all of our patients came from Dakar or its close suburbs.

Furthermore, the probably higher average socio-economic level of our patients undoubtedly contributes to facilitating rapid access to the hospital. The longest delays observed in our series are due to negligence or a delayed reference at night or on weekends. In fact, there are few ophthalmology structures in Dakar that provide functional permanence or due to their ignorance.

In our study, ocular trauma by PRA was more frequent in the right eye (47.1%) than in the left eye (25.5%).

On the other hand Lam [8], found a predominance on the left with 53.7%/41.8% involvement of the right eye.

Lam 's idea [9], in Senegal for whom: "if a difference appears in the frequency of trauma between the right eye and the left eye, it can only be due to chance in the direction of the projectile".

We had noted blindness (distance visual acuity <1/10) in the traumatized eye in 3.92% on admission, this result is close to those found by Ayena [10], (2.95%) but lower than those of Ombwa Eballé [5], (9%) and Kaya et al [11] (19%).

This difference could be mainly linked to the nature of the shock and the severity of the initial lesions.

Eye injuries, although mostly unilateral, consisted mainly of contusions with a rate of 79.34% followed by eye wounds with a rate of 20.54%.

Our results agree with those of Ombwa Eballé, et al. [5], whose majority of ocular trauma is with a closed globe.

In our study the retina was affected in second position with a rate of 20.35%, followed by uveal lesions which come in third position with 12.12% and in fourth position corneoscleral lesions with 10.24%.

However, the cornea remains the tissue most affected in globe trauma. This observation is almost constant in all data from the African literature [12,14]. The USEIR study [14], indicates that the cornea is the most affected tissue with a rate of 52% followed by the retina (46%) and the vitreous (43%). This preponderance of corneal lesions is explained by the anatomical situation of the cornea which is the most exposed structure of the anterior segment. The differences noted between the different series can be explained by the characteristics of the studies and their methodology. Orbital lesions with a serious prognosis were very frequent (13 eyes/102 eyes or 22.41 %) in our series and dominated by fractures of the orbital walls and orbital syndromes. Our results agree with those of Ombwa Eballé A, et al. [5], with an orbital fracture noted in 39 eyes/176 eyes or 22.2% and lower than car-related accidents in Israel which are the source of 0.9% of orbital fractures [15]. These orbital lesions justified the orbital-palpebral sequelae such as orbital dystopia, oculomotor paralysis, ptosis and ectropion recorded requiring oculoplastic treatment. Drug treatment alone was carried out in 39.2% of our patients and surgical treatment in 45.1%.

Compared to the types of treatment received, our results are superior to those of Sounouvou I et al. [16], in Benin who reported 10% surgical treatment and those of Sovogui et al. [17], in Guinea which reported 17%. These results would depend on the severity of the eye injury. Medical treatment concerned minor injuries. Serum and anti-tetanus vaccine: they help prevent tetanus in the event of a globe wound if the victim is not immunized. For the surgical cases this involved emergency anatomical repair (eyelid suture, debridement of corneal oscleral wounds or extraction of intraocular foreign bodies, washing of total hyphema), it should be noted that no case of Post-traumatic evisceration was

not carried out. In the majority of cases, the clinical outcome of our patients was favorable with visual acuity without post-therapeutic correction > 3/10 in 54.90% of cases. However, cases of post-traumatic cataracts were noted in 3 patients or 2.80%.

These complications were taken care of but nevertheless some had irreversible functional after-effects; 7.84% had distance visual acuity final between 1/10 and 3/10, and 2.94% had a lack of light perception.

The after-effects observed were dominated by corneal cases, phthisis and glaucoma.

## CONCLUSION

Trauma from PRA constitutes a frequent reason for consultation. Pupils and students were the most affected. PRA constitute a public health problem. Prevention by wearing helmets and glasses, especially among motorcyclists, is essential.

## REFERENCES

1. Accident de la route. 2019.
2. Méda N. Aspects épidémiologiques, cliniques et thérapeutiques des traumatismes oculaires graves de l'enfant au centre hospitalier universitaire Yalgado Ouédraogo de Ouagadougou. SOAO. 2008; 2: 14-19.
3. Lam A, Seck SM, Agboton G, Seck CM, Gyeye NN, Faye Sarr MH, et al. 218 Traumatismes oculaires chez l'enfant de 0 à 15 ans au Sénégal, Revue. 2007; 30: 2S212.
4. World report on road traffic injury prevention. Geneva, Switzerland: World Health Organization (WHO); 2004.
5. Ombwa Eballé A, Ndocko EM, Ebana SR, Mbella N, Mvogo CE, et al. Les traumatismes oculo-orbitaires dus aux accidents de motos taxis à Douala au Cameroun. J Fr Ophthalmol. 2016; 7.
6. Meda N, Ouédraogo A, Daboué A, Ouédraogo M, Ramdé B, Somé D, et al. Etiologies des traumatismes oculo-palpébraux au Burkina Faso. J Fr Ophthalmol. 2001; 5: 463-466.
7. Tchabi S, Sounouvou I, Yèhouessi L. Ocular contusions at the Cotonou Benin national university hospital. J Fr Ophthalmol. 2010; 7: 450-454.
8. Lam A, Ndiaye MR. Traumatismes oculaires au Sénégal, bilan épidémiologique et statistique de 1872 cas. Méd Afr Noire. 1992; 39: 810-815.
9. Lam A, Agboton G, Seck SM, Seck CM, Gueye ND. Epidemiologies des traumatismes oculaires en Afrique: situations et perspectives VII symposium international sur les traumatismes oculaires-ISOT. 2006.
10. Ayena KD, Agbo ADR, Abalo A, Hounkpati E, Hounkpati JD, Djagnekpo PA, Ameke L, et al. Les traumatismes oculaires à Lomé. Med Afr Noire. 2009; 56: 261-266.
11. Kaya GG, Ngouoni G, Ondzotto G, Botaka E, Kimbourou AF, Bagamboula-Makita C, et al. Traumatismes de l'œil et de ses annexes au centre Hospitalier et Universitaire de Brazzaville. Med Afr Noire. 2008; 55: 505-513.
12. Nwosu SN. Domestic ocular and adnexal injuries in Nigerians. West Afr J Med. 1995; 3: 137-140.
13. Sidi Cheikh S, Ducouso F, Traore L, Momo G, Schemann JF. Étude rétrospective des traumatismes oculaires perforants traités à l'IOTA: à propos de 180 cas. Médecine d'Afrique Noire. 2000; 47: 5.

14. May DR, Kuhn FP, Morris RE, Witherspoon CD, Danis RP, Matthews JP, et al. The epidemiology of serious eye injuries from the United States Eye Injury Registry. *Graefes Arch Clin Exp Ophtalmol.* 2000; 238: 153-157.
15. Yulish M, Pikkell J. Motor vehicle accident eye injuries in Northern Israel. *Int J Environ Res Public Health* 2014; 11: 4311-4315.
16. Sounouvou I, Zoumenou E, Alamou S, Tapsoba Y, Tchogang Tchinguoua N, Tchabi S. Traumatismes oculaires à la Clinique Universitaire d'Accueil des Urgences du CNHU-HKM de Cotonou (CUAU) – SARAF. 2014; 19: 23-26.
17. *Sovogui Health Sci. Dis.* 2022; 23: 122-126.