

Study of Complications and Visual Impairment in Vernal Keratoconjunctivitis (VKC)

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Abstract

Aim: To study the complications and visual impairment in vernal keratoconjunctivitis. **Method:** A prospective hospital-based study was carried out in 100 VKC patients over a period of 2 years. All patients suffering from VKC irrespective of age and gender were included while patients suffering from ocular infections and ocular trauma were excluded from the study. Ocular complaints, duration of symptoms and previous treatment taken. The ocular examination included visual acuity, slit lamp examination, IOP and refraction. **Results:** Corneal complications were noted in 21% of cases followed by lids in 18% of cases. Corneal complications such as superficial scarring was noted in 11% followed by micropannus in 4%, pseudogerontoxon in 3% and shield ulcer in 2% and keratoconus in 1%. The corneal involvement was seen in 5.5% in palpebral form, 23.53% in bulbar, and 48.2% in mixed pattern of VKC. Thus, it is concluded that maximum corneal involvement is observed in mixed clinical pattern of VKC. Majority of cases (82%) had visual acuity ranging from 6/6 to 6/9 in right eye as well as left eye. Visual acuity in the form of counting fingers was present in 4 cases. Out of 100 cases, 55% cases showed refractive errors in the form of astigmatism, myopia and hypermetropia. Astigmatism was found to be commonest refractive error. In our study we observed steroid induced glaucoma in 1% of cases. **Conclusion:** VKC is of more concern due to involvement of cornea and its complications like, shield ulcers, superficial corneal scarring, keratoconus, astigmatism, mechanical ptosis. Steroid induced glaucoma although rare but is a serious complication. Visual acuity is affected mainly due to corneal involvement leading to astigmatism, scarring and keratoconus.

Keywords: VKC, complications, visual impairment.

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INTRODUCTION

Allergic disease as a clinical entity is well known from ancient times. Fifteen percent of world's population suffers from allergic disease. It is estimated that 10 percent to 20 percent of population of India suffers from one or the other allergic disease, of these more than one third have ocular allergic manifestations [1]. The eye is frequent target of inflammation in both local and systemic allergies like allergic rhinitis, atopic dermatitis, and asthma [2]. Allergic conjunctivitis includes the diverse group of diseases; the largest group being associated with exogenous allergens. The four classic forms of allergic conjunctivitis are seasonal allergic conjunctivitis, vernal keratoconjunctivitis, giant papillary conjunctivitis and atopic keratoconjunctivitis. Vernal Keratoconjunctivitis (VKC) was first described by Arlt in 1846 as conjunctivitis lymphatica [3, 4]. It is

characterized by chronic, bilateral, recurrent, interstitial, self-limiting allergic inflammation of conjunctiva having a periodic seasonal incidence [3-5]. It is believed to be diseases of childhood; mean age of presentation is 12 years and generally resolves after puberty, usually around 4-10 years after onset. The disease is more common among males, with the male to female ratio varying from 4:1 to 2:1. It is characterized by itching, redness, discomfort, stringy discharge, photophobia, burning and stinging, giant papillae on the upper tarsal conjunctiva, superficial keratopathy, and corneal shield ulcers, keratoconus leading on to permanent corneal damage [6]. The seasonal character of the disease is most striking feature, it starts in May and June and recedes in autumn i.e. the inflammation often goes into remission in cooler months. The immunopathogenesis of VKC is multifactorial involving a Th2 mediated mechanism with an

overexpression of cytokines, growth factors; eosinophils and eosinophilic proteins [4]. Patients with VKC have a family history of atopic diseases in 49% of cases. These patients may also have a medical history of other atopic conditions including asthma (26.7%), rhinitis (20%), and eczema (9.7%) and showing no evidence of infection [7]. VKC is of more concern due to its vision threatening complications like, keratoconus, corneal scarring, refractive errors, shield ulcers and treatment related complications like steroid induced glaucoma [6, 8]. This study will reveal most frequently observed complications of vernal keratoconjunctivitis seen in rural population and will help in suggesting measures to prevent complications in this population.

MATERIAL AND METHODS

A prospective hospital-based cross-sectional study was carried out and 100 patients were selected having any forms/ types of vernal keratoconjunctivitis

upto 50 years of age. Patients suffering from ocular infections and ocular trauma were excluded from the study. Predesigned study proforma was used to collect data and history was obtained with special attention to characteristic symptoms, duration of occurrence of symptoms and previous treatment taken was noted. Family history and history of atopic disease was also noted. Visual acuity was recorded using Snellens chart. Slit biomicroscopic examination was performed to evaluate corneal and conjunctival involvement. Anterior segment photographs were taken for pictorial documentation. Intraocular pressure was measured using non-contact tonometer in patients.

RESULTS

Out of 100 patients with VKC, majority of cases presented in the age group of 10- 15 years followed by age group less than 10 years, with mean age 15.4 years, SD \pm 8.11 years.

Table-1: Age distribution of VKC cases

Age in years	Clinical pattern of VKC			
	Palpebral	Bulbar	Mixed	Total cases
	No. (%)	No. (%)	No. (%)	No. (%)
<10	16(29.63%)	5(29.41%)	9(31.03%)	30(30%)
10-15	17(31.48%)	6(35.29%)	10(34.48%)	33(33%)
15-20	9(16.67%)	2(11.76%)	3(10.34%)	14(14%)
20-25	6(11.11%)	3(17.65%)	4(13.79%)	13(13%)
25-30	4(7.41%)	0	1(3.45%)	5(5%)
30-35	2(3.70%)	0	1(3.45%)	3(3%)
35-40	0	0	1(3.45%)	1(1%)
40-45	0	1(5.88%)	0	1(1%)
Total	54(54%)	17(17%)	29(29%)	100
Mean \pm SD	15.30 Years \pm 7.23years	15.65years \pm 7.46years	15.46years \pm 8.22years	15.40years \pm 8.11years

Out of 100 cases with VKC, 68% were male and 32% were females, with M: F ratio 2.2:1.

Table-2: Age and Gender in VKC cases

Gender	Age < 25 years	Age >25 years	Total cases
Male	63	5	68
Female	27	5	32
Total	90	10	100

VKC related complications were seen in 40 cases (40%). Out of which corneal scarring (11%), pseudogerontoxon (3%), pannus in (5%), shield ulcer

(2%), keratoconus in (1%) and steroid induced glaucoma was seen in (1%) of cases, wherein patient had used topical steroid for long term.

Table-3: VKC and Complications

Complications	Clinical pattern of VKC			
	Palpebral	Bulbar	Mixed	Total
	No. (%)	No. (%)	No. (%)	No. (%)
Corneal complications				
Keratoconus	0	0	1(7.69%)	1(1%)
Micropannus	0	1(5.88%)	3(10.34%)	4(4%)
Pseudogerontoxon	0	1(5.88%)	2(6.89%)	3(3%)
Shield ulcer	0	0	2(15.38%)	2(2%)
Superficial scarring	2 (3.70%)	2(11.26%)	7(24.13%)	11(11%)
Complications of lids				
Mechanical ptosis	4(7.41%)	0	7(24.13%)	11(11%)
Blepharitis	3(5.55%)	2(11.76%)	2(6.89%)	7(7%)
Glaucoma				
Steroid induced glaucoma	0	0	1(7.69%)	1(1%)
Total	9(16.66%)	6(34.78%)	25(94.14%)	40(40%)

It was seen that the corneal involvement was seen in 5.5% in palpebral form, 23.53% in bulbar, and 48.2% in mixed pattern of VKC. Thus, it is concluded

that maximum corneal involvement is observed in mixed clinical pattern of VKC.

Table-4: Corneal involvement and VKC

Corneal involvement	Clinical pattern of VKC			
	Palpebral	Bulbar	Mixed	Total
	No. (%)	No. (%)	No. (%)	No. (%)
Yes	3(5.5%)	4(23.53%)	14(48.2%)	21(21%)
No	51(94.4%)	13(76.47%)	15(51.7%)	79(79%)
Total	54(54%)	17(17%)	29(29%)	100

Majority of cases (24%) developed VKC related complications with a duration of symptoms from 1 year to 5 years, followed 8% between 5years to 10

years. Mechanical ptosis was observed in all groups of duration of disease.

Table-5: Duration of symptoms and complications of VKC

Complications	Duration of symptoms (in years)				
	< 1 year	1-5 years	5-10 years	10-15 years	15-20 years
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Corneal complications					
Keratoconus	0	1(1%)	0	0	0
Micropannus	1(1%)	2(2%)	1(1%)	0	0
Pseudogerontoxon	0	2(2%)	1(1%)	0	0
Shield ulcer	0	1(1%)	1(1%)	0	0
Superficial Corneal scarring	0	8(8%)	3(3%)	0	0
Complications of lids					
Mechanical ptosis	3(3%)	5(5%)	1(1%)	1(1%)	1(1%)
Blepharitis	1(1%)	4(4%)	1(1%)	0	1(1%)
Glaucoma					
Steroid induced glaucoma	0	1(1%)	0	0	0

Majority of cases (82%) had visual acuity ranging from 6/6 to 6/9 in right eye as well as left eye. Visual acuity in the form of counting fingers was present in 4 cases. Out of 100 cases, 55% cases showed

refractive errors in the form of astigmatism, myopia and hypermetropia. Astigmatism was found to be commonest refractive error.

Table-6: Refractive error and VKC

Refractive error	Clinical pattern of VKC			
	Palpebral	Bulbar	Mixed	Total
	No. (%)	No. (%)	No. (%)	No. (%)
Emetropia (EMT)	31(57.41%)	8(47.06%)	6(20.69%)	45(45%)
Astigmatism (AST)	10(18.52%)	7(41.18%)	18(62.07%)	35(35%)
Hypermetropia (HMT)	2(3.70%)	1(5.88%)	3(10.35%)	6(6%)
Myopia (MYP)	11(20.37%)	1(5.88%)	2(6.89%)	14(14%)
Total	54(54%)	17(17%)	29(29%)	100

DISCUSSION

Vernal Keratoconjunctivitis (VKC) also known as “spring catarrh” is a chronic type of allergic conjunctivitis. In our study as shown in Table-1 we found that 63% of patients were below 15 Years at the time of presentation and the mean age was 15.4 years, with SD \pm 8.11. Hence it is more common in children and young adults. In our study, male predominance was noted with 68% males as compared to 32% females. M: F ratio was 2.2: 1. Similar observations were made by

the most authors except Chenge *et al.*, [8] and Ukponmwam *et al.*, [9] in their studies.

Corneal complications were noted in 21% of cases followed by lids in 18% of cases. Corneal complications such as superficial scarring was noted in 11% followed by micropannus in 4%, pseudogerontoxon in 3% and shield ulcer in 2% and keratoconus in 1%. It was seen that the corneal involvement was seen in 5.5% in palpebral form,

23.53% in bulbar, and 48.2% in mixed pattern of VKC. Thus it is concluded that maximum corneal involvement is observed in mixed clinical pattern of VKC. Our results about superficial scarring are similar with the study of Ujwala S Saboo *et al.*, [9] and Tabbara *et al.*, who found 11% and 12% of cases with superficial scarring respectively [10]. Ujwala S Saboo *et al.*, in their study found shield ulcer in 3% of cases. Hence our study matches with this study [9].

We found lid complications such as mechanical ptosis in 11% and blepharitis in 7% of cases. In a study by Ujwala S Saboo *et al.*, mechanical ptosis was seen in 1.6% of cases [9]. Bonini *et al.*, in their study reported mechanical ptosis in 5.1% of cases [11].

In our study we observed steroid induced glaucoma in 1% of case. Similar results were observed by Saleh *et al.*, in their study with 0.69% of cases of steroid induced glaucoma [12]. Bonini *et al.*, found steroid induced glaucoma in 2.1% of cases [11].

82% cases had visual acuity ranging from 6/6 to 6/9 in right eye as well as left eye. Visual acuity in form of counting fingers was present in 2 cases of corneal scarring and keratoconus respectively each in right and left eye. Out of 100 cases of VKC, 45 cases did not show any refractive error. Among remaining 55 ametropic patients, 35(63.6%) cases had astigmatism followed by 14 (25.4%) cases with myopia and 6 (10.9%) cases with hypermetropia.

Mean IOP was 15.74 ± 1.98 and 15.06 ± 1.86 respectively in right and left eyes of the patients. One patient was found with glaucomatous disc changes in fundus and had IOP 25mmHg in right eye and 22 mmHg in left eye and was under topical antiglaucoma medication.

CONCLUSION

VKC is of more concern due to involvement of cornea and its complications like, shield ulcers, superficial corneal scarring, keratoconus, astigmatism, mechanical ptosis. Steroid induced glaucoma although rare but is a serious complication. Visual acuity is affected mainly due to corneal involvement leading to astigmatism, scarring and keratoconus.

REFERENCES

1. Steven, B. K. ocular immunology in health and diseases, chapter 4, ocular allergic response, 93.
2. Pediatric ophthalmology and strabismus book, section 6, 2010-2011, chapter 16 infectious and allergic ocular diseases, 197.
3. Bielory, L., & Friedlaender, M. H. (2008). Allergic conjunctivitis. *Immunology and allergy clinics of North America*, 28(1), 43-58.
4. Steward, D. E. Allergic conjunctivitis. *System of ophthalmology*. 8 part 1: 432:493.
5. Zicari, A. M., Nebbioso, M., Lollobrigida, V., Bardanzellu, F., Celani, C., Occasi, F., ... & Duse, M. (2013). Vernal keratoconjunctivitis: atopy and autoimmunity. *Eur Rev Med Pharmacol Sci*, 17(10), 1419-1423.
6. Kumar, S. (2009). Vernal keratoconjunctivitis: a major review. *Acta ophthalmologica*, 87(2), 133-147.
7. Bonini, S., Bonini, S., Lambiase, A., Marchi, S., Pasqualetti, P., Zuccaro, O., ... & Bucci, M. G. (2000). Vernal keratoconjunctivitis revisited: a case series of 195 patients with long-term followup. *Ophthalmology*, 107(6), 1157-1163.
8. Kumar, S. (2009). Vernal keratoconjunctivitis: a major review. *Acta ophthalmologica*, 87(2), 133-147.
9. Chenge, B., Makumyamviri, A. M., Kaimbo, W. A., & Kaimbo, D. (2003). Tropical endemic limbo-conjunctivitis in Lúbumbashi, Democratic Republic of the Congo. *Bulletin de la Societe belge d'ophtalmologie*, (290), 9-16.
10. Saboo, U. S., Jain, M., Reddy, J. C., & Sangwan, V. S. (2013). Demographic and clinical profile of vernal keratoconjunctivitis at a tertiary eye care center in India. *Indian journal of ophthalmology*, 61(9), 486.
11. Tabbara, K. F. (1999). Ocular complications of vernal keratoconjunctivitis. *Canadian journal of ophthalmology*, 34(2), 88-92.
12. Bonini, S., Bonini, S., Lambiase, A., Marchi, S., Pasqualetti, P., Zuccaro, O., ... & Bucci, M. G. (2000). Vernal keratoconjunctivitis revisited: a case series of 195 patients with long-term followup. *Ophthalmology*, 107(6), 1157-1163.
13. Al-Akily, S. A., & Bamashmus, M. A. (2011). Ocular complications of severe vernal keratoconjunctivitis (VKC) in Yemen. *Saudi journal of ophthalmology*, 25(3), 291-294.