• Letter to the Editor •

Corneal ulcer possibly caused by the opportunistic pathogen *Schizophyllum commune*

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Dear Editor,

I am Dr. Xian-Ning Liu, from the Institute of Ophthalmology of Xi'an First Hospital in Xi'an, Shaanxi Province, China. I write to present a case report of corneal ulcer caused by *Schizophyllum commune* (*S. commune*). Mycotic keratitis is one of the most severe causes of corneal blindness in developing countries, such as China and India[1-2]. In general, *Fusarium* and *Aspergillus* comprise majority of the mycotic pathogens related to corneal trauma, whereas *Candida* is more often related to reduced immune function in the body[3]. However, an increasing number of various rare filamentous fungi causing mycotic keratitis has been reported worldwide in recent years[4-6]. Here, we reported a case of a corneal ulcer caused by *S. commune*. To our knowledge, it is the second case in the world and the first one in China, but their pathogeneses may be different[7]. We obtained informed consent from the patient for his images and clinical information to be reported. This report conformed to the principle of the Declaration of Helsinki.

A 56-year-old man presented to our Ophthalmic Outpatient Department with the complaint of grinding and blurred vision accompanied by impaired vision in the right eye for 3d; no treatment was initiated. He had a history of viral keratitis and was receiving treatment of antiviral eyedrops and glucocorticoids in the right eye. His left eye underwent lamellar keratoplasty 5mo prior and pterygium excision 3mo prior. He was later hospitalized with the diagnosis of "a corneal ulcer in the right eye". The results of a physical examination were as follows: intraocular pressure was 8 mm Hg, edema and an irregular ulcer were observed in the upper cornea, surface necrotic tissue was attached on the ocular surface, central corneal stroma was scattered within white grainy material, and new blood vessels grew into the upper margin of the cornea (Figure 1A). The images of corneal confocal microscopy revealed fungal hyphae and inflammatory cells in the corneal stroma at the site of the ulcer (Figure 1B). Moreover, the lesion corneal tissue was detected by scraping, and fungal hyphae and inflammatory cells were observed under a microscope on a Gram-stained slide (Figure 1C). Another copy of the tissue scraping was cultured on Sabouraud dextrose agar and incubated at 28℃. Tiny colonies were observed two days later. On the seventh day, white floccose colonies with concentric ringed areas had formed on the plate. Yellowish liquid droplet exudate appeared on the surface of the colony (Figure 1D). The reverse side of the colony was also white at first and later changed to yellow gradually (Figure 1E). The whole plate emitted a foul odor similar to that of methane. Under a microscope, the mycelium was of different widths and divided into branches with nail-like protrusions (Figure 1F). The species of this pathogenic mold was identified by the polymerase chain reaction test targeting the fungal internal transcribed spacer-2 conserved region gene with primers (sense: 5'-TCCGTAGGTGAACCTGCGG-3', antisense: 5'-TCCTCCGCTTATTGATATGC-3'). The sequence was matched using the Basic Local Alignment Search Tool with *S. commune*. The patient was diagnosed with a corneal ulcer caused by *S. commune*. The results of the *in vitro* susceptibility test using disk diffusion indicated sensitivity to voriconazole,

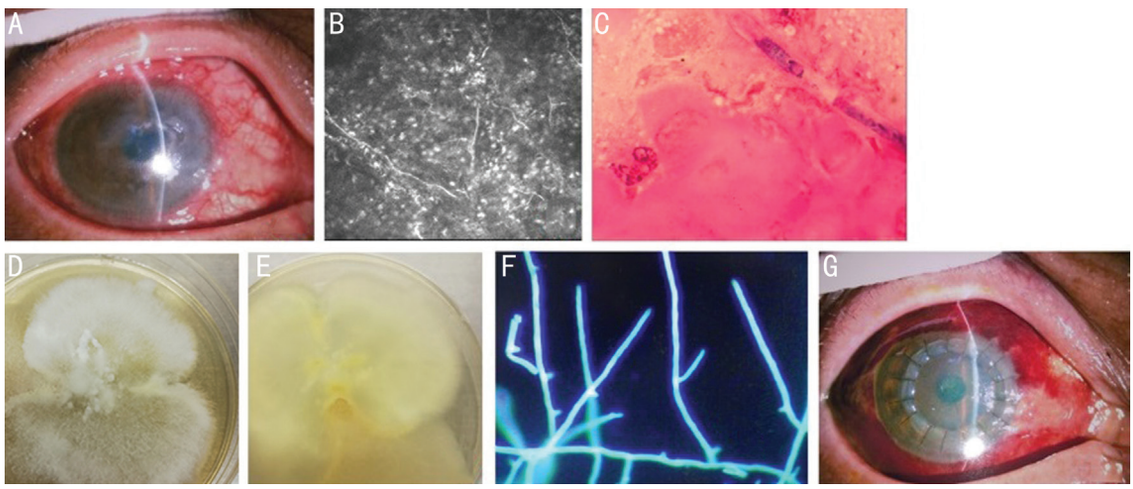

Figure 1 The clinical manifestation of the corneal ulcer and the identification of its pathogen A: Right eye of the patient before treatment; B: Corneal confocal microscopy image shows the hyphae and inflammatory cells at the site of the ulcer; C: Image of corneal scraping by Gram staining under a microscope (×1000) shows the hyphae and inflammatory cells at the site of the ulcer; D: Surface of the colony of *S. commune*; E: Reverse side of the colony of *S. commune*; F: Hyphae of cultured *S. commune* stained with fluorescent dyes under a microscope (×200); G: Right eye of the patient after surgery.

fluconazole, and amphotericin and resistance to terbinafine. The right eye of the patient was treated with a lamellar cornea transplant after debridement, and voriconazole ointment (1%) twice a day was applied for two weeks after the surgery. The patient was permitted to leave the hospital when his condition stabilized. His outpatient follow-up revealed the following findings: corneal graft was transparent, no new blood vessels or loose sutures (Figure 1G), the anterior chamber depth was normal, room flashing was negative, pupil response to light was obvious, and the intraocular pressure was 12 mm Hg.

S. commune is a common basidiomycete fungus, which belongs to *Basidiomycota*, *Agaricomycetes*, *Agaricales*, *Schizophyllaceae*, and *Schizophyllum*[8]. It is widely distributed in nature and contains a set of enzymes to degrade decaying matter. Since Kligman *et al*[9] reported the first case of onychomycosis caused by *S. commune* in 1950, there have been increasing numbers of reports of this pathogen invading tissues of the human brain and respiratory tract or sometimes associating with allergic diseases, especially in immuno-compromised patients[10-14]. The only case of keratitis in a patient with a history of trauma appeared in India[7]. Our case involves the first corneal infection by *S. commune* discovered in China and a possible secondary infection caused using glucocorticoids. Our patient had no history of trauma in the right eye. We speculated that the infection was due to the long-term use of glucocorticoids to repair the corneal stroma opacity caused by prior viral keratitis, which led to a disorder of the ocular ecology and a decrease in the ocular immunological defenses. The infection by a rare environmental conditional pathogenic fungus was one result of the risky condition. This case belongs to those increasing reports of infections due to *S. commune* in recent years as a result of the decline in human immunity accompanied by the wide and long-term use of antibiotics, glucocorticoids, or immunosuppressants in clinical practice.

Therefore, more reports of rare pathogenic infections would alert ophthalmologists to pay more attention to reduced immunity among patients and control the application of glucocorticoids and immunosuppressants in the process of treatment. As an opportunistic pathogen, *S. commune* needs to be paid more attention in ophthalmic infection cases, which would help update ophthalmologists' knowledge of pathogenic fungi. Furthermore, this case indicates that nucleotide sequencing is very helpful for accurate identification since the hyphae of *S. commune* is easily confused with *Aspergillus sp.*[15], which supports the importance of molecular diagnostics, especially for rare pathogens without typical morphology.

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