Scholars Journal of Medical Case Reports
Abbreviated Key Title: Sch J Med Case Rep
ISSN 2347-9507 (Print) | ISSN 2347-6559 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Ophthalmology Service

Ocular Surface at Risk: Exploring Corneal and Conjunctival Manifestations in Pediatric Measles

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DOI: https://doi.org/10.36347/sjmcr.2026.v14i06.001 | **Received:** 10.04.2026 | **Accepted:** 21.05.2026 | **Published:** 03.06.2026

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Abstract | **Case Report**

Measles is a highly contagious viral disease that can cause significant ocular complications, particularly in children from developing countries. We report 32 pediatric cases referred for ophthalmological evaluation after hospitalization for pulmonary complications of measles. All patients presented bilateral conjunctivitis, while 21 cases showed superficial punctate keratitis limited to the corneal epithelium without stromal or endothelial involvement. Tear film abnormalities and dry eye signs were also observed. Treatment with lubricants, tobramycin eye drops, and vitamin A ointment resulted in complete healing within seven days without sequelae. Although ocular manifestations of measles are usually mild and reversible, vitamin A deficiency, malnutrition, immunosuppression, and incomplete vaccination may lead to severe corneal damage and blindness. Early diagnosis, symptomatic treatment, and effective vaccination remain essential to prevent visual complications.

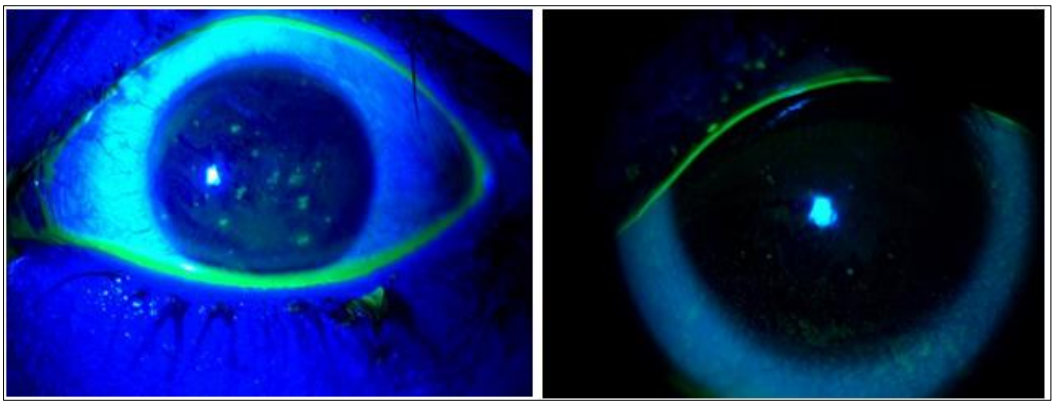
Keywords: Measles; Pediatric, epithelial lesions.

INTRODUCTION

Measles is a highly contagious acute viral infection predominantly affecting children. The virus responsible for this infection is classified within the genus *Morbillivirus* of the family *Paramyxoviridae*. During the eruptive phase, measles manifests as non-pruritic maculopapular lesions. While infrequent, the infection can result in severe ocular complications. Measles vaccination is incorporated into the national immunization schedule of numerous countries, including Morocco.

CASE REPORT

We present a case series of 32 children, aged 2 months to 13 years, who were diagnosed and treated in the pediatric department for pulmonary complications associated with measles. They were subsequently referred to our service for an ophthalmological evaluation to identify any potential ocular complications. Ocular involvement was bilateral in all patients and affected two sites: the conjunctiva, which exhibited hyperemic conjunctivitis in all children, and the cornea. Twenty-one of our patients presented with purely epithelial corneal involvement, with sparing of the stroma and endothelium. This involvement manifested as bilateral superficial punctate keratitis (SPK) (Figures 1, 2, 3). The tear break-up time (BUT) was less than 5 seconds in 10 children and between 5 and 10 seconds in 8 patients. The Schirmer test results were less than 5 mm in 7 patients and between 5 and 10 mm in 9 cases. All patients received treatment that included lubricating agents, an antibiotic eye drop formulation containing tobramycin, and a vitamin A ointment. After 7 days of treatment, the corneal lesions resolved without sequelae.



Figures 1 and 2: **Slit-lamp photograph of the cornea after fluorescein instillation showing partial fluorescein staining of the epithelial lesions, consistent with superficial punctate keratitis**

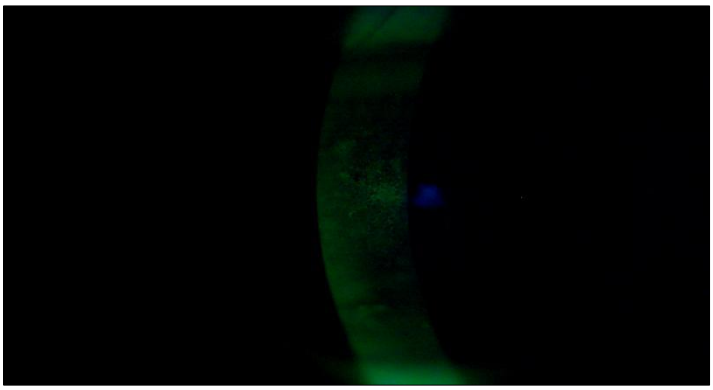


Figure 3: **Slit-lamp photograph after fluorescein instillation showing staining of the central epithelial lesions.**

Figures 4 and 5: **Photograph of the lower eyelid showing blepharitis and meibomitis**

DISCUSSION

Ophthalmologically, measles can result in various manifestations, the most prevalent being conjunctivitis. This condition typically affects over half of the patients and may precede the characteristic exanthem of the disease, often resolving concomitantly with the resolution of the infection. Conjunctivitis may be associated with subconjunctival hemorrhage, particularly localized in the superonasal quadrants [2].

Corneal involvement in measles is quite common and can be severe. Its prevalence is particularly significant in developing countries, exacerbated by a deficiency in vitamin A. During the acute phase of the disease, it manifests as a sensation of sand in the eyes, ocular burning, photophobia, tearing, and sometimes ocular pain. Despite these symptoms, visual acuity is generally normal or only slightly reduced [3].

Measles causes a significant decrease in plasma levels of vitamin A and albumin, which persists even after the acute phase of the disease. In the cornea, vitamin A is essential for several reactions, and its disruption may be linked to corneal ulceration. First, it is necessary for the incorporation of sulfate into complex polysaccharides, which are crucial for corneal integrity, the wettability of the conjunctival-corneal epithelium, and the proper functioning of the lacrimal ducts. Second,

vitamin A plays a role in the glycosyl transfer reaction during the synthesis of glycoproteins, such as lysozyme found in tears, and other glycoproteins essential for cell-mediated immunity [6].

Corneal lesions observed in measles often include filamentary keratitis or small superficial epithelial ulcers. These may not stain or may only stain with rose bengal, or become visible after the instillation of fluorescein. The lesions can be singular or multiple, sometimes confluent, and may take various forms such as circular, horseshoe-shaped, or multi-angled, with a predominantly central or interpalpebral location, between the eyelids [2-8].

Superficial corneal ulcers can also develop in the perilimbal region, often resulting from the confluence of micro-epithelial ulcerations. These ulcers can deepen and lead to debilitating corneal scarring or even corneal perforations, especially in cases of xerophthalmia caused by vitamin A deficiency. Bacterial superinfection may also occur in the context of measles-related corneal lesions, necessitating specific antibiotic treatment to manage the infection [4-10].

Moreover, all of our patients exhibited purely epithelial corneal involvement, with no damage to the corneal stroma or endothelium. Blepharitis and meibomian gland dysfunction (meibomitis) are infrequent manifestations and are not typically described in the literature during measles. However, their presence could contribute to worsening alterations of the ocular surface.

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In the posterior segment of the eye, measles can cause measles-associated retinopathy and optic neuritis, potentially leading to temporary or permanent vision loss [11].

Anterior ocular involvement in measles generally progresses favorably towards recovery without sequelae under symptomatic treatment. In our patients, complete restoration of the ocular surface was observed concurrently with the regression of the skin rash. The ophthalmological manifestations described are often mild and can be managed with symptomatic treatment. However, incomplete or absent vaccination, immunosuppression, as well as malnutrition due to vitamin A or protein deficiency, are factors that can lead to severe forms of measles with serious ocular involvement, potentially resulting in corneal perforation and blindness [12].

CONCLUSION

Ophthalmological manifestations of measles, primarily conjunctival and corneal, can lead to serious complications, including blindness, particularly in developing countries where vaccination programs are less well established or frequently disrupted. Treatment is generally symptomatic, and the condition usually progresses towards complete recovery without sequelae.

The authors declare that they have no link of interest concerning this article.

The authors declare that they obtained a written informed consent from the patients and/or volunteers included in the article and that this report does not contain any personal information that could lead to their identification.

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