

# Keratitis with double hypopyon to illustrate differences between corneal ulcer and corneal abscess: a photo essay

Noel Hong-Kei Wat, MbChB, MRCS(Ed); Gillian Denise Ji-Yee Siu, MBChB, MRCS(Ed), FCOphth(HK), FHKAM(Ophthalmology); Amy Lee Wong, MBBS, MRCS(Ed), MMed(Ophth Singapore), MSc OVS(CUHK), FCOphth(HK), FHKAM(Ophthalmology)  
Department of Ophthalmology, Caritas Medical Centre, Hong Kong

## Correspondence and reprint requests:

Dr Gillian DJY Siu, Department of Ophthalmology, Caritas Medical Centre, Hong Kong. Email: [sjy638@ha.org.hk](mailto:sjy638@ha.org.hk)

## Abstract

We report a case of keratitis with double hypopyon in a 70-year-old man to illustrate differences between corneal ulcer and corneal abscess.

**Key words:** Abscess; Corneal ulcer; Keratitis; *Pseudomonas aeruginosa*

## Case presentation

In September 2020, a 70-year-old man presented with right eye keratitis 3 days after a metallic foreign body injury. He had a history of bilateral cataract surgery. At presentation, his best-corrected visual acuity was light perception. Slit lamp examination showed a central ulcer with 20% thinning involving the central 70% of the cornea, with a 1-mm intrastromal hypopyon and a 1.5-mm anterior chamber hypopyon (**Figure 1**). Ultrasonography showed mild anterior vitreous condensation. Computed tomography of the orbit did not show any intraorbital foreign body. Anterior segment ocular coherence tomography demonstrated a cystic space with a thin posterior wall containing the intrastromal abscess collection (**Figure 2**). Corneal scraping yielded *Pseudomonas aeruginosa*, which was sensitive to ceftazidime, ciprofloxacin, gentamicin, levofloxacin, Sulperazon, and Tazocin. The patient was initially treated

with topical 1.4% gentamicin and 5% vancomycin as well as oral 500 mg ciprofloxacin daily for 1 week. The regimen was tapered to topical 0.5% levofloxacin after culture and sensitivity results were available. At the 3-month follow-up, the corneal ulcer healed with a thinned scar, and his best-corrected visual acuity improved to 1/60.

## Discussion

Double hypopyon in keratitis is a good illustration to differentiate corneal ulcer from corneal abscess. Corneal ulcer is a lesion with superficial loss of tissue secondary to infectious or non-infectious causes, whereas corneal abscess is a collection of pus within a tissue space.<sup>1</sup> With the help of slit beam examination and anterior segment ocular coherence tomography, corneal abscess should only be called if there is an intrastromal collection of pus or hypopyon. In our patient, pus in the intrastromal cavity gave rise to the second hypopyon in the anterior chamber.

Corneal ulcer and corneal abscess are often used interchangeably in the literature.<sup>2-6</sup> Chhabra et al<sup>7</sup> described a case of postoperative keratitis as a corneal abscess although anterior segment ocular coherence tomography did not show a discrete lesion within the cornea. Infective corneal lesions were termed corneal abscesses even when there was no evidence of collection of infective material within the cornea.<sup>8-10</sup> Rubino et al<sup>5</sup> described a case of toxic keratopathy as corneal abscess when corneal ulcer may have been a more accurate term.<sup>5</sup> There is a misconception that

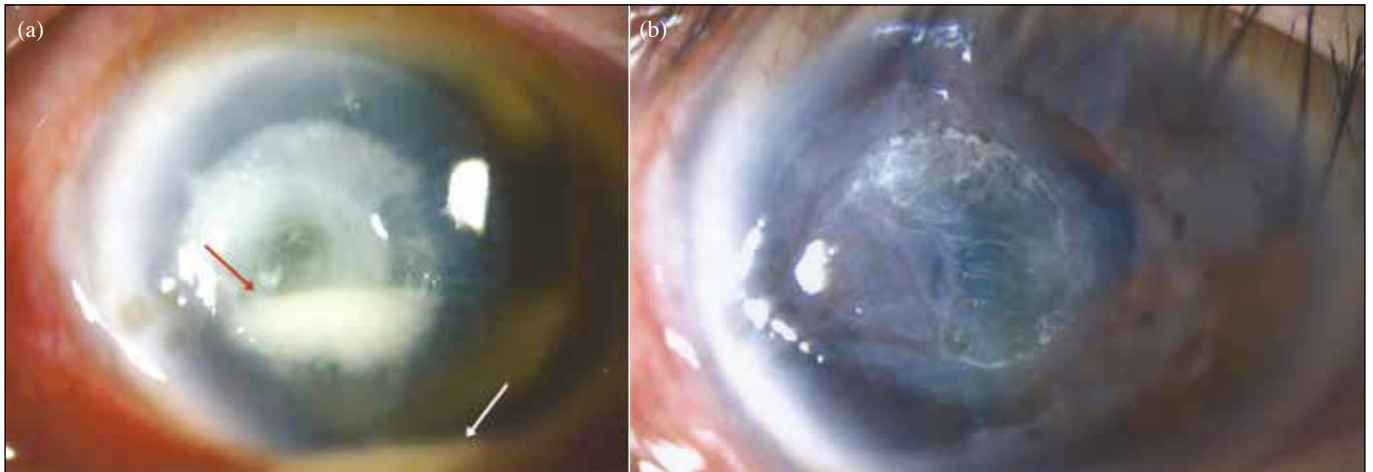


Figure 1. Slit lamp examination showing (a) a 1-mm intrastromal hypopyon in the central cornea (red arrow) and a 1.5-mm hypopyon in the anterior chamber (white arrow) and (b) a thinned corneal scar at 1 month after healing.

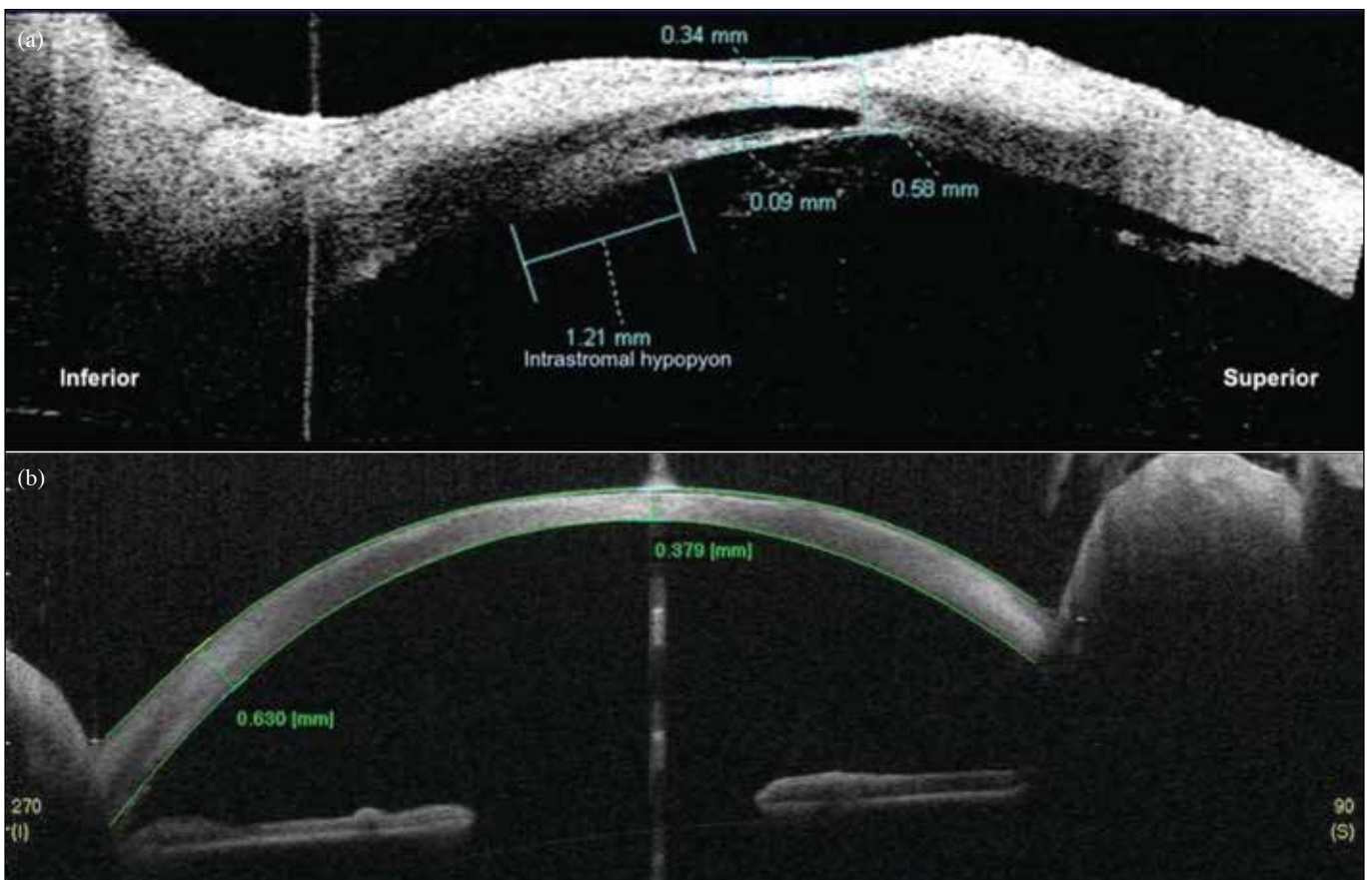


Figure 2. Anterior segment ocular coherence tomography of the cornea in a vertical cut showing (a) the corneal abscess with a 1.21-mm intrastromal hypopyon. An empty pocket in the center of the cornea indicates a bulla in the deep stromal area. Inferior to the bullae is an area of higher density signal correlating to the hypopyon filling up the inferior part of the bulla. (b) A thinned cornea with scarring at 22 months.

a corneal abscess is equivalent to a more severe corneal ulcer.<sup>11</sup> The term ‘corneal abscess’ has not been properly defined. Thus, there is no evidence that corneal abscess takes longer to recover than corneal ulcer. Corneal abscess is a rare form of corneal ulcer but not equivalent to corneal

ulcer and therefore should not be used interchangeably.

Although management of corneal abscess and ulcer is similar and requires intensive fortified antibiotic treatment, a corneal abscess does not necessarily imply

longer treatment duration. However, there may be further implications for a corneal ulcer in the form of an abscess. The corneal abscess involves thinned corneal walls around infective material and therefore has a risk of rupture. If the abscess wall ruptures into the anterior chamber, a sudden flare in anterior chamber activity and hypopyon may occur. This increases the risk of keratitis-induced endophthalmitis, as infective material is released into the anterior chamber from the cornea. Ironically, the cornea may even recover faster after the infective material is removed. However, the thin-walled abscess may rupture anteriorly causing corneal perforation.<sup>12</sup> Therefore, correct differentiation between corneal abscess and corneal ulcer is important.

## Contributors

GDJYS and NHKW designed the study, acquired the data, and analyzed the data. All authors drafted the manuscript and critically revised the manuscript for important intellectual content. All authors had full access to the data, contributed to the study, approved the final version for publication, and take responsibility for its accuracy and integrity.

## Conflicts of interest

All authors have disclosed no conflicts of interest.

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## Data availability

All data generated or analyzed during the present study are available from the corresponding author on reasonable request.

## Ethics approval

The patient was treated in accordance with the tenets of the Declaration of Helsinki. The patient provided written informed consent for all treatments and procedures and for publication.

## References

1. Mannis M, Mannis M, Holland E. *Cornea*. 4th ed. Elsevier; 2017: 241-5.
2. Barsam A, Patel N, Laganowski HC, Perry HD. Recurrent corneal ulceration in presence of synthetic microfibrils. *Clin Ophthalmol* 2011;5:837-9. [Crossref](#)
3. Cuadros J, Gros-Otero J, Gallego-Angui P, et al. Aspergillus tamarii keratitis in a contact lens wearer. *Med Mycol Case Rep* 2017;19:21-4. [Crossref](#)
4. Li YC, Zeldovich A, Chua BJ, Rowe NJ, Martin FJ, McClellan KA. Hazardous contact: a case of visual loss following Pseudomonas keratitis from novelty contact lens wear. *Med J Aust* 2006;185:173-4. [Crossref](#)
5. Rubino P, Orsoni JG, Rampini A, Mora P. Over-treated corneal abscess may be toxic keratopathy. *Case Rep Ophthalmol* 2010;1:20-3. [Crossref](#)
6. Zloto O, Barequet IS, Weissman A, Ezra Nimni O, Berger Y, Avni-Zauberman N. Does PACK-CXL change the prognosis of resistant infectious keratitis? *J Refract Surg* 2018;34:559-63. [Crossref](#)
7. Chhabra M, Goel R, Khanam S, Singh S. Role of intrastromal vancomycin in recalcitrant corneal abscess after phacoemulsification. *BMJ Case Rep* 2021;14:e241709. [Crossref](#)
8. Gupta B, Jain AK, Saini M, Sardana M, Soni R, Angrup A. Globicatella sanguinis corneal abscess with endophthalmitis. *J AAPOS* 2022;26:46-8. [Crossref](#)
9. Dorin J, Debourgogne A, Zaïdi M, Bazard MC, Machouart M. First unusual case of keratitis in Europe due to the rare fungus Metarhizium anisopliae. *Int J Med Microbiol* 2015;305:408-12. [Crossref](#)
10. Morley AM, Tuft SJ. Rothia dentocariosa isolated from a corneal ulcer. *Cornea* 2006;25:1128-9. [Crossref](#)
11. Borderie VM, Bourcier TM, Poirrot JL, Baudrimont M, Prudhomme de Saint-Maur P, Laroche L. Endophthalmitis after Lasiodiplodia theobromae corneal abscess. *Graefes Arch Clin Exp Ophthalmol* 1997;235:259-61. [Crossref](#)
12. Hassan A, Rampat R, Vasquez-Perez A. Severe keratitis and corneal perforation by Paenibacillus glucanolyticus. *Cornea* 2021;40:1062-4. [Crossref](#)