

To Study the Change in Central Corneal Thickness in Patients with Vernal Kerato-conjunctivitis (VKC) in a Tertiary Health Care Centre (Vindhya Region MP)

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Received: 18-01-2023 / Revised: 21-02-2024 / Accepted: 26-03-2024

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Conflict of interest: Nil

Abstract:

Purpose: To evaluate the change in central corneal thickness in patients with vernal keratoconjunctivitis (VKC).

Method: The study was conducted in Department of Ophthalmology, at tertiary health care Centre. The study group included 100 eyes of 50 patients with vernal kerato-conjunctivitis and 100 eyes of 50 age and sex matched normal subjects were selected as a control group. The central corneal thickness was measured with (ZEISS Cirrus HD-OCT 500) Machine.

Result: In the study group, out of 50 patients, 36 were males and 14 were females. Majority were in the age group of 5-10 years. The mean central corneal thickness was $490.9 \pm 20.7 \mu\text{m}$ in the study group and $545.30 \pm 30.20 \mu\text{m}$ in the control group, and the difference was statistically significant.

Conclusion: The central corneal thickness in patients with Vernal Keratoconjunctivitis (VKC) is low as compared to age and sex matched control population. Evaluation of corneal thickness is important in situations such as corneal refractive surgery and contact lens use, and is an essential parameter in a wide range of ocular disorders, including glaucoma and keratoconus. Therefore, ophthalmologists should be aware of the low central corneal thickness in patients with Vernal Keratoconjunctivitis.

Keywords: Vernal Keratoconjunctivitis, Central Corneal Thickness, Glaucoma, Keratoconus, Contact Lens.

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Introduction

Vernal keratoconjunctivitis (VKC) /Spring catarrh is a chronic, bilateral, although it can occasionally present unilaterally [1] at times asymmetrical, seasonally exacerbated, allergic inflammation of the ocular surface, involving the lids, conjunctiva (tarsal/bulbar), limbus and the cornea, [2-3] with periodic incidence of self-limited character. [4]

Mainly affecting patients in their first or second decade [5-7]. The disease is more common among males [8-9] with the male to female ratio reported in the various studies varying from 4:1 to 2:1. The male predominance in VKC is conspicuous below 20 years of age but after 20 years, male and female ratio almost become equal. It is more common and most severe in hot, arid environment such as temperate zones of Mediterranean areas, Central and West Africa, the Middle East, Japan and the Indian subcontinent. [10-12] Its onset is most common in the spring and summer in the month of April to August. [13] However, VKC may occur anytime of the year. Central corneal thickness (CCT) is important as an indicator of overall

corneal health [14], and corneal thickness measurement has recently gained recognition as having implications in contact lens use and refractive surgery, as well as being an early diagnostic tool for individuals at higher risk of developing primary open-angle glaucoma [15,16]. In our clinical practice, we see many patients of VKC every year but measurement of central corneal thickness is not performed routinely in every case. Hence this study was conducted with the aim of detecting change in corneal thickness changes in VKC subjects.

Methods: The present study Titled "To Study the change in Central corneal thickness in patients with vernal keratoconjunctivitis in tertiary health care Centre" is a prospective observational longitudinal single-Centre study, and was carried out on outdoor patients of vernal keratoconjunctivitis in Department of ophthalmology in tertiary health centre India, during the period of January 2020 to September 2021. The study had included 100 cases

of vernal keratoconjunctivitis during the period of January 2020 to September 2021

Case Selection

A total of 200 eyes of 100 patients with VKC attending the outpatient department of Ophthalmology Department in tertiary health care centre, Rewa (M.P.) fulfilling the following criteria were enrolled in the study.

Inclusion Criteria:

1. All cases of vernal keratoconjunctivitis.
2. Patients willing to sign consent.

Exclusion Criteria:

1. Patients below 5 years of age.
2. Patients with previous history of drug instillation.
3. Any patient with ocular trauma and surgery.
4. Contact lens wearers.
5. Other ocular disorders like glaucoma and blepharitis.

The age group of the patients was 5- 20 years and both the genders were selected for the study. Study group consisted of 100 eyes of 50 patients with VKC. The control group included 100 eyes of age and sex matched healthy individuals without any ophthalmic or systemic pathology. The patients or their parents were inquired as to details of history including age of onset, duration of illness, frequency of eye rubbing, visual difficulties and presence of allergic disease. All the participants underwent detailed ocular examination including recording of best corrected visual acuity (BCVA), slit lamp bio-microscopy, retinoscopy, fundus examination, pachymetry.

The central corneal thickness was measured with (ZEISS Cirrus HD-OCT 500) Machine.

Statistical Analysis: Data analyses were conducted using Stat graphics Plus ver. 5.1 One-way analysis of variance was used when comparing groups. A 95% normal range (defined as the mean \pm 1.96 SD) summarizes the range of CCTs in 95% of the eye. A p value of \leq 0.05 was accepted as statistically significant

Results

The study group consists of 100(50 patients and 50 control) patients. The mean age was 10.5 ± 2.19 years (range 5-20 years) and maximum patients were clustered between 6-15 years of age. Out of 50 patients, 36 were males and 14 were females. The mean age of onset of the disease was 10.2 ± 2.33 years with maximum (51.9%) patients having age of onset between 5- 9 years of age. The mean duration of illness was 3.2 ± 2.69 years. The most common symptoms present were itching (100%), redness (56. %) and ropy discharge (13. %). The

mean central corneal thickness (CCT) among the study eyes was 490.9 ± 20.7 μ m and 545.30 ± 30.20 μ m in the control group. Which was significant ($p<0.001$). Similar results were found in a study conducted by Hakak B et al on 2019 at Srinagar.

Discussion

Vernal keratoconjunctivitis is known to be one of the most severe forms of ocular allergy with potential to cause corneal damage and permanent visual loss. Corneal involvement in VKC patients occurs in the form of superficial punctate keratitis, with, pseudogerontoxon, shield ulcer, astigmatism and keratoconus.

In a study by Kumagai et al, active forms of MMP-2 and MMP-9 were found at higher levels in the tears of VKC patients compared to healthy controls, showing that these two MMPs may play a role in the corneal thinning frequently seen in VKC patients [17,18,19]. Central corneal thickness an important indicator of overall corneal health [20]. Significant alterations in CCT may interfere with accurate measurement of intraocular pressure (IOP), and underestimation of IOP due to corneal thinning has the potential to delay diagnosis and treatment of glaucoma. Corneal thickness provides valuable information about possible changes in the cornea due to disease, trauma, etc [1]2.

Therefore, evaluation of corneal thickness is essential in a wide range of ocular disorders such as glaucoma, keratoconus, corneal refractive surgery, dry eye, and vernal keratoconjunctivitis [7,8] In patients with vernal keratoconjunctivitis, evaluation of corneal thickness provides clinically useful information on the physiological status of the cornea.

Previously one or two literatures have been reported the CCT values in VKC patients. So, studies with larger sample size are needed to more clearly define the relationship between corneal thickness, and VKC.

To conclude we can say this study revealed that mean CCT in patients with VKC was significantly lower than in normal eyes.

References

1. Resnikoff S, Cornand G, Filliard G, et al. Limbal vernal conjunctivitis in the tropics. Rev Int Trachome 1988;3-4:53-71.
2. Leonardi A, Lazzarini D, Bortolotti M, Piliogo F, Midena E, Fregona I. Corneal confocal microscopy in patients with vernal keratoconjunctivitis. Ophthalmology. 2012; 119(3):509-515.
3. Sacchetti M, Lambiase A, Mantelli F, Deligianni V, Leonardi A, Bonini S. Tailored approach to the treatment of vernal

- keratoconjunctivitis. *Ophthalmology*. 2010; 117(7):1294–1299
4. Bonini S, Coassin M, Aronni S, Llambras. Vernal keratoconjunctivitis. *Eye* 2004; 18; 345-51.
 5. Pokharel S. vernal keratoconjunctivitis; modes of presentation in Nepalese population. *Kathmandu University medical journal*.2007; 5(4); 526-30.
 6. Khan MD, Kundi N, Saeed N, et al. A study of 530 cases of vernal conjunctivitis from the North West Frontier Province of Pakistan. *Pak J Ophthalmol* 1986; 2:111–14.
 7. Chenge B, Makumyamviri AM, Kaimbo wa Kaimbo D. La limbo-conjonctivite endémique des tropiques à Lubumbashi, République Démocratique du Congo. *Bull Soc belge Ophthalmol* 2003;290:9–16
 8. Stanford-Smith J, vernal eye disease in northern Nigeria. *Trop Geogr Med* 1979;31:321-28.
 9. De Smedt S, Nkurikiye J, Fonteyne Y, et al. Vernal keratoconjunctivitis in school children in Rwanda and its association with socio-economic status: a population-based survey. *Am J Trop Med Hyg* 2011; 85:711–17.
 10. Dahan E, Appel R. Vernal keratoconjunctivitis in the black child and its response to therapy. *Br J Ophthalmol*. 1983; 67(10):688–692.
 11. Buckley RJ. Vernal keratopathy and its management. *Trans Ophthalmic Soc UK* 1981; 101:234–38.1988; 28(4)303-311.
 12. Lambiasi A, Minchiotti S, Leonardi A, Secchi AG, Rolando M, Calabria G, et al. Prospective, multicenter demographic and epidemiological study on vernal keratoconjunctivitis: A glimpse of ocular surface in Italian population. *Ophthalmic Epidemiol*2009; 16:38-41.
 13. Jivangi VS, Raiker HA, Khatib ZI, et al. clinical profile of patients with vernal keratoconjunctivitis *Int J Res med sci* 2015;39(10)2831- 2834.
 14. Ujwala S Saboo, Manish jain, Jagadesh C Reddy, and Virender S Sangwan. Demographic and clinical profile of vernal keratoconjunctivitis in tertiary health care centre in India 2013
 15. Hahn S, Azen S, Ying-Lai M, Varma R, Los Angeles Latino Eye study group (2003): Central corneal thickness in Latinos. *Invest Ophthalmol Vis Sci*, 2003; 44: 1508–12
 16. Zaman ML Doughty MJ: Human corneal thickness and its impact on intraocular pressure measures: a review and meta-analysis approach. *Surv Ophthalmol*, 2000; 44: 367–408.
 17. Van Bijsterveld OP, Baardman J: Measurements of corneal thickness in patients with keratoconjunctivitis sicca. *Klin Monbl Augenheilkd*, 1990; 197: 240–43
 18. Leonardi A: The central role of conjunctival mast cells in the pathogenesis of ocular allergy. *Curr Allergy Asthma Rep*, 2002; 2: 325–31.
 19. Jun J, Bielory L, Raizman MB: Vernal conjunctivitis. *Immunol All Clin North Am*, 2008; 28: 59–82.
 20. Kumagai N, Yamamoto K, Fukuda K et al: Active matrix metalloproteinases in the tear fluid of individuals with vernal keratoconjunctivitis. *J Allergy Clin Immunol*, 2002; 110: 489–91.
 21. Iyamu E, Ez NM. The relationship between central corneal thickness and corneal curvature in adult Nigerians. *S Afr Optom*, 2011; 70: 44–50.