Section: Ophthalmology

Original Research Article

CLINICO-EPIDEMIOLOGICAL PROFILE OF VERNAL KERATOCONJUCTIVITIS IN PATIENTS PRESENTING AT A TERTIARY CARE HOSPITAL IN UTTARAKHAND, INDIA

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Abstract

Background: Vernal Keratoconjuctivitis (VKC) is a disease showing great racial and geographical variation. It is most common and most severe in hot, arid environments such as the Mediterranean basin, Western part of Africa, and the Indian subcontinent. The objective is to study the clinico-epidemiological profile of patients presenting at a tertiary care hospital in the region. **Materials and Methods:** All patients (2-21 years of age) diagnosed with vernal keratoconjunctivitis, presenting to a tertiary care hospital in Kumaon region of Uttarakhand, India from January 2021-June 2022 were included in this hospital based cross-sectional study. **Result:** The Mean Age of Presentation was found to be9.78 ± 4.92 years with maximum number of patients (43%) belonging to middle childhood age group (6-11 years). The disease has male predominance, the male to female ratio observed in the study was 4.5:1. Itching (85.1%) and redness (80.9%) were the two most commonly reported symptoms in the study. **Conclusion:** There is significant difference in clinical presentations of the patients presenting from different parts of our country and from across the globe.

INTRODUCTION

Vernal keratoconjunctivitis (VKC) is a recurrent bilateral disorder of the conjunctiva having a periodic seasonal incidence. It usually affects the paediatric and adolescent population residing in warmer, arid, windy climates. There is a predominant seasonal influence commonly in spring. However, a perennial variant with periodic exacerbations has also been reported. The disease predominantly affects male children typically until the completion of teenage. In the rare instances of the disease affecting females, it may persist beyond teenage. There is a positive personal and/ family history of atopy.[1]

The pathogenesis involves a variety of factors, including environmental allergens, climate, and genetic predisposition. The immunopathogenesis involves Type 1 and Type 4 hypersensitivity reactions, increased activities of various growth factors resulting in conjunctival fibroblastic stimulation, increased substance P and increased estrogen and progestogen receptors in the conjunctiva.[2-4] The conjunctival biopsy specimens show inflammatory cells including eosinophils, plasma cells, lymphocytes and monocytes. The disease was reported to be transmitted through bone marrow transplantation which suggests towards a genetic component of the disease.[5]

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. The disease consists of palpebral, limbal and mixed palpebral and limbal forms with or without keratopathy. The palpebral variety is characterized by diffuse papillary hypertrophy of upper tarsal conjunctiva. The hallmark sign of VKC is a papillary reaction on the upper tarsal plate. This may vary from small papillae to giant or cobblestone papillae. Limbal VKC has a thickened gelatinous appearance. Horner Trantasdots are whitish dots that represent macro aggregates of degenerated eosinophils and epithelial cells. Perilimbal pigmentation of the bulbar conjunctiva is an important feature seen in dark skin people.[6] Chronic limbal inflammation can manifest as pannus and chronic epitheliopathy due to stress on stem cells. The keratopathy typically starts as superficial punctate spots on the cornea that may

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coalesce to form macroerosions. Non-infectious epithelial ulcers, oval or shield shaped (shield ulcers), may develop in the superior or central cornea as a result of mechanical rubbing by tarsal conjunctival papillae or from eosinophilic degranulation. VKC is considered as an important association with keratoconus which can be better appreciated by video keratography.[7]

We conducted a cross sectional study in a tertiary care hospital of Uttarakhand, India to study the clinico-epidemiological profile of patients presenting at a tertiary care hospital in the region.

MATERIALSANDMETHODS

This cross-sectional study was conducted among 94 patients (2-21 years of age) diagnosed with vernal keratoconjunctivitis, attending the outpatient Department of Ophthalmology, Government Medical College and Sushila Tiwari Memorial Hospital, Haldwani in Kumaon region of Uttarakhand, India from January 2021-June 2022. Simple Random Sampling was used.

Proper history and clinical examination of patients in eye out patient Department, Government Medical College and Sushila Tiwari Memorial Hospital, Haldwani were taken.

Inclusion Criteria

- Patient must be of 2-21 years of age.
- The diagnosis of VKC made on the basis of history and typical signs and symptoms.

Exclusion Criteria

- Patients above 21 years and below 2 years of age.
- Patients presenting with other form of conjunctivitis.
- Patients not willing to participate in the study.

Method

The study was reviewed and approved by our Institutional Review Board and was conducted in strict adherence to the tenets of the Declaration of Helsinki. Each patient fulfilling the inclusion criteria was enquired and a detailed history was be taken followed by comprehensive ophthalmic examination. The diagnosis of VKC was made on the basis of history and typical signs and symptoms.

Patients were be enquired for the following details

- **Age-** Age groups was classified according to Age Stages Defined According to NICHD Paediatric Terminology9, neonates, infants and toddlers were excluded from the study.
- Sex
- Personal and family of atopic conditions (Asthma\ Eczema\ Allergic Rhinitis)
- History of allergy to any specific known allergen (Dust, pollen, food allergy, etc.)
- Age of onset of the disease
- Presenting symptoms
- Duration of disease
- Urban-rural-metropolitan distribution
- Belonging to Hills (Colder climate and Lesser pollution) or Plains (Warm climate and polluted atmosphere)
- Any other systemic or ocular comorbidities.
- A detailed history to rule out any conditions mentioned in the exclusion criteria.

General Physical Examination

Detailed Ophthalmological Examination Including-

- Uncorrected and best corrected visual acuity using Snellen's chart.
- Local ophthalmic examination to detect any gross ocular pathology.
- Slit Lamp Biomicroscopy
- Depending upon the clinical indications, the findings keratometry were also included.

The cases will be classified in the following three groups

- Bulbar/ Limbal type
- Palpebral/ Tarsal type
- Mixed type

Further the cases were graded according to severity using the following Clinical Grading System.[8]

Statistical analysis: The data collected was analysed as per consultation with statistician in our institute using appropriate data analysis software and statistical techniques.

RESULTS

Total 94 patients i.e., 188 eyes with Vernal Keratoconjunctivitis were evaluated in this study.

The Mean Age of Presentation was 9.78 ± 4.92 years with the youngest patient being of 3 years of age while the oldest patient being of 20 years of age. The median value for age group was found to be 9 years.

The Means Number of Days of Present Illness was found to be 28.73 ± 38.94 days, ranging from 1 to 300 days. The median value was found to be 14 days.

The Mean Age of Onset of Disease was 7.35 ± 4.66 years, with the earliest onset of disease at 2 years of age, although the incident of disease was found to be as late as 19 years of age. The median value was found to be 6 years.

The Mean Total Duration of Disease in months was 28.51 ± 23.47, ranging from as less as 1 month till a chronic disease lasting for 11 years. The median value was found to be 24 months.

61.7% of study subjects were of 10 years of age or less, while 38.3% lay in the range of 11-20 years age group.

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Table 1: Descriptive statistics

	Mean ± SD	Median (IQR)	Range
Age	9.78 ± 4.92	9(6,12)	3 - 20
History Of Present Illness (days)	28.73 ± 38.94	14(7,30)	1 - 300
Age of Onset	7.35 ± 4.66	6(3,10)	2 - 19
Duration of Disease (months)	28.51 ± 23.47	24(12,36)	1 - 132

Table 2: Frequency Distribution of Study Subjects by Age Group.

Age Categories	Number of Study Subjects	Valid Percent
<=10 years	58	61.7
11-20 years	36	38.3
Total	94	100

Highest number of cases of disease was found in middle childhood (43%), while the lowest was in late adolescence (15%).

Table 3: Frequency Distribution of Study Subjects by Age Group Categories

Age Group Categories	Number of Study Subjects	Valid Percent
Early Adolescence	18	19.1
Early Childhood	22	23.4
Late Adolescence	14	14.9
Middle Childhood	40	42.6
Total	94	100

Much higher cases of the disease entity were found in male subjects (82%) as compared with female subjects (18%).

Table 4: Frequency Distribution of Study Subjects by Gender

Sex	Number of Study Subjects	Valid Percent
Female	17	18.1
Male	77	81.9
Total	94	100

Table 5: Frequency Distribution of Study Subjects by Month of Presentation in the Eye OPD

Month of Presentation	Number of Study Subjects	Valid Percent (%)
January	0	0
February	6	6.4
March	10	10.6
April	18	19.14
May	9	9.6
June	22	23.4
July	12	12.8
August	6	6.4
September	3	3.19
October	4	4.3
November	4	4.3
December	0	0
Total	94	100

Table 6: Incidence of patients of VKC in various months of the study period

Month of Presentation	Number of Study Subjects	Total no of patients in the inclusion criteria	Incidence of patients (%)
January	0	330	0
February	6	372	1.6
March	10	362	2.76
April	18	580	3.10
May	9	278	3.23
June	22	634	3.47
July	12	193	6.21
August	6	284	2.11
September	3	391	0.76
October	4	328	1.22
November	4	273	1.46
December	0	233	0
Total	94	4258	2.21

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Incidence of patients of the disease was found to be minimum in the month of December and January which took a spike February onwards and almost plateaued in the month from April to June. Maximum prevalence was observed in the month of July, which took a dip in the following months.

Table 7: Frequency Distribution of Study Subjects by Chief Complaints

Chief Complaints	Number of Study Subjects	Valid Percent
Diminution Of Vision	2	2.1
Itching	47	50
Redness	43	45.7
Watering/Photophobia	2	2.1
Total	94	100

Chief Complaints was defined in the study as the major symptom which was most significant for the study subjects to seek medical attention and visit the OPD. Chronic itching was the most bothering symptom for the 50% of the subjects followed by redness (45.7%), while diminution of vision and watering/photophobia were each seen in 2.1% of the study subjects.

85.1% of the subjects presented with the symptom of itching, being the most common symptom. Symptom of redness was present in 80.9% of the study subjects, followed by watering (40.4%), discharge (23.4%). Diminution of vision was present in 6.4% of subjects, being the least frequently encountered symptom, however, direct corelation of DOV with the disease entity was not studied.

The most commonly encountered morphological subtype encountered in the study was mixed subtype, accounting to 51.1% of all the subjects. Limbal subtype was diagnosed in 38.3% of the subjects, while the pure palpebral form was seen only in 10.6% of the subjects.

DISCUSSION

The results from this study showed to have similarities and variations in various parameters of the study from previous literature available on the disease based in various part of India and across the globe, reenforcing the hypothesis that there was certain degree of variations in prevalence and clinical presentation of the disease in different geographical locations.

The Mean Age of Presentation was 9.78 ± 4.92 years with the youngest patient being of 3 years of age while the oldest patient being of 20 years of age. The median value for age group was found to be 9 years.

Highest number of cases of disease was found in middle childhood (43%), while the lowest was in late adolescence (15%). Age groups was classified according to Age Stages Defined According to NICHD Paediatric Terminology,[9] neonates, infants and toddlers were excluded from the study.

The results were similar to Saboo US et al,[10] where the mean age at presentation was found to be 12 years ± 6.63 years (±Standard Deviation). The study was conducted in southern part of India.

Sofi RA et al,[11] reported 40 % of patients were in the age group of 11–15 years in a study conducted in Kashmir valley, a temperate zone analysis, which stands contrary to our findings in which 61.7% of study subjects were of 10 years of age or less, while 38.3% lay in the range of 11-20 years age group.

The Mean Age of Onset of Disease was 7.35 ± 4.66 years, with the earliest onset of disease at 2 years of age, although the incident of disease was found to be as late as 19 years of age. The median value was found to be 6 years.

A total of 77 males and 17 females were diagnosed as VKC in our study, accounting to 81.9% and 18.1% of cases respectively. The male to female ratio was 4.5:1.

Saboo US et al,[10] reported 87% males and 13% females subjects in a retrospective analysis conducted in South India. The male to female ratio was 6.4:1. Sofi RA et al.11found 73 % were males and 27 % were females in their Indian temperate zone study. There appears to be an increasing trend in female patients as we move from southern to northern states of India.

Ukponmwan stated a female preponderance (M:F ratio of 1:1.3) in their study based in Nigeria,[12] however, another report from that region suggested M:F ratio of 1.27.[13]

The Means Number of Days of Present Illness was found to be 28.73 ± 38.94 days, ranging from 1 to 300 days. The median value was found to be 14 days. The findings suggest that patients have a varied attitude to seek medical attention towards the ocular symptoms of the disease.

The Mean Total Duration of Disease in months was 28.51 ± 23.47, ranging from as less as 1 month till a chronic disease lasting for 11 years. The median value was found to be 24 months. The findings are similar to as reported by Saboo US et al,[10]in their study conducted in South Indian population, who stated that the average period between the initial onset of symptoms and presentation to their institute was 25 ± 33 months (Mean ± SD).

The incidence of patients was found to be minimum in winter months of December and January which took a dramatic rise in spring season February onwards and almost plateaued in the month from April to June. Maximum incidence was observed in the month of July, which took a dip in the monsoons. The findings show close resemblance with South Indian population as reported by

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SabooUS et al,[10] in which 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.

Since the place of study have a good influx of patients from both hilly region and plains, a comparison was made between the same. 87% of the study subjects belonged to the plains while only 13% belonged to hills. These figures indicate a lesser prevalence of disease in hills, having a relatively cooler climate and lesser environmental pollution as compared to the plains.

Chief Complaints was defined in the study as the major symptom which was most significant for the study subjects to seek medical attention and visit the OPD. Chronic itching was the most bothering symptom for the 50% of the subjects followed by redness (45.7%), while diminution of vision and watering/photophobia were each seen in 2.1% of the study subjects.

85.1% of the subjects presented with the symptom of itching, being the most common symptom. Symptom of redness was present in 80.9% of the study subjects, followed by watering (40.4%), discharge (23.4%). Diminution of vision was present in 6.4% of subjects, being the least frequently encountered symptom, Visual acuity of 6\36 or less was present in only 2.1% of our patients, however, direct corelation of DOV with the disease entity was not studied.

Majority of cases presented with moderate intermittent form of disease accounting to 47.9% of all cases, followed by moderate chronic form accounting to 23.4% of cases. Mild form comprised of 20.2% while severe disease was seen in only 8.5% of all the cases.

The most commonly encountered morphological subtype in the study was mixed subtype, accounting to 51.1% of all the subjects. Limbal subtype was diagnosed in 38.3% of the subjects, while the pure palpebral form was seen only in 10.6% of the subjects.

Saboo US et al,[10] found Isolated limbal form of VKC in 12.6% of patients, while isolated palpebral form was seen in 15.6%. The majority of 72% of patients had a mixed form of disease with involvement of both limbal and palpebral areas in South Indian population.

Papillae in the upper palpebral conjunctiva was the most commonly encountered clinical finding in the study and was present in 80.90% of the subjects. Focal limbal inflammation was defined as limbal inflammation involving less than six clock hours of the limbus, was present in 54.30% of the subjects, while annular limbal inflammation was present in 21.30% subjects. Focal collections of degenerated eosinophils and epithelial cells, known as the Horner-Trantas dots were seen in 50% of the subjects. Collection of giant papillae in upper tarsal conjunctiva giving appearance of cobble stone was present in 12.8% of the patients, other findings such as fine and coarse superficial punctate epithelial erosion (SPEE) was seen in 8.50% and 1.10% of cases respectively.

Bonini et al,[14] reported bilateral disease with minor differences in severity between eyes in most of the cases (98%) similar to findings of this study. Papillae had a prevalent location on the upper tarsal conjunctiva (83.6%), followed by the bulbar (7.5%) and the mixed form (8.7%). Giant cobblestone-like papillae were observed in 16.4% of cases. Saboo US et al,[10] reported the commonest signs were palpebral papillae (85%) and limbal inflammation (73%), similar to figures of this study. Perilimbal conjunctival pigmentation was present in 11% of patients.

CONCLUSION

Patients with VKC go through a chronic course with multiple episodes of exacerbation and remissions, one should seek early treatment to avoid complications that may arise from chronic inflammatory process and eye rubbing. Moreover, since there is an important role of topical corticosteroids and immunomodulators in the treatment of the disease, treatment should be taken under proper medical supervision. Self-medication practices should be avoided, to prevent complications that may arise from irrational use of drugs.

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