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When Infection Meets Inflammation: Diagnostic Pitfall and Strategic Corticosteroid Timing in a Corneal Abscess Complicated by Catarrhal Infiltrate in Ocular Rosacea

ABSTRACT :

Background:

Bacterial corneal abscess is a vision-threatening emergency requiring prompt management. Ocular rosacea is a chronic inflammatory condition often associated with meibomian gland dysfunction and sterile peripheral corneal infiltrates. The coexistence of infectious and inflammatory mechanisms represents a major therapeutic challenge, particularly regarding the timing of corticosteroid introduction.

Case presentation:

5 We report the case of a 31-year-old patient presenting with a central corneal abscess associated with ocular rosacea. Initial management with intensive topical antibiotics led to clinical improvement. However, a secondary peripheral infiltrate with corneal neovascularization appeared despite infection control. Careful examination of eyelid margins revealed underlying rosacea with severe 1 blepharitis and meibomian gland dysfunction, supporting the diagnosis of a sterile catarrhal infiltrate.

Management and outcome:

After confirmation of infection control, targeted treatment of blepharitis was initiated, followed by cautious introduction of topical corticosteroids. This resulted in rapid resolution of the inflammatory infiltrate and significant clinical improvement.

Conclusion:

This case highlights a diagnostic pitfall between persistent infection and secondary

inflammatory infiltrate in ocular rosacea. Careful clinical evaluation, particularly of adnexal structures, and appropriate timing of corticosteroid therapy are crucial to optimize visual outcomes.

Keywords:
Corneal abscess; Ocular rosacea; Catarrhal infiltrate; Corticosteroids; Diagnostic challenge

Introduction

Bacterial corneal abscess is a sight-threatening condition requiring urgent and appropriate antimicrobial therapy. Delay or mismanagement may result in irreversible visual loss. Ocular [1] rosacea is a chronic inflammatory disorder frequently associated with meibomian gland dysfunction, tear film instability, and sterile peripheral corneal infiltrates known as catarrhal infiltrates.

The coexistence of an active infectious process and an immune-mediated inflammatory reaction represents a major diagnostic and therapeutic dilemma. The introduction of corticosteroids in such cases must be carefully timed, as premature use may exacerbate infection, while delayed use may worsen inflammatory damage.

We report a challenging case illustrating this dual mechanism and the importance of clinical reasoning in guiding management.

Case Report

A 31-year-old patient presented with decreased visual acuity in the right eye. Best-corrected visual acuity was counting fingers at 2 meters in the right eye and 10/10 in the left eye. Intraocular pressure was normal bilaterally.

Slit-lamp examination of the right eye revealed a central oval corneal abscess measuring approximately 3.5 × 2.5 mm, associated with a significant epithelial defect and surrounding stromal edema. No stromal thinning or descemetocele was observed. The left eye was normal.

Corneal OCT demonstrated anterior stromal hyperreflectivity without significant thinning or deep cavitation, suggesting preserved structural integrity. B-scan ultrasonography was normal.

Examination of adnexal structures revealed severe blepharitis with meibomian gland dysfunction and telangiectasia, associated with active cutaneous rosacea.

Corneal scraping did not identify a specific pathogen, likely due to prior self-medication with antibiotic-steroid eye drops.

Initial Management and Evolution

The patient was treated with intensive topical fortified antibiotics, antiseptic agents, and lubricants.

During the first 10 days, clinical evolution was favorable, with progressive reduction of the epithelial defect, decreased stromal edema, and stabilization of the lesion, consistent with infection control.

Secondary Clinical Worsening

Between day 10 and day 12, a new peripheral corneal infiltrate appeared, characterized by

a small, well-defined whitish lesion associated with superficial corneal neovascularization. Importantly, the central abscess remained stable without signs of worsening.

This raised a critical differential diagnosis:

- Persistent or recurrent infection
- Secondary inflammatory infiltrate

A detailed examination of eyelid margins revealed signs of ocular rosacea, supporting the diagnosis of a sterile catarrhal infiltrate.

Discussion

This case illustrates the diagnostic challenge of distinguishing between persistent infection and secondary immune-mediated inflammation.

Ocular rosacea [1] leads to chronic inflammation through several mechanisms:

- Meibomian gland dysfunction
- Tear film instability
- Increased metalloproteinase activity
- Release of pro-inflammatory cytokines

These processes promote the development of sterile peripheral infiltrates and corneal neovascularization.

Key distinguishing features include:

- Central location and epithelial defect in infectious keratitis
- Peripheral location and absence of epithelial defect in catarrhal infiltrates
- Poor response to antibiotics but rapid response to corticosteroids in inflammatory lesions

The main therapeutic challenge lies in determining the appropriate timing for corticosteroid introduction. While corticosteroids are contraindicated in active infection, they play a crucial role in controlling secondary inflammation once infection is adequately treated.

Therapeutic Strategy

Management included:

 Treatment of blepharitis with eyelid hygiene and topical azithromycin

 Oral doxycycline to reduce inflammation and metalloproteinase activity

 Careful introduction of topical corticosteroids after confirmation of infection control

This approach resulted in rapid resolution of the peripheral infiltrate, regression of neovascularization, and near-complete corneal healing.

Conclusion

This case highlights a major diagnostic pitfall in corneal pathology, where infectious and inflammatory mechanisms coexist.

A sequential therapeutic approach, combining strict infection control and targeted anti-inflammatory treatment, is essential.

Careful examination of adnexal structures and appropriate timing of corticosteroid therapy are key determinants of visual prognosis.

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