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ORIGINAL ARTICLE

Incidence of keratopathy in vernal catarrh.

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ABSTRACT… Objective: To identify the severity and types of corneal complication of vernal catarrh and the extent of visual impairment caused by them. **Study Design:** Cross-sectional study. **Setting:** Margalla Hospital Taxila Cantt. **Period:** March 2021 to May 2022. **Methods:** The study included all vernal catarrh cases with informed consent. Slit lamp inspection allowed for the exclusion of patients from the study. The majority of the diagnosis was made based on the history and lab tests. Slit lamp examination and corneal fluorescein staining were carried out in each case. The variables were noted and statistical analysis was performed on them. Inclusion Criteria: All patients between age of 5-20years of VKC were included. Exclusion Criteria: Patients who were difficult to examine on slit lamp or did not agree to informed consent were excluded. **Results:** The most frequent corneal complication was superficial punctate keratitis (45%). Cases with corneal plaques (8%) and shield ulcers (14% each) had more severe visual impairment. Also observed was a strong association with keratoconus (15%). Hydrops (6%), pseudogentoxon (3%) and corneal opacification (9% each) were also found. **Conclusion:** In VKC, corneal complications are frequent, potentially dangerous, and can impair vision.

Key words: Allergic Conjunctivitis, Vernal Keratoconjunctivitis (VKC) Vernal Catarrh.

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INTRODUCTION

Vernal catarrh (VKC) is a seasonal exacerbation-prone recurrent bilateral allergic inflammation of the conjunctiva and cornea. It is a bilateral disorder in which both IgE- and cell mediated immune mechanism play an important role.[1] Within minutes of exposure to an allergen, it can manifest as an acute type 1 immediate hypersensitivity reaction. When airborne antigen is released in the tear film, it travels to the conjunctiva where immunoglobulin E (IGE) binds to the mast cell surface, causing histamine to be released. Patients with the condition may be allergic to a wide range of things, including airborne allergens like pollen, mites, mold, and animal dander. With a self-limiting course, VKC mostly affects young boys between the ages of 5 and 20. Around puberty, it starts to go away, and it rarely returns after age 25.

The primary cause of visual morbidity is disease-related corneal complications. A study done on 82 subjects with VKC has shown that twenty six (31.7%) of 82 subjects had complications with keratopathy. Keratopathy is more frequent in palpebral disease. A study done on 290 eyes with VKC shows corneal scarring in 59 (20.3%) eyes, Keratoconus in 17 (5.9%) eyes, shield ulcer in 09 (3.1%) eyes while 07 (2.4%) eyes had corneal neovascularization.[2] Eosinophil derived proteins, such as eosinophil cationic protein (ECP) and eosinophil derived major basic protein (EMBP), are the cause of this vernal keratopathy. It is cytotoxic to the corneal epithelium and prevents protein synthesis and migration of the epithelium. Both serum and tears have higher concentrations of them.[3]

Vernal keratopathy has an impact on many aspects of a patient's daily life, particularly on children's academic pursuits. Determining the corneal complications of vernal catarrh and researching its impact on visual acuity were the goals of our study. It was decided to conduct a thorough investigation into the corneal complications of VKC. Early detection of these subtle corneal changes is vital to help arrest these changes in the early stages before developing further complications.

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These changes can be measured accurately by corneal topography, making it the gold standard in the screening of keratoconus and other corneal ectasias.[4]

To find disease-related corneal complications, a test was run, which included fluorescein staining of the cornea.

METHODS

At Margalla Hospital in Taxila Cantt, we carried out this cross-sectional study after approval from local ethical committee (Dated: 03-04-2023). The study included a total of 100 cases of VKC with corneal involvement. From March 2021 to May 2022, these patients were seen at the Ophthalmic OPD.

Our patients' names, ages, genders, addresses, length of illness, any seasonal variations, medical history, and personal or family history of any allergic disorder were all included in a thorough proforma that was created for the study. Itching, redness, watering, photophobia, a feeling of a foreign body, blurred vision, and conjunctival discharge were listed as the complaints that were present. The different types of corneal signs include opacification keratoconus acute hydrops, corneal plaque, shield ulcer, superficial punctate keratitis, and pseudogentoxon. The history and clinical examination served as the primary foundation for the diagnosis. To find corneal complications of the disease, a Snellen chart was used after checking visual acuity (VA) with a through slit lamp examination (including fluorescein staining of the cornea). Clinically, the Munson sign and the oil droplet sign by ophthalmoscope were used to identify keratoconus. Keratoscope confirmation of subtle cases. The disease's conjunctival symptoms were also noted.

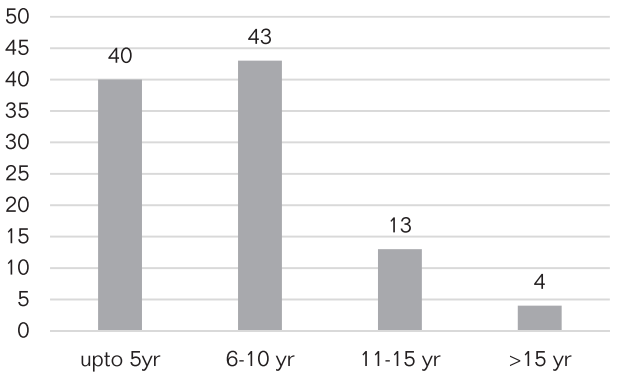
All patients with VKC and corneal involvement who agreed to participate in the study met our inclusion criteria. Patients who refused informed consent were also excluded, as were those who were challenging to examine with a slit lamp. As needed, medical and surgical care was given.

RESULTS

In our study, we included 100 cases of VKC with varying degrees of corneal involvement. Our patients were split 90 percent male and 10 percent female. 34 cases (34%) were in the age range of 11 to 20 years, while 61 (61%) cases were up to 10 years old. Five (05%) of the people were older than 20. Figure-1 displays the age of the disease's onset. None started before the age of 20, and the earliest one started was 28 months old. Twenty (20%) and twelve (12%) people had been in pain for more than ten years.

FIGURE-1

Age of disease onset.



The majority of the patients were from lower socioeconomic classes, and Table-I below lists their monthly family income. 83% of our patients resided in slums, 5% did so in upscale neighborhoods, and 70% presented with no symptoms. Table-II gives a description of their frequency 20% of patients had a perennial course, while 8% had a history of seasonal recurrence.

TABLE-I

Monthly family income of patients

Monthly Income in Rs.	No of Patients
< 200	15 (15)
2000-5000	64 (64)
5001-10000	13 (13)
>10000	08 (8)

Total no. of patient = 100; value in parentheses are percentages.

While 73% of cases had no history of such conditions, 27% of cases had associated monocular allergic diseases. 84% of patients had no family

history of monocular allergy, compared to 16% of patients who did.

In 22% of cases, pseudooptosis was present, and 19% of cases had blepharitis of varying severity. In our study, palpebral VKC accounted for 56% of all cases. Only 4% of patients had the limbic type of VKC, and 40% of patients had the mixed type.

TABLE-II

Types of symptoms of patients

Type of Symptom	No of Patients
Itching	100 (100)
Redness	97 (97)
Watering	88 (88)
Photophobia	95 (95)
Foreign body sensation	52 (52)
Defective vision	48 (48)
Discharge	68 (68)

48% of patients had upper palpebral papillary hypertrophy, 24% had enlarged papillae, and 18% had a cobblestone appearance. Cobblestones and enormous papillae were present in 10%. In Table-III, the severity and different kinds of corneal complications are listed.

TABLE-III

Showing corneal signs / complications.

Corneal Signs	No of Patients
Superficial punctate keratitis	45 (45)
Keratoconus	10 (10)
Shield ulcer	14 (14)
Corneal opacification	9 (9)
Plaque	8 (8)
Acute corneal hydrops	3 (3)
Pseudogentoxon	3 (3)

Total no. of patients= 100; value in parenthesis are percentage.

The ranges of visual acuity measured were 6/6 to 6/12, 6/18 to 6/36, 6/60 to CF 3 m, and CF less than 3 m. Corneal involvement was the primary cause of vision loss. Only 75% of patients can have their visual acuity accurately recorded. In the remaining cases, this was brought on by the patient's lack of cooperation or extreme distress.VA record of the worse affected eye is show in Table-IV.

TABLE-IV

Showing visual acuity in the worse affected eye.

Visual Acuity	No. of Patients
6/6—6/12	31 (31)
6/18---6/36	24 (24)
6/60---CF 3m	5 (5)
<CF 3m	15 (15)
Could not be recorded	25 (25)

Total No. of patients= 100; values in parenthesis are percentage.

DISCUSSION

VKC is a bilateral recurrent condition characterized by photophobia, itching, watering, and redness. VKC is one of the several disorders in the spectrum of allergic conjunctivitis, which also includes perennial allergic conjunctivitis, seasonal allergic conjunctivitis, atopic keratoconjunctivitis, vernal keratoconjunctivitis, and giant papillary conjunctivitis.[5] It affects people all over the world and is more prevalent in young men who have an individual or family history of atopy. Nagrale et al16 also observed a higher prevalence of VKC in males, with 82.5% of affected individuals being male, while the incidence in females was 17.5%.

In the current study, 100 cases of VKC with corneal complications were included. Male predominance in this disease is confirmed by the 90 cases that were male. Others have noted a male predominance similar to this one.

In our study, 61% of participants were under the age of 10—the same age as that reported both domestically and abroad.

The majority of the study participants were underprivileged and belonged to a lower socioeconomic class. Eighty percent of our patients had large families, lived in slums, and had low socioeconomic status. This could be because some environmental allergens are constantly being exposed to VKC patients. Poor nutrition, unsanitary living conditions, and extreme poverty may all be causes of this illness. The inability to maintain

good medication adherence, which is required to treat and prevent corneal complications of the disease, is another explanation for this. The poor socioeconomic standing of our patients may be an indicator of the same for our society as a whole.

16% of patients' families and 27% of patients had histories of allergies. 39% of the patients, according to Khan et al, had a personal or family history of allergies. 20% of patients had a perennial course, while 80% had a seasonal variation. This finding concurs with Khan and contradicts Bonini al, who favored the persistent nature of the illness.

Despite the fact that VKC has long been associated with allergies. Environmental conditions play a significant role in the development and severity of keratopathy in VKC. VKC often occurs on a seasonal basis, with a peak incidence over late spring and summer, although there may be mild perennial symptoms.[6] The immunopathogenesis of VKC is multifactorial. VKC is not only IgE mediate reaction via mast cell release but also activated eosinophils are thought to play a significant role and these can be shown consistently in conjunctival scrapings; However mononuclear cells and neutrophils are also present in VKC patients.CD4 T-helper-2 driven type IV hypersensitivity with immunomodulators such as IL-4, IL-5, and bFGF also plays an important role in VKC patients.[7]

In 45% of these cases, superficial punctate keratitis was present. Patients' levels of photophobia were associated with this frequent corneal complication in varying degrees. VKC is of more concern due to its vision threatening complications like, keratoconus, corneal scarring, refractive errors, shield ulcers and treatment related complications like steroid induced glaucoma.[8] A comparatively high 5% of our cases—keratoconus—were reported. In a different Japanese study, 40% of patients with keratoconus had a history of allergies. Numerous authors have supported the relationship between VKC, atopy, and keratoconus. Early visual disability is more common in children with VKC and keratoconus than with keratoconus alone. Corneal hydrops is more frequent in keratoconus eyes with concurrent VKC than in eyes without VKC, and it may be a sign of keratoconus. The high incidence of keratoconus in this study can be used to explain the high percentage of acute hydrops (3%) found there. Shield ulcers and corneal plaques are severe vernal keratopathy manifestations in children. They endanger children's vision because of their propensity for corneal scarring and amblyopia. The risk of bacterial or fungal keratitis is higher in these patients. Shield ulcers and corneal plaques were present in 14% and 8% of our cases, respectively. Acute hydrops, corneal plaques, or healed shield ulcers may have caused nine percent of corneal opacities.

VKC is a severe form of ocular allergy that can cause permanent cosmetic or visual defects, usually as a result of the disease's or its treatment's steroid-induced corneal complications.

In our study, shield ulcers, plaques, keratoconus, acute hydrops, and corneal opacities were the primary causes of vision loss. Patients with pseudogentoxone and superficial punctate keratitis were not significantly more visually impaired.

Medical therapy is typically used as the first line of treatment and frequently entails injecting steroids into the supratarsal region as well as mast cell stabilizers and topical steroids. Surgical intervention is indicated when a case is unresponsive to medical therapy and when an ulcer is severely crusted and has inflammatory deposits at the base. These could include amniotic membrane transplantation, contact lenses, superficial keratectomy, or excimer laser phototherapeutic keratectomy with or without bandages.[9]

CONCLUSION

In the practice of ophthalmology, VKC is of more concern due to involvement of cornea and its complications like, shield ulcers, superficial corneal scarring, keratoconus, astigmatism, mechanical ptosis. vernal keratopathy is a fairly common presentation. More young men than women are impacted. As a result of vernal catarrh, superficial punctate keratitis was discovered to be the most frequent corneal complication. Keratoconus, shield ulcers, corneal plaques, and acute hydrops were the main causes of vision loss. Vernal keratopathy may be brought on by poverty, overcrowding, and unsanitary living conditions. Early diagnosis, effective

management, and regular follow-up are crucial to mitigate the risk of long-term visual impairment. The findings underscore the importance of awareness and education among healthcare providers and caregivers regarding the potential severity of VKC and the necessity for timely intervention.[10]

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION	
1	**Muhammad Firdous:** Manuscript writing.
2	**Qamar Farooq:** Data entry.
3	**Aftab ur Rehman:** Data collection.