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Research article

A Clinical Study of Vernal Keratoconjunctivitis

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Abstract
Objectives: To study the variations in epidemiological characteristics, clinical features, disease process and various modalities of management in VKC.
Materials and Methods: A hospital based prospective study of 70 patients presenting with symptoms of allergic conjunctivitis was done at Department of Ophthalmology, J.J.M. Medical College, Davangere, from June 2012 to May 2013. Multiple epidemiological (age, sex) and clinical parameters (type, symptoms, treatment, failure of treatment) were studied. All patients were appropriately managed and reviewed once in fortnight and follow up ranged from a minimum of 3 months to 6 months.
Results: Vernal keratoconjunctivitis was found to be the commonest type (64.3%) of allergic conjunctivitis. It was found to affect young males below 16 years (66.7%). Mean age group to be affected was 13.75 years with a mean duration of 4.87 years. Seasonal occurrence (75.5%) and itching (100%) were the predominant features. Palpebral form was the most common form of the disease (49%). Pulse steroid therapy was found to be a safe and effective method of management of vernal conjunctivitis.
Conclusion: VKC is a common form of allergic conjunctivitis in a tropical country like ours. It is a bilateral, recurrent debilitating form of disease found to affect young males below 16 years. VKC is associated with other systemic atopy or family history of allergic disorders. Conjunctival eosinophils can be used as an evidence for diagnosis of VKC.
Keywords: allergic conjunctivitis, palpebral, bulbar, conjunctival eosinophils, topical steroids

1. Introduction

Vernal keratoconjunctivitis (VKC) (Vernal; Greek, occurring in spring) is a recurrent bilateral chronic allergic inflammatory disease of the ocular surface affecting mainly young males in the first decade of life. Diagnosis is based on signs and symptoms including itching, photophobia, sticky mucous discharge, and giant papillae on the upper tarsal conjunctiva or at the limbus, superficial keratopathy and corneal shield ulcer.[1] The distribution of vernal conjunctivitis is worldwide accounting from 0.1% to 0.5% of patients with ocular problems.[2] The disease is usually seasonal, lasting from the beginning of spring until autumn. However, perennial cases that are persistent throughout the year are not rare, especially in patients living in subtropical or desert climates. Its predominance during the high pollen season lends credence to the widely accepted hypothesis that VKC is an immunologically mediated, hypersensitive reaction to environmental antigens.[3]

Ocular allergy occurs frequently and has extremely annoying symptoms that has led to absences from school and work and on addition to this its treatment is not easy. Given the chronic nature of the disease, the patient has to be educated regarding what to expect and the pit falls of therapy. Consequently this study was undertaken to know the variations in epidemiological characteristics, clinical features, disease process and various modalities of management in VKC.

2. Materials and methods

The present study was a Hospital based prospective study. It was carried out on 70 patients with symptoms of allergic conjunctivitis attending the outpatient department of the Department of Ophthalmology attached to J.J.M. Medical College, Davangere, Karnataka from June 2012 to May 2013. It was carried out after obtaining permission from ethical committee of the institution, and consent from the study participants.

All patients with history of itching, photophobia and mucous discharge were included in the study. Patients who were non compliant, who were not available for follow up for required period of time and those with other ocular disorder like glaucoma, infectious keratitis, posterior segment abnormality were excluded from the study.

Using a pre-formed proforma, history was obtained from each patient with special attention to characteristic symptoms, duration of symptoms, occurrence of symptoms, whether seasonal or perennial, family and personal history of allergy and past treatment. Patients underwent a detailed clinical examination, unaided visual acuity was determined separately for each eye. The BCVA was recorded after refraction, slit lamp examination with fluorescein staining, measuring of intraocular pressure using an applanation tonometer and fundus examination.

Palpebral form included patients with characteristic papillae upto 8mm in size in tarsal conjunctiva while limbal form included limbal nodules. In addition conjunctival scraping was performed in all patients under topical anesthesia with 0.5% Proparacaine using a spatula on the upper tarsal conjunctiva. The conjunctival scraping was then spread on a glass slide, air-dried, fixed and stained. All cells were evaluated and presence of eosinophils was recorded under light microscopy at 100% magnification to confirm presence of active allergic reaction.

Patients were divided based on signs and symptoms as per Table 1. Patients with mild grade were treated with Sodium Cromoglycate 4% E/d qid alone and those with moderate to severe grade were put on pulse steroid therapy (Fluoromethalone 0.1% E/d qid in moderate form and Prednisolone 1% E/d qid in severe form) and Olopatadine hydrochloride 0.1% E/d bid simultaneously.

Table 1: Patients were divided based on signs and symptoms

Symptoms and Signs	Mild	Moderate	Severe
Itching	Occasionally feel like rubbing	Occasionally rubbing eyes	Rubbing eye daily
Burning	Occasional	Daily with occasional closing	Close eyes daily
Discharge	Occasionally wipe eyes	Wipe eyes daily	Wipe eyes several times a day
Papillae	≤1mm	≥1mm but ≤3mm	≥3mm
Limbal involvement	≤1 bulbar quadrant	1 to 3 bulbar quadrant	All 4 quadrants
Superficial punctate keratitis	None	<1/2 cornea	>1/2 cornea

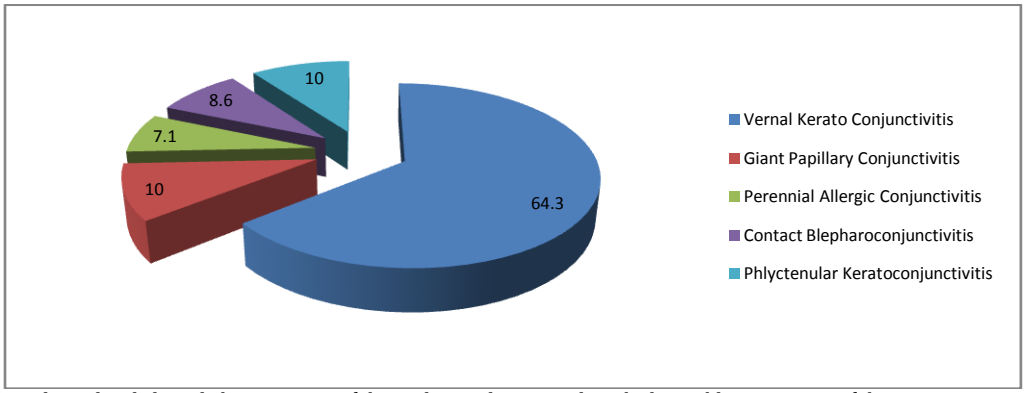
Those with uncontrolled severe VKC after treatment with steroid were put on Cyclosporine 2% E/d qid. Effectiveness of different modalities of treatment noted. Patient reviewed once in fortnight and period of follow up ranged from a minimum of 3 months to 6 months.

Percentage and Z test for proportions were the statistical tools used to assess the results at the end of the study period.

3. Results

70 patients with symptoms of allergic conjunctivitis were studied over a period of one year from June 2012 to May 2013. Incidence of allergic conjunctivitis is given in Figure 1. Vernal keratoconjunctivitis was the most common form followed by Giant papillary conjunctivitis and Phlyctenular keratoconjunctivitis.

Figure 1: Graph showing Incidence of Allergic Conjunctivitis



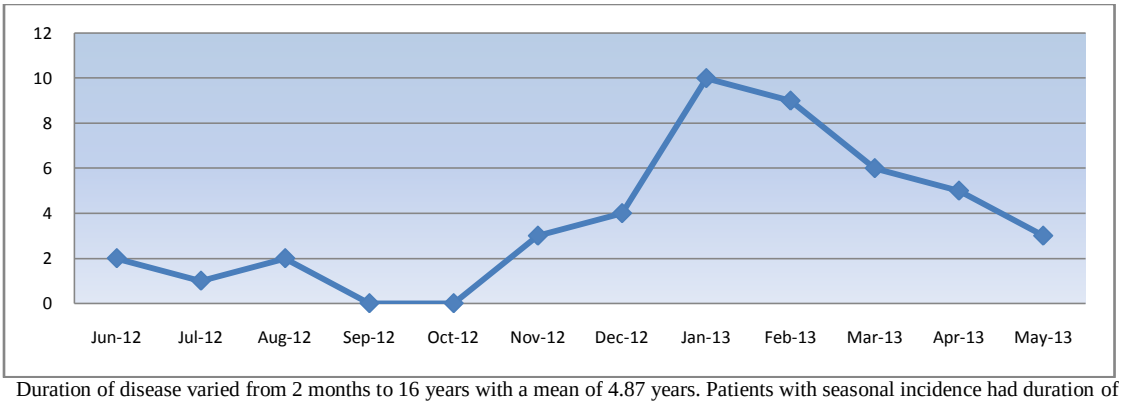
The epidemiological and clinical characteristics of the study population are described in Table 2. Majority of the patients presented in an age group of 10 – 16 years, mean age was 13.75 years. Males were predominantly affected. Seasonal occurrence of symptoms was common. Itching was the predominant symptom. Palpebral form was most common followed by bulbar and mixed form. Superficial punctate keratitis was commonest corneal involvement.

Table 2: Analysis of epidemiological and clinical data

Characteristics	Type	No. of Cases	%
Age related distribution	3 – 9 (yrs)	12	26.7
	10 – 16 (yrs)	18	40.0
	17 – 23 (yrs)	10	22.2
	24 – 30 (yrs)	5	11.1
Gender composition(n=45)	Male	37	82
	Female	8	18
Periodic variation in occurrence of symptoms	Seasonal occurrence	34	75.5
	Perennial Occurrence	11	24.5
VKC association with Allergic disease	Patients with history of allergic disorders.	6	13.3
	Patients without history of allergic disorders	39	86.7
Incidence of symptoms	Itching	45	100
	Redness	26	57.7
	Photophobia	12	26.6
	Ropy discharge	16	35.5
	Burning sensation	9	20
	Watering	6	13.3
Disease pattern	Palpebral	22	49.0
	Bulbar	12	26.6
	Mixed	11	24.4
Corneal involvement	Superficial punctate keratitis	12	26.67
	Pseudogerontoxon	3	6.67
	Total cases	15	33
Relationship between duration of disease and positive Conjunctival eosinophils	< 1 year	1	1
	1 – 3 years	18	18
	4 – 6 years	16	15
	7 – 9 years	2	0
	10 – 12 years	6	1
	> 12 years	2	0

Month wise incidence of VKC is given in Figure 2. Maximum cases were reported during January to April, with very few cases during the period of June to October. There was another peak starting from November.

Figure 2: Graph showing incidence of new cases of VKC (month wise)



Duration of disease varied from 2 months to 16 years with a mean of 4.87 years. Patients with seasonal incidence had duration of disease for 6 years or less while perennial nature had disease for more number of years. Personal or family history of allergic diseases was present in 6 (13.3%) patients, asthma in 3 followed and hay fever rhinitis in 3 patients. All of the cases in age group 3-9 years showed bulbar form of the disease. Palpebral and mixed form of disease occurred in elderly age group.

Treatment groups are mentioned in Table 3. Bulbar form of the disease was found to be sensitive to Sodium Cromoglycate alone but took longer time to achieve control. The response of pulse steroid therapy was usually dramatic with reduction in symptoms within days however the type and nature of steroid did not affect the overall result.

Table 3: Treatment groups

Treatment Group	No. of cases
I) Topical Steroid + Olopatadine hydrochloride 0.1% E/d	Total = 22
Prednisolone 1% E/d	8
Fluoromethalone 0.1% E/d	14
II) Sodium Cromoglycate 4% E/d alone	Total =23

Outcome in treatment groups is given in Table 4. All patients except 7 showed moderate to good control over a period of one month. Among 7 patients who were not under control, 2 patients belonged to Steroid + Olopatadine group and had the palpebral form of the disease, 5 belonged to sodium cromoglycate group.1 had bulbar form of the disease and 2 each palpebral and mixed form. Z test for proportions, Z=1.19, p>0.05

Table 4: Outcome in treatment groups

Treatment group	No. of cases	Improved cases	Uncontrolled cases
Steroids	22	20 (90.9%)	2
Non-steroids	23	18 (78.3%)	5
Total	45	38	7

2 cases which were uncontrolled after treatment with steroid and olopatadine 0.1% E/d were treated with 2% cyclosporine E/d, qid daily, improvement was noted within a week. 2 patients were lost after the first follow up. Among 36 patients who had good control at the end of one month, topical corticosteroids were gradually tapered and withdrawn and were asked to continue topical olapatadine, 2 times daily, and sodium cromoglycate 4% E/d 4 times daily respectively. Many non compliant patients belonging to sodium cromoglycate group came back with recurrent attacks next season as compared to those on olopatadine.

In this study, even after 4 weeks of therapy with low dose of topical corticosteroids no patient showed significant intraocular pressure rise. No other significant side effects noted in patients on low dose of topical corticosteroids during the study period. Of the 2 patients, treated with topical 2% cyclosporine the only side effect noted was burning sensation and tearing soon after the administration of the eye drops.

4. Discussion

Vernal Keratoconjunctivitis(VKC) is a bilateral, chronic, external ocular inflammatory disorder, mainly affecting patients in their first or second decade representing an important cause for hospital attendance. In this study, among the 70 patients who presented with symptoms of allergic conjunctivitis vernal keratoconjunctivitis had the highest incidence 64.3%. This study when compared to other studies done in USA led to interesting observation. Mark B. Abelson, Nalini Madiwale *et al*, observed seasonal and perennial allergic conjunctivitis to have the highest incidence in their study (46.4%), whereas the incidence of vernal keratoconjunctivitis was least (8.5%).[4] The marked difference between the incidence of VKC in these studies may have a relationship with the climatic conditions. VKC is said to be more common in tropical countries like India with hot climate.

Male predominance was noted in our study with 82% males being affected with VKC and incidence in females being 18%. Similar results were obtained by Baryishak Y.R, Zavaro *et al* study showed incidence of 73.0% males being affected by VKC.[5] Mean age affected was found to be 13.75% years, (range : 3-30 years) and mean duration was found to be 4.9 years (range 2 months to 16 years). Similar results were observed by Bisht *et al* in his study, the mean age as 14.3 years (range 7-30 years) and duration of disease as 1.5 to 4 years.[6] The notable difference between sexes, and the resolution of the disease with puberty are features that have persistently suggested that hormonal factors play a part in the development of VKC (Bonini *et al*[7].)

75.5% patients had seasonal symptoms, 24.5% complained perennial symptoms, 13.3% patients had personal or family history of allergic diseases, asthma and rhinitis being common and maximum cases were reported during January to April. These results correlated with study done by Ujwala S Saboo and associates showing 64% seasonal, 36% perennial occurrence, 4.91% of patients had personal or family history of allergy and highest incidence of disease was noted in month of May,[8] which corresponds to hot dry weather in southern part of India

In this study, 100% patients complained of itching, 57.7% had redness, 35.5% had ropy discharge, 26.6% complained of photophobia, 20% had burning sensation, 13.3% had watering. Similar results were observed by Bisht R. Goyal A. *et al*.[6] The dictum is "no itching; no vernal conjunctivitis". Our study supports this fact.

The disease pattern consisted of palpebral form in 49%, bulbar form in 27% and mixed form in 24% patients. Study done by Togby showed mixed form to be predominant about 71.4% followed by palpebral form 17.4%, and bulbar form 11.2%.[9] The multi centric study from Italy reported

predominance of limbal form about 53.8%,[10] whereas Ukponmwan reported 82.6% cases with palpebral presentation in Nigeria.[11] This signifies that the prevalence of subtypes of VKC is different in various parts of the world.

VKC can cause various corneal complications leading to decreased vision. In our study, corneal involvement was seen in 15(33%) patients. Superficial punctate keratitis was the commonest followed by pseudogerontoxon. We noted moderate vision loss in 8.89% patients. Bonini *et al*., noted permanent visual loss in 6% of patients due to corneal complications and scarring.[7] Conjunctival scrapings showed eosinophils in 78% patients, this compares favourably with study done by Abelson *et al* who observed 63% conjunctival scrapings positive for eosinophils.[4] Another feature observed in this study regarding conjunctival eosinophils was the duration of the disease had an inverse effect on positive conjunctival eosinophils.

Pulse steroid therapy was found to be a safe and effective method of management of vernal conjunctivitis in our study. Bielory BP and associates found similar observations.[12] Topical corticosteroids are the most effective treatment for moderate to severe forms of VKC because of their broad and early interference with the inflammatory cascade. Bulbar form of the disease was found to be sensitive to sodium cromoglycate alone. Dahan and associates observed improvement in 90% subjective and 58% objective signs of bulbar form of the disease treated with sodium cromoglycate.[13] Olopatadine hydrochloride 0.1% E/d were used along with steroids in patients and proved beneficial for long term treatment. Corum *et al* reported that 2 months treatment with Olopatadine hydrochloride 0.1% relieves the signs and symptoms of VKC.[14] 2% Cyclosporine E/d, 4 times daily was found to be effective and safe in treatment of two cases of severe uncontrolled VKC. Study done by Pucci *et al* concluded that 2% cyclosporine eye drops 4 times/day represent a valid alternative to steroids in severe forms of VKC.[15]

5. Conclusion

VKC is a common form of allergic conjunctivitis in a tropical country like ours affecting young males below 16 years. Predominant features of VKC are its seasonal occurrence and itching. Palpebral form is the most common form of disease, followed by bulbar and mixed forms. VKC is associated with other systemic atopy or family history of allergic disorders. Conjunctival eosinophils can be used as an evidence for diagnosis of VKC. Topical steroid have been shown to be effective in controlling ocular surface inflammation, but they should be used with particular caution due to their ocular side effects. Olopatadine can be used for long term treatment. Topical sodium cromoglycate is well effective in controlling bulbar form of disease but long term compliance is poor. The efficacy and safety of Topical Cyclosporine A in management of severe uncontrolled cases of VKC requires further investigations with larger studies.

Education of the patient and his or her parents as to the prolonged and recurrent nature of VKC is one of the first aims of treatment. Understanding the cyclical nature of this disease may minimize the patient's frequent changes of topical ocular therapy and the use of alternative therapies of dubious efficacy.

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