

## SPECTRUM OF OCULAR ALLERGY-AN INDIAN OVERVIEW

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### ABSTRACT

Ocular allergy is a very common pathology, and its incidence has increased in industrial countries in combination with an increase in atopy. Many different clinical features characterize the ocular allergy, which can be seasonal, perennial, or chronic. Therefore, ocular allergy must be considered part of the allergic syndrome; perennial or seasonal keratoconjunctivitis appear to be directly related to allergic rhinitis manifestations and, less frequently, to asthma and eczema. The principal field of research in ocular allergy concerns therapeutic applications and new concepts of physiopathologic mechanisms needed to understand the most optimal treatment that can be delivered. In Indian scenario symptoms is very common in adult and children, as per the study burning, rubbing and itching is the commonest presentation. As our understanding of the underlying immunological mechanisms in allergic eye disease continues to grow, future avenues for pharmacological targeting of different categories of allergic eye disease will be become available. Appropriate treatment may be based on the specific immunopathology, and directed at the activated cell types primarily responsible for the disease process

**KEYWORDS:** Vernal Kerato Conjunctivitis –VKC, RAST, MINI Tab, SAC

### INTRODUCTION

Ocular allergy is one of the common eye diseases affecting 20% of world population, associated with systemic atopy in 2/3<sup>rd</sup> of the cases. The association between exposure to airborne plant pollens & development of ocular and nasal symptoms in itself was noted by Charles Blacklay in 1873. The occurrence of ocular allergic has increased in developed countries & now affects over 20% of US population <sup>1</sup>. The most common are primary IgE mediated and share features in common to other atopic conditions. Most common of ocular allergy is seasonal allergic conjunctive this is associated with seasonal rhinitis (hay fever), & sensitization / exposure to airborne allergens such as ragweed & grass pollen. Patients usually suffer from SAC in spring & fall seasons, when levels of pollens are at their peak. PAC is less common, but is more chronic condition. This form of ocular allergy involves sensitization to antigens that are present year round, such as dust mite, animal dander, and mold & air pollutants. Present study aims to know the common spectrum of ocular allergy and correlate the absolute eosinophil counts and serum IgE levels. Elucidate the conjunctival impression cytology and to assess the common allergen via the skin allergen tests

### MATERIALS AND METHODS

The study was conducted at Minto eye hospital, Bangalore Medical College and Research Institute, suspected patients prospectively recruited with written consent for the accrual period of one year. The typical signs and symptoms like bilateral intense itching, giant papillae on the superior tarsal conjunctiva and lesions of the limbal conjunctiva render the diagnosis of VKC straight forward. Laboratory investigations are usually unnecessary. However, sometimes laboratory

tests are carried out to support the diagnosis in a typical and mild form of VKC. Various kinds of cells and mediators are detected in the conjunctiva, tear film and in serum of VKC cases by studying conjunctival cytology, biopsy, tear film and serum examination. However, total and specific IgE are usually indicated as the only evidence carried out to support the diagnosis<sup>26</sup>. Besides, in cases with atopy and with refractory VKC, allergic tests like skin tests and RadioAllergo Sorbent Tests (RAST) are performed to determine causes. Laboratory investigation viz., Hb, TC, DC, ESR, absolute eosinophil counts, Serum IgE Levels, Skin allergy tests and Conjunctival Impression Cytology was done with greater accuracy. Collected data were analyzed by using MINI tab -10.50 versions, Univariate analysis was employed to test the hypothesis.

Results:

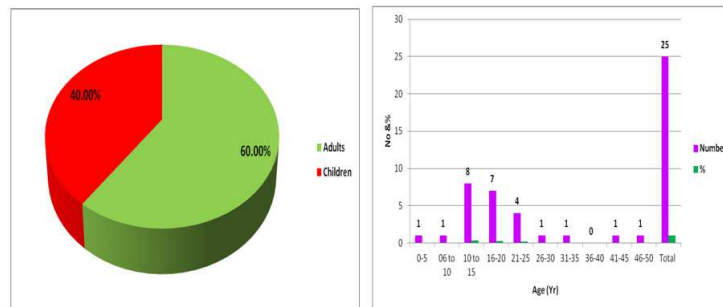


Figure 1: Gender Wise Distribution      Figure 2: Age Wise Distribution

The mean age of the subjects in this study was 19.32±9.99 years, Maximum number of patients in our study were in the age group < 15 years accounting for 40%. The youngest patient was 4 years old of Limbal VKC, oldest patient was 48 yrs, presented in Figure 1 & 2. Sex frequency were distributed based on incidence accordingly male comprises 20(80.0%) and female was 05(20.0%) respectively. The sex Incidence distribution of VKC patients showed a male preponderance with 84% males & a Male: Female ratio of 4:1

Table 1: Symptoms at the Time of Presentation as Compared with Age

Symptoms	Number of Eyes (n=50)	%	P-Value
Burning	36	72.0%	0.000*
Rubbing	28	56.0%	0.001*
Itching	16	32%	0.036*
<b>Total</b>	<b>50</b>	<b>100%</b>	

\*Significant @0.05 level (p<0.05)

Burning (72.0%) Rubbing (56.0%), Itching (32.0%) were the most common symptoms were found to be statistically significant with age of the patients (p<0.05).

Table 2: Associated Ocular Problems-Cumulative Number

Sl. No	Ocular Problems	Number of Eyes	%	P-Value
1	Myopia	40	80.0%	P<0.05
2	Keratoconus	20	40.0%	P<0.05
3	PMD	2	4.0%	p>0.05
4	Abnormal TBUT	36	72.0%	P<0.05
5	Abnormal Mucin Forming patterns	36	72.0%	P<0.05
6	Tears PH Alkaline (8)	50	100.0%	P<0.05
7	Epithelial Keratitis of Togby	38	76.0%	P<0.05
8	Limbal Hypertrophy – Adults	30	60.0%	P<0.05
	– Children	20	40.0%	P<0.05
9	Giant Papillae	8	16.0%	p>0.05

The most common associated ocular problems encountered in VKC were: - Myopia: (80%), abnormal TBUT (72%), alkaline (8) tears PH (100%), epithelial keratitis of Togby (76%)

**Table 3: Mucin Ferning Patterns**

	Adults No. of Eyes %		Children No. of Eyes %	
Small Ferns	6	20.0%	8	40.0%
Moderate Ferns	4	13.3%	2	10.0%
Large Ferns	20	66.7%	10	50.0%
<b>Total</b>	<b>30</b>	<b>100.0%</b>	<b>20</b>	<b>100.0%</b>
Inference	Large ferns are positively Associated with adults $p=0.341$ (2x3 Fisher Exact test)			

Of 30 eyes in adults, 24 eyes (80%) showed abnormal ferning patterns. Of 20 eyes in children 12 eyes showed abnormal (60%) ferning patterns. Of the 25 cases of Ocular allergy, 16 (64%), had associated symptoms allergy

**Table 4: Skin Allergy Tests**

Adults (n=15)		
	Number	%
Allergic to Spinach	8	53.3%
Allergic to Pulses	9	60.0%
Allergic to Dust mite	9	60.0%
Children (n=10)		
	Number	%
Allergic to monosodium Glutamate (Ajinomoto)	6	60.0%
Allergic to Dust mite	8	80.0%

Children: Allergic to monosodium glutamate (ajinomoto) 18 out of 25 patients who underwent skin allergy tests at skin allergy clinic, desensitization was helpful only in 45% of cases.

**Table 5: Conjunctival Impression Cytology Diagnosis**

CIC Study	Goblet Cells		Number of GC Absent	%
	Number of GC Present	%		
Acute (n=14)	2	14.3%	12	85.7%
Chronic (n=11)	2	18.2%	9	81.8%
Inference	No. of goblet cells presents re equally likely Between Acute and Chronic with $p=1.000$			

The cytological results showed of total 14 cases of Acute etiology presence of goblet cells in 2 cases (4 eyes, 14.3%), and was absent in 12 cases (24 eyes, 85.7%), of total 11 cases of chronic etiology presence of goblet cells was seen in 2 cases (4 eyes, 18.2%), and absent in 9 cases (18 eyes, 81.8%). No Metaplasia seen in any of acute or chronic cases.

**Table 6: Conjunctival Impression Cytology Diagnosis**

CIC Study	Inflammatory Cells			
	Number of IC Present	%	Number of IC Absent	%
Acute (n=14)	8	57.1%	6	42.9%
Chronic (n=11)	7	63.6%	4	36.4%
Inference	Number of inflammatory cells presents is statistically similar Between acute and chronic patients with $p=1.000$			

The inflammatory cells were present in 8 cases of acute etiology(16 eyes, 57.1%), in 7 cases of chronic etiology. (14 eyes, 63.6%).

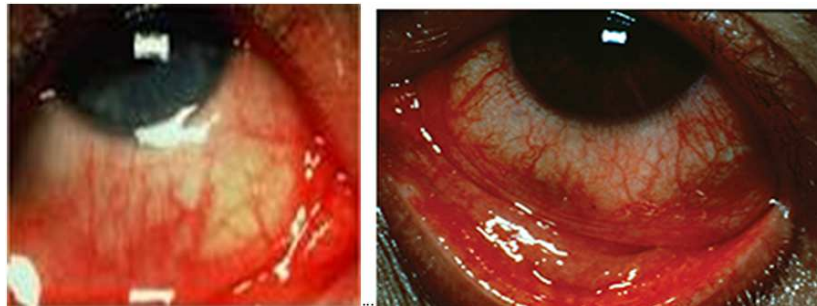
**Table 7: CIC Grading for Dry Eye | Inflammation**

	Normal CIC		Absence of Goblet Cells		Inflammation Present		Dry Eye State		Dry Eye with inflammation	
	Number	%	Number	%	Number	%	Number	%	Number	%
Acute (n=14)	2	14.3%	6	42.9%	1	7.1%	6	42.9%	7	50.0%
Chronic (n=11)	3	27.3%	8	72.7%	6	54.5%	8	72.7%	7	63.6%
P value	0.623 0.135 0.021* 0.135 0.689									
Inference	Inflammation present is significantly more in chronic patients with P=0.021*									

**Of total 14 acute cases**, as per CIC study, dry eye states were seen in 6 cases (42.9%), and dry eye with inflammation seen in 7 cases (50%), Normal CIC pattern seen in 2 cases (14.3%).

**Of total 11 Chronic cases**, as per CIC study, dry eye states were seen in 8 cases (72.7%), and dry eye with inflammation seen in 7 cases (63.6%), Normal CIC pattern seen in 2 cases (14.3%).

Of raised serum IgE levels in 15 cases, CIC studies showed dry eye with Inflammation in 7 cases (46.7%), Dry eye in 6 cases (40%), and Normal CIC study in 2 cases (13.3%). Of raised AEC levels in 15 cases, CIC studies showed dry eye with Inflammation in 8 cases (53.3%), Dry eye in 5 cases (33.3%), & Normal CIC study in 2 cases (13.3%).Of both raised serum IgE levels and raised absolute eosinophil count levels in 8 cases, CIC studies showed dry eye with Inflammation in 6 cases (75%), Dry eye in 2 cases (25%), & Normal CIC study in none.



**Figure 3: Images of Ocular Spectrum**

**Table 8: Co-Relation of VKC with Serum IgE Levels**

	Raised Serum IgE Levels		Normal Serum IgE Levels	
	Number	%	Number	%
Ocular Allergy (VKC) (n=25)	15	60.0%	10	40.0%

Raised serum IgE levels seen in 60% of VKC patients.

**Table 9: Correlation of Systemic Allergy to Raised Serum IgE Levels**

(n=25)	Systemic Allergy		Raised IgE Levels		Raised AEC Levels	
	Number	%	Number	%	Number	%
	16	64.0%	15	93.8%	11	68.8%

Of total 16 cases of systemic allergy, 15 had raised serum IgE level & 11 had raised AEC levels, Raised Serum IgE levels seen in 93.8% of Systemic Atopy patients.

**Table 10: Response to Treatment**

Response	Number of Cases (n=25)	%
Improved	15	60.0%
Resistant	10	40.0%
<b>Total</b>	<b>25</b>	<b>100.0%</b>

## DISCUSSIONS

The present study was done at Bangalore West Lions super specially Eye Hospital cornea clinic. The study showed majority of cases in age group 11-15 years. The youngest patient was 4 yrs. old & oldest was 48 yrs old. Male preponderance was 80%, female 20%. M: F ratio was 4.1. Of 15 adults, 60% were acute and 40% were chronic cases & of 10 children, 50% were acute and 50% were chronic cases. Most common symptoms encountered were burning 72 %, rubbing 56% and Itching 32%. Other associated ocular problems were myopia 80%, epithelial keratitis of togly 76%. Tear film studies showed predominance of abnormal TBUT 72%, abnormal mucin patterns 72%, and alkalinity of tears 100%. Systemic allergy (Eosinophila) was seen associated with VKC in 64% of cases, and was associated with raised Serum IgE levels in 93.8% of cases. Skin allergy test showed common most allergies as pulses 60%, dust mite 60% and spinach 53.3% in adults and ajinomoto 60% and dustmite 80% in children. CIC studies and specialized hematological investigation i.e., Serum IgE and AEC counts were carried out in all patients. CIC studies showed number of goblet cells as equally present in both acute and chronic cases (P=1.000). Inflammation was present significantly more in chronic patient with P=0.021. Abnormal CIC pattern in the form of Dry Eye / Dry Eye with inflammation was seen in 86.7% of patients with raised Serum IgE levels in 86.6% of patients with raised AEC levels and in 100% of patients with combined raised Serum IgE & AEC levels.

As per the CIC study, ocular surface inflammation is related to raised Serum IgE levels and raised Absolute Eosinophil count levels and also related to combined raised Serum IgE levels and raised AEC levels. Response to Treatment was analysed as per Serum IgE levels & AEC levels & AEC levels, 3 groups of patients were encountered. Normal AEC/IgE levels-easy to treatment with mast cell stabilizers +/- antihistamines + AAY tears. Normal IgE levels/Raised AEC levels required topical steroids alone response slower as compared to above group. Raised AEC/IgE levels need above treatment and also topical steroids/ supratascal injections in some cases very resistant to treatment. Raised serum IgE levels seen in 60% of VKC patients and were seen in 93.8% of systemic a togby patients.

## CONCLUSIONS

Systemic allergy history is impessant and is co-related in majority of cases of VKC. Serum IgE levels plays important role in VKC, being raised in significant number of cases in our study. Serum IgE levels and AEC levels can be considered for better management of cases not responding to routine treatment and for chronic cases, refractory to treatment. Conjunctival impression cytology is an important tool in diagnosis of dry eye associated with inflammation in chronic cases of VKC and can be considered in cases not responding to treatment. VKC is seen to progress to dry eye state, very rapidly based on out findings of CIC studies.

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