

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

4
5
6 **ABSTRACT :**

7
8 **Background:**

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

14
15 **Case presentation:**

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

22
23 **Management and outcome:**

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

27
28 **Conclusion:**

29 This case highlights a diagnostic pitfall between persistent infection and secondary
30 inflammatory infiltrate in ocular rosacea. Careful clinical evaluation, particularly of adnexal
31 structures, and appropriate timing of corticosteroid therapy are crucial to optimize visual
32 outcomes.

33
34 **Keywords:**

35 Corneal abscess; Ocular rosacea; Catarrhal infiltrate; Corticosteroids; Diagnostic challenge
36
37
38
39
40
41
42
43
44
45
46
47

48 **Introduction**

49 Bacterial corneal abscess is a sight-threatening condition requiring urgent and appropriate
50 antimicrobial therapy. Delay or mismanagement may result in irreversible visual loss.

51 Ocular rosacea is a chronic inflammatory disorder frequently associated with meibomian
52 gland dysfunction, tear film instability, and sterile peripheral corneal infiltrates known as
53 catarrhal infiltrates.

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

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

60

61 **Case Report**

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

64 Intraocular pressure was normal bilaterally.

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

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

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

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

76

77 **Initial Management and Evolution**

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

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

83

84 **Secondary Clinical Worsening**

85 Between day 10 and day 12, a new peripheral corneal infiltrate appeared, characterized by a
86 small, well-defined whitish lesion associated with superficial corneal neovascularization.

87 Importantly, the central abscess remained stable without signs of worsening.

88 This raised a critical differential diagnosis:

- 89
- 90 • Persistent or recurrent infection
 - 91 • Secondary inflammatory infiltrate

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

94

95 **Discussion**

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

98 Ocular rosacea leads to chronic inflammation through several mechanisms:

- 99 • Meibomian gland dysfunction
- 100 • Tear film instability
- 101 • Increased metalloproteinase activity
- 102 • Release of pro-inflammatory cytokines

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

105 Key distinguishing features include:

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

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

113
114 **Therapeutic Strategy**

115 Management included:

- 116 • Treatment of blepharitis with eyelid hygiene and topical azithromycin
- 117 • Oral doxycycline to reduce inflammation and metalloproteinase activity
- 118 • Careful introduction of topical corticosteroids after confirmation of infection control

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

121
122 **Conclusion**

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

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

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

129
130 **References**

- 131 1. Kanski JJ, Bowling B. *Clinical Ophthalmology: A Systematic Approach*. 8th ed. Elsevier;
132 2016.
- 133 2. Jones DB. Decision-making in the management of microbial keratitis. *Ophthalmology*.
134 1981;88(8):814–820.
- 135 3. Ting DSJ, Ho CS, Deshmukh R, Said DG, Dua HS. Infectious keratitis: an update on
136 epidemiology, causative microorganisms, risk factors, and antimicrobial resistance.
137 *Eye (Lond)*. 2021;35(4):1084–1101.
- 138 4. Watson S, Cabrera-Aguas M, Khoo P. Common eye infections. *Aust Prescr*.
139 2018;41(3):67–72.
- 140 5. Pflugfelder SC, Karpecki PM, Perez VL. Treatment of blepharitis: recent clinical trials.
141 *Ophthalmology*. 2014;121(6):S25–S32.

- 142 6. Akpek EK, Merchant A, Pinar V, Foster CS. Ocular rosacea: patient characteristics and
143 follow-up. *Ophthalmology*. 1997;104(11):1863–1867.
- 144 7. Vieira AC, Mannis MJ. Ocular rosacea: common and commonly missed. *J Am*
145 *AcadDermatol*. 2013;69(6):S36–S41.
- 146 8. Dart JK. Predisposing factors in microbial keratitis: the significance of contact lens
147 wear. *Br J Ophthalmol*. 1988;72(12):926–930.
- 148 9. Wilhelmus KR. Therapeutic review of corticosteroids in infectious keratitis. *Cornea*.
149 2002;21(7):645–650.
- 150 10. Srinivasan M, Mascarenhas J, Rajaraman R, et al. Corticosteroids for bacterial
151 keratitis: the Steroids for Corneal Ulcers Trial (SCUT). *Arch Ophthalmol*.
152 2012;130(2):143–150.
153

UNDER PEER REVIEW IN IJAR