

Pattern and management of traumatic cataract in children aged 0 to 15 years at the University Hospital of Abeche (CHU-A) and at the "Voir la Vie" Clinic

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ABSTRACT

Objective: This study was carried out to evaluate the postoperative visual outcome and management of traumatic cataract in children.

Methods: This was a retrospective and descriptive multicenter study conducted at the University Hospital of Abéché and the "Voir la Vie" Clinic. Children aged 0 to 15 years and operated for traumatic cataract were included in this study. The variables studied were epidemiological, clinical and therapeutic. The data collected were entered using Excel 2013 and analyzed by SPSS 18.0 software.

Results: The average age was 10.25 ±3.19 years. The age group 10 to 15 years was the most represented with 131 (66.8%), 5 to 9 years 55 (28.1%) and 0 to 4 years 10 (5.1%). The sex ratio M/F was 1:9. One hundred and fifty five (79.1%) of the patients came from rural areas. One hundred and fifty one (77%) of the main mechanism were bruises. One hundred and ten (56.1%) of the circumstances of occurrence were child's play and 107 (54.6%) of the main traumatizing agent were vegetable bodies. One hundred and thirty two (67.3%) of preoperative visual acuity were less than 1/10 of cases. One hundred and seventeen (59.7%) of the most common type of anesthesia were locoregional of cases. Nineteen (8.7%) patients of the most common intraoperative complication were vitreous loss. At 30 days postop, 55.10% (n=108) of patients had distance visual acuity greater than or equal to 1/10.

Conclusion: Traumatic cataract in children is predominant in males. It is the main cause of unilateral blindness. Adequate management with the placement of implants in the posterior chamber gives better functional vision.

Key words: Traumatic cataract, Children, Traumatizing agent, Vision, Surgery outcome, Abeche

INTRODUCTION

Post-traumatic cataract refers to any lens opacity by an external insulting agent. It is secondary to a bruise or perforating trauma with or without an intraocular foreign body¹. In the world population, an estimated 1.6 million blindness, 2.3 million low vision and 19 million monocular blindness are due to trauma².

On an annual basis, there is an estimated incidence of approximately 20 children with blinding cataract (congenital or infantile). The backlog or incident cases of children with traumatic cataract has not yet been estimated in Africa, but is likely to be lower than congenital or infantile cataract³. It is a common condition due to the increase in ocular trauma, accounting for 1.3 to 3.7% of trauma emergencies⁴. It is a frequent cataract despite prevention efforts and the progress of ophthalmologic microsurgery⁵.

The circumstances of occurrence are dominated by games, beating or corrective punishment, brawls, and

public road accidents⁶. The traumatizing agents are due to a braid needle, projections by stone thrower and pieces of wood⁷. Its frequency is 7.63%⁸.

In Chad, no studies have been devoted to traumatic cataract in children. For this reason, we wanted to carry out this work with the aim of improving the management of traumatic cataract. To carry out this work, we set ourselves the following objectives:

General objective: To find out the pattern of traumatic cataracts and the postoperative outcome in children aged 0 to 15 years at the Ophthalmology Department of the University Hospital of Abéché and at the "Voir la Vie" clinic.

Specific objectives: To describe the sociodemographic profile of patients; To identify the anatomical forms of traumatic cataract and to assess outcomes of traumatic cataract in children 0-15 years of age.

MATERIALS AND METHODS

Study design: This was a multicentre descriptive retrospective study conducted at the University Hospital Center of Abéché (UHC-A) and at the “Voir La Vie” Clinic located in the Ouaddaï Region in Eastern Chad, from January 2016 to June 2020.

Ethical considerations: This study adhered to the tenets of Helsinki declaration. To conduct this study, we obtained the research authorization of the Dean of the Faculty of Health Sciences of Abéché, those of the Direction of the UHC of Abéché and of the “Voir la Vie” Clinic. Post-operative consultations were free in order to reduce no-shows.

Case definition: Traumatic cataract is defined as the clouding of the lens following trauma. Visual acuity was assessed according to WHO standards (<1/10, 1/10 to <3/10 and 3/10).

Inclusion criteria: All patients aged 0 to 15 years who underwent surgery for traumatic cataracts during the study period were included in this study.

Exclusion criteria: We did not include children above 15 years of age because they have already been addressed in our recent study; Patients absent from the appointment; All cases of non-traumatic cataracts were excluded; All cases of traumatic cataracts for which the surgical indication has not been established.

Data collection and analysis: The data collected was entered using Excel 2013 and analyzed by SPSS 18.0 software.

RESULTS

Socio-demographic aspect

Age: The age range of 10 to 15 years was the most represented with 131 (66.8%). The mean age of the patients was 10.25 ± 3.19 years with extremes of 8 months and 15 years (Table 1).

Table 1: Distribution by age group

| Age (years) | No. | (%) |
|-------------|-----|------|
| 0 – 4 | 10 | 5.1 |
| 5 – 9 | 55 | 28.1 |
| 10 – 15 | 131 | 66.8 |
| Total | 196 | 100 |

Gender: Male predominance was observed with 130 (66.3%) of the cases than female 66 (34.7%). The sex ratio was 1:9 (Figure 1).

Figure 1: Distribution according to the gender



Residence: One hundred and fifty five (79%) of the children were from rural areas.

Circumstances of occurrence: The main circumstance of occurrence of eye trauma was child play with 110 (54.1%) of the cases, followed by fights with 50 (25.51%) and domestic accidents in 26 (13.26%) (Table 2).

Table 2: Distribution by circumstances of occurrence

| Circumstances of occurrence | No. | (%) |
|-----------------------------|-----|-------|
| Public Road Accident | 4 | 2.04 |
| Domestic accidents | 26 | 13.27 |
| Brawls | 50 | 25.51 |
| Children’s game | 110 | 56.12 |
| Others | 6 | 3.06 |
| Total | 196 | 100 |

Nature of the traumatizing agent: Plant agents were the most vulgar with 107 (54.6%) of the cases (Table 3).

Table 3: Distribution by nature of the injuring agent

| Injuring agent | No. | (%) |
|----------------|-----|------|
| Punch | 52 | 26.5 |
| Braid needle | 7 | 3.6 |
| Metallic | 13 | 6.6 |
| Stiks | 107 | 54.6 |
| Stone throw | 8 | 4.1 |
| Others | 9 | 4.6 |
| Total | 196 | 100 |

Clinical aspects

Time between the trauma and the consultation: The time between the occurrence of the trauma and the consultation was more than one year in 56.6% of the cases.

The affected side: Traumatic cataract involvement of the right eye was the most reported with 102 (52%).

Mechanism of trauma: In our study contusion represented 151 (77%) of the cases; cataract with corneal wound or perforation was found in 45 (23%) of the cases.

Associated anomalies: Traumatic cataract without any associated lesion was found in 183 (93.36%) of the cases.

Type of cataract: In our study, cataract was cortical in 151 (77.55%) of the cases, it was anterior capsular in 30 (15.30%) and posterior subcapsular in 14 (7.15%).

Treatments

Type of anesthesia: The most common type of anesthesia was locoregional anesthesia with 117 (59.7%) of the cases.

Implant intraocular: The patients had received an intraocular lens in 150 (76.5%) of the cases.

Surgical technique: The most used operative technique was lensectomy + posterior chamber implant in 150 (76.5%) of the cases.

From the glass: Intraoperative vitreous loss was observed in 19 (8.7%) patients

Visual acuity before surgery and at D30 postoperation: Visual acuity was less than 1/10 before management in 132 (67.3%) of the cases (Table 4).

Table 4: Preoperative Visual Acuity (VA)

| Visual acuity (VA) | No. | (%) |
|--------------------|-----|------|
| < 1/10 | 132 | 67.3 |
| 1/10 - 3/10 | 9 | 4.6 |
| ≥ 3/10 | 8 | 4.1 |
| Unmeasurable | 47 | 24.0 |
| Total | 196 | 100 |

Table 5: Postoperative D30 Visual Acuity (VA)

| Visual Acuity (VA) | No. | (%) |
|-----------------------------|-----|-------|
| <1/10 | 6 | 3.06 |
| ³ 1/10 to 3/10 | 32 | 16.32 |
| >3/10 | 76 | 38.77 |
| Unmeasurable | 29 | 14.79 |
| Absent from the appointment | 53 | 27.04 |
| Total | 196 | 100 |

After surgery, at 30 days postop, 108 (55.10%) of patients had a VA greater than or equal to 1/10. Children underwent surgery and were absent from the appointment on D30 represented 27.04%.

DISCUSSION

Clinical aspects

All patients had consulted for unilateral visual impairment. The circumstances of occurrence of this visual acuity decline were dominated by children's game accidents with 56.12% of the cases followed by fights in 25.1%. This figure was close to those of Dembélé *et al*⁷ in 2015 in Mali and Mensah *et al*¹⁰ in 2004 in Abidjan, who observed 54.3% and 52.84% of the cases following children's game accidents respectively. On the other hand, Ben Zina *et al*¹¹ in 1998 in Tunisia and Sordet *et al*¹² in 2002 in France both found 35% of the cases of game-related trauma. All authors agree that play in the absence of adult supervision is the main circumstance in which eye injuries occur in children.

Regarding the vulnating agents, wooden objects/sticks dominated in 44.4% followed by punches in 26.5% of the cases. This result is consistent with that of Diomande¹³ in 2012 in Ivory Coast who had stated that 44% of wooden objects were the cause of traumatic cataract. On the other hand, it is different from those of Ben Zina *et al*¹¹ in Tunisia in 1998, Traoré *et al*¹⁴ in 2002 in Mali who obtained 67% and 52% of wooden vulnating agents respectively.

The reason of this predominance of plant bodies is likely related to the high prevalence of patients from rural areas where parents practice agricultural activities and wooden objects are within the reach of children.

Seventy seven percent of the common mechanism of trauma was a contusion. This rate is different from Doutetien *et al*⁹ in Benin who found 92.8% of the cases of cataract following a bruise ocular trauma. Baklouti *et al*¹⁵ in Tunisia and Karim *et al*¹ in Morocco in 1998, found different results respectively 55% and 53.3%.

Regardless of the mechanism, whether perforating or a contusion, any trauma to the eyeball, however minimal, is likely to cause a cataract, either by direct damage to the lens or by disruption of its metabolism.

For the delay of consultation, it varied from one week to more than one year. One hundred and eleven patients (56.6%) had consulted one year after the trauma. The delay in consultation is reported in developing countries. This delay can be explained by various reasons;

- (i) The socio-economic conditions of a very poor population;
- (ii) The scarcity of specialized ophthalmology centers;
- (iii) Parental neglect in the face of unilateral eye damage and,
- (iv) The use of traditional treatment still practiced by the majority of our African populations.

Fifty two percent of the findings about laterality revealed a predominance of right eye involvement. Soumahoro *et al*¹⁶ in 2014 in Abidjan (Ivory Coast) and Sordet *et al*¹² in France in 2002, had noted respectively 63% and 56% right eye involvement. The predominance of right eye involvement is explained by the high exposure of this side in patients. In addition, the directing eye comes into play. Indeed, if the directing eye is the right one, when children's game, the child will tilt his head more to the left, exposing his right eye to trauma.

This result is consistent with the fact that the dominant side is always exposed during games as well as at work, as it is always involved in the manipulation of objects. Sordet *et al*¹², Vatauvuk *et al*¹⁷ in 2004 and Diamonde¹³ reported a predominance of the left eye with a percentage of 56%, 56.2% and 66% of the cases respectively. The most common circumstance of occurrence in these studies was a fight.

This means that the left eye is directly exposed to a blow from a right-handed opponent. The initial visual acuity was reduced and limited to light perception in 67.3% of the cases. Doutetien *et al*⁹, Karim *et al*¹, Sordet *et al*¹² and Soumahoro *et al*¹⁶ noted respectively 78.2%, 95.5%, 88% and 91% of initial visual acuity collapse.

The collapse in initial visual acuity was thought to be related to delay in consultation as discussed above. As for associated lesions, traumatic cataract was isolated in 93.3% of patients. The most common corneal lesion was adherent leukoma in 2.5%. According to Karim *et al*¹, there are two possible outcomes of perforative cataract:

- (i) If the lens is in place, with the capsule intact, the corneal wound will be sutured urgently and the cataract will be operated on later "cold" within a period varying from three weeks to one month according to the authors, with the insertion of an artificial lens.
- (ii) If there is an exit of crystalline masses in the anterior chamber with an increased risk of ocular hypertonia and inflammation, these patients should be operated on earlier. The practice of emergency intraocular implantation is controversial. It is even discouraged by most authors because of the increased risk of infection and inflammation. On the other hand, the scarred state with cataract was a good indication for posterior chamber implantation except in cases of lens subluxation or large capsular opening. In these cases, scleral or anterior chamber implantation and fixation could be used. Lens opacification was complete in 77.5% of patients. This result was close to those Dembélé *et al*⁷ in Mali and Baklouti *et al*¹⁵ in Tunisia, who represented 65.7% and 75% of total cataracts respectively. This predominance of total cataract is synonymous with a too long delay between the date of the trauma and the date of treatment.

Therapeutics and prognosis

The patients were operated on under loco-regional anesthesia in 59.7%. General anesthesia is generally used in children for whom locoregional anesthesia is not indicated and in young children.

We noted vitreous loss in 8.7% of patients. Karim *et al*¹ found 4 cases of vitreous loss in 45 children in Morocco. Doutetien *et al*⁹ represented 33.3% of vitreous loss in Benin.

As for postoperative visual acuity, it improved in 55% with visual acuity > 1/10. Diomandé¹³ found 56.4% of patients with visual acuity ≥ 1/10. Moudenne *et al*¹⁸ in 2009 pointed out that 53.84% of patients had recovered a final visual acuity greater than 1/10. Vatauvuk *et al*¹⁷ reported visual acuity ≥ 1/10 in 31.25%.

These results show that traumatic cataract surgery can restore vision, especially when the patient is seen early and the operative technique is accompanied by intraocular lens. After a follow-up at D30 post-op, we found 27.04% of patients lost to follow-up. This was due to the fact that the patients came from remote rural areas and lack of compliance to medical recommendations as soon as an improvement in the child's visual acuity was noted.

Visual acuity was not measurable in 14.7% of patients. This is due to the difficulty of measuring visual acuity and the lack of understanding of visual acuity by children.

Limitation

We were not able to categorize the visual acuity from mild to severe visual impairment postoperative and this constituted the limitation of this study.

Recommendations

We recommend emphasis on the prevention of ocular trauma.

CONCLUSION

Traumatic cataract in children is predominant in males. It is the main cause of unilateral blindness. The main circumstance of occurrence of eye trauma was child play and the age range of 10 to 15 years was the most represented. The time between the occurrence of the trauma and the consultation was more than one year and the most associated lesions to the cataract were corneal wound or perforation. In most of cases, cataract was cortical. Majority of the patients had received an intraocular lens. The results show that traumatic cataract surgery can restore vision, especially when the patient is seen early and the operative technique is accompanied by intraocular lens.

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