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Epidemioclinical and Etiological Aspect of Non-Trachomatous Corneal Opacities in Lubumbashi

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ABSTRACT

Aim: *to describe the epidemioclinical and etiological aspect of non-trachomatous corneal opacities in the population of Lubumbashi.*

Material and Method: *This is a prospective, cross-sectional descriptive study of 281 patients with non-trachomatous corneal opacity collected at the reference center of the University Clinics of Lubumbashi from 2011 to 2016, i.e. a period of 5 years according to a convenience sample. Each patient underwent a complete routine ophthalmological examination. All forms of corneal opacities associated or not with ocular perforation and qualitative and quantitative variables were included in the study. Dystrophies and trachomatous opacities were excluded from the study. For all statistical tests, the significance threshold was 5% ($p < 0.05$). 95% CI. The size of corneal opacity was assessed at the slit lamp in the absence of OCT.*

Results: *31.0 38 subjects were examined of which 1244 patients had corneal involvement (4%), 281 patients had corneal opacity (281/1244 or 22,6%). The mean age of the patients was 25.2±15.9 years. Male gender was dominant with a number of 57.3%. The left eye was more affected in 52.7%; Most patients in 38.1% had visual acuity ≥ 3/10. Corneal blindness (58.4%), trauma was the remarkable cause (36.3%) and leukoma was objectified opacity in 39.9%. Superficial corneal lesions (60.1%). Classical medical treatment was 65,1% (Corticosteroid therapy: 71%, Vitamin B12: 11.5%) against 34.9% of other treatments.*

Conclusion: *Corneal opacity is a real public health problem in our environment given its high frequency and its adequate management is not up to par.*

Keywords

Corneal opacities, Clinic, Epidemiology, Etiology, Lubumbashi.

Introduction

According to the most recent WHO figures on the causes of blindness, corneal opacities affect 1.9 million people (5.1% of the total number of blind people in the world). If we were to add to this

figure the other diseases responsible for blindness through corneal pathology (such as trachoma, vitamin A deficiency, etc.), the figure would be much higher. In addition, there are probably tens of millions of people who are blind as a result of corneal disease [1]. Corneal opacity accounts for 3.46% of global blindness [2]. It is the leading cause of blindness in children [3]. In developing countries, corneal blindness affects all age groups, approximately 80% of cases are preventable [4].

In the DRC, the epidemiology of corneal blindness is less reported. In Kinshasa, the authors showed that 5% of cases concerned corneal problems [5] and 4.9% corneal leukoma [6]. In Lubumbashi, another study showed that 14.8% of corneal opacity was unilateral in children [7].

In general, corneal transplantation remains a reference treatment for corneal opacity. In the DRC, the shortage of grafts, the high cost of this adequate care in specialized entities, the difficulty experienced by some patients in being able to access appropriate care (financial barrier of needy families) pose a problem of care for patients with corneal opacities because the latter remain victims of corneal opacities that are long incurable and irreversible in our environments. The technical platform of the DRC to date is still limited. It is in this context that we conducted this study with the aim of describing the epidemioclinical and etiological aspect of non-trachomatous corneal opacities in the population of Lubumbashi in order to contribute to the improvement of the adequate care of this very blinding pathology. We also wanted to make available these data absent in our environment to facilitate the task and knowledge of the practitioner in the days to come.

Material and Method

A cross-sectional and prospective descriptive study from 2011 to 2016 was conducted at the ophthalmological center of the university clinics of Lubumbashi in the province of Haut Katanga. There were 31,038 subjects examined, 1244 patients had corneal involvement in which 281 patients had corneal opacity associated or not with ocular perforation. We included patients with non-trachomatous corneal opacity and the following variables: age, sex, the affected eye, visual acuity, types of opacities, depth of opacities, size of the lesion (measured at the slit lamp due to lack of OCT), evolution in relation to the treatment received by patients with corneal opacity were studied. Patients with trachoma and dystrophy were excluded from the study,

On examination, each patient underwent a routine questioning and ophthalmologic examination. Corneal sensitivity was determined using a slit lamp, the Seidel test was used to test for the presence or absence of an ocular perforation, the depth of the corneal lesion (epithelial, stromal, endothelial); the topography of the corneal lesion relative to the visual axis, the number of lesions, the thickness, the size, the location of the opacity . Any corneal opacity limited to the corneal epithelium was considered superficial and any subepithelial opacity was considered deep. The corneal opacity is an opacity < 5 mm in corneal diameter, nephritis is ≥ 5 mm and leukoma is more than 1 mm reaching the stroma or corneal endothelium. The presence of an inflammatory reaction was also sought. The treatment was administered in the form of eye drops or drops, tablets, capsules, dressings or surgery as needed. The classic treatment consisted of vitamin A (ointment or capsule), vitamin B12 and corticosteroid therapy depending on the affected corneal layer. The other types of treatments were traditional used by financially limited patients to access better care for this blinding disease. Taking photos made it possible to identify the types of corneal opacities and to assess therapeutic monitoring. The medical team consisted of 2 doctors and 2 nurses per consulting room.

Patients had freely consented before participating in the study. The SPSS 2023 software allowed the analysis of the results. We calculated the mean and standard deviation, the association between qualitative variables was with the chi 2 test, the student test was used to compare the means. For all statistical tests the significance threshold was 5% ($p < 0.05$).

Results

Relative Frequency of Corneal Opacities, Sociodemographic and Clinical Characteristics of Patients

Frequency of corneal opacities

Of 31,038 subjects examined, 1244 patients had corneal involvement, representing 4% of all corneal blindness; and 281 patients had corneal opacity, representing a relative frequency of 22.59%.

Sociodemographic and Clinical Characteristics of Patients

The mean age was 25.2±15.9 years. Male gender was predominant in 57.3%. The left eye was more affected in 52.7%; Most patients in 38.1% of cases had VA ≥ 3/10 and blindness was noted in 58.4%. Trauma was the cause of remarkable corneal opacity in 36.3% and leukoma was the leading cause of corneal opacity in 39.9% of cases. More than half of the patients or 60.1% had superficial corneal opacities (Table 1).

Types of Treatments and Sociodemographic and Clinical Characteristics of Patients

Only 34.9% of patients benefited from conventional medical treatment, i.e. 65.1%, of which corticosteroid therapy was the most used in 71% followed by vitamin B12 in 11.5%. There was no significant difference in patients regarding mean age, sex and affected eye ($p>0.05$). Male sex was dominant in 57.3% . The left eye was more affected in patients who received conventional medical treatment (56.8%) and the right eye in patients who used treatment other than conventional medical treatment (55.1%). Most patients had visual acuity ≥ 3/10° in 38.1% and ocular blindness was objectified with a rate of 58.4%. Leukoma was the common type of corneal opacity in (56.1%) and stage 4 LCET predominated with 73%. Lesions were deeper in 39.9% compared to 60.1% of superficial corneal opacities (Table 1 and 2).

Table 1: Sociodemographic and clinical characteristics of patients.

Features	Frequency	%
Age groups	average: 25.2 ± 15.9 years	
≤ 10 years	53	18.9
11 to 20 years old	68	24.2
21 to 30 years old	73	26
31 to 40 years old	33	11.7
41 to 50 years old	30	10.7
> 50 years old	24	8.5
Sex	sex ratio: M/F 1.3.	
Female	120	42.7
Male	161	57.3
Eye reached		
Right eye	133	47.3
Left eye	148	52.7
Visual acuity before PEC		
≥ 3/10	107	38.1
≤ 1/10 (MM, CD)	71	25.3
PL	48	17.1
No	31	11
Not determined	24	8.5
Causes of opacities		
Burn	6	2.1
Foreign body	5	1.8
Corticosteroids	40	14.2
Insects	4	1.4
LCET stage 4	79	28.1
Trauma	102	36.3
Other causes	37	13.2
Not determined	7	2.5
Types of corneal opacities		
Leukoma	112	39.9
Nephelion	58	20.6
Pillowcase	36	12.8
Affected layers		
Deep lesions (leukoma)	112	39.9
Superficial lesions	169	60.1

Table 2: Distribution of patients according to sociodemographic and clinical characteristics and types of treatment received.

Features	Conventional medical treatment	Other Treatments	p-value
Mean age ± standard deviation	26.4 ± 15.9	23.1 ± 15.9	0.099
Sex (%)	**SR M/F: 1.3**	**1.5**	
Female	81 (44.3)	39 (39.8)	0.471
Male	**102 (55.7)**	**59 (60.2)**	
Eye affected (%)			
Right eye	79 (43.2)	54 (55.1)	0.056
Left eye	104 (56.8)	44 (44.9)	
Visual acuity (%)			
AV ≥ 3/10	79 (43.2)	28 (37.8)	
B AV ≤ 1/10 (MM, CD)	49 (26.8)	22 (29.7)	0.000
PL	35 (19.1)	13 (17.6)	
No	20 (10.9)	11 (14.9)	
Causes of opacities (%)			
Burn	4 (2.19)	2 (2.04)	
Foreign body	0	5 (5.10)	
Corticosteroids	23 (12.57)	17 (13.35)	
Insects	0	4 (4.08)	0.000
LCET stage 4	71 (38.79)	8 (8.16)	
Trauma	59 (32.24)	43 (43.88)	
Other causes	21 (11.48)	17 (17.35)	
Indeterminate	5 (2.73)	2 (2.04)	
Opacities types (%)			
Leukoma	57 (31.1)	**55 (56.1)**	0.000
Nephelion	32 (17.5)	26 (26.5)	
Pillowcase	23 (12.6)	13 (13.3)	
Layers affected (%)			
Deep lesions (subepithelial)	57 (31.1)	**55 (56.1)** (leukoma)	0.000
Superficial lesions (epithelium)	**126 (68.9)**	43 (43.9)	

Legend: *Other causes: in utero use of chloramphenicol, history of measles, dry eye due to facial paralysis (lagophthalmos), ophthalmic zoster, superficial punctate keratitis, use of medicinal plants.
*Trauma (tree hit, spoon and knife hit). ⁎Other treatments: indigenous treatment, use of honey, use of sugar water, penicillin powder.

Discussion

Frequency of Corneal opacities

Corneal lesions in our series represented 4% of all patients examined, among which corneal opacities concerned 281 patients or 22.59%. In a study published in 1997 by Kaimbo et al. [5], corneal lesions had a proportion that varied between 4.5% to 5%, this percentage is close to ours, on the other hand Prabhasawat et al. [8] revealed in their study at Siriraj Hospital in Thailand that the prevalence of causes of corneal blindness was 1.7%, this percentage is lower when compared to the figure that our series reported.

In this same study, women were more affected than men, respectively 53.7% and 36.3%, Anas O et al. [9] in their study on corneal blindness in Morocco also found a female predominance at 58% unlike our study where the male sex was predominant.

In the same study concerning Anas et al. [9], the mean age of patients was 36 years, bilateral blindness in 62%, the main causes of blindness were dominated by the sequelae of infectious keratitis considered as the 1st cause of corneal blindness in 22%, in our series reports a mean age of 25.2±15.9 years, there was no significant difference regarding the mean age (p=0.099) and blindness represents 58.4%. Our study is close to the results proven by Anas et al. [9]. Trauma was the first cause responsible for corneal opacity in 36.3% followed by stage 4 LCET with 28.1%. The results of Chenge Borasisi et al. [10] in their 2003 study on limboconjunctivitis showed that out of 422 children examined, 139 children had LCET in its mixed form in 38% of cases and also its bulbar form in 3%, our results corroborate with those of Chenge et al. [10] in the mixed form and a little different in the bulbar form; in the same study, keratitis had 1.9% and trauma 9.2%.

Corneal leukoma was the most notable corneal opacity in 39.9% of

cases, Our results more or less agree with those of Anas et al. [9] in relation to the average age, sex and numbers reported. According to Kayembe L [6], corneal leukomas represented 4.9%, there is a large gap in proportion between what the previous author found, this can be explained by the fact that a disease can evolve in time and space by the change of many demographic and clinical parameters.

According to Whitcher et al. [1], trauma and ulcerations were the important causes of corneal blindness that are often underreported but may account for 1.5-2.0 million new cases of unilateral blindness each year. Ukety TO [11] in 1991 in his study reported 2 cases of corneal ulcer associated with ulcero-erosive blepharitis and 6 patients who had a dendritic ulcer; Ngoie Maloba V et al. [12], proved in 2018 on 380 patients with ulcer a frequency of 0.85% of cases, these authors add that the average age of the patients was 38.67 years, patients aged over 40 were in the majority with 19.2%, children aged 0-5 years represented 8.5% and those aged 6-10 years had 10.3%. Our series reported a predominance in the age group of 21 to 30 years with 26% of cases and those under 10 years had 18.9% and corneal ulcers had 29.39%. For Iye S et al. [7], in their study on childhood blindness showed the higher numbers in children aged 0-5 years (47%) and those aged 6-10 years (32%) were the most affected by the disease. Furthermore, Ezegwui [13] reported in his study on ulcers that apart from trauma, indigenous treatment was incriminated in 19.5%. The same author also states that 71.4% presented a visual acuity of the affected eye of 3/60 and 4 eyes or 6.2% had deteriorated visual acuity and that women were more affected than men respectively in 53.7% and 36.3%. Our study showed that the left eye predominated with 56.8%. Most patients in 38.1% of cases had a visual acuity ≥ 3/10°.

Types of Treatments for Corneal Opacity

In our study, patients who received conventional medical treatment represented 65.1% and those who misused a drug other than conventional medical treatment had a proportion of 34.9%. Conventional medical treatment was essentially corticosteroid therapy in 71%.

The management of corneal opacities includes several current methods varying from one author to another [4]: human transplantation from a deceased donor practiced since 1887, this method has the disadvantage of a high risk of rejection and HIV infection, hence there is a shortage of grafts. The graft can be transfixing if it is total and lamellar if it is partial (corneal substitutes, regeneration is carried out from the collagen of the stroma or limbal stem cells which have an unlimited tissue renewal power by stimuli during a corneal lesion). Synthetic grafting is used from biological supports especially in severe lacrimal dysfunctions, ocular surface diseases. Autograft and amniotic membrane grafting, manual epitheliectomy and therapeutic laser photoablation. Other antioxidant drugs are vitamin A and vitamin C [14], our study however reported for the Classic medical treatment 65.1% and for other drugs used (traditional treatments): 34.9% due to shortage of grafts and financial limit to access quality care in our environment.

Conclusion

Corneal opacities are one of the causes of visual impairment and blindness in our environment given its high hospital frequency. Due to the shortage of grafts in the Democratic Republic of Congo, another treatment alternative is possible for needy families with limited financial resources for adequate care for corneal transplants in specialized entities.

References

1. Whitcher JP, Srinivasan M, Upadhyay MP. Corneal blindness: a global perspective. Bull World Health Organ. 2001; 79: 214-221.
2. Johnson G, Minassian D, Weale R, et al. The Epidemiology of Eye Disease Arnold. London. 2003; 306-317.
3. Solomon A. The State of the World's Sight. Vision 2020: The Right to Sight. WHO Press. 1999-2005.
4. Gain P, Jullienne R, Zhiguo HE, et al. Global survey of corneal transplantation and eye banks. JAMA Ophthalmol. 2016; 134: 167-173.
5. Kaimbo wa Kaimbo D, Missotten L. Eye diseases and the causes of blindness in the southwestern Equator (equatorial ferest) in Zaire, data from an eye camp in three rural centers. Bull Soc Belgian Ophthalmol. 1997; 265: 59-65.
6. Kayembe L. Common causes of blindness in Zaire. Br J Ophthalmol. 1985; 69: 389-391.
7. Abial SI, Numbi VM, Kasongo DL, et al. Clinical and etiological profile of childhood blindness in the urban- rural population of Lubumbashi. Open Journal of Ophthalmology. 2023; 13: 83-90.
8. Prabhasawat P, Trethipwanit KO, Prakairungthong N, et al. Causes of corneal blindness, a multicenter retrospective analysis. J Med Assoc Thai. 2007; 90: 2651-2657.
9. Anas Oulmodi, Mohamed Baali, Yassine Maslik, et al. Corneal blindness in Morocco from 2012-2017. Media library l SFO-online – French Society of Ophthalmology, found on the site: https://www.sfo.fr.
10. Chenge B, Makumyaviri AM, Kaimbo D. Endemic limboconjunctivitis of the tropics in Lubumbashi, Democratic Republic of Congo. Bull Soc Belge Ophtalmol. 2003: 9-16.
11. Ukety TO, Maertens K. Ocular ulcerative herpes following measkes in Kinshasa, Zaire. Curr Eye Res. 1991; 10: 131-137.
12. Ngoie Maloba V, Ngayuwa Nkiene J, Tunku Kabamba G, et al. Frequency of corneal ulcer in 380 cases: retrospective study conducted in two hospital centers in DR Congo. J Fr Ophtalmol. 2018; 41: 57-61.
13. Ezegwui IR. Corneal ulcers in a tertiary care hospital in Africa. J Natl Med Assoc. 2010; 102: 644-646.
14. Nakamura T, Inatomi T, Sotozono C, et al. Transplantation of cultivated autologous oral mucosal epithelial cells in patients with severe ocular surface disorders. JAMA Ophthalmol. 2016; 134: 167-173.