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(CASE REPORT)

A primary VZV infection complicated by retinitis in an immunocompetent child

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Abstract

Chickenpox, a primary infection caused by the varicella-zoster virus (VZV), is generally a mild childhood illness in immunocompetent children. Ocular complications during the primary infection remain rare. We report the case of a 10-year-old girl, with no medical history, who presented with unilateral decreased visual acuity one week after a clinically confirmed episode of chickenpox. The ophthalmological examination revealed a vitreous Tyndall effect associated with macular reorganization. The macular OCT showed hyperreflectivity of the photoreceptors with localized serous retinal detachment. The etiological assessment ruled out other infectious or inflammatory causes, and the VZV serology was positive (IgM and IgG). A treatment combining oral acyclovir, azithromycin, and deferred systemic corticosteroids was initiated, with a progressively favorable outcome, marked by the disappearance of the serous retinal detachment and visual recovery to 8/10 after one month. This case illustrates the possibility of retinal involvement during a primary VZV infection in an immunocompetent child and highlights the importance of early diagnosis and appropriate management to prevent visual sequelae.

Keywords: Primary Infection; Varicella-Zoster Virus; Retinitis; Immunocompetence; Antiviral

1. Introduction

Chickenpox, a primary infection caused by the varicella-zoster virus (VZV), is usually mild in immunocompetent children. Ocular complications during this phase are rare. Retinitis is an unusual manifestation that can affect visual prognosis. We report a case that occurred in an immunocompetent child.

2. Case Presentation

We report the case of a patient aged 10 years and 8 months, admitted to the ophthalmological emergency department at CHU Mohammed VI of Oujda in March 2024 for the management of unilateral decreased visual acuity in the left eye. This patient has no medical history. A week before her admission, a diagnosis of chickenpox was made by her pediatrician. The patient received only symptomatic treatment given that the clinical picture was not severe. The ophthalmological examination upon admission found a visual acuity of 5/10, an anterior segment without abnormalities, normal intraocular pressure, a vitreous Tyndall effect, and macular changes at the fundus (figure 1). The macular OCT shows hyperreflectivity of the photoreceptor layer with a small serous retinal detachment (figure 2). ICG angiography shows hypofluorescence at the late stage (figure 3).

Our patient underwent a biological assessment that returned normal results, including a complete blood count, inflammatory markers, sarcoidosis panel, and tuberculosis panel, while the VZV serology was positive. IgG and IgM, the toxoplasmosis serology and the immune competence virus serology are negative.

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The patient received azithromycin 250 mg 1 tablet morning and evening on the first day, then 1 tablet per day for 4 weeks, acyclovir 200mg/5ml 10 ml morning and evening for 4 weeks, prednisone 20 mg 30mg for 7 days, started 5 days after the antibiotic treatment.

The progression is favorable after one week of treatment with the disappearance of the vitreous Tyndall effect and a reduction in the size of the serous retinal detachment, along with an improvement in visual acuity to 6/10 (figure 4). After 1 month of treatment, visual acuity improved to 8/10 with a complete disappearance of the serous retinal detachment (figure 5).

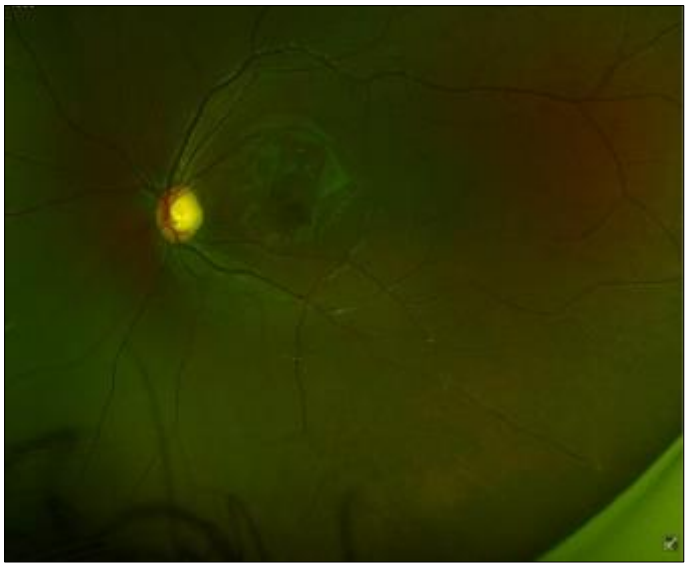

Figure 1 Fundus shows macular remodeling

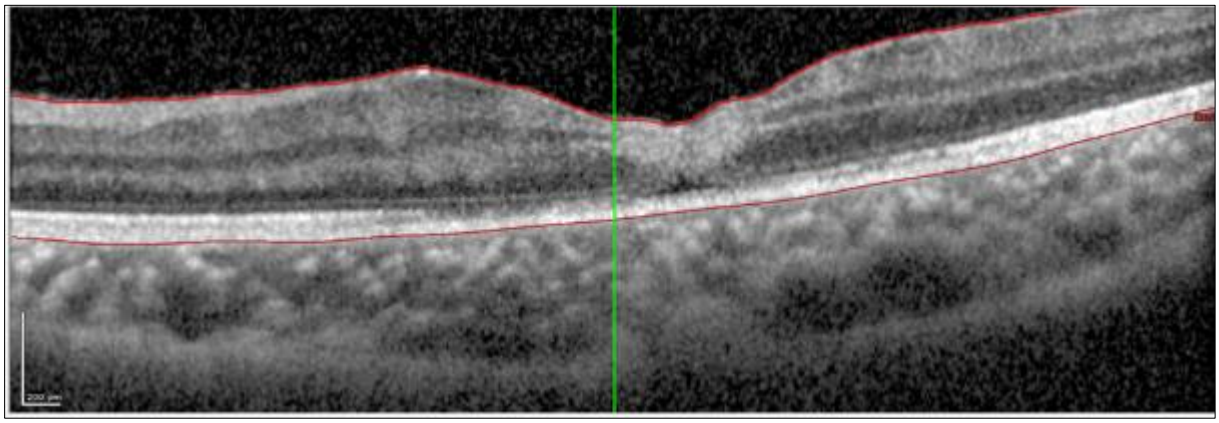

Figure 2 The macular OCT shows hyperreflectivity of the photoreceptor layer with a small serous retinal detachment

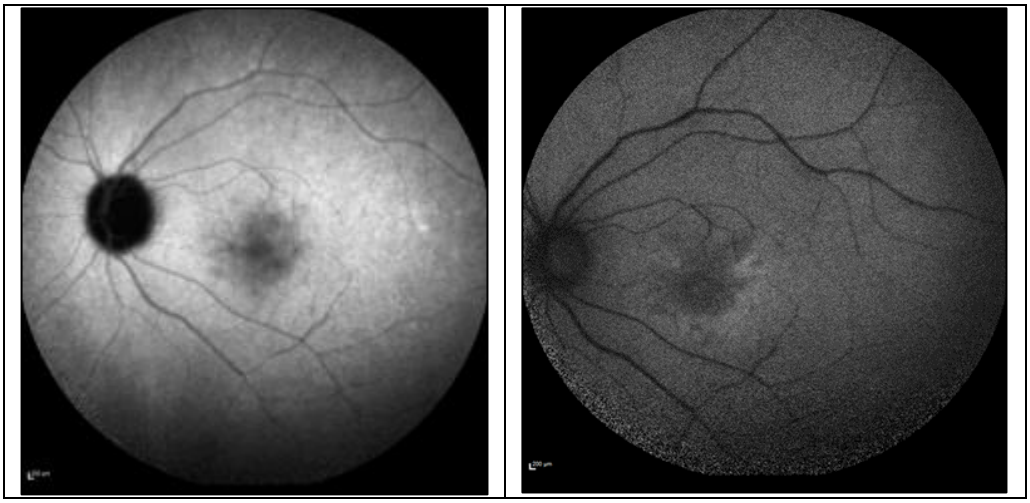

Figure 3 ICG angiography shows hypocyannescence at the late phase

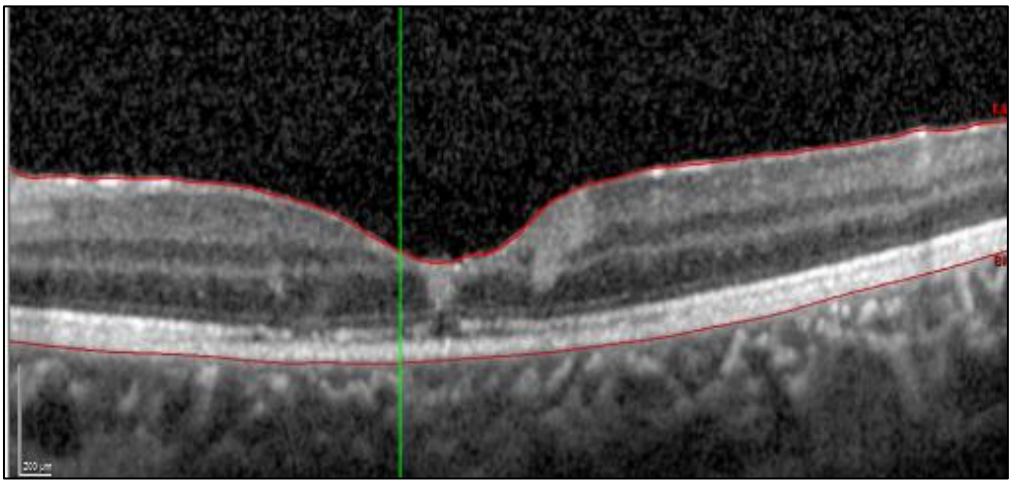

Figure 4 Decrease in the size of serous retinal detachment

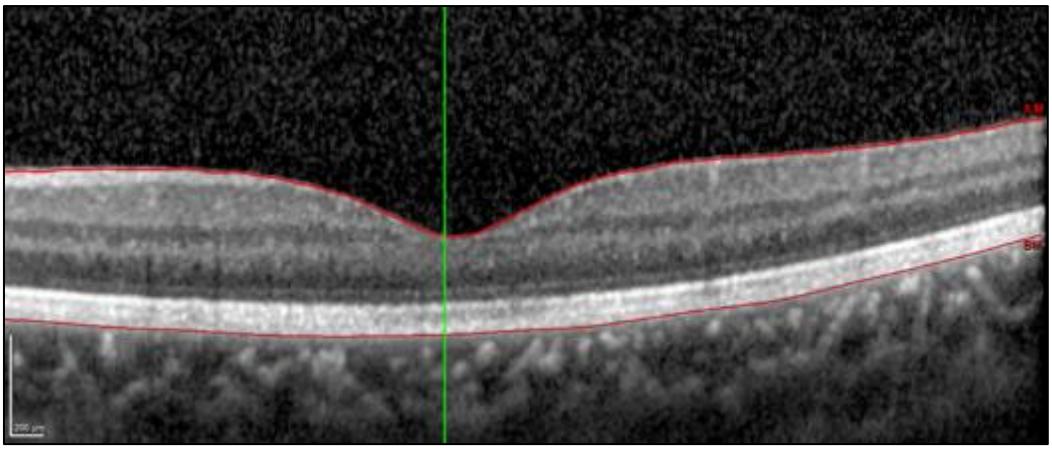

Figure 5 Disappearance of serous retinal detachment

3. Results and Discussion

VZV is a dermo-neurotropic alphaherpesvirus specific to humans, which manifests clinically in two ways: chickenpox (primary infection) and shingles [1]. Chickenpox is a common disease in children, occurring in 90% of cases in children under 10 years old. Complications can occur in 8% of primary infection cases in immunocompetent individuals [2], generally in children in regions where vaccination is not common [3]. The structure of VZV is now well established. Like other herpesviruses, it is a double-stranded DNA virus with a genome of approximately 125,000 base pairs [4]. It was long thot that its genome included 68 open reading frames (ORFs), including three repeats. However, a recent genome-wide transcriptomic study suggests that there may actually be more than 68 ORFs. Moreover, the presence of transcription and the coding potential of an ORF are not equivalent. A biological specificity of VZV is its close association with cells in vitro, which complicates the production of viruses without cells cultivated at high concentration, and it only reproduces within human cells [5].

Chickenpox manifests as a pruritic vesicular rash that primarily appears on the trunk, head, and face. The extremities are somewhat spared; the skin vesicles contain a well-structured and infectious virus that, once airborne, allows the transmission of VZV to those who have not yet contracted the disease. The accompanying symptoms include malaise, fever, and fatigue, and the illness generally lasts about a week. Complications include a bacterial superinfection of the skin, encephalitis, and pneumonia. Adults and immunocompromised patients are more likely to suffer from severe infections than healthy children [3, 6,7,8]. Ocular manifestations during primary infection remain very rare.

VZV infection is generally diagnosed clinically by observing the appearance of the rash. In cases where the situation is confusing or unusual, the diagnosis can be established by identifying VZV DNA in the skin lesions using PCR. The culture of VZV from skin lesions can also be used, but it is more expensive, takes more time, is less accessible, and has lower sensitivity compared to PCR. In the case of patients suspected of meningitis or encephalitis, as well as other complications due to VZV, viral DNA can be detectable in the cerebrospinal fluid and/or saliva [7,8].

Although the oral version of the antiviral acyclovir is available, regular treatment of chickenpox in otherwise healthy children is not systematically recommended. Otherwise, healthy adults and immunocompromised patients who contract chickenpox should be treated. It appears to be in development, severe chickenpox should be treated with intravenous acyclovir. To achieve the best results, it is advisable to administer antivirals as early as possible to immunocompromised individuals and anyone who appears to be developing severe chickenpox [3, 7, 8].

In theory, the prodrug of acyclovir, valacyclovir, has the potential to be as effective, if not more effective than acyclovir, in the treatment of herpes zoster ophthalmicus, with a simplified dosing regimen of three times a day. Valaciclovir is rapidly converted into acyclovir and allows for a bioavailability of acyclovir that is three to five times higher than that of oral acyclovir. After a single dose of 200 mg or 800 mg of acyclovir orally, the bioavailability is respectively 20% and 12%. After a single dose of 1000 mg of valaciclovir orally, the average absolute bioavailability of acyclovir is 54.2%. The plasma exposure to acyclovir obtained after oral administration of valaciclovir is comparable to that obtained with doses of acyclovir administered intravenously. Consequently, the intraocular concentration of acyclovir in the aqueous humor is twice as high after the administration of valaciclovir compared to the administration of acyclovir [9, 10, 11].

Vaccination represents a major advancement in the prevention of herpes zoster and HZO. The recombinant vaccine against shingles has proven its effectiveness of over 90% in preventing shingles and its complications, including in elderly individuals. However, the use of the vaccine is still insufficient in several regions due to the price, access barriers, and lack of awareness [12].

4. Conclusion

Retinitis complicating a primary VZV infection in an immunocompetent child remains an exceptional entity. This case highlights the need for ophthalmological vigilance in the event of any decrease in visual acuity occurring after chickenpox, even in the absence of immunological risk factors. The diagnosis is based on clinical examination and multimodal imaging, while early antiviral treatment, possibly combined with appropriate corticosteroid therapy, allows for a favorable outcome and limits functional sequelae. A better understanding of these atypical forms could help improve screening and visual prognosis for the affected patients.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

The authors declare that they have no conflict of interest related to this article.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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