Original Article

Demographic and clinical profile of vernal keratoconjunctivitis at a tertiary eye care center in India

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Purpose: To study the demographic and clinical profile of patients with vernal keratoconjunctivitis (VKC) at a tertiary eye care center in India. **Materials and Methods:** Retrospective chart analysis of 468 patients of VKC seen from January 2006 to December 2006. **Results:** Mean age at presentation was 12 years. Majority of the patients had mixed pattern disease (72%). Chronic perennial disease was seen in 36% patients. Personal or family history of allergies was noted in 5% patients. Severe disease based on clinical grading was present in 37% patients. Moderate to severe vision loss was seen in 12% of total population. Persistent disease beyond 20 years of age was found in 12% patients. VKC-related complications such as corneal scarring (11%), shield ulcer (3%), keratoconus (6%), and limbal stem cell deficiency (1.2%) were seen. Treatment-related complications like corticosteroid-induced cataract and glaucoma were seen in 6% and 4% of patients, respectively. **Conclusion:** Clinical pattern of VKC seen in the tropical climate of India is essentially similar to that seen in other tropical countries. Few distinct features that we noted represent chronic perennial disease, low association with atopy, and higher propensity for disease and treatment-related complications.

Key words: Allergic eye disease, papillae, shield ulcer, vernal keratoconjunctivitis

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Vernal keratoconjunctivitis (VKC) is an allergic disease that typically affects young individuals with male preponderance.[1,2] Greater prevalence of VKC is seen in the regions with hot, humid climate, and higher load of airborne allergens. It is a common ocular surface disorder in the Mediterranean region, central Africa, India, and South America.[1-7] Clinically, it is characterized by presence of papillary hypertrophy of the palpebral and/or the limbal conjunctiva, bulbar conjunctival pigmentation, limbal thickening, Horner Trantas dots, and mucous discharge. Patients with VKC experience significant morbidity, which affects the quality of life;[8] moreover, vision-threatening corneal complication in severe and chronic cases coupled with potential iatrogenic side effects makes VKC a concerning ocular surface disorder.

The clinical profile of this disease seems to have geographical variations.[2-7] However, there are no major series explaining the demographic and clinical pattern of VKC from this part of the world; hence, we conducted a retrospective chart analysis to study the pattern of VKC in a tertiary eye care center in southern India.

Materials and Methods

The study was approved by our Institutional Review Board and was conducted in strict adherence to the tenets of the Declaration of Helsinki. A retrospective chart analysis of all patients of VKC who presented to our Tertiary Eye Care Institute in South India from January 2006 to December 2006 was done. A total of 468 VKC patients were identified. The diagnosis of VKC was made on the basis of history and typical signs and symptoms. Active VKC was diagnosed based on the complaint of ocular itching in the presence of upper tarsal conjunctival papillae and/or limbal hypertrophy with bulbar conjunctival pigmentation.[1] The quiescent form was diagnosed on the basis of inactive upper tarsal conjunctival papillae and/or scarring and a previous history of ocular itching. The following data was retrieved from the chart review: Age, gender, personal and family allergies, age of onset of the disease, presenting symptoms, duration of disease, and details of ophthalmic examination including visual acuity, slit lamp examination for clinical signs, intraocular pressure, fundus examination, details of treatment (medical and surgical), and complications. Depending upon the clinical indications, the findings noted on examination under anesthesia or ancillary tests such as corneal topography by orbscan performed were also included. The palpebral form included patients with characteristic signs of cobble stone papillae of >1 mm on the upper tarsal conjunctiva with no limbal infiltration, while the limbal form consisted of papillae of <1 mm on the upper tarsal conjunctiva with limbal infiltration, and mixed form had features of both palpebral and limbal types of VKC. The severity of the disease was retrospectively graded based on the clinical signs at initial presentation, as per the method described by Bonini *et al*.[9] Visual impairment was assessed by means of the World Health Organization criteria for visual disabilities as used by Tabbara *et al*.[5]

Results

A total of 468 patients of VKC presented in the year 2006. Month-wise distribution showed highest number (71; 15%) of the patients in the month of May. The mean age at presentation was 12 years ± 6.63 years (±Standard Deviation). There were 405 (87%) males and 63 (13%) females. The male (M) to female (F) ratio was 6.4:1. The male to female ratio increased with age and was 8.7:1 in patients aged >16 years. The disease

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was active at initial presentation in 393 individuals (84%). The average period between the initial onset of symptoms and presentation to this institute was 25 ± 33 months (Mean ± SD). Patients who had their first episode at or after 20 years of age were categorized as adult onset VKC. Fifty-six patients (12%) were aged ≥20 years at the time of presentation, of which 16 (14 males, 2 females) patients had an adult onset of disease, while the rest had primarily a childhood disease that continued beyond 20 years of age.

The common reported symptoms were itching (88%), redness (86%), and watering (65%). The commonest signs were palpebral papillae (85%) and limbal thickening (73%). Perilimbal conjunctival pigmentation was present in 52/468 (11%) of patients. Chronic perennial form of VKC, lasting for more than 48 months was present in 167 patients (36%). Isolated limbal form of VKC was present in 59 patients (12.6%), while isolated palpebral form was seen in 73 patients (15.6%). The majority (336; 72%) of patients had a mixed form of disease with involvement of both limbal and palpebral areas. The socio-economic status based distribution of these patients showed that 314 patients (67%) belonged to high socioeconomic group, while 154 patients (32%) belonged to low socioeconomic group. The criteria for low and high socioeconomic status were based on the nonpaying and paying categories of the patients, respectively.

In the present series, 23 patients (5%) had either a positive family or personal history of atopy or allergic disorders, of which 3 had positive family history and 20 had a personal history of allergic diseases that included respiratory tract-related allergies in 15 (variably termed as "dust allergy," rhinitis, bronchitis, and asthma by patients) and allergic dermatitis in 5 patients.

The categorical distribution based on severity of disease is shown in Table 1. At presentation, 119/468 (25%) patients were on topical corticosteroids, while information about topical corticosteroids use was not available in 31/468 (6%) patients. It is noteworthy that treatment at presentation could have altered the disease severity and may not represent the true clinical spectrum. We had 412 (88%) patients with visual acuity ranging between 20/20 to 20/50 (grade A: Mild visual loss), 39 (8%) patients with visual acuity ranging between 20/50 to 20/200 (grade B: Moderate visual loss), and 17 (4%) patients with visual acuity of 20/200 or less in the worse eye (grade C: Severe visual loss) [Table 2].

The different ocular complications due to VKC seen in our series are described in [Table 3]. The commonest complication was corneal scarring, which was present in 52 patients (11%). Keratoconus was seen in 6%, whereas corneal shield ulcers were seen in 3% patients. Peripheral corneal neovascularization was seen in 34 (7%) patients. Clinically limbal stem cell deficiency (LSCD) (corneal neovascularization along with conjunctivalization and corneal scarring) was seen in 1.2% of patients. Corticosteroid-induced complications like cataract and glaucoma were seen in 6% and 4% of patients, respectively.

All patients were treated with topical corticosteroids in the active stage of disease along with mast cell stabilizers or antihistaminic eye drops for long-term prophylactic use. Topical 2% cyclosporine A was used in 23 patients (5%). Supratarsal injections of corticosteroid were used in 11 patients to treat severe non-responding disease. Two patients were treated with systemic corticosteroids for short period with tapering doses for 1 month in 1 patient and 3 months in other. None of the patients receiving supratarsal steroid injection had post-treatment glaucoma.

Table 1: Severity of vernal keratoconjunctivitis at presentation as per the grading system by Bonini *et al.*

Severity	Frequencies (%)
0	57 (12.17)
1	107 (22.86)
2A	68 (14.52)
2B	63 (13.46)
3	90 (19.23)
4	60 (12.82)
5	23 (4.91)

Table 2: Visual status of vernal keratoconjunctivitis patients at presentation

Category	Visual acuity	Number (%)
A	20/20 to 20/50	412 (88.03)
B	20/50 to 20/200	39 (8.33)
C (Economic blindness)	20/200 or less	17 (3.63)

Table 3: Complications in vernal keratoconjunctivitis

Complications	Number of patients (%)
Total no. of patients	468
Corneal scar	52 (11.11)
Conjunctivalization of cornea/ Limbal stem cell deficiency	6 (1.2)
Shield ulcers	14 (2.99)
Keratoconus	29 (6.19)
Microbial keratitis	2 (0.42)
Dellen	1 (0.21)
Cataract	29 (6.19)
Glaucoma	18 (3.84)
Acquired ptosis	5 (1.06)
All complications	156 (33.3)

Discussion

Our study showed that VKC in the tropical Indian subcontinent is essentially similar to the pattern described in other tropical countries. The pattern here is predominantly mixed form of disease (72%) with significant number of patients having chronic perennial form (36%). Slightly higher propensity for VKC and its treatment-associated complications were seen. Persistent disease beyond 20 years of age was seen in increased number of patients (12%). To the best of our knowledge and PubMed search results, this is the largest series from this part of the world.

The study included 405 males and 63 females with M:F ratio of 6.4:1. Leonardi and co-workers in two separate observation including a multicentric study from Italy found M:F ratio between 3.3 and 3.5.[3,4] By and large, all other series

have reported M: F ratio between 4:1 and 2:1.[5,7] Ukponmwan reported a female preponderance (M:F ratio of 1:1.3) from Nigeria;[6] however, another report from that region suggested M:F ratio of 1.27.[7] M:F ratio in our study is slightly higher than those reported from other parts of the world, but confirms the global pattern of male preponderance of VKC. The mean age of presentation was 12 years. VKC is believed to be a disease of childhood and usually resolves at puberty; interestingly, we found that 12% of patients in our series were above 20 years of age, of these 3.5% patients had an adult onset of disease and others had childhood disease which had persisted beyond the age of 20 years. Leonardi *et al*., found 4% of patients above the age of 20 years and Shafiq *et al*., reported 6% of patients with VKC above the age of 20 years in a hospital-based study in Pakistan.[10] Certainly, we had slightly larger number of patients with persistent disease beyond 20 years of age in our population. Hot and dry tropical environmental condition may be responsible for this.

The highest incidence of patients was seen in the month of May, which corresponds to the hot dry weather in the southern part of India. VKC has seasonal exacerbations; however, chronic perennial form has been described and 36% of patients in our series had chronic perennial disease. Tuft *et al*., noted differences between the clinical features of VKC in tropical and temperate countries and showed that VKC in tropical countries exhibits larger population with chronic perennial disease and lesser association with atopy.[6,10,11] In concordance to this, we noted that 36% of our patients exhibited chronic perennial disease and positive personal or family history of allergies was present in only 4.91% of patients; however, this is in contrast to the picture seen in the temperate zones as reported by Lambiase *et al*., and Bonini *et al*., who found associated systemic allergies in 41.5-48.7% patients in different series.[4,12] Environmental factors may play a role in these regional differences associated with the same disease.

The prevalence of subtypes of VKC is different in various parts of the world. The multi centric study from Italy reported predominance (53.8%) of limbal presentation,[4] whereas Ukponmwan reported 82.6% cases with palpebral presentation in Nigeria.[6] In contrast, majority of our cases (71.8%) had a mixed presentation comprising of both limbal as well as palpebral involvement, followed by isolated palpebral involvement in 15.6% and limbal involvement in 12.6% of the patients. Perilimbal conjunctival pigmentation is a new clinical sign described in VKC.[13-15] In this series, perilimbal conjunctival pigmentation was documented in 52/468 (11%) of the patients. Rao *et al*., described perilimbal pigmentation as a consistent finding in VKC. In our experience, we have often noted perilimbal pigmentation in VKC patients, but fewer patients in this study may be a reflection of the retrospective nature of the study and the lack of documentation of this relatively new sign of VKC.

VKC can cause various corneal complications leading to decreased vision. Bonini *et al*., noted permanent visual loss in 6% of patients due to corneal complications and scarring. We noted moderate to severe vision loss of <20/50 in 12% of our patients, of which 3.44% had visual acuity <20/200. Corneal scars were noted in 11% of patients. Corneal shield ulcers were present in 3% of patients; however, slightly greater incidence of corneal shield ulcers were reported by Bonini *et al*.,[12] (9.7%) and Leonardi *et al*.,[3] (15.3%) as compared to our series. Keratoconus is another corneal complication associated with VKC, and we noted that 6.2% of our patients had keratoconus diagnosed clinically and with corneal topography. Other series have reported a very low incidence of this complication from 0.5 to 2.1%.[3,10,12] Peripheral corneal neovascularization is a known finding in VKC and has been reported by other series, although the magnitude is not reported.[6,12] In our series, isolated peripheral corneal neovascularization was seen in 7.26% of patients. LSCD was seen in 1.2% of these patients that involved center of the cornea in 3 patients, leading to severe decrease in vision. We believe that these findings are due to chronic persistent inflammation leading to destruction of the limbal stem cells resulting in conjunctivalization of the cornea. We have previously described the characteristics of the patients with VKC having LSCD and have also reported two such cases that have been successfully treated with limbal stem cell transplantation.[16,17] There are no reports of such a complication from other parts of the world. LSCD is rare; however, it causes severe visual impairment.

Other visually significant complications seen in our series were corticosteroid-induced glaucoma and cataract. Corticosteroid-induced cataract was seen in 29 patients (6%), while glaucoma affected 18 patients (4%). Cataract was visually significant and required cataract extraction with posterior chamber intraocular lens implantation in 8 patients. Intractable glaucoma was treated with trabeculectomy in 6 patients and combined trabeculotomy with trabeculectomy in 1 patient. Bonini *et al*.,[12] described corticosteroid-induced glaucoma in 2.1% of patients in their series with no incidence of cataract, while Leonardi *et al*., reported only 1 case of corticosteroid-induced cataract.[3] Higher incidence of steroid-induced cataract and glaucoma in our series may be a reflection of severe disease requiring frequent topical corticosteroid eye drops to treat the inflammation. On the other hand, it can also be due to inappropriate long-term use of corticosteroid eye drops by the patients as these are easily available over the counter. This prompts us to alert physicians on diligent use of corticosteroids in this patient population. Proper patient and parent counseling about the recurrent nature of the disease and harmful side effects of injudicious prolonged use of corticosteroid medications are highly recommended.

Limitation of our study was its retrospective nature from a tertiary eye care center, hence the data may not represent the exact characteristics of patients treated in a community center.

In summary, this study has shown that VKC in India is essentially similar to the typical pattern of VKC seen in other tropical countries. Perennial pattern in large number of patients, persistent disease beyond the age of 20 years in 12% with adult onset disease in 3.5% of the patients and higher propensity for corticosteroid-induced cataract and glaucoma are certain findings seen in our study that one should consider during management of these cases.

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