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Severe Rosacea Complicated by Sterile Abcess of the Cornea

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Abstract | **Case Report**

Ocular rosacea is a chronic inflammatory disease that may lead to severe corneal complications. We report a 15-year-old girl with cutaneous rosacea presenting with bilateral blepharitis and peripheral sterile corneal infiltrates mimicking infectious keratitis. Ophthalmic examination showed meibomian gland dysfunction, superficial punctate keratitis, peripheral sterile corneal abscess and preserved visual acuity. Treatment combining eyelid hygiene, topical azithromycin, tapering corticosteroids, lubricants, and systemic doxycycline led to rapid clinical improvement. Early recognition and prompt anti-inflammatory management are essential to prevent vision-threatening corneal damage.

Keywords: Ocular rosacea; sterile corneal abscess; marginal keratitis; blepharitis; meibomian gland dysfunction.

INTRODUCTION

Ocular rosacea is a chronic inflammatory condition frequently associated with cutaneous rosacea and characterized by eyelid margin disease, meibomian gland dysfunction, tear film instability, and chronic ocular surface inflammation. Although often underdiagnosed, ocular rosacea can lead to significant morbidity, particularly when corneal involvement occurs. Corneal manifestations range from superficial punctate keratitis and peripheral infiltrates to more severe complications such as sterile corneal ulcers, abscesses, thinning, and, in advanced cases, perforation.

Sterile corneal abscesses represent a rare but sight-threatening complication of severe ocular rosacea. They are thought to result from immune-mediated inflammatory responses triggered by chronic eyelid inflammation, altered tear film composition, and bacterial antigens rather than direct microbial infection. The clinical presentation may closely mimic infectious keratitis, posing a diagnostic challenge and potentially delaying appropriate anti-inflammatory treatment.

CLINICAL CASE

We report the case of a 15-year-old girl who has been receiving dermatological treatment for rosacea for two years with doxycycline. She was admitted to ophthalmology for eye redness associated with photophobia and intense itching in both eyes for two weeks.

The ophthalmological examination revealed anterior and posterior blepharitis with meibomitis in both eyes, more pronounced on the right. Multiple thick crusts stuck to the eyelashes affected the free edge of the upper and lower eyelids of both eyes (**Figure 1**)

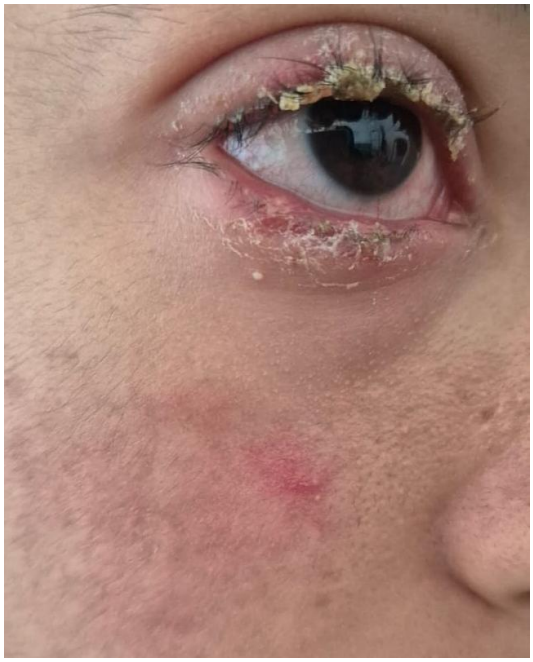

Figure 1: Image showing papulopustular rosacea associated with ocular involvement

Visual acuity was preserved.

The cornea showed round, whitish peripheral stromal infiltrates, with no inflammatory reaction in the anterior chamber, and superficial punctate keratitis after fluorescein instillation, indicating the presence of dry eye (**Image 2**).

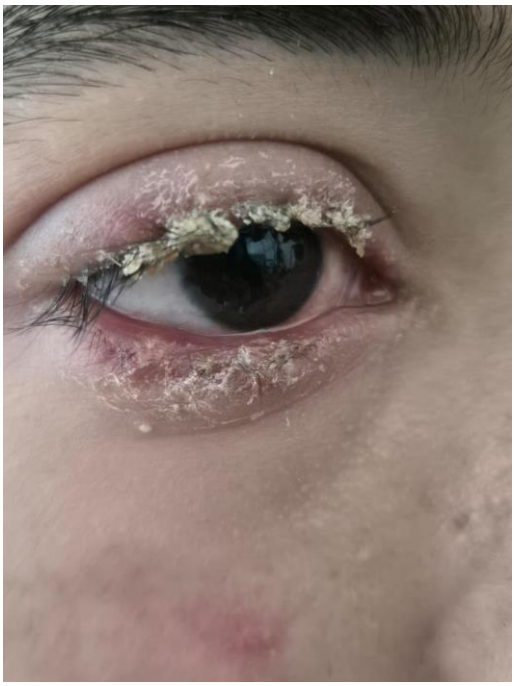

Figure 2 : Image showing blepharitis with multiple thick crusts on the free edge of the superior and inferior eyelids

The fundus examination was normal in both eyes.
Intraocular pressure was normal (15 mmHg) in both eyes.
The general examination revealed papulopustular rosacea, mainly affecting the face (Image **3**).

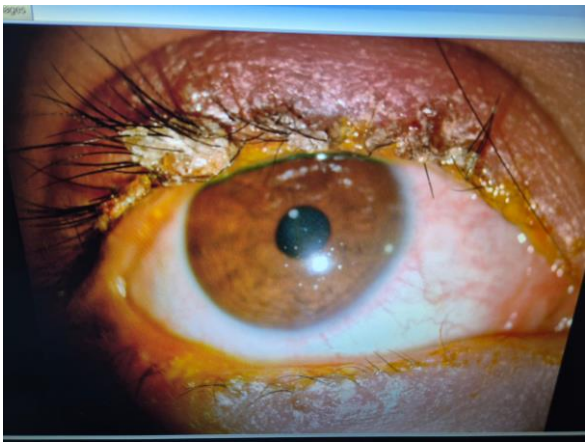

Figure 3 : image showing corneal involvement of rosacea with multiple sterile marginal infiltrates

A diagnosis of ocular rosacea with a sterile corneal abscess was made. The patient was made aware of the importance of daily eyelid hygiene: gentle eyelid massage with cleaning of the free edges using warm compresses for 5 to 10 minutes twice a day. The patient was placed on topical antibiotic treatment with azithromycin (twice a day) associated with decreasing doses topical corticosteroids lubricating eye drops (four times a day) and a topical vitamin A healing eye drop in the evening, with continued oral antibiotic treatment with doxycycline.

After one week, the blepharitis had regressed, with the crusts on the free edges disappearing, the peripheral sterile corneal infiltrates regressing and the superficial punctate keratitis healing.

DISCUSSION

Ocular rosacea represents a chronic inflammatory disease of the ocular surface that is often overlooked and may manifest before the appearance of cutaneous signs. Clinical severity varies widely, ranging

from uncomplicated eyelid inflammation and meibomian gland dysfunction to severe corneal involvement with a risk of permanent visual impairment. The case presented here illustrates an uncommon and severe corneal complication of ocular rosacea, namely a sterile marginal corneal abscess, and underscores the diagnostic complexity and therapeutic challenges associated with this entity.

The pathophysiology of sterile marginal corneal abscesses in ocular rosacea is thought to be predominantly immune-driven rather than infectious in origin. Persistent lid margin inflammation, qualitative changes in meibomian gland secretions, and increased exposure to bacterial antigens may provoke a hypersensitivity response in the peripheral cornea. This inflammatory process is further mediated by increased activity of matrix metalloproteinases, particularly MMP-8 and MMP-9, which play a key role in stromal degradation, corneal thinning, and, in advanced cases, perforation. Such mechanisms may account for the rapid clinical deterioration observed in the absence of microbiological evidence of infection.

From a clinical standpoint, sterile marginal corneal abscesses can closely resemble infectious keratitis, as they may present with focal stromal infiltrates, epithelial breakdown, and localized inflammation. Nevertheless, certain features—including peripheral localization, relatively mild symptoms, minimal anterior chamber reaction, and a lack of response to antimicrobial therapy alone—may suggest a noninfectious inflammatory process. Failure to recognize this distinction and delays in initiating anti-inflammatory treatment, particularly topical corticosteroids, may result in progressive corneal damage. This case highlights the importance of early diagnostic clarification in patients with known or suspected ocular rosacea.

The management of severe ocular rosacea is inherently multifaceted and requires a stepwise therapeutic strategy. Fundamental measures include meticulous lid hygiene and optimization of the tear film. Systemic tetracyclines, especially doxycycline, remain a cornerstone of treatment owing to their anti-inflammatory effects, including suppression of MMP activity and modulation of inflammatory mediators. When corneal involvement is present, judicious use of topical corticosteroids is often required to control inflammation, preferably in conjunction with antimicrobial coverage. In cases of persistent or refractory inflammation, topical immunomodulatory agents such as cyclosporine or tacrolimus may be considered. Despite optimal medical therapy, progressive corneal complications may still occur, necessitating surgical intervention.

In summary, ocular rosacea should be systematically considered in the differential diagnosis of peripheral corneal infiltrates and sterile abscesses, particularly in patients with chronic blepharitis or meibomian gland dysfunction. Early recognition, accurate differentiation from infectious keratitis, and prompte initiation of appropriate anti-inflammatory treatment are essential to prevent potentially devastating visual outcomes.

CONCLUSION

Severe ocular rosacea can result in rare but vision-threatening corneal complications, including sterile marginal corneal abscesses that may closely mimic infectious keratitis. Early recognition of this entity and accurate differentiation from microbial keratitis are crucial, as delayed or inappropriate management may lead to rapid corneal thinning and perforation. Prompte initiation of anti-inflammatory therapy, alongside systemic treatment and meticulous follow-up, is essential to preserve corneal integrity and visual outcomes.

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