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Microbiological Profile of Corneal Ulcer in Dr. Mohammad Hoesin General Hospital Palembang, Indonesia: July to September 2021

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ABSTRACT

Introduction: Microbial agents cause infectious processes, which may result in corneal inflammation leading to corneal necrosis, ulceration, and perforation. This disorder is one of the major etiologies of monocular blindness in developing countries in Asia, Africa, and the Middle East. The etiology of corneal ulcers varies in different regions. **Methods:** This research is a descriptive study approach. Data obtained from the medical records of patients who were registered as corneal ulcer patients in Dr. Mohammad Hoesin Palembang from July 2021 to September 2021. **Results:** A total of 9 patients were diagnosed with a corneal ulcer. The number of corneal ulcer patients was more in male patients (77.8%). The age of patients varies from 16 years to 63 years, and most elderly patients are diagnosed with this condition. Predisposing factors are unknown in most patients. The most common location for ulcers is the central cornea (88.9%), with >6 mm in size. Hypopyon is found in 2 patients (22.2%), while perforation and corneal melting in 1 patient consecutively. The most common microbiological profiles of corneal ulcer patients in this study are unspecified (66.7%), while ulcers due to bacteria in the second place of the microbiological profile (33.3%) consist of *Enterobacter aerogenes*, *Staphylococcus epidermidis*, and *Pantoea* spp and sensitive to almost all kinds of antibiotics. **Conclusion:** The most common microbiological profiles of corneal ulcer patients in this study are unspecified, while ulcer due to bacteria in the second place of the microbiological profile consists of *Enterobacter aerogenes*, *Staphylococcus epidermidis*, and *Pantoea* spp and sensitive to almost all kinds of antibiotics.

1. Introduction

Microbial agents cause infectious processes, which may result in corneal inflammation. Severe inflammation can lead to corneal necrosis, ulceration, and perforation.¹ This disorder is one of the major etiologies of monocular blindness in developing countries in Asia, Africa, and the Middle East.² Meanwhile, according to Basic Health Research (Riset Kesehatan Dasar), in 2007, corneal cicatrix caused blindness in 18,1% Indonesian Population.³

The etiology of corneal ulcers varies in different regions, with the highest proportion of bacterial corneal ulcers reported in some countries such as

North America, Netherlands, Singapore, and Australia, while fungal ulcers are more dominant in India and Nepal.⁴

Predisposing factors of bacterial corneal ulcers are ocular trauma, contact lens users, ocular surface diseases, or systemic condition. Early diagnosis with the culture of corneal scraping and prompt treatment may improve prognosis, but empirical treatment could be an option before a culture is performed.⁵

This study aims to determine the characteristics and microbiological profile of corneal ulcer patients at Dr. Mohammad Hoesin Palembang.

2. Methods

This research is a descriptive study approach. Data were obtained from the medical records of patients who were registered as corneal ulcer patients in the patient register at the ophthalmology polyclinic, central general hospital, Dr. Mohammad Hoesin Palembang. Data was collected from the patient register book recorded from July 2021 to September 2021.

Medical record data included in this study were patients diagnosed with corneal ulcers. The exclusion criteria were patients with missing medical records. Data processing was performed using SPSS version 25. The data studied included demographic data, including gender and age. The clinical variables such

as predisposing factors, clinical features, and microbiological profiles.

3. Results

Demographical characteristics of corneal ulcer patients

During the period from July 2021 to September 2021, there were 9 patients diagnosed with a corneal ulcer. The demographic data include gender and age.

In this study, the number of corneal ulcer patients was more in male patients (77.8%), with a ratio of 3.5: 1 between males and females. The age of patients varies from 16 years to 63 years and mostly elderly patients diagnosed with this condition as seen in Table 1.

Table 1. Demographical characteristics of corneal ulcer patients

Variable	n	%
Age (mean, range)	45.7	16-63
Gender (n, %)		
Male	7	77.8
Female	2	22.2

Predisposing factors of corneal ulcer patients

The predisposing factors of patients with corneal ulcers such as ocular trauma, contact lenses user, ocular surface disease, and systemic condition.

Predisposing factors are unknown in most patients in a recent study, as seen in Table 2. But the systemic condition is also found to be a predisposing factor in 33% of patients.

Table 2. Predisposing factors of corneal ulcer patients

Variables	n	%
Trauma	0	0
Contact lenses user	0	0
Ocular surface disease	0	0
Systemic condition	3	33.3
Unknown	6	66.7

Clinical features of corneal ulcer patients

The clinical features of patients with corneal ulcers include location and size of the ulcer, presentation of hypopyon, descemetocele, perforation, and corneal

melting. The most common location for ulcers is the central cornea (88.9%), with >6 mm in size. Hypopyon is found in 2 patients (22.2%), while perforation and corneal melting in 1 patient consecutively.

Table 3. Clinical features of corneal ulcer patients

Variables	n	%
Location		
Central	8	88.9
Paracentral	1	11.1
Peripheral	0	0
Size		
<2 mm	0	
2-6 mm	2	22.2
>6 mm	7	77.8
Hypopyon	2	22.2
Descemetocele	0	0
Perforation	1	11.1
Cornea melting	1	11.1

Microbiological profiles of corneal ulcer patients

The microbiological profiles of patients with corneal ulcers include bacterial, fungal, or unspecified corneal ulcers. The most common microbiological profiles of corneal ulcer patients in this study are unspecified

(66.7%), while ulcers due to bacteria in the second place of the microbiological profile (33.3%) consist of *Enterobacter aerogenes*, *Staphylococcus epidermidis*, and *Pantoea spp* and sensitive to almost all kinds of antibiotics.

Table 4. microbiological profiles of corneal ulcer patients

Variable	n	%
Bacterial	0	0
<i>Enterobacter aerogenes</i>	1	11.1
<i>Staphylococcus epidermidis</i>	1	11.1
<i>Pantoea spp</i>	1	11.1
Fungal	0	0
Unspecified	6	66.7

4. Discussion

A corneal ulcer is still one of the major causes of blindness, especially in developing countries. Analyzes were performed on 9 patients who met the inclusion and exclusion criteria in this study. Data were obtained from the medical records of patients who were recorded as corneal ulcer patients in the patient register at the ophthalmology clinic of Dr. Mohammad Hoesin Palembang General Hospital, data was collected from the register book from July 2021 to September 2021.

From the descriptive table of patient characteristics, it was found that most ulcer patients in a recent study were male. In the study of Mayasari, it was found that the incidence of corneal ulcers was highest in males.⁵ The other study by Katara et al. in

2013 shows that 60 males (60%) is corneal ulcers.⁶ It corresponds to the research conducted by Sameen, which show similar results; around 68.8% of corneal ulcer patients are male.⁷

Elderly patients are found to be more diagnosed with a corneal ulcer, with a mean age of 45.7 years old. In the other research, the most corneal ulcer was found in the age group of 41-50 years old (33.64%).⁵ Shoja et al. found similar results.⁸ The potential reason which could explain this phenomenon is in this age group, people tend to be more active physically or just go out to work even often, more exposing themselves to some traumas.⁵

Predisposing factors of a corneal ulcer are unknown in most patients in a recent study. But the systemic condition is also found to be a predisposing

factor in 33% of patients. The systemic condition can be predisposed to aseptic corneal ulcers such as Sjogren Syndrome, Stevens-Johnson Syndrome, and Rosacea). Local disorders include herpetic keratitis and paralytic lagophthalmos) leading to severe trophic impairments in the cornea.⁹

The most common location for ulcers is the central cornea with >6 mm in size. Hypopyon, perforation, and corneal melting are found as well in this study. Putri et al., in their research, found that most patients came with ulcers in the central area of the cornea. Ulcers located at the central cornea can cause visual impairment and lead to blindness.¹⁰

The most common microbiological etiology in this study is unspecified (66.7%), while ulcers due to bacteria in the second place of the microbiological profile (33.3%) consist of *Enterobacter aerogenes*, *Staphylococcus epidermidis*, and *Pantoea spp* and sensitive to almost all kinds of antibiotics. Based on the data from microbiological examination (Gram Staining and KOH), there were 7 patients (72.9%) infected by Gram-positive cocci. Spore and hyphae, meanwhile, were to be obtained in the KOH staining of 31 patients (28.97%).⁵ It found the similarity both in the research of Titiyal et al. and Keshav et al. Titiyal et al. found that 50% of corneal ulcer patients were caused by bacteria. Keshav et al. also stated that bacterial causes were found in 88.26% of the patients.^{11,12}

5. Conclusion

The most common microbiological profiles of corneal ulcer patients in this study are unspecified, while ulcer due to bacteria in the second place of the microbiological profile consists of *Enterobacter aerogenes*, *Staphylococcus epidermidis*, and *Pantoea spp* and are sensitive to almost all kinds of antibiotics.

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