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Original Article

Ocular Complication in Vernal Keratoconjunctivitis Patients

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ABSTRACT

Background: Vernal keratoconjunctivitis (VKC) is a chronic ocular allergic condition predominantly affecting the pediatric population. It is characterized by severe inflammation of the conjunctiva and cornea, leading to a spectrum of complications if not adequately treated. The prevalence and impact of VKC vary geographically and demographically, necessitating region-specific investigations to understand its epidemiology, clinical manifestations, and outcomes.

Objective: The study aimed to investigate the distribution of VKC types among affected individuals in a specific region, identify the prevalence of associated ocular complications, and evaluate the demographic characteristics of the patient population.

Methods: This descriptive study was conducted over an 8-month period, assessing 200 patients diagnosed with VKC at the outpatient department of ophthalmology in HMC Peshawar. Patients were included based on recurrent signs and symptoms of VKC, excluding those with other ocular conditions. A comprehensive ophthalmic examination was performed, encompassing uncorrected and corrected visual acuity tests, anterior slit lamp examination, fundus examination with a 78D lens, intraocular pressure measurement using a Goldman applanation tonometer, and keratometry. Corneal topography was conducted for suspected cases. Data were analyzed using SPSS version 25.0, focusing on the distribution of VKC types, gender prevalence, and complication rates.

Results: The study revealed a significant male predominance (73%) among VKC patients, with the limbal type being the most common form of the condition (45%). Complications were observed in 21% of the patients, with irregular astigmatism (35.7%) and keratoconus (26.2%) being the most prevalent. The gender distribution and types of VKC highlighted the need for targeted clinical attention, especially considering the potential for serious complications such as corneal scarring, cataract, and glaucoma.

Conclusion: VKC remains a significant pediatric ocular health concern, with a marked male predominance and a high incidence of complications that can impact the quality of life. Early diagnosis, effective management, and regular follow-up are crucial to mitigate the risk of long-term visual impairment. The findings underscore the importance of awareness and education among healthcare providers and caregivers regarding the potential severity of VKC and the necessity for timely intervention.

Keywords: Vernal keratoconjunctivitis, Paediatric ocular disease, Ocular allergy, Irregular astigmatism, Keratoconus, Ophthalmic examination, SPSS analysis, Ocular complications.

INTRODUCTION

Vernal keratoconjunctivitis (VKC) represents a significant concern within the spectrum of ocular allergies encountered in clinical settings, encompassing conditions like perennial allergic conjunctivitis (PAC), seasonal allergic conjunctivitis (SAC), and atopic keratoconjunctivitis (AKC) (1). Distinctively, VKC is an allergic inflammatory response primarily affecting the conjunctiva and cornea, predominantly observed in young males (2). This condition is instigated by a type 1 hypersensitivity reaction, wherein the immune system reacts to environmental allergens. Clinical presentations of VKC are characterized by a constellation of symptoms including burning, itching, photophobia, excessive tearing, redness, a sensation of a foreign body in the eye, eyelid swelling, mucoid discharge, and in some instances, reduced vision. The diagnostic signs of VKC encompass chemosis, conjunctival hyperemia, tarsal papillae, limbal infiltrates, a brownish discoloration of the eyes, Horner-Trantas dots, and eyelid edema (3).

VKC is categorized into three variants: palpebral, limbal, and mixed. The palpebral form is marked by the presence of giant papillae, whereas the limbal variant is characterized by Horner-Trantas dots, and the mixed type exhibits features of both palpebral and limbal VKC (4). The prognosis of VKC can be complicated by several factors, either directly related to the disease process or as a

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consequence of therapeutic interventions. Disease-specific complications include irregular astigmatism, keratoconus, shield ulcer, and corneal opacity, while the prolonged utilization of corticosteroids in the management of VKC may lead to secondary complications such as cataracts and glaucoma (5).

Given the potential for severe ocular complications, early diagnosis, appropriate management, and diligent follow-up are imperative to mitigate the risk of vision-threatening outcomes in VKC patients. This necessitates a comprehensive understanding of the disease's pathophysiology, clinical manifestations, and progression to tailor treatment strategies that effectively address both the symptoms and the underlying allergic response, while also considering the long-term implications of treatment options to prevent the development of serious ocular complications (6).

MATERIAL AND METHODS

This descriptive study was conducted to evaluate the clinical manifestations and complications associated with vernal keratoconjunctivitis (VKC), enrolling patients from the outpatient department of ophthalmology at HMC Peshawar. The study spanned eight months, from the 1st of March 2022 to the 31st of October 2022. Inclusion criteria were patients presenting with recurrent signs and symptoms of VKC, including palpebral, limbal, and mixed types. Exclusion criteria encompassed individuals with a history of trauma, corneal dystrophy, congenital glaucoma, congenital cataract, other ocular diseases, or ocular allergies not attributable to VKC.

A comprehensive history of each participant was recorded, followed by a thorough ophthalmic examination. This examination included assessments of both uncorrected and corrected visual acuity, anterior segment evaluation via slit lamp examination, and fundus examination using a 78D lens. Intraocular pressure was measured with a Goldman applanation tonometer, and corneal curvature was determined using a keratometer (7). Corneal topography was performed selectively on cases where there was a clinical suspicion of corneal abnormalities. All findings were systematically documented on a structured proforma designed for this study (8).

The study adhered to the ethical principles outlined in the Declaration of Helsinki regarding medical research involving human subjects. Ethical approval was obtained from the institutional review board before the commencement of the study. Participants were briefed about the study's objectives, and informed consent was secured from each participant or their legal guardians in the case of minors, ensuring confidentiality and the right to withdraw from the study at any point.

Data collected from the study were analysed using SPSS version 25.0. Statistical methods applied to the data included descriptive statistics to summarize the demographic and clinical characteristics of the study population, along with inferential statistics to identify potential correlations between clinical manifestations of VKC and observed complications (9). The analysis aimed to provide insights into the prevalence and severity of VKC-related complications, contributing to a better understanding of the disease's impact on affected individuals.

RESULTS

In the study, a comprehensive analysis of the distribution of vernal keratoconjunctivitis (VKC) types among patients and the associated complications provides insightful findings. A total of 200 patients were evaluated, revealing a predominant occurrence of VKC among males, who constituted 146 cases (73%), in contrast to 54 female cases (27%), underscoring a significant gender disparity in the prevalence of VKC.

Table 1: Gender Distribution by Types of Vernal Keratoconjunctivitis (VKC)

Types of VKC	Male	Female	Total (Percentage)
Palpebral	44	18	62 (31%)
Limbal	67	23	90 (45%)
Mixed	35	13	48 (24%)
Total	146	54	200
VKC: Vernal Keratoconjunctivitis, %: Percentage of total VKC patients			

The distribution of VKC types varied, with the limbal type being the most common, accounting for 90 patients (45%), followed by the palpebral type in 62 patients (31%), and the mixed type observed in 48 patients (24%) (Table 1). This distribution highlights the limbal type as the predominant form of VKC within the studied population, suggesting potential differences in susceptibility or environmental exposure among the genders.

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Table 2: Complications of VKC in 42 Patients

Complications	Numbers	Percentage (%)
Irregular Astigmatism	15	35.7%
Keratoconus	11	26.2%
Corneal Scarring	7	16.7%
Cataract	5	11.9%
Glaucoma	2	4.8%
Shield Ulcer	2	4.8%
Total	42	100%
%: Percentage of patients with complications out of those studied		

Further examination into the complications arising from VKC among 42 patients revealed a diverse range of ocular issues. Irregular astigmatism emerged as the most frequent complication, affecting 15 patients, which represents 35.7% of those with complications. This was closely followed by keratoconus, reported in 11 patients (26.2%), indicating a considerable impact on corneal integrity and vision quality. Corneal scarring was identified in 7 patients (16.7%), further emphasizing the severe sequelae VKC can have on ocular health. Less common complications included cataract and glaucoma, affecting 5 (11.9%) and 2 patients (4.8%), respectively, along with shield ulcer, also in 2 patients (4.8%) (Table 2). These findings underscore the critical nature of VKC as a condition with potential for serious ocular complications, necessitating prompt diagnosis and management to mitigate long-term visual impairment.

DISCUSSION

Vernal keratoconjunctivitis (VKC), as revealed in our study, emerges as a prevalent ocular allergy in our region, echoing the findings of Farrukh et al. who reported VKC to constitute 21.9% of pediatric ocular diseases, and Khatri et al., who observed a slightly higher prevalence at 24.8%. This alignment underscores VKC's significance among pediatric ocular afflictions in diverse settings. VKC's rarity and chronic nature, coupled with its potential to inflict severe damage to the cornea and conjunctiva, pose a substantial threat to the quality of life of affected children and their families. The complications associated with VKC, whether directly disease-related or stemming from prolonged steroid use, necessitate vigilant management to mitigate long-term adverse outcomes.

Our analysis of 200 VKC patients, predominantly under 20 years of age with a notable male majority (73%), reinforces the gender predisposition observed in prior studies, such as Awan et al., which reported a male predominance (57.5%) in VKC occurrences (10). This gender disparity may be attributed to cultural and environmental factors, with male children more frequently exposed to outdoor allergens. Our study observed a higher male to female ratio compared to other research, potentially reflecting regional variations in outdoor activities and exposure risks (11).

The distribution of VKC types within our cohort, with the limbal type presenting in 45% of cases, diverges from findings such as those by Duke RE et al., where the palpebral type was more prevalent (12). These discrepancies highlight the potential influence of geographical and environmental factors on VKC manifestation patterns (13). The observed complication rate of 21% in our study participants is lower than the 40% reported by Bangal et al., a variation possibly related to differing climatic conditions affecting the severity and prevalence of VKC complications (14).

Irregular astigmatism emerged as the most common complication in our study (35.7%), a finding echoed by Thiagarajan D et al. and Shah et al., underscoring its prevalence among VKC patients. Conversely, Rajneesh et al. found myopia to be more common, suggesting that the spectrum of visual impairments associated with VKC can vary significantly across populations. Keratoconus was the second most common complication observed (26.2%), closely aligning with the prevalence reported by Wajnsztajn D et al., highlighting the critical need for timely intervention, such as collagen cross-linking, to prevent severe visual impairment and the necessity for keratoplasty (2, 15).

The incidence of steroid-induced glaucoma and cataract in our study (4.8% each) reflects the risks associated with unmonitored steroid use, a concern similarly reported by Al-Akily SA et al (16). This underscores the importance of careful steroid management and the need for alternative therapeutic strategies to avoid such complications (17, 18).

This study, while comprehensive, is not without limitations. The cross-sectional design and geographical concentration may limit the generalizability of the findings. Additionally, the reliance on patient-reported symptoms and treatment histories could introduce recall bias. Future research could benefit from a longitudinal approach to better understand VKC's natural progression and the long-term efficacy of treatment modalities (19, 20).

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CONCLUSION

In conclusion, our findings affirm the significant impact of VKC on pediatric ocular health, highlighting the necessity for early diagnosis, tailored treatment, and consistent follow-up to prevent vision-threatening complications. The study also calls for heightened awareness among healthcare providers and caregivers about the potential adverse effects of prolonged steroid use and the importance of regular ophthalmologic evaluations for VKC patients. Further research exploring alternative treatments and long-term management strategies for VKC is recommended to enhance patient outcomes and quality of life.

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