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CASE REPORT

Right Eye Bacterial Corneal Ulcer due to *Staphylococcus haemolyticus* Infection: A Case Report

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ABSTRACT

Background: A corneal ulcer is an ocular emergency that leads to blindness. It is caused by a defect in the corneal epithelium involving the underlying stroma. Staphylococcus haemolyticus is a normal part of skin microflora. It causes infections, one of which is eye infection. **Objective**: To report a case of corneal ulcer in the right eye caused by Staphylococcus haemolyticus infection in an eighteen-year-old male patient. **Case**: An eighteen-year-old man with a history of right eye chemical injury caused by gasoline. He was presented to the hospital with a complaint of burning in his right eye, blurred vision, watering, glare, and purulent discharge. His right eye slit lamp examination revealed a plaque on the central cornea measuring approximately 6 mm in diameter, with a feathery edge and no hypopyon in the anterior chamber. His visual acuity on the right eye 1/60 and on the left eye 6/8.5. Corneal scraping of the ulcer was sent for fungal culture and microscopy. **Conclusions**: Corneal infection caused by more than 1 microorganism is relatively uncommon. The most common risk factor for mixed bacterial and fungal corneal ulcer was ocular trauma. The treatment for mixed bacterial and fungal corneal ulcer is based on topical, systemic and surgical debridement in 1 month follow-up period. The surgical debridement was effective in handling cases like this and can shorten the healing time of corneal ulcers, as shown by the increase in visual acuity from 1/60 OD to 2/60 OD at the last visit.

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Highlights

1. Corneal ulcer is an ocular emergency that leads to blindness caused by a defect in the corneal epithelium involving the underlying stroma;
2. Accurate knowledge of the causative agents is important for treatment option.

BACKGROUND

Corneal ulcer is an ocular emergency leading to blindness (Kodali et al., 2024), due to stromal necrosis caused by a defect in the corneal epithelium with tissue decay (Mohan et al., 2023; Waslan dan Oktaliani, 2023). The causative agents were inflammatory or infection at the cornea (Mohan et al., 2023; Singh, 2012), such as virus, protozoa or bacterial and fungal infections (Baruah et al., 2020; Kenia et al., 2020; Singh, 2012) and non-infection such as autoimmune or postsurgical (Hassanpour et al., 2022). Several symptoms, such as O atopy and 'cold sores', had a high risk of developing herpes simplex keratitis, while grinding, hammering, and chiseling due to corneal foreign bodies. Corneal dystrophy due to corneal erosion syndrome (Arbabi et al., 2018).

Microbial keratitis incidence between 0,3 per 100,000 per year (Amescua et al., 2012) to 799 per 100,000 per year, counting for 20-30% of all blindness around (Palchoudhury et al., 2020), with clinical findings such as pain, photophobia and redness (Shoja dan Manaviat, 2004) due to corneal epithelium damage and stromal inflammation (Hardianto et al., 2023). Meanwhile, in developing country, the number of microbial keratitis more than 1.5 million cases/ year. These infections cause ocular morbidity due to contact lens usage, corneal surgery, ocular surface disease, chronic use of topical medication, and systemic immunosuppression (Amescua et al., 2012).

Bacterial keratitis accounts for 40% (Shoja and Manaviat, 2004) to 56% (Wiranata et al., 2021), with serious consequences on permanent vision loss due to corneal destruction (Shi et al., 2025). So, it should be treated as an ocular management issue due to rapid progression and complications (Gokhale, 2008). Until now, the common agents of bacterial keratitis include *Staphylococcus aureus*, *Streptococcus pneumoniae*, *Pseudomonas aeruginosa* (Hatami-Mazinani et al., 2020), and *Staphylococcus epidermidis* (Shoja dan Manaviat, 2004). Bacterial keratitis presents with infiltration and corneal edema, and anterior chamber reaction (Shoja dan Manaviat, 2004). *Staphylococcus haemolyticus* is a normal part of skin microflora. It causes infections, one of which is eye infection (Eltwisy et al., 2022).

Corneal ulcer due to bacterial causes requires timely medical attention. Accurate knowledge of the causative agents is important for treatment options (Hatami-Mazinani et al., 2020), as it leads to significant morbidity with complications, namely corneal scarring or perforation (Shoja dan Manaviat, 2004), glaucoma, cataracts or anterior and posterior synechiae, and vision loss. Untreated bacterial keratitis causes endophthalmitis and subsequent vision loss (Hoque, 2023). The initial medical management of bacterial keratitis should be antibiotic therapy, such as fluoroquinolone monotherapy, or combination with fortified antibiotics (Gokhale, 2008), especially during early-stage bacterial keratitis (Nishida et al., 2021). Bacterial keratitis posed a challenge for ophthalmologists regarding of antimicrobial resistance (AMR) (Shi et al., 2025), so effective management should include early diagnosis for effective outcomes (Ung et al., 2019a).

OBJECTIVE

We present a case of an eighteen-year-old male with a right eye corneal ulcer due to *Staphylococcus haemolyticus* infection.

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CASE

An eighteen-year-old male came with a chief complaint of a burning sensation in the right eye for 2 weeks. Blurry vision, watery eyes, redness, and discharge in the right eye. Besides that, He also complained that his right eye felt sore, blocked, and more easily dazzled. His eyelids had been swollen and difficult to open for one week. It was first felt after he accidentally washed his face when his hands were after holding gasoline. There was neither dizziness nor fever.

Six hours after He was exposed to gasoline, He bought Xytrol eye drops from the pharmacy. In the early morning, there was no improvement; then He went to the Emergency Room of the community health center and was given C-Lyteers eye drops and was advised to continue the medicine from the pharmacy. Three days later, he was seen at the Outpatient Department of the Community health center; the complaint still persisted, and he was advised to stop the Xytrol eye drops and continue the C-Lyteers. Two days later, there was no improvement. He came to the Outpatient Department and was given eye drops (Natacren and Tropin) and oral medication (itraconazole and mefinal). There was no history of using glasses, eye disease previously, eye trauma previously, or other diseases. There was no family history of the same complaint. He had no allergies.

He was alert (GCS E4M6V5). His weight was 49 kg and height 163 cm. His blood pressure was 118/60 mmHg, pulse 86 x/minute, regular, respiratory rate 18 x/minute, and temperature 36^{o}C. General examination was normal. Right eye ophthalmologic examination showed visual acuity 1/60; conjunctival hyperemia and discharge; and a plaque diameter of 5 mm, infiltrate diameter of 5 mm, Dellen positive, neither hypopyon nor satellite lesion in the cornea (Figure 1). Left eye ophthalmologic examination found visual acuity 6/8.5, and others were normal.

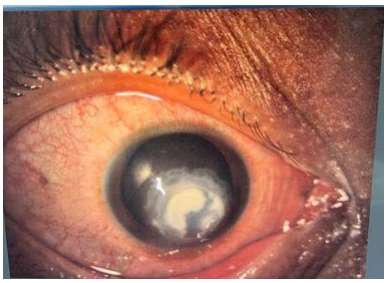


Figure 1. Right eye clinical picture.

He was diagnosed with a right eye corneal ulcer. He was suggested to be admitted to the hospital but he declined and given Giflox eye drop 1 drop every 2 hours on the right eye; Natacen eye drop 1 drop every 2 hours on the right eye; Protagenta eye drop 1 drop omni hora on the right eye; C-Tropin eye drops 1 drop every 8 hours on the right eye; Polygran eye drop 1 drop every 2 hours on the right eye; Gentamycin eye drops 1 drop every 8 hours on the right eye; and Cefixime 200 mg every 12 hours oral.

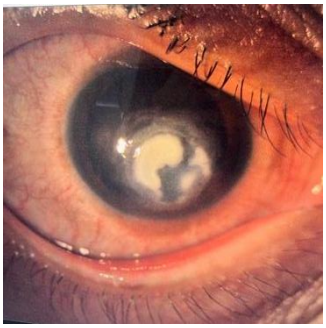


Figure 2. Right eye clinical picture the day after the first control.

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The day after, He came back to the Outpatient Department with a complaint of right eye sore, hot, watery eyes, blurred vision, discharge, felt like something was stuck, and glare. Right eye ophthalmologic examination showed visual acuity 1/60; pericorneal vascular injection (PCVI), conjunctival vascular injection (CVI), and discharge; and a plaque diameter of 5 mm, infiltrate diameter of 6 mm, Dellen positive, neither hypopyon nor satellite lesion in the cornea (Figure 2). Left eye ophthalmologic examination found visual acuity 6/6.5 and others were normal. His medications were continued.

Fourth day after the first visit, his complaints were still the same. Ophthalmological examinations were the same as the previous visit. His medication was given more frequently: Giflox eye drop 1 drop omni hora in the right eye; Natacen eye drop 1 drop omni hora in the right eye; Protagenta eye drop 1 drop omni hora in the right eye; C-Tropin eye drops 1 drop every 8 hours in the right eye; Polygran eye drop 1 drop every 2 hours in the right eye; Gentamicin eye drops stopped; and Cefixime stopped.

On the ninth day from the first visit, his complaints were still the same. Right eye ophthalmologic examination showed a plaque diameter of 3 mm, infiltrate diameter of 6 mm, Dellen positive, thinning positive, no hypopyon in the cornea (Figure 3). He was admitted to the hospital. His laboratory values were normal. He was given an additional dose of Inj Cefotaxime 1 gram every 12 hours IV, injection of Cefotaxime 1 gram every 24 hours subcutaneously, Ketoconazole 1 tablet every 12 hours oral, Mefenamic acid 1 tablet every 8 hours, and was scheduled for corneal swab and debridement.



Figure 3. Clinical picture of the patient's eyes.

Second day of admission, He had done a debridement. Right eye ophthalmologic examination showed visual acuity 1/60; conjunctiva hyperemic and bleeding; and an infiltrate post-debridement, Dellen positive, neither hypopyon nor plaque in the cornea (Figure 4). His treatment was the same.

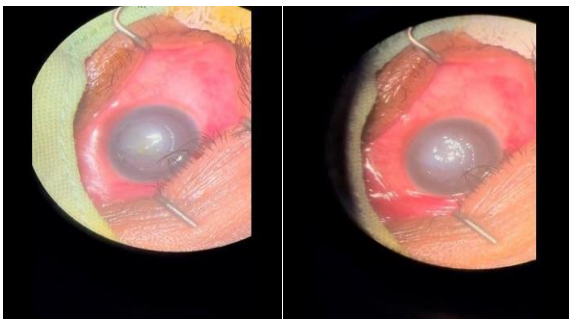


Figure 4. Right eye intraoperative condition.

On the second day post-debridement, the subcutaneous cefotaxime was stopped. His right eye ophthalmology examination was the same as previously. On the third day post-debridement, right eye conjunctival hyperemia was not found, only subconjunctival bleeding. The corneal swab found gram-positive cocci, namely *Staphylococcus haemolyticus,* suspected *Methicillin-resistant Staphylococcus aureus* (MRSA). He was given Levofloxacin eye drop 1 drop omni hora on the right eye; C-Genta eye drop 1 drop omni hora on the right eye; C-Phenicol eye drop 1 drop omni hora on the right eye; Protagenta eye drop 1 drop omni hora on the right eye; Natacen eye drop 1 drop on the right eye;

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Cotrimoxazole 1 tablet every 12 hours oral; Mefenamic acid 1 tablet every 8 hours oral; and Ketoconazole 1 tablet every 12 hours.

Post discharged controlled at Outpatient Department, his right eye ophthalmology examination was the same from previous (Figure 5). His therapy was the same. One week after discharge, the visual acuity of his right eye was 2/60 (Figure 6). Two weeks after discharge, the visual acuity of his right eye was 2/60; cloudy infiltrate and minimal Dellen in the right eye cornea (Figure 7).

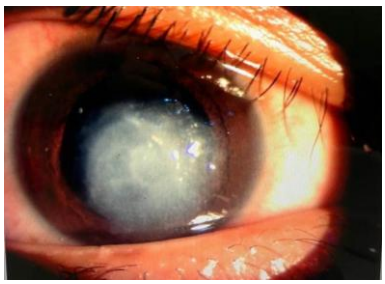


Figure 5. Right eye clinical picture post-discharge.

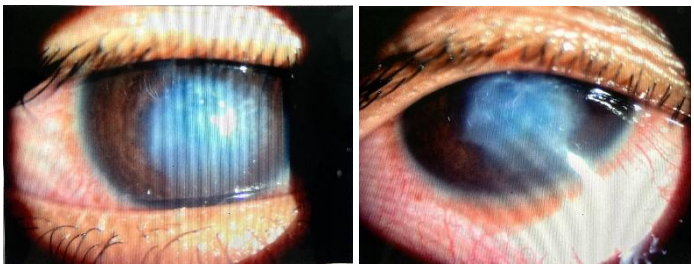


Figure 5. Right eye clinical picture one week after discharge.

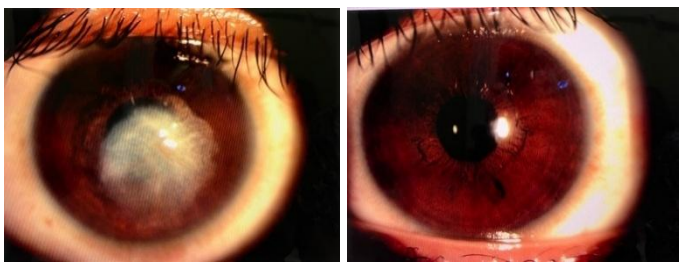


Figure 6. Right eye clinical picture two weeks after discharge.

DISCUSSION

Corneal ulcer is a loss of corneal epithelium caused by stromal infiltrate and necrosis of the surrounding tissue, with or without hypopyon (Mohan et al., 2023; Palchoudhury et al., 2020). It is predominant in males (Pant et al., 2019; Saxena et al., 2024), with a sex ratio of 1.63:1, affecting the 30-40 age group, rural population, and low socio-economic status (Thakur et al., 2020). However, a study noted no difference between males and females (Upadhyay et al., 1991). Others found similar results, with male predominance, and causative agent of microbial (positive culture) (Shoja dan Manaviat, 2004). Similar findings also found male predominance and infection causes in 20-60 years old group age (Wiranata et al., 2021), which is in line with this case; it happens in males, with younger age (eighteen-years-old). Corneal ulcer can infect anyone at any age, even infants. However, it was common in productive age (21-40 and below 10 years (Das and Chaddah, 1954). Others also found age ranges of corneal ulcers from 6 months to 78 years (Adepoju et al., 2025).

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The predisposing factor was corneal trauma (Pant et al., 2019; Upadhyay et al., 1991), bacterial infection (Adepoju et al., 2025; Pant et al., 2019), no education, non-manual labor occupation, history of ocular injury (Byanju et al., 2024), dry eyes (Baranwal et al., 2015), history of previous eye surgery and eye disease (Al Shamahy, 2019; Mohan et al., 2023), vitamin A deficiency (Faustino et al., 2016; Suan et al., 1990), chronic dacryocystitis (Inoue et al., 2022), ectropion or entropion (Mohan et al., 2023), trichiasis, distichiasis, exophthalmos, lagophthalmos (Valsan dan College, 2024), contact lens wear (Di Bisceglie dan Carmichael, 1987; Galentine et al., 1984; Ibrahim et al., 2009; Loh dan Agarwal, 2010; Mohammad-Rabei et al., 2014) and alcohol usage (Shamsal et al., 2022). Meanwhile, systemic diseases also increase the risk of corneal ulcer (Ahmed et al., 2010), including diabetes mellitus and chronic ischemic heart disease (Chang et al., 2020), and critically ill patients (Couto et al., 2011). Our patient's etiology of corneal ulcer was accidentally washed his face when his hands were after holding gasoline. A study found that farmers and labor class are more affected (Saxena et al., 2024), meaning the presence of physical or chemical trauma such as fingernail, metal splinter or contact lenses causing the scratch at the cornea. Even the scratch is not deep, but the involvement of microorganism deteriorate it due to inflammation (Janumala et al., 2012). Clinical characteristics of bacterial keratitis include pain, redness, foreign body sensation, photophobia, tearing, watery discharge, and swelling (Dargin dan Lowenstein, 2008). The patients complained tad a burning sensation 2 week before visiting the hospital, sore at the right eyes, and more easily dazzled. His eyelids had been swollen and difficult to open for one week. It was first felt after he accidentally washed his face after handling gasoline.

Bacterial keratitis is a progressive type, causing corneal destruction within 24-48 hours (Janumala et al., 2012). Corneal ulcers are commonly caused by bacterial pathogens. Ulcers start as keratitis after a break in the corneal epithelium allows bacterial entry. The most common bacterial pathogens are *Staphylococcus aureus*, coagulase-negative staphylococcus, and *Pseudomonas aeruginosa* (Lee et al., 2021); *Diplococcus pneumoniae*, *Klebsiella pneumoniae*, *streptococci*, and *Staphylococcus pyogenes var. aureus*; and *Escherichia coli* (Suie et al., 1959). The other causative organisms are *Staphylococcus pneumoniae* (Ung et al., 2019b). Our patient was infected with *Staphylococcus haemolyticus,* suspected MRSS from the corneal swab result. It is a normal skin microflora. It is the second most common pathogen from coagulase-negative Staphylococci (CoNS) group which causing eye infection (Panda et al., 2016). The infection is characterized by biofilm formation, as the bacteria have intercellular adhesion (ICA) properties (Eltwisy et al., 2022).

The process is starting by activation of plasminogen to plasmin due to infection, meanwhile protease chymase and tryptase cause epithelial microlesions, while healing process was delayed due to lack of adhesive glycoproteins, as they were degraded (Al-Mujaini et al., 2009). Also, the bacteria produce toxins including enterotoxins, hemolysins, and fibronectin-binding proteins (Eltwisy et al., 2022). Those substances inducing the corneal damage by provoking proinflammation immune response (Eltwisy et al., 2022). Tissue swelling occurs, and the corneal stroma within the grey zone of infiltration imbibes fluid. Due to bacterial enzymes that "digest" and degrade the corneal matrix, corneal ring infiltration forms (Al-Mujaini et al., 2009).

The physical examination includes visual acuity testing, intraocular pressure, and pupillary response (Upadhyay et al., 2015). Meanwhile, microbial culture and identification (diagnostic laboratory) is essential for diagnosis and medical treatment (Leck et al., 2024). The eyelids and conjunctiva should be examined for any injection, swelling, or discharge and for the presence of ciliary flush. A thorough slit-lamp examination should determine the size, location, and shape of the lesion or lesions (Leck et al., 2024; Roongpoovapatr et al., 2020). Seidel's test is helpful if there is any concern for rupture (Roongpoovapatr et al., 2020). Corneal ulcers due to Streptococcal bacterial infection show a gray ulcer with clear boundaries, tending to be in the center of the cornea, and laboratory results found gram-positive diplococcus bacteria (Upadhyay et al., 2015). Our patient's right eye ophthalmologic examinations showed visual acuity of 1/60; conjunctival hyperemia and discharge; and a plaque diameter of 5 mm, infiltrate diameter of 5 mm, Dellen positive, neither hypopyon nor satellite lesion in the cornea.
The medication of corneal ulcers is based on laboratory test results (ulcer scrapings and microbiological culture). However, the primary treatment includes topical antibiotics due to the avascular nature of the

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tissue and the presence of the blood-aqueous humor barrier, while systemic antibiotics are added in extreme cases (Egrilmez dan Yildirim-Theveny, 2020). While waiting for the test results, empirical therapy must be given immediately. Cycloplegics (Atropine/homatropine 1% eye drops, 1 drop every 8 hours) if signs of iritis are found. A case study applying 0.66% Nanoemulsion Povidone-Iodine (PVP-I) as an antiseptic against microbes was effective in treating the signs and symptoms of corneal ulcer (Bordin, 2020), and claimed to be useful with unspecific infectious agent.

Corneal ulcers with an area of < 3 mm not in the center can be given topical antibiotics (fluoroquinolone eye drops 1 drop every 30-60 minutes which are then reduced according to clinical response) (Gokhale, 2008); topical antifungals (natamycin 5%, amphotericin B 30%, or voriconazole 1% eye drops every 60 minutes which are then reduced according to clinical response); and topical anti-acanthamoeba (neomycin or chlorhexidine eye drops every 1-2 hours) (Egrilmez dan Yildirim-Theveny, 2020; Shanker et al., 2024). Corneal ulcers with an area of > 3 mm or <3 mm in the center are given intensively every 5 minutes for the first 60 minutes; continued every 15-30 minutes for the first 12 hours; and then reduced to drops every 60 minutes according to clinical response; patients must be hospitalized to ensure drug administration, observation of therapeutic response, and clinical symptoms (Austin et al., 2017). Patients with corneal ulcers accompanied by hypopyon must be hospitalized, topical antimicrobials on ulcers with an area of >3 mm; systemic drugs are given (oral or intravenous); systemic antibiotics (ceftriaxone injection 2×1 gram intravenously per day, if there are contraindications then given ciprofloxacin 500 mg every 12 hours and doxycycline 100 mg every 12 hours); systemic antifungals (voriconazole orally 400 mg every 12 hours on day 1 continued 200 mg every 12 hours or Fluconazole 200 mg every 12 hours); topical fortified antibiotics; and subconjunctival antibiotics: given if there is no therapeutic response to topical drugs (Hoffman et al., 2024; Nafi' dan Rijal, 2024; Papathanassiou dan Gartry, 2007).

Our patient had Giflox eye drops 1 drop every 2 hours in the right eye; Natacen eye drops 1 drop every 2 hours in the right eye; Protagenta eye drops 1 drop omni hora in the right eye; C-Tropin eye drops 1 drop every 8 hours in the right eye; Polygran eye drops 1 drop every 2 hours in the right eye; Gentamicin eye drops 1 drop every 8 hours in the right eye; and Cefixime 200 mg orally every 12 hours. After the corneal swab confirmed Staphylococcus haemolyticus, He was given Levofloxacin eye drop 1 drop omni hora on the right eye; C-Genta eye drop 1 drop omni hora on the right eye; C-Phenicol eye drop 1 drop omni hora on the right eye; Protagenta eye drop 1 drop omni hora on the right eye; Natacen eye drop 1 drop on the right eye; and Cotrimoxazole 1 tablet every 12 hours oral. One week after discharge, his right eye visual acuity was 2/60. Two weeks after discharge, his right eye visual acuity was 2/60; cloudy, infiltrate, and minimal dellen in the right eye cornea.

Meanwhile, other medical management, including surgical management, such as corneal cryotherapy, conjunctival flap, amniotic membrane transplantation, combination of amniotic membrane transplantation and conjunctival flap, paracentesis, bandage contact lenses with tissue glue, penetrating keratoplasty, and evisceration bulbi (Diamant dan Abbott, 1998; Du et al., 2023). Our patient underwent debridement.

The complications are secondary glaucoma (Lotti dan Dart, 1992), descementocele, threatened/actual corneal perforation, corneal scarring, stromal necrosis, loss of perception of light vision (Ting et al., 2021). If there is a hypopyon, it can cause an inflammatory process resulting in endophthalmitis which, if not treated immediately, can develop into meningitis or encephalitis. In addition, corneal ulcers accompanied by untreated hypopyon can result in corneal perforation and iris prolapse. Our patient had hypopyon and decreased visual acuity (right eye 1/60).

The prognosis depends on how quickly the patient receives treatment, the etiology, and the complications that occur. Corneal ulcers can improve and heal if they receive appropriate therapy. Our patient still had an infiltrate in his cornea even after debridement and medical therapy.

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Limitations

The strength of this case report was supported by the corneal swab result found gram positive coccus bacteria, namely *Staphylococcus haemolyticus*. This finding led to more focused and targeted antibiotic therapy, which accelerated recovery. Furthermore, its limitation was multi-antibiotic treatment. Our patient had Levofloxacin eye drops; C-Genta eye drops; C-Phenicol eye drops; and Cotrimoxazole orally. This multi-antibiotic treatment caused over-treatment for the patient. Besides that, our patient was given antifungal medication, namely Natacen eye drops and Ketoconazole. From the culture of the corneal swab, no fungus was found. Antifungal medication was not necessary to be given.

CONCLUSION

Corneal ulcer is an ocular emergency that leads to blindness. It is caused by a defect in the corneal epithelium involving the underlying stroma. An eighteen-year-old male came with a chief complaint of a burning sensation in the right eye for 2 weeks. Blurry vision, watery eyes, redness, and discharge in the right eye. He accidentally washed his face when his hands were after holding gasoline. He was diagnosed with a right eye corneal ulcer due to *Staphylococcus haemolyticus*. He was given antimicrobial treatment. Antimicrobial agents are the mainstay of treatment. This condition leads to significant morbidity with complications. Therefore, corneal ulcer requires timely medical attention. Accurate knowledge of the causative agents is important for treatment options.

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Conflict of Interest

None declared

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The authors did not receive any funding for this case study.

Patient concern for Publication

Written and verbal informed consent to present this case report was obtained from the responsible parties, which in this case, was the patient herself and his/her guardian.

Author Contribution

The authors contributed to all processes in this study, including preparation, data gathering and analysis, drafting, and approval for the manuscript's publication.

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