



CASE REPORT DIAGNOSIS AND TREATMENT OF VERNAL KERATOCONJUNCTIVITIS

Fariz Auliadi Khalil¹, Risa Ayu Nilmarani¹, Syarifah Rohaya², Diana Novita^{1*}

¹Faculty of Medicine, Malikussaleh University, Aceh Utara, Indonesia

²Department of Ophthalmology, Regional Public Hospital Cut Meutia, Aceh Utara, Indonesia

*Corresponding Author : E-mail: diana.2006112023@mhs.unimal.ac.id

ABSTRACT

Background: Vernal keratoconjunctivitis (VKC) is a bilateral ocular allergic disease mediated by hypersensitivity reactions. Vernal keratoconjunctivitis events occur in boys in the first decade of life and continue until puberty. Early identification and effective treatment are essential because the condition is recurrent and potentially burdensome to the patient's quality of life. This case report examines the diagnosis, management, and therapy options for patients with VKC and highlights the significance of the clinician's involvement in cases with VKC. **Case Presentation:** We report a case, a boy, 8 years old, came to the eye clinic at Cut Meutia Hospital with pain in both eyes, red eyes, decreased vision, and increased eye discharge. This complaint has been experienced for the past few years, and most appeared when the patient played under the sun or when the patient's allergy came. Examination showed mild conjunctival inflammation, pseudoptosis, and papillae on the limbus. **Conclusion:** The patient was diagnosed with VKC and received several treatments, including artificial tear and dexamethasone.

Keywords: *Photophobia; Hypersensitivity; Limbus; Papillae; Tarsal*

INTRODUCTION

Vernal keratoconjunctivitis (VKC) is a recurring form of allergy mediated by hypersensitivity reactions (I and IV) and is characterized by bilateral chronic inflammation of the ocular surfaces, which might lead to permanent damage or visual disability.^{1,2} Vernal keratoconjunctivitis is a chronic disease where the average duration of recurrence is 4 – 8 years, and the risk decrease with increased age or after puberty. Vernal keratoconjunctivitis tends to occur twice in boys than girls in the first decade of life, however, the ratio of males to females is about the same in older patients.^{3,4} Vernal keratoconjunctivitis is a subset of allergic conjunctivitis related to race and geography. Vernal keratoconjunctivitis is prevalent in nations with tropical, windy climates and high air pollution.^{2,5}

The pathogenesis of VKC is associated with a complex interaction between genetic, environmental, and immunological factors.⁶ Several environmental factors, including ultraviolet (UV) radiation and allergen-laden wind, may induce an inflammatory response in the conjunctiva.⁷ T-helper lymphocytes (Th)-2 produce different cytokines and interleukins (IL), including IL-3, IL-4, and IL-5, which increase IgE production, activation, and differentiation of eosinophils and mast cells (neutral proteases tryptase and chymase (MC_T)). During degranulation, eosinophils release various inflammatory mediators,

such as eosinophilic cationic protein, peroxidase, and major basic protein. These inflammatory mediators are toxic to the corneal epithelium and cause degradation of the base membrane and stroma. Corneal fibroblast cells release receptors for these inflammatory mediators, activating a recurrent inflammatory cascade and further damaging the conjunctival tissue.^{8,9}

Vernal keratoconjunctivitis consists of three subtypes. First, the palpebral type affects the superior tarsal conjunctiva.¹⁰ This type is also characterized by large papillae (*cobblestone*).¹ The limbal type is characterized by hypertrophy of the papillae at the superior limb, called *Horner-Trantas dots*. Meanwhile, the mixed type is a combination of palpebral and limbal characteristics.²

Patients with VKC will complain of initial symptoms of itching, redness, and watery eyes. Other symptoms include decreased vision, photophobia, burning sensation, and the presence of mucous and/or serous discharge in the eye. Clinical signs found in patients include conjunctival hyperemia, mild to moderate chemosis, the feeling of a foreign body, and pain, where these clinical signs are severe when waking up in the morning.² The grading of VKC is based on the patient's clinical signs and symptoms. Grade 0 is a patient with no clinical symptoms. Grade 1 is a patient with VKC symptoms without photophobia. Grade 2 is a patient with symptoms of



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VKC and photophobia. Grade 3 is a patient with symptoms of VKC, photophobia, and mild to moderate superficial punctate keratopathy. Meanwhile, Grade 4 is a patient with symptoms of VKC, photophobia, and diffuse superficial punctate keratopathy or a corneal ulcer.^{11,12} Grade 5, the evolutionary stage, is where there are additional symptoms during certain climatic periods.²

The first treatment was to identify allergens and causative factors. Patients and families are instructed to avoid those factors and take anticipatory actions. The treatment of VKC includes antihistamines, mast cell stabilizers, dual acting agents, immunomodulators, corticosteroids, and vasoconstrictors. Surgery is only indicated if there are complications in patients.² Some complications that can occur in VKC patients include shield ulcer, scarring in the cornea, keratoconus, superficial punctate keratitis, hydrops, pseudogerontoxon, and due to the use of steroids (cataracts and glaucoma).¹³

CASE REPORT

An 8-year-old male patient, accompanied by his mother, came to the eye clinic at Cut Meutia Hospital with pain in both his eyes which had been experienced since \pm 3 years ago. The discomfort was greatest in the morning and when he saw the light. It was tough for him to open his eyes due to the discomfort. The pain felt like burning in both his eyes. Additionally, the patient complained of red eyes, decreased vision, and increased production of eye discharge in the morning. The patient has experienced this complaint for the past few years, and most appeared when the patient played under the sun or when the patient's allergy came. The history of the same complaint in the family was denied. Eye drops were previously administered to the patient at an ophthalmologist's clinic. The family denied the use history of other drugs.

The patient's general physical exam showed a mild illness with the *compos mentis* stage. The abnormal examination of the eyes showed the vision of OD 6/9, OS 6/12, pseudoptosis oculi dextra et sinistra, edema on the palpebral superior oculi dextra et sinistra, hyperemia on the conjunctiva tarsal superior dextra et sinistra, mild chemosis on the conjunctiva bulbi dextra et sinistra, and direct-indirect light reflex was difficult to assess. Furthermore, the patient underwent a slit-lamp examination, it found the presence of papillae on the

limbus oculi dextra et sinistra (Figure 1). Other supporting examinations were not performed on this patient. Based on the history and examination results, the patient was diagnosed with vernal keratoconjunctivitis, limbal type grade 2 ODS.

The patient was given several drugs, including artificial tears comprising sodium chloride and potassium chloride every four hours, dexamethasone eye drops every four hours, and oral methylprednisolone three times a day. The patient and family were informed that the disease might reoccur later and resolve after puberty. In addition, patients and their families were informed about minimizing trigger factors, such as playing in hot temperatures and applying cold compresses to both eyes to reduce pain.

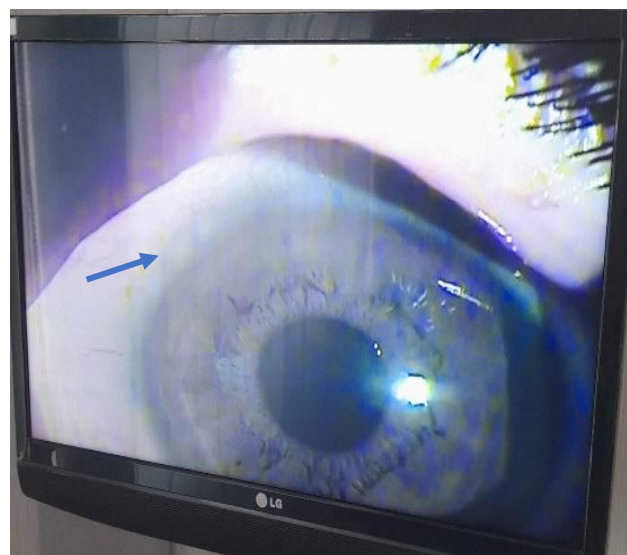


Figure 1. Horner-Trantas Dots on limbus (blue arrow).

DISCUSSION

It has been reported that a patient, a boy aged 8 years, came to the eye clinic at Cut Meutia Hospital with pain in both eyes in the morning, both eyes were red, with decreased vision and increased production of eye discharge. Based on the anamnesis results, it is known that the patient has often had the same issues for the past 3 years, which occur when the patient plays in hot weather and when his allergy comes by. After a complete examination, the patient was diagnosed with vernal keratoconjunctivitis (VKC). Vernal keratoconjunctivitis is a form of the ocular allergic disease that often occurs in children in the



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first decade of life, especially in boys.^{2,5} The incidence of VKC is associated with genetic, environmental, and immunological factors.⁶ The patient complains that the symptoms appear when the patient plays in hot weather. Based on the literature, VKC often occurs in summerspring, when many agricultural activities occur during those seasons. This causes the carrying of various kinds of pollen and dust into the surrounding environment. This mechanism triggers the inflammatory reaction in the conjunctiva.^{7,14} The patient is also known to have a history of allergy to dust. Based on the literature, it is known that 50% of VKC patients have a history of atopic diseases, such as rhinitis, asthma, or eczema.¹⁵ Vernal keratoconjunctivitis is a chronic disease, where the average duration of recurrence of this disease is 4 – 8 years, but the risk of VKC will decrease as patients get older or after puberty.² This is consistent with patient complaints, which appear recurrently and occur in some circumstances.

The patient is complaining that the pain is worse in the morning. This is consistent with the characteristics of VKC. Clinical signs VKC include conjunctival hyperemia, a feeling that there is a foreign body, and pain, which worsens when patients wake up in the morning, which is called 'the morning misery'. Other typical symptoms of VKC include photophobia, increased tearing, viscous mucus discharge, and even blurred vision.¹⁶ Vernal keratoconjunctivitis is also characterized by the appearance of papillae of varying sizes that arise from the superior tarsal to the limbus. We found in this patient; the papillae were on the surface of the limbus called Horner-Trantas dots. These papillae are degeneration of the corneal epithelium and eosinophils in the corneal limbal epithelium.¹

Based on its location, VKC is divided into three types, they are palpebral, limbal, and mixed types. Literature shows that the palpebral type is the most common form of VKC, followed by the mixed type and the limbal type.¹⁷ The type of VKC is also influenced by geography, where the palpebral type of VKC often occurs in Europe and America, while the limbal type of VKC tends to occur in Africa and Asia, where this is influenced by climate.^{5,11} In this case, VKC was found in the limbal.

Vernal keratoconjunctivitis treatment consists of education for patients, pharmacotherapy, and surgery. Educating patients with VKC focuses on avoiding trigger factors, where in this case report, the

patient is advised not to play during hot weather and avoid allergens such as dust. Patients are also advised to apply cold compresses to both eyes to minimize the symptoms. A cold compress can act as a natural decongestant. Tear substitutes help stabilize the tear film, as an eyewash, and dilute the concentration of allergens and mediators.¹⁸ The pharmacotherapeutic given depends on the grade of VKC, but generally, antihistamines as prophylaxis, *mast cell stabilizers*, and topical or systemic steroids. Surgery is rarely indicated, except in cases with advanced complications.² This is in accordance with our treatment, dexamethasone, and artificial tears. Antihistamines were not administered to this patient due to the hospital's inadequate medicine supply.

Complications in the course of VKC disease can occur, for example, corneal epithelial erosion, shield ulcer, and corneal plaque, which often occur in VKC patients. This complication occurs due to the release of mediators from inflammatory cells and as a result of mechanical trauma to the papillae in the superior tarsal conjunctiva. Keratoconus tends to occur in children with allergic diseases. Keratoconus is a non-inflammatory disease of the cornea, which is characterized by central and paracentral thinning of the cornea. Keratoconus can cause astigmatism and decreased visual acuity.¹⁹

One week after administering pharmacological treatment, we followed up this patient. Based on the anamnesis, the patient admitted that his complaints had decreased significantly. The examination showed visus ODS 6/7,5 and the oculi dextra et sinistra showed no chemosis and Horner-Trantas dots on the limbus in the patient. This follows the literature stating that VKC has a good prognosis if properly treated. Overall, prognosis is good, however 6% patients will develop complications.²⁰

CONCLUSION

Vernal keratoconjunctivitis (VKC) is a form of allergy mediated by hypersensitivity reactions and is characterized by bilateral chronic inflammation of the ocular surface. Vernal keratoconjunctivitis tends to occur in boys in the first decade of life. This disease caused by the interaction of various factors, namely genetics, environment, and immunology. A distinctive sign is the appearance of papillary hyperplasia, which, based on its position, divides VKC into 3 types, palpebral, limbal, and mixed. Treatment focuses on avoiding precipitating factors



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because VKC is a chronic disease at risk for recurrence.

ETHICAL APPROVAL

There is no ethical approval for this case report.

CONFLICTS OF INTEREST

The authors declare no conflict of interest for this case report.

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AUTHOR CONTRIBUTIONS

Investigation, Syarifah Rohaya; Fariz Auliadi Khalil; Diana Novita; and Risa Ayu Nilmarani; Data collecting, Fariz Auliadi Khalil; Writing–original draft preparation, Diana Novita; Writing–review, Risa Ayu Nilmarani; Supervision, Syarifah Rohaya; Editing, Fariz Auliadi Khalil

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