ORIGINAL ARTICLE

Presentation Patterns and Complications of Vernal-Keratoconjuntivitis

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ABSTRACT

Aim: The aim of the study is to determine the pattern and complications of vernal-keratoconjunctivitis.

Study design: This is a retrospective observational study.

Duration and setting of study: This study was done on patients presenting to a private ophthalmologist's clinic in Peshawar over a period of fifteen months from July 2017 to October 2018.

Methods: Patient consent was not required. During the research, the principles of Helsinki declaration were strictly adhered to.

Results: In this study we evaluated 1180 patients suffering from vernal- keratoconjunctivitis (VKC). The majority of patients with VKC were male (75%). Out of 1180 patients, 378 (32.04%) had severe VKC. The most common complication was keratoconus (n=311, 26.35%). 4% patients had corrected visual acuity of less than 6/60 in their one or both eyes and four patients (0.34%) were blind with absolutely no perception of light. Sixty six patients (5.59%) had developed steroid induced glaucoma and forty two patients (3.55%) had steroid induced cataract. The ocular findings in patients with severe VKC that led to blindness or severe visual impairment were keratoconus, corneal ulcers, corneal plaques and scars, steroid-induced cataracts and steroid-induced glaucoma.

Conclusions: Vernal- keratoconjunctivitis can lead to vision loss and therefore need proper management. Use of steroids in VKC can lead to steroid induced glaucoma and catraract and should be used with caution.

Keywords: vernal- keratoconjunctivitis, keratoconus, blindness, glaucoma, cataract.

INTRODUCTION

Vernal kerato - conjunctivitis (VKC) is a recurrent, bilateral disorder of ocular surface involving both palpebral and bulbar conjunctiva, limbus and cornea. It is an immune mediated disorder in which both Ig-E and T-cell play important roles.[1] The immune pathogenesis is multifactorial and has many environmental causes in the form of antigens. The hypersensitivity reaction between these antigens and the antibody Ig-E provoke the release of histamine and other toxins from the basophil and mast cells in the tissues. These toxins are then responsible for the symptoms of the disease.[2]

VKC is relatively common in warm dry climates such as Africa, Middle East, South Asia, Mediterranean and South America. It is also seen in parts of Western Europe and North America.[3]

The word vernal is derived from the Greek word that means “occurring in spring” and that is why it is also called spring catarrh. The disease is more common in hot and dry summer climate but in some people it might occur throughout the year.[4]

VKC was first described by Arlt in 1846 where he reported 3 cases of peri-limbal swelling in young patients. The first paper about this disease was published in 1876 by Camuest.[5] Duke Elder suggested that most of the symptoms of VKC appear at the age of 2 years and the condition gradually resolves around puberty, but sometimes it persists even after the age of 20 years.[8] There is a strong association between VKC and certain atopic conditions such as rhinitis, eczema and asthma.[3]

There are three clinical types of VKC:

1. Palpebral type: This involves the tarsal conjunctiva of the upper lid and shows papillary hyperplasia (giant papillae) of the upper tarsal conjunctiva.[9]
2. Limbal type: It is associated with limbitis and with the formation of limbal nodules known as Horner-Trantas dots.[10,11]
3. Mixed type: It has clinical features of both, palpebral and limbal VKC.[12]

Itching is the principal symptom of VKC. Other symptoms include hyperemia, pale yellowish appearance of the eye, watering, burning, photophobia, sticky mucoid discharge and foreign body sensation. Corneal changes associated with VKC are punctate epitheliopathy, macroerosions,[8] ulcerations,[13] corneal plaques, sub-epithelial scarring and psuedogerontoxon.[8]

The severe form of VKC is a potentially blinding disease. This is due to its worrisome complications including keratitis, shield ulcer, dense corneal scarring, keratoconus, acute hydrops, cataract and glaucoma.[14]

METHODS

This retrospective observational study was conducted at Daud Eye Clinic from July 2017 to October 2018. The relevant details of patient’s history and clinical

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examination were recorded on a specially designed proforma. Evaluation included history taking, general examination, slit lamp examination, radioscopy, ophthalmoscopy and corneal topography. Visual acuity was recorded with Snellen visual acuity chart. Intraocular pressures were checked with Perkin's hand held applanation tonometer. Data was analyzed using IBM SPSS statistics for windows.

RESULTS

Total patients of VKC were 1180, in which 885(75%) were male. Most of the patients appeared to be between the ages of 3 to 20 years. The age distribution and severity of the VKC is given in table 1 and table 2 respectively. One hundred and three patients (8.73%) had associated allergies like asthma, eczema and rhinitis. Six hundred and fifty patients (55%) had positive family history of VKC (family including parents, siblings, aunts and uncles).

Visual acuity in the VKC patients is given in table 3. Almost 82% of the total number had corrected visual acuity of 6/6 to 6/18. 13.5% had visual acuity of 6/24 to 6/60 in one or both eyes. 4.4 % patients had corrected visual acuity of less than 6/60 in their one or both eyes. Four patients (0.34%) were blind with absolutely no perception of light.

Complications associated with the VKC are given in table 4. In which the most common complication was keratoconus which was present in three hundred and eleven patients (26.35% of the total number). These patients were treated with either glasses, rigid gas permeable lenses, laser or penetrating keratoplasty. The less common complication was acute hydrops, which was present in 1.1% patients.

Topical steroids and antihistamines were the most common medications used in these patients. Sixty six patients (5.59%) had developed steroid induced glaucoma and forty two patients (3.55%) had steroid induced cataract. Almost all the patients with severe secondary complications had used potent topical steroids. They all came from peripheral clinics and obtained their medicines from the pharmacies with or without prescription. Two potent steroids, Betnesol and Methachlor (A combination of chloramphenicol And steroid) were the usual drugs associated with serious blinding complications.

Table 1: Age distribution of VKC patients

Age in years	No. of Patients	(%)
< 10 years	428	(36.27)
10-20 years	492	(41.7)
21-40 years	250	(21.1)
Above 40 years	10	(0.85)

< = less then, %=percentage

Table 2: Type of VKC on the basis of severity

Type	No. of patients	(%)
Mild	409	(34.66)
Moderate	388	(32.88)
Severe	378	(32.04)

%=percentage, VKC= Vernal Keratoconjuntivitis

Table 3: Visual Acuity Range

Visual Acuity	Right Eye n(%)	Left Eye n(%)
6/6 = 6/18	957 (81.79)	979 (81.58)
<6/18 = 6/60	158 (13.50)	145 (13.46)
< 6/60	52 (4.44)	45 (4.43)
NPL	04 (0.34)	04 (0.34)

< = less then, %=percentage, n=number, NPL=no perception of light

Table 4: Complications of VKC and its medication

Complications	No. of patients	%
Keratoconus	311	26.35
Corneal Ulcers	20	1.69
Acute hydrops	13	1.1
Corneal Scarring	42	3.55
Glaucoma	66	5.59
Cataract	42	3.55
Ptosis	24	2.03

%=percentage

DISCUSSION

We examined eleven hundred and eighty patients suffering from VKC over a span of 15 months. VKC is a major health issue in dry and hot regions. It has serious adverse effects on the quality of life of the affected pediatric and juvenile population. It is also potentially a blinding disease in the developing countries like Pakistan.

With the global climatic change across the world, we are likely to see further increase in temperature and dryness in our country, which is going to cause significant increase in the number of patients of VKC and their sufferings in the early years of their lives. Poverty, illiteracy and serious gaps in our health delivery system are other major causes that make patients suffer more in our region because they are more prone to develop serious ocular complications.

Effect of climate, sun exposure, dust and wind exposure, economic status, family histories of atopy, exposure to kerosene/wood fire smoke are identified as associated risk factors of VKC.[15,16] Our study shows that the pattern of VKC in Khyber Pakhtunkhwa province of Pakistan is more or less similar to the pattern of other tropical countries. But we often see much more severe complications with serious negative impact on the quality of life of the affected individuals. These individuals have to suffer from

prolong pain, photophobia, watering, itching and burning at a very tender age which pose serious obstacles to their education and social life. Because of poverty and illiteracy, most of them cannot access quality care in tertiary hospitals and thus end up with serious ocular complications. The male to female ratio in our study was 3:1 which is almost similar to reports from places like Kashmir 2.9:1,[17] Yemen 3.1:1,[18] Italy 3.3:1,[19] Egypt 2.3:1[20] and Nigeria 2:1.[21] VKC is known to be a disease of early childhood that usually resolves at puberty; but we found that 21% of patients in our study were over 20 years of age. In correspondence Leonardi reported 4% of patients above the age of 20 years[15] and according to Shafiq 6% of patients with VKC were above the age of 20 years in a hospital-based study in Pakistan.[22] Certainly, we had slightly larger number of patients with persistent disease beyond the age of 20 years and this may be due to the hot and dry tropical environmental conditions in our area.

VKC can cause various corneal complications which lead to decreased vision. Bonini reported permanent visual loss in 6% of patients due to corneal complications and scarring. We noted about 12.7% patients having corrected visual acuity between 6/24 and 6/60 and almost 5% patients having visual acuity less than 6/60 due to complications associated with VKC. There were 4 patients (0.34%) with absolutely no perception of light in both eyes.

Corneal scars were found in 12% of patients whereas visually disabling corneal scars were present in 3.55%. Corneal shield ulcers were reported in 1.7% of patients; however, greater incidence of corneal shield ulcers were reported by Bonini (9.7%)[14] and Leonardi (15.3%)[14] as compared to our study.

Keratoconus is another major corneal complication associated with VKC. We noted that 26.35% of our patients had keratoconus which was diagnosed clinically and with corneal topography. This is a huge number as compared to the other studies. 7% of keratoconus in VKC was reported in Peshawar in 1988[25] and 6% was reported in a study from Kashmir[17] while 5.9% was found in Abbotabad.[26] This increased number in keratoconus is probably due to the severity of the disease, the lack of access to treatment and the constant rubbing of eyes by these patients. 13 patients (1.1%) had acute hydrops while 28 patients were in resolving stage.

Another complication of VKC we noted was steroid induced glaucoma (SIG) and steroid induced cataract (SIC). Sixty-six patients (5.6%) in our study had SIG and 42 patients (3.5%) had SIC. A study from India reported 2.24% SIG in VKC patients[27] and a similar study from Singapore reported 5.5% VKC patients who developed SIG.[28]

In the majority of patients, the disease started in late March or early April and most of them did not need medications after 15th October.

All patients were advised to keep their eyes clean, protect it from exposure to wind, dust, direct sunlight and to avoid rubbing the eyes.

CONCLUSIONS

Almost one fifth of patients had VA of 6/24 or less. Keratoconus was one of the common complications and was present in one fourth of patients. Steriod induced glaucoma and steriod induced cataract was common complications of patients in prolong steriod theraphy in VKC patients. .

REFERENCES

1.Shaikh A, Ovais SM. The morbidity of vernal Keratoconjunctivitis. Pak J Ophthalmol 2001;3(17): 86-9.

2.La Rosa M, Lionetti E, Reibaldi M, Russo A, Longo A, Leonardi S, et al. Allergic conjunctivitis: a comprehensive review of the literature. Ital J Pediatr 2013;39(1)1-8.

3.Irfan M, Khan S, Ullah W, Ahmed Z, Khalid K. Frequency of different types of vernal keratoconjunctivitis in patients presenting to a tertiary care hospital. J Postgrad Med Inst 2020;34(4):227-30.

4.Smith JS. Disease of conjunctiva. In: Eye diseases in hot climates. 3rd ed. Oxford: Butterworth-Hieneman; 2001.83-104.

5.Hussain M. Spring cataract. Pak J Ophthalmol 1990;6:8-12.

6.Duke-elder S. Diseases of the outer eye, part 1. In: Duke-elder S: System of ophthalmology. London: Hery Kempton; 1965:476.

7.Hussain M, Awan SR, Nadeem AR. Vernal keratoconjunctivitis and association of intestinal worm infestation. Ann King Edw Med Univ 1998;4(4):77-9.

8.Kanski JJ. Disorders of the conjunctiva: Vernal kertoconjunctivitis. In: Clinical Ophthalmology. 4th ed. Oxford: Butterworth Hienemann; 1999:66-71.

9.El-Asrar AM, Geboes K, Al-Kharashi S, Tabbara KF, Missotten L, Desmet V. Adhesion molecules in vernal keratoconjunctivitis. Br J Ophthalmol. 1997;81(12):1099-106.

10.Newel FW. Vernal kertoconjunctivitis. In: Ophthalmology principles and concepts. 7th ed. Mosby; 1992:231-2.

11. Choleva P, Tole D, Churchill A. Allergic eye disease in children: identifying the signs and symptoms. Int j ophthalmic pract 2014;5(2):50-2.

12.Miller SJ. Parsons' diseases of the eye. 18th ed. Edinburgh: Churchill Livingstone; 1990; 140-1.

13.Kerr N, Stern GA. Bacterial keratitis associated with vernal keratoconjunctivitis. Cornea. 1992;11(4):355-9.

14. Bremond-Gignac D, Donadieu J, Leonardi A, Pouliquen P, Doan S, Chiambarretta F, et al. Prevalence of vernal keratoconjunctivitis: a rare disease? Br j ophthalmol 2008;92(8):1097-102.

15.Leonardi A. Vernal keratoconjunctivitis: pathogenesis and treatment. Prog Retin Eye Res. 2002;21(3):319-39.

16.De Smedt S, Nkurikiye J, Fonteyne Y, Hogewoning A, Van Esbroeck M, De Bacquer D, et al. Vernal keratoconjunctivitis in school children in Rwanda and its association with socio-economic status: a population-based survey. Am J Trop Med Hyg 2011;85(4):711-7.

17.Sofi RA, Mufti A. Vernal Keratoconjunctivitis in Kashmir: A temperate zone. Int Ophthalmol 2016; 36(6):875-9.

18.Al-Akily SA, Bamashmus MA. Ocular complications of severe vernal keratoconjunctivitis (VKC) in Yemen. Saudi J Ophthalmol 2011;25(3):291-4.

19.Lee Y, Raizman MB. Vernal conjunctivitis. Immunol Allergy Clin North Am 1997;17(l):33-51

20.Marey HM, Mandour SS, El Morsy OA, Farahat HG, Shokry SM. Impact of Vernal Keratoconjunctivitis on School Children in Egypt. Semin Ophthalmol. 2017;32(5):543-9.

21.Duke RE, Odey F, De Smedt S. Vernal keratoconjunctivitis in public primary school children in Nigeria: prevalence and nomenclature. Epidemiol Res Int 2016; 2016. https://doi.org/10.1155/2016/9854062

22.Buckley RJ. Vernal keratoconjunctivitis. Int Ophthalmol Clin 1988;28(4):303-8. doi: 10.1097/00004397-198802840-00009.

23.Collum LM. Vernal keratoconjunctivitis. Acta Ophthalmol Scand Suppl 1999;(228):14-6

24.Lee Y, Raizman MB. Vernal conjunctivitis. Immunol Allergy Clin North Am 1997;17(1):33-51

25.Khan MD, Kundi N, Saeed N, Gulab A, Nazeer AF. Incidence of keratoconus in spring catarrh. Br J Ophthalmol 1998;72(1):86-9.

26.Arif AS, Aaqil B, Siddiqui A, Nazneen Z, Farooq U Corneal Complications And Visual Impairment In Vernal Kerato-conjunctivitis Patients. J Ayub Med Coll Abbottabad. 2017;29(1):58-60.

27.Senthil S, Thakur M, Rao HL, Mohamed A, Jonnadula GB, Sangwan V, et al. Steroid-induced glaucoma and blindness in vernal keratoconjunctivitis. Br J Ophthalmol 2020;104(2):265-9. doi:10.1136/bjophthalmol-2019-313988

28.Ang M, Ti SE, Loh R, Farzavandi S, Zhang R, Tan D, et al. Steroid-induced ocular hypertension in Asian children with severe vernal keratoconjunctivitis. Clin Ophthalmol 2012;6:1253-8.