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Eyelid changes in patients with trachomatous corneal opacity

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Abstract:

Introduction: Trachoma-induced corneal opacities are the most prevalent cause of vision impairment and a potential cause of blindness. These may result from a chronic conjunctiva infection or cicatricial entropion and trichiasis, which constantly cause the lashes to brush against the cornea.

Aim of the study: To study the eyelid changes in trachoma patients presenting with corneal opacity.

Subjects and Methods: A cross-sectional study included patients with chronic trachoma presenting by corneal opacity associated with eyelid changes between March and September 2022.

Results: The study included 50 patients. 40% of the patients suffered from trichiasis in the right eye, while 40% suffered from trichiasis in the left eye. 38% of the patients suffered from entropion in the right eye, while 42% suffered from entropion in the left.

Conclusion: Patients with trachoma often have eyelid abnormalities that contribute to corneal opacity; thus, surgical correction of entropion and trichiasis should be considered.

Keywords: Corneal opacity; eyelid; trachoma.

1. Introduction

Worldwide, trachoma remains the most prevalent cause of infection-related blindness [1]. Multiple Chlamydia trachomatis infections result in scarring of the conjunctival surface of the eyelid, which can then lead to entropion (where the eyelashes turn inward and touch the globe, causing pain and injury to the cornea) and follicular conjunctivitis, among other conditions [2].

Infection with trachoma goes in two overlapping phases, the first phase is the inflammatory phase, while the second one is the cicatricial phase [3]. Nonspecific vasodilation of the conjunctival blood vessels is the first sign of trachoma infection [4] with some specific changes noted after infection for several weeks, also, the development of follicles subjacent to the conjunctival fornices, the tarsal plates, and

the limbus, which are the key sign of active trachoma, a spot 0.5–2.0 mm in diameter and white to pale yellow that is sometimes slightly raised [5].

In the least developed nations, trachoma still affects millions of individuals. Even while it may take many decades for trachoma to become extinct and living circumstances to improve on their own, there is a special worldwide commitment to do away with the disease [6]. Significant strides are being made toward the

eradication of blinding trachoma, thanks to a 1997 World Health Assembly decision that formed the Global Alliance for the Elimination of Trachoma by the Year 2020 [7].

Multiple grading systems have been used for trachoma but the most common is the simple trachoma grading system of WHO [8]. A new simplified grading system has been published by Solomon et al. (2020) including five signs, each of these signs can be absent or present [9].

2. Subjects & Methods

2.1. Subjects

Fifty cases with trachoma were included in this cross-sectional observational non-interventional research (every subject who meets the inclusion criteria is recruited until the sample size is attained).

The patients that were included were gathered from the outpatient clinic of Fayoum University's Department of Ophthalmology between March and September of 2022.

Inclusion criteria

Patients with corneal opacity accompanied by signs of trachoma presented

to the FUH outpatient clinic and were older than 18 years old were included in the study.

Exclusion criteria

All patients with Corneal opacity due to causes other than trachoma, with a history of previous corneal surgery, and uncooperative patients were excluded.

2.2. Study design

A cross-sectional observational non-interventional study.

2.3. Methods

Data collection

- Demographic history (age, gender, District).
- General medical history (DM, HTN).
- Ophthalmological history (previous ophthalmic surgery).

Examination

Patients were examined for Signs of trachoma using a slit lamp with direct focal illumination which includes (Pannus Siccus, conjunctival scars, PTDs, PTCs, trichiasis, and corneal opacity).

Grading of corneal opacity was done, according to Soloman et al. (2004) [10], as follows

- CC1: for peripheral minimal scarring or opacity other than the pannus siccus and not involving the visual axis
- CC2: for moderate scarring or opacity involving the visual axis with the pupillary margin visible through the opacity

- CC3: for severe central scarring or opacity with the pupillary margin not visible through the opacity with the opacity involving the whole corneal thickness.

2.4. Statistical Methods

All data were analyzed using Statistical Package for Social Science (SPSS) 28.0. For numerical variables, descriptive statistics were shown as the mean and standard deviation; categorical variables were shown as numbers and percentages. The study was conducted using IBM Statistical Package of Social Science (SPSS) version 28 for Windows. The Chi-Square test is used to compare two or more qualitative groups. To evaluate the relationship between quantitative non-parametric variables, use the bivariate Spearman's correlation test. Spearman's correlation test in bivariate mode was used to examine the relationship in terms of quantitative non-parametric variables.

3. Results

This research involved fifty patients. There were 72% females and 28% males among them. The average age was 11.17 ± 58.36 years. 38% of the patients had

trichiasis in the right eye, 38% had trichiasis in the left eye, 36% had entropion in the right eye, and 36% had entropion in the left (Table 1).

Table 1: Lid changes in trachoma patients with corneal opacity.

Variables		No.	%
Trichiasis			
Rt	No	31	62
	Yes	19	38
Lt	No	31	62
	Yes	19	38
Entropion			
Rt	No	32	64
	Yes	18	36
Lt	No	32	64
	Yes	18	36

The association between the degree of visual loss and the cause was studied using the Chi-square test with exact significance reported. A statistically significant association was observed between the degree of visual loss and the cause in the right and left eyes.

The highest degree of corneal opacity was observed among patients with both trichiasis and entropion, followed by trichiasis only and entropion only. Patients with no trichiasis or entropion had having lower degree of corneal opacity (**Table 2**).

Table 2: Comparing DPAS scores and Fitzpatrick skin type, sun exposure and usage of sunblock among the studied group.

		Corneal opacity degree			<i>p</i> -value	
		CC1	CC2	CC3		
Rt eye	No Trichiasis or Entropion	N	1	19	0	<0.001
		%	5.0%	95.0%	0.0%	
	Trichiasis only	N	0	1	9	
		%	0.0%	10.0%	90.0%	
	Entropion only	N	0	3	2	
		%	0.0%	60.0%	40.0%	
	Both Trichiasis and Entropion	N	0	2	13	
		%	0.0%	13.3%	86.7%	

Rt eye	No Trichiasis or Entropion	N	3	14	3	0.070
		%	15.0%	70.0%	15.0%	
	Trichiasis only	N	0	5	4	
		%	0.0%	55.6%	44.4%	
	Entropion only	N	0	1	3	
		%	0.0%	25.0%	75.0%	
	Both Trichiasis and Entropion	N	0	0	17	
		%	0.0%	0.0%	100%	

4. Discussion

Globally, trachoma is the primary cause of infectious blindness. Repeated bouts of *Chlamydia trachomatis* infection result in cumulative scarring of the conjunctival surface of the eyelid, which can lead to blepharitis, follicular conjunctivitis, and eventually trichiasis, a condition in which the eyelashes turn inward and touch the globe, inflicting pain and damage to the cornea [11].

According to the most current estimates, 333,000 disability-adjusted life years (DALYs) were lost to trachoma globally in 2010. *Chlamydia trachomatis* infections that recur frequently lead to inflammation and cumulative scarring of the upper eyelid's underside. In certain cases, this eventually results in trichiasis, a clinical stage of trachoma in which the eyelashes turn inward and touch the eye. In the absence of surgical intervention, this disorder may gradually deteriorate the

cornea, resulting in vision impairment and eventual permanent blindness. Trachoma is thought to pose a higher danger to the public's health in dry, dusty, and hot conditions, yet it may exist in places where poor hygiene and overcrowding enable the illness to spread [12].

It is critical to research trachoma because it frequently results in cicatricial entropion, which causes the lashes to constantly brush against the cornea, or chronic conjunctival inflammation, which causes the cornea to become opaque. This is the main thing that impairs vision and can cause blindness. The literature contains relatively few studies that address the corneal opacity caused by trachoma [13].

Zhao et al. (2020) observed that extended contact with children—who operate as a community's reservoir for active infection—is the source of this, which is

consistent with our findings. Other cross-sectional studies have consistently indicated that women are more likely to contract trachoma and experience related scarring issues [14].

As per Wu et al. (2014), which included 33 patients, trichomatous trichiasis was found to be highly common in adulthood, particularly after 30 years of age (81.37%). The majority of the patients in this study were female, accounting for 67.9% of the total. The trichiasis prevalence was 3.39% overall [15].

Spadea et al. (2016) reported that 7.31% of people aged 35 and older had Trichomatous Trichiasis (TT). In people over 40, the prevalence of TT was 9.1%. Calculations were made to determine the frequency-adjusted prevalence rates, their 95% confidence interval, and the estimated number of TT in the population. The prevalence rates by terrain could not be adjusted since the population distribution by terrain was not provided. There was a

noticeable difference in TT amongst the district subgroups, age groups, topography, and gender [16].

According to Gower et al, there was central corneal scarring in 33% of the eyes, with entropion ranging from mild to severe. 70% of the eyes had successful epilation, and 24% had successful removal. Less corneal opacity was linked to successful epilation, but only in extreme circumstances [17].

According to Hadfield et al, there was obvious conjunctival scarring on all eyelids and entropion in eyes ranging from mild to severe. We saw three different types of trichiasis lashes: after entropion, misdirected, and metaplastic. The severity of trichiasis increased as the entropion grade rose [18].

5. Conclusion

In patients with trachoma, eyelid alterations are the primary cause of corneal opacity; hence, surgery for entropion and trichiasis should be considered.

Ethical approval and consent to participate: The research was approved by the Fayoum University Hospital's ethics committee on January 9, 2022, under

approval number M356, before its start. Before recruiting any patients or their guardians for the study, written informed consent was obtained from them after the

work's aims were explained. All procedures were carried out following applicable laws and recommendations. Before enlisting any patient or their guardian in the study, written informed consent was obtained once the goals of the investigation were explained.

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