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Microbial Pattern and Antibiotic Sensitivity Test Among Eye Infection Patients at Bali Mandara Eye Hospital Bali

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Abstract

Infection disease of the eye is usually found in health care facilities and can be caused by viral, bacterial, parasites, and fungi. Bali Mandara Eye Hospital was a special hospital for eye disease in Bali. In this hospital, infectious disease of the eye is dominated by bacterial conjunctivitis, viral conjunctivitis, corneal ulcer, and endophthalmitis. This study was a retrospective descriptive study using patients taking eye under-ground culture in Bali Mandara Eye Hospital, and samples were taken from 2019 till 2020. It can be seen that was found seven microbes and dominated disease was corneal ulcer 26 sample (86%), followed by endophthalmitis 4 sample (14%). The most microba were *Pseudomonas aeruginosa*. *Pseudomonas aeruginosa* was found resistant to almost all antibiotics and sensitive to levofloxacin, gentamycin, and ceftazidime.

Keywords: infection, eye, culture, antibiotics

Abstrak

[Pola Kuman dan Antibiotika Sensitivitas Tes Pada Penyakit Infeksi Mata di Rumah Sakit Mata Bali Mandara]

Penyakit infeksi pada mata merupakan masalah yang sering dijumpai pada fasilitas kesehatan. Infeksi pada mata dapat disebabkan oleh virus, bakteri, parasit, dan jamur. Rumah Sakit Mata Bali Mandara merupakan salah satu rumah sakit khusus mata yang dimiliki oleh Provinsi Bali. Penyakit infeksi di Rumah Sakit Mata Bali Mandara didominasi oleh konjungtivitis bakteri, konjungtivitis virus, ulkus kornea, dan endoftalmitis. Penelitian ini merupakan penelitian deskriptif retrospektif dengan sampel pemeriksaan kultur sekret mata yang dilakukan di Rumah Sakit Mata Bali Mandara tahun 2019 hingga 2020. Penelitian ini mendapatkan hasil distribusi kuman pada pasien penyakit infeksi mata di Rumah Sakit Mata Bali Mandara sebanyak 7 jenis kuman dengan didominasi oleh penyakit ulkus kornea sebanyak 26 sampel (86%) diikuti dengan penyakit endophtalmitis sebanyak 4 sampel (14%). Bakteri penyebab terbanyak adalah *Pseudomonas aeruginosa*. *Pseudomonas aeruginosa* resisten pada sebagian besar tipe antibiotika yang diujikan dan hanya sensitif pada levofloxacin, gentamicin dan ceftazidime.

Kata Kunci: infeksi, mata, kultur, antibiotika

INTRODUCTION

Infection of the eye is usually found in health care facilities and can be caused by viral, bacterial, parasites, and fungi. The most common form of eye infections was conjunctivitis, endophthalmitis, and corneal ulcer. Conjunctivitis in 2009 was a top ten type of infectious eye diseases². The eye's infection is caused by bacteria mostly caused by *Haemophilus influenza*, *Streptococcus pneumonia*, *Staphylococcus aureus*, and *Pseudomonas aeruginosa*³. Treatment for patients with infectious eye diseases is usually by antibiotics,

and antibiotic resistance can occur if given not according to the culture or dosage⁴. Antibiotic resistance occurs when treatment is not achieved, and the patient does not require recovery.

Bali Mandara Eye Hospital is a government eye hospital in Bali, and infection cases in the eye were bacterial conjunctivitis, viral conjunctivitis, corneal ulcer, and endophthalmitis. An eye disease, especially a corneal ulcer, can cause impaired visual activity and irreversible blindness if not received prompt and effective treatment.

METHODS

This study was a retrospective descriptive study with patients who examined the eye culture in Bali Mandara Eye Hospital. The samples were taken from 2019 till 2020. Data of culture results and antibiotic sensitivity tests were collected from the medical record. Data are presented in tabular form.

RESULTS

This study found seven microbes, and the dominant disease was corneal ulcer with 26 sample (86%) followed by 4 samples of endophthalmitis (14%). The characteristics of microbes in Bali Mandara Eye Hospital from 2019 until 2020 are presented in Table 1.

Tabel 1 Characteristic of microbes in Bali Mandara Eye Hospital During 2019-2020

Microbes	Eye Secret Culture	
	N	%
<i>Moraxella Spp</i>	1	3,3
<i>Streptococcus spp</i>	3	10
<i>Pseudomonas aeruginosa</i>	6	20
<i>Staphylococcus spp</i>	3	10
<i>Staphylococcus aureus</i>	1	3,3
<i>Enterobacter spp</i>	1	3,3
<i>Klebsiella spp</i>	1	3,3
<i>No growth</i>	14	46
Total	30	100

Antibiotics sensitivity test for each microbe is shown in table 2. Table 2 shows an antibiotics sensitivity test after being carried out with specific antibiotics disc that matched with the isolate. S percent describes the percentage of isolate sensitivity to the antibiotics. Red color represents sensitivity 0-40%, yellow color represents sensitivity 40-80%, and green color more than 80%.

DISCUSSION

This study was the first study that examined microbial patterns and antibiotics

sensitivity tests in Bali Mandara Eye Hospital. This study found that the most common infectious eye disease was a corneal ulcer. It is different from studies conducted by Ramesh et al. in India, which found the most common infectious disease of the eye were adnexa infection followed by corneal ulcer.⁵

In this study, the most common bacteria that cause eye infection were gram-negative bacteria; this is in contrast with the study in 2015 conducted by Shiferaw et al., which found that the cause of eye infection was gram-positive bacteria dominated by *Coagulase-negative staphylococci*.⁶

The study formed by Atmawati et al. in Banjarmasin in 2017 found five types of microbes: *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Staphylococcus saprophyticus*, *Streptococcus sp.*, and *Escherichia coli*.² However, in this study, we found *Pseudomonas aeruginosa*, *Streptococcus spp*, and *Staphylococcus spp*. *Moraxella spp*, *Staphylococcus spp*, *Staphylococcus aureus*, *Enterobacter spp*, and *Klebsiella spp* were found in a small percentage. Atmawati et al. found corneal ulcers and endophthalmitis as infectious eye diseases that appear in their samples.

Moraxella spp was sensitive to almost all antibiotics and resistant to Cefotaxime, Ceftriaxone, and cefixime. *Streptococcus spp* is sensitive to almost all antibiotics and resistant to gentamycin. *Pseudomonas aeruginosa*, *Staphylococcus spp*, and *Staphylococcus aureus* were found resistant to almost all antibiotics. Although *Klebsiella spp* was sensitive to almost all antibiotics, it is resistant to Amoxicillin, Ampicillin, and Sulphamethoxazole. This result is different from studies conducted by Shiferaw et al. which found all bacteria gram-positive sensitive to Vancomycin and resistant to Amoxicillin while bacteria gram-negative found resistant to Tetracycline, Norfloxacin, Ceftriaxone, and Ciprofloxacin⁶. The results were different may be caused by temperature, environment, and used topical antibiotics by a patient. Antibiotic resistance may

be caused by decreased drug efficacy because of improper use, and patients can buy drugs without prescription⁶.

Table 2. Antibiotics Sensitivity Test in Bali Mandara Eye Hospital During 2019-2020

Microbes	Amoxycilin %S	Ampicilin %S	Chloramphenicol %S	Ciprofloxacin %S	Doxycycline %S	Erythromycin %S
<i>Moraxella Spp</i>			100	100		
<i>Streptococcus spp</i>	100	100	100	66.6	100	66.6
<i>Pseudomonas aeruginosa</i>	0	0	0	66.6	0	0
<i>Staphylococcus spp</i>	0	0	33.3	33.3	33.3	33.3
<i>Staphylococcus aureus</i>	0	0	100	0	0	
<i>Enterobacter spp</i>	0	0	0	100		0
<i>Klebsiella spp</i>	0	0	100	100	100	0

Microbes	Gentamycine %S	Sulphamethoxazole %S	Ceftazidime %S	Cefotaxime %S
<i>Moraxella Spp</i>	100	0		0
<i>Streptococcus spp</i>	33.3			
<i>Pseudomonas aeruginosa</i>	100	0	83.3	0
<i>Staphylococcus spp</i>	100	33.3		33.3
<i>Staphylococcus aureus</i>	0			0
<i>Enterobacter spp</i>		0	100	0
<i>Klebsiella spp</i>	100	0	100	100

Microba	Tetracycline %S	Cephazoline %S	Amikacin %S	Neomycin %S	Ceftriaxone %S
<i>Moraxella Spp</i>	100				
<i>Streptococcus spp</i>					
<i>Pseudomonas aeruginosa</i>	0	0	100	33.3	0
<i>Staphylococcus spp</i>	0	66.6	66.6	33.3	33.3
<i>Staphylococcus aureus</i>	100	100		0	0
<i>Enterobacter spp</i>		0	100		0
<i>Klebsiella spp</i>	100	100	100	100	100

Microbes	Cefixime %S	Piperacilin %S	Ofloxacin %S	Azythromycin %S	Levofloxacin %S
<i>Moraxella Spp</i>	0	100			
<i>Streptococcus spp</i>					
<i>Pseudomonas aeruginosa</i>	0	83.3	83.3	16.6	83.3
<i>Staphylococcus spp</i>	0	0	33.3	33.3	33.3
<i>Staphylococcus aureus</i>	0	0	0	0	0
<i>Enterobacter spp</i>	0	100	100	0	0
<i>Klebsiella spp</i>	100	100	100	0	100

CONCLUSION

This study found that the most infectious disease of the eye found in Bali Mandara Eye Hospital was a corneal ulcer and microbe that mostly caused it was *Pseudomonas aeruginosa*. *Pseudomonas aeruginosa* was found resistant to almost all antibiotics and sensitive to levofloxacin, gentamycin dan ceftazidime. This study needs further research by increasing the sample and collaborating with an ophthalmologist clinician.

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