

To Study Risk-Factors and Variation in Clinical Presentation of Vernal Keratoconjunctivitis in Patients of 2-21 Years of Age

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Abstract

Background: There appears to be variability in the prevalence of different subtypes, based on geography and atopic history, which raise a that the pathogenesis of the different subtypes may be different.

Objective: To study risk-factors and variation in clinical presentation of vernal keratoconjunctivitis in patients of 2-21years of age.

Methods: 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.

Results: 87% of patients in our study belonged to plains while only 13% belonged to the hills. This difference can be attributed to difference in ecological and climatic characteristic of the habitat of the patients. Majority of our subjects presented with moderate intermitted form (47.9%) of the disease. The comparatively less severe form, the isolated limbal subtype of the disease was seen in 38.3% of our study subjects when compared with the study conducted in peninsular India having only 12.6% of isolated limbal VKC. This significant difference can again be attributed to difference in climatic conditions of the two population being compared.

Conclusions: Maximum incidence of patients was observed in the month of July, which corresponds to hot and dry months of the year in the place of study.

Keywords: Risk-factors, Vernal keratoconjunctivitis, 2-21years of age.

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Introduction

The disease runs a chronic course with periodic exacerbations and remission requiring regular follow-up. Symptomatic relief in less severe cases is achieved by mast cell stabilizers. Mast cell stabilizers, such as

cromolyn sodium, nedocromil sodium and lodoxamide prevent degranulation of the mast cells. They are used for prophylactic treatment and require a loading dose. Ketotifen and olopatadine have a dual action

of antihistaminic effect and prevention of mast cell degranulation. Topical antihistamines, such as levocabastine and emedastine remain the main stay of treatment for mild cases [10]. Severe limbal changes need immunotherapy with steroids, cyclosporine or tacrolimus to prevent permanent stem cell damage and epithelial keratopathy [1-3]. Topical corticosteroids, such as prednisolone, dexamethasone, fluorometholone and loteprednol have been used in more severe cases. These agents need to be used under close supervision owing to chance of secondary glaucoma, cataract and secondary infections [4].

Supratarsal injections of periocular steroid such as triamcinolone acetonide and dexamethasone sodium phosphate are very effective in the acute stage of the disease. It is important to identify patients who are steroid responders prior to injection. Shield ulcers especially those with opaque base respond well to corticosteroids and mechanical debridement. Cyclosporin, a T-cell and mast cell inhibitor has been used with varied success in VKC [5]. Tacrolimus is another potent immunomodulator that is effective in the management of VKC [6].

However, there is a chance of opportunistic infections and herpes simplex keratitis. Oral medications, such as Montelukast, a leukotriene antagonist and cyclosporin have been used for severe cases [7]. The role of oral antihistamines and corticosteroids for the management of VKC is limited by systemic side effects. Cases not responding to medical treatment and those with persistent epithelial defects can be benefited by amniotic membrane graft. It is important however, to rule out secondary infections in shield ulcers and treat as per the causative microbiological agent. Resultant corneal scar may need phototherapeutic keratectomy or superficial keratectomy. Severe cases of VKC with extensive limbal stem cell deficiency may

need specialized contact lens and Boston keratoprosthesis [8].

Patients with VKC can experience significant morbidity, which can affect the quality of life [9] of the patients, ranging from mild diminution to vision threatening corneal complications [10]. The chronicity of disease, remission and relapsing pattern, and potential to severely hinder ocular surface health makes the condition a disease of great concern for ophthalmologist. High prevalence of the disease has been reported in the Mediterranean area, central Africa, Japan, India, and South America. The clinical profile of this disease seems to have geographical variations [12]. however very limited information is available about clinical profile of VKC in Indian patients, particularly this part of the country. Hence this study was conducted to study risk-factors and variation in clinical presentation of vernal keratoconjunctivitis in patients of 2-21 years of age

Materials and Methods

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.

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

Inclusion criteria

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

Exclusion criteria

1. Patients above 21 years and below 2 years of age.
2. Patients presenting with other form of conjunctivitis.
3. 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 taken followed by comprehensive ophthalmic examination. The diagnosis of VKC was made on the basis of history and typical signs and symptoms.

Patients were enquired for the following details-

- Age- Age groups was classified according to Age Stages Defined According to NICHD Paediatric Terminology [15]. 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, foodallergy, 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

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

The cases will be classified in the following three groups-

1. Bulbar/ Limbal type
2. Palpebral/ Tarsal type
3. Mixed type

Further the cases were graded according to severity using the following Clinical Grading System [16].

Statistical Analysis

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

Results

A highly significant number of subjects (49/94) gave history some personal or family history of some atopic condition. History of atopic conditions like Asthma/Allergic Rhinitis/Eczema was present in 52.12% of the subject or in their family. History of Allergic Rhinitis was the most common, was present in 25.5% of the subjects. 21.3% of subjects gave history of Eczema, while a history of Asthma was present in only 2.1% of study subjects. 51.1% of subjects had no history of atopy. History of atopy was further studied in mother, father and siblings of the patients.

Table 1: Frequency Distribution of Study Subjects having History of Asthma

Asthma	Number of Study Subjects	Valid Percent
No	92	97.9
Yes	2	2.1
Total	94	100

Table 2: Frequency Distribution of Study Subjects having History of Eczema

Eczema	Number of Study Subjects	Valid Percent
No	74	78.7
Yes	20	21.3
Total	94	100

Table 3: Frequency Distribution of Study Subjects having History of Allergic Rhinitis

Allergic Rhinitis	N	Valid Percent
No	70	74.5
Yes	24	25.5
Total	94	100

History of atopy in mother was present in 14.9% of patients, History of atopy in siblings was present in 6.4% of patients, however, no such history was elicited in the father.

Table 4: Frequency Distribution of Study Subjects having History of Atopy in Mother

History of Atopy in Mother	Number of Study Subjects	Valid Percent
No	80	85.1
Yes	14	14.9
Total	94	100

Table 5: Frequency Distribution of Study Subjects having History of Atopy in Father

History of Atopy in Father	Number of Study Subjects	Valid Percent
No	94	100
Yes	0	0

Table 6: Frequency Distribution of Study Subjects having History of Atopy in Siblings

History of Atopy in Siblings	Number of Study Subjects	Valid Percent
No	88	93.6
Yes	6	6.4
Total	94	100

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. However, the confounder of lesser accessibility to medical resource in these remote areas and the distance patient need to travel to reach the place of study cannot be overlooked

Table 7: Frequency Distribution of Study Subjects in Accordance with Topographical Location of Area of Residence

Topography	Number of Study Subjects	Valid Percent
Hills	12	12.8
Plains	82	87.2
Total	94	100

Discussion

Uttarakhand is located in northern part of India, has a total geographic area of 51,125 square kms. According to 2011 census of India, Uttarakhand population has reached 1.01 crore with an increase of 19.17 percent from past decade. It has two mandals namely Garhwal and Kumaon; further these two are divided in seven and six districts respectively. Nainital district comes under Kumaon region which has eight blocks and Haldwani is one of them where the study was conducted. 188 eyes of 94 patients were studied who were clinically diagnosed as a case of vernal keratoconjunctivitis.

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, reinforcing the hypothesis that there was certain degree of variations in prevalence and clinical presentation of the disease in different geographical locations.

A highly significant number of subjects gave history of some atopic condition. History of atopic conditions like Asthma/Allergic Rhinitis/Eczema was present in 48.9% of the subject. 52.13% (49/94) subjects gave either personal or family history of some atopy.

Saboo US *et al* [10]. reported only 5% patients had either a positive family or personal history of atopy or allergic disorders in South Indian population of their study subjects, of which 0.7% had positive family history and 4.3% had a personal history of allergic diseases.

However, Lambiase A *et al* [14]. reported 48.7% systemic allergic diseases association in VKC patients in Italian populations, the figures were similar to the findings of our study. History of Allergic Rhinitis was the most common, was present in 25.5% of the subjects. 21.3% of subjects gave history of Eczema, while a history of Asthma was present in only 2.1% of study subjects. 51.1% of subjects had no history of atopy.

Bonini *et al* [17]. reported the most frequent atopic conditions associated with VKC were asthma (64.2%), allergic rhinitis (49.4%) and eczema (23.5%). The figures of eczema were found to be similar to our findings, however, the data on allergic rhinitis and asthma showed disparity. History of atopy in mothers of VKC patients was present in 14.9% of patients, History of atopy in siblings was present in 6.4% of patients, however, no such history was elicited in fathers of the patients.

All the subjects were screened for keratoconus and the suspect eyes were further subjected to pentacam imaging. Diagnosis of keratoconus was made in 2 out of 188 eyes. Limbal stem cell deficiency manifesting as limbal deficiency pannus was observed in 4.30% of cases. 2 out of 188 eyes presented with severe meibomian gland dysfunction and blepharitis secondary to on and off long-term drug therapy. Self-medication practice was present in 18.1% of the subjects. There were no cases of conjunctival granulomas, macroerosions and shield ulcer. Complications rate was found to be 8.5% in our study.

Saboo US *et al* [10]. reported complication rate of 33.3%, a much higher figure than observed in our study. Moderate chronic form of the disease was present in 23.4% of cases in our study, however chronic perennial form was reported in 36% of cases in southern part of India [10]. This difference can again be attributed to difference in environmental conditions between the places of study.

More incident of milder form of the disease i.e. the limbal form may be attributed to cooler climate and lesser environmental pollution in our place of study. Similarly, higher incident of limbal form was reported by Sofi RA *et al* [18] in their study based in Kashmir valley, having similar ecological characteristics as ours. This hypothesis of more prevalence of limbal form in cooler climate was further emphasized by multi centric study from Italy which reported predominance (53.8%) of limbal presentation [14] whereas Ukponmwan reported 82.6% cases with palpebral presentation in Nigeria, having hot climatic conditions [19].

Conclusion

52.12% of subjects gave personal or family history of some associated atopic conditions, in contrary to this only 5% of patient had personal or family history of atopy in South Indian population. Associated history of atopy seems to play an important role in pathogenesis of the disease in our study population, considering the difference in ecological characteristic of the habitat of the two study populations. Keeping in mind the findings of this study and reviewing previously available literature, conclusion can be made that Vernal Keratoconjunctivitis is a multifactorial disease.

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