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Original Research Article

Demographic study of vernal keratoconjunctivitis in tertiary eye centre in Eastern India

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ABSTRACT

Background: Vernal keratoconjunctivitis (VKC) is a chronic form of ocular allergy that can potentially cause severe visual complications, affecting mainly children and young adults. The objective of this study is to evaluate the age group involved, sex predilection, occupation, seasonal variations, type of disease and prevalence of corneal involvement in cases presented to tertiary eye care centres of Eastern India.

Materials and Methods: A total of 180 patients with signs and symptoms of VKC, who presented between April 2019 to March 2021 were studied. Patients who were not having any systemic or ocular illness and not received systemic or ocular medications during the four weeks, were included in the study.

Results: Most of the patients were found to be between 6 to 15 years (67.22%) age group and 70% are male. 71.66% of the patients were school going children. Majority of the patients were presented in the month of April to September (71.11%) i.e. during warm weather. Bulbar variety (42.22%) are most common type of VKC and 68.51% cases had corneal involvement at presentation.

Conclusion: Vernal Keratoconjunctivitis is the disease of childhood, mostly during school going age and more commonly affects males. It is usually bilateral and more prevalent during hot and humid climate.

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1. Introduction

Vernal keratoconjunctivitis (VKC) is an acute on chronic external ocular inflammatory disorder of conjunctiva and cornea, primarily affecting patients in their first or second decades of life.¹ The patients are visually handicapped because of intense itching and burning along with lacrimation, stringy mucoid discharge, photophobia and heaviness of eyelid due to involvement of tarsal conjunctiva. VKC makes up 0.1–0.5% of ocular diseases in developed countries. In Europe, the prevalence of VKC ranges from 1.2–10.6 cases per 10000 population. However, its size is higher in warm and dry tropical and sub-tropical countries of Africa, The Middle East, Latin America, and Asia.

In Africa, the prevalence of VKC reaches 2–37% and in Ethiopia, it accounts for 5.3%–7.3% with male dominance.¹ Symptoms are accentuated in warm and humid climate.²

VKC starts as type 1 hypersensitivity reaction, when a sensitized individual comes in contact with specific antigen resulting in degranulation of mast cell in conjunctiva and release of Histamine which causes watery red eyes with intense itching, later there is super imposed involvement of T-lymphocytes.³

Mild cases of VKC shows improvement with non-specific supportive therapy, but severe cases show frequent remission and relapse, run a protracted course and if not treated properly results in sight-threatening complications over a period of time.³

Vernal keratoconjunctivitis is very commonly seen in children, especially during summer season. Now, a days it is

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also seen in adults, Hence, our study is aimed to analyse the demographic data of Vernal Keratoconjunctivitis in Eastern India.

2. Materials and Methods

The study was conducted at two large tertiary eye care centres of Eastern India from April 2019 to March 2021. A total of 180 patients with signs and symptoms of VKC (ocular itching, hyperemia, mucus discharge, papillary hypertrophy, gelatinous thickening and Horner-Trantas spots) who attended the outpatient Department of Ophthalmology, Patna Medical College & hospital, Patna and Nalanda medical college & hospital, Patna were selected and included in our study. Since both the centres are situated in the same place, hence geographical variation was nullified. Neither of the patients had any systemic or ocular illnesses nor received systemic or ocular medications during the four weeks prior to study. Informed consent was obtained from all the patients to be included in the study.

Presence of symptoms like itching, foreign body sensation, swollen eyes, ropy discharge, photophobia were graded according to scoring systems as indicated in Table 1 and patients were categorized by asking the severity of symptoms to the patients.

The signs including palpebral and bulbar conjunctival hyperemia, conjunctival chemosis, limbal gelatinous thickening, papillae, cobblestone, muddy discoloration of conjunctiva. Horner–Trantas spots were also graded according to the severity scale (0= no sign, 1= mild, 2=moderate, 3=severe, 4= extremely severe). Table 2 shows scoring pattern of signs in vernal conjunctivitis.

3. Results

Patients satisfying inclusion criteria were categorized in single group and study was carried out to evaluate their age distribution, sex distribution, occupation, habitat, seasonal variation and type of disease (Bulbar, Palpebral or mixed).

In the study group, the age of the patients were ranging from 5 years to 25 years. Most of the patients were found to be between 6 years to 15 years (67.22%) followed by 1-5 yrs age group. (Table 3).

Most of the patients were male (70%, n= 126) and female patients were 30% (n=54). (Table 4)

Most of the patients were school going children (71.66%) followed by farmers (11.11%). (Table 5)

Majority of patients belonged to the rural area (73.33%). (Table 6).

Majority of the patients were presented in the month of April to September (71.11%) i.e. during warm weather in this part of the country.(Table 7).

Majority of the cases were of bulbar variety (42.22%) followed by palpebral (35%) and mixed variety (22.78%). (Table 8).

Table 1: Allergic ocular symptoms with scoring

| Symptoms | Score 0 | Score 1 | Score 2 | Score 3 | Score 4 |
|-------------------------------|---------|-----------------------------------|-------------------------------|------------------------|-------------------------------------|
| Itching | Absent | Intermittent ticking sensation | Occasionally Rubs the eye | Rubs eye regularly | Vigorous Knuckle with severe itch |
| Ropy Discharge | Absent | Occasionally discharge accumulate | Occasionally wipes eye | Wipes eye daily | Wipes eye several times a day |
| Foreign body sensation | Absent | Occasionally feels sand in eye | Feels sandy daily | Looks for foreign body | Sandy feeling very much distressing |
| Burning Sensation | Absent | Feels occasionally | Daily with occasional closing | Closes eye daily | Desire to close eye all the time |
| Photophobia | Absent | Occasionally | Occasional | Close eye regularly | Desire to close eye all the time |

Table 2: Allergic ocular symptoms with scoring

| Signs | Score 0 | Score 1 | Score 2 | Score 3 | Score 4 |
|-------------------------------|---------|------------------------|---------------------------------|--------------------------|-------------------------------------------|
| Palpebral Conjunctival | Absent | Minimal redness | Obvious redness but not diffuse | Diffuse redness | Very marked Diffuse redness |
| Bulbar Conjunctival Hyperemia | Absent | Minimal redness | Obvious but not diffuse redness | Diffuse redness | Very marked diffuse redness |
| Foreign body sensation | Absent | Upto one quadrant | Upto two quadrant | Upto three quadrant | More than three quadrant |
| Horner Trantas dots | Absent | Upto one quadrant | Upto two quadrant | Upto three quadrant | More than three quadrant |
| Chemosis of Conjunctiva | Absent | Minimal | Focal area of chemosis | Obvious | Marked diffuse with conjunctival prolapse |
| Papillae | Absent | Mosaic flat appearance | Some are elevated and some flat | Elevated with appearance | Cobble stone Papillae |
| Ropy Discharge | Absent | Minimal | Thin ropy | Thick ropy | Very thick profuse discharge |

Table 3: Age distribution of the patients

| Age group in years | No. of cases | Percentage |
|--------------------|--------------|------------|
| 1-5 | 27 | 15% |
| 6-10 | 68 | 37.78 % |
| 11-15 | 53 | 29.44% |
| 16-20 | 22 | 12.22% |
| 21-25 | 10 | 5.56% |

Table 4: Sex distribution of the patients

| Sex | No. of cases | Percentage |
|--------|--------------|------------|
| Male | 126 | 70% |
| Female | 54 | 30% |

Table 5: Distribution of patients according to occupation

| Occupation | No. of cases | Percentage |
|---------------------------|--------------|------------|
| Pre school going children | 19 | 10.56% |
| School going children | 129 | 71.66% |
| Farmer | 20 | 11.11% |
| Laborer | 12 | 6.67% |

Table 6: Area distribution of patients

| Habitat | No. of cases | Percentage |
|---------|--------------|------------|
| Rural | 132 | 73.33% |
| Urban | 48 | 26.67% |

Table 7: Number of patients reported in different months of year

| Month of year | No. of cases | Percentage |
|---------------|--------------|-------------|
| January | 7 | 3.89% |
| February | 10 | 5.56% |
| March | 12 | 6.67% |
| April | 20 | 11.11% |
| May | 22 | 12.22% |
| June | 25 | 13.89% |
| July | 24 | 13.33% |
| August | 19 | 10.56% |
| September | 18 | 10% |
| October | 11 | 6.11% |
| November | 7 | 3.89% |
| December | 5 | 2.77% |
| Total | 180 | 100% |

Table 8: Type of lesion

| Type | No. of cases | Percentage |
|-----------|--------------|------------|
| Palpebral | 63 | 35% |
| Bulbar | 76 | 42.22% |
| Mixed | 41 | 22.78% |

Table 9: Corneal involvement in different form of the disease

| Form of disease | No. of cases | No. of cases showing corneal involvement | Percentage |
|-----------------|--------------|------------------------------------------|------------|
| Palpebral | 63 | 18 | 28.57% |
| Bulbar | 76 | 41 | 53.94 % |
| Mixed | 41 | 15 | 36.58 % |

18 out of 63 (28.57%) cases of palpebral, 41 out of 76 (53.94%) case of bulbar and 15 out of 41 (36.58%) case of mixed form shows corneal involvement. Overall, 68.51% cases had corneal involvement at presentation. Table 9

Punctate epithelial erosion was seen in 34 cases, subepithelial scarring in 13 cases, Shield ulcer in 12 cases, Pseudogerontoxon in 11 cases and Keratoconus in 4 cases. Corneal involvement was observed more among patients having bulbar type of disease.

4. Discussion

In the present study, the demographic data were evaluated among the patients presenting with the signs and symptoms of VKC in the outpatient department of both the tertiary eye care centres. Total 180 patients having bilateral disease were included in the study. Because, of the lockdown period due to COVID pandemic, most of the patients usually presented late in the hospital. All the patients were analysed in terms of age and sex distribution, occupation, habitat, seasonal variation and type of disease (Bulbar, Palpebral or mixed).

Vernal keratoconjunctivitis is a disease of young adults, occurring most frequently between ages six to twenty years. In the present study, 143 patients out of 180 (79.44%) were between age of 6 and 20 years. Kumar et al in his major review also shown that the majority of VKC occurs in patients between the ages of 5-25 years old with an age of onset between 10-12 years old; however there are reports of patients as young as 5-months-old.³ In our series the youngest patient was 11 months old.

Predominance of males in vernal conjunctivitis has been observed in our study (70%). The same results has been published by majority of workers. Alemayehu et al in their study shown that the odds of developing VKC among males were 4.23 times more as compared to females.² Other studies done in Rwanda and Italy, showed that male children in dry and hot climate are more affected by VKC as compared to temperate which is similar to our study area.⁴ This might due to hormonal factors in the development of VKC. Studies has shown that estrogen and progesterone can be detected in the receptors within the epithelium and subepithelium of both the tarsal and bulbar conjunctiva in patients with VKC, which is not detected in healthy individuals. This shows an immunoreactivity component to VKC associated with hormonal factors. In addition to the above explanation VKC patients have different circulating sex hormone levels relative to nonallergic subjects which suggest a role of sex hormones in the pathogenesis of VKC.⁴ Even though the pathogenesis how pollens, grasses, wind exposure, sunlight exposure, and others cause of VKC is not well known, it is common that males are highly prone to these conditions since they spend much of their time in outdoor activities. This could cause the above sources of allergens to reach their eyes that might lead to hypersensitivity reactions to these antigens which in turn

lead to VKC.⁵

In our study, majority of the patients were school going children (71.66%). Large percentage of students in our study were from rural areas, where allergen exposure was more common and most of them were in age group of VKC. Alemayehu et al in their study had shown that the odds of developing VKC among children having a close animal contact in this study were 3.38 times as compared to those not exposed. This might due to animals and their dander have a high probability of harboring different allergen sources which can lead to type I hypersensitivity reaction and pet allergens suspend in the air, stick to different furniture, clothes, walls and other significant areas where children usually spend their time.² Also, children usually have close contact with these domestic animals which exposes them to allergens that might cause a reaction to conjunctiva.⁶

In present study, 71.11% patients were presented in the month of April to September i.e. during warm and humid weather in this part of the country. This finding is consistent with other studies done in Gondar, Ethiopia, and Rwanda.^{7,8} This may be because of dust particles, especially in the dry and hot season. Dust particles have a greater capability of harboring inflammatory particles, which have a higher chance to reach our eyes and develop conjunctival inflammation. In addition, children in this age groups had a high chance to spend their time in dusty areas which are sources of different allergens.

In the present study, Most of the cases were of bulbar variety (42.22%) followed by palpebral (35%) and mixed variety (22.78%). Vajpayee et al reported that bulbar variety is more common 75%, followed by palpebral 7.14% and mixed 17.86%.⁹ Alemayehu et al found more than half (53.1%) of VKC patients had Mixed VKC, followed by palpebral (43.8%). Other studies done in Ethiopia (81.4%), Egypt (69.80%) and India (40.80%) had similar findings.^{8,10} Other studies including Italy (53.8%), Rwanda (98.4) and Ethiopia (58.5%) reported that limbal type was the most common type of VKC.¹¹ On the other hand, studies done in Mali (65.22%) and Nigeria (47.1%) had palpebral type VKC in a leading position.¹² Even though, it was not clear why some forms of VKC are common in some areas while others not, these discrepancies might probably due to different hormonal and hereditary factors.

In our study, 68.51% cases had corneal involvement at presentation. In review of 400 cases of vernal conjunctivitis by Neumann et al, 3.25% cases had corneal involvement which was bilateral in majority of the cases and most of them were children.¹³ Tobbara et al in a study comprising of 14 children reported punctate keratitis in 79% of the patients of which 28.5% were bilaterally affected.¹⁴

5. Conclusion

Vernal Keratoconjunctivitis is the disease of childhood, mostly during school going age and male are more affected. It is usually bilateral and more prevalent during hot and humid climate. In eastern part of the country, bulbar type is most common and overall more than half of the patients presents with corneal involvement.

6. Conflict of Interest

The authors declare that there are no conflicts of interest in this paper.

7. Source of Funding

None.

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