JURNAL KEDOKTERAN DIPONEGORO
(*DIPONEGORO MEDICAL JOURNAL*)
Online : http://ejournal3.undip.ac.id/index.php/medico
E-ISSN : 2540-8844
DOI : 10.14710/dmj.v15i2.54654
JKD (DMJ), Volume 15, Number 2, March 2026 : 190-194

EXOGENOUS ENDOPHTHALMITIS WITH IMPENDING PERFORATION MANAGEMENT AND OUTCOME AT RURAL HOSPITAL: A CASE REPORT OF 28-YEARS OLD MALE WITH POST-TRAUMATIC ENDOPHTHALMITIS

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Keywords:
Corneal Ulcer, Endopthalmitis , Evisceration, Post-trauma

Received: 13 December 2025
Revised: 19 January 2026
Accepted: 19 January 2026
Available online: 01 March 2026

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ABSTRACT

Background: Endophthalmitis is a potentially severe disease that can significantly reduce vision, characterized by severe inflamation of the intraocular fluid and tissue. The pathology of endopthalmitis is divided into two categories: endogenous and exogenous. Endogenous endophthalmitis is caused by an infection that spreads hematogenously from other organs. Exogenous endophthamitis, on the other hand, is caused by the invasion of microorganism from external environment The recommended therapy for endophthalmitis is intravitreal antibiotics and vitrectomy. The sooner intervention is performed, the better the prognosis and the better the patient's visual acuity will be. This case report discusses the therapeutic management of a patient with exogenous endophthalmitis in a rural hospital and its outcomes.
Case Presentation: We report a case, a 28-year-old male patient who experienced pain in his right eye after being hit by metal shavings while grinding without wearing eye protection 2 weeks before. Physical examination of the patient's right eye revealed 1/~ vision with poor light perception. Extensive infiltrates covered the entire corneal surface. A desmetocele was present, as indicated by a positive fluorescein test. The discharge was mucopurulent. Other findings could not be assessed due to the cloudy cornea
Conclusion: The patient was diagnosed with post-traumatic endophthalmitis with impending perforation. and received anticycloplegic therapy, pain relievers, antiglaucoma medication, topical and intravenous antibiotic. However, the patient's right eye developed a perforated corneal ulcer 2 weeks later, requiring evisceration.

INTRODUCTION

Endophthalmitis is a potentially severe disease that can significantly reduce vision, characterized by severe inflammation of the intraocular fluid and tissue. The pathology of endophthalmitis is divided into two categories: endogenous and exogenous. Endogenous endopthalmitis is caused by an infection that spreads hematogenously from other organs. Conversely, exogenous endophthamitis is brought on by microorganisms from the outside world. It most frequently happens as a side effect of intravitreal injection, trauma, or eye surgery.[1]Endophthalmitis is mostly caused by foreign germs that enter the eye through damage. Injury from metal (not glass) or physical trauma, retained intraocular foreign bodies, lens abnormalities, and primary healing delays longer than 24 hours are risk factors for ocular trauma turning into endophthalmitis. [2] One in ten cases of penetrating trauma with a retained foreign body can develop into endophthalmitis.[3] In endophthalmitis, the infection is confined to the eye and does not cause bacteremia or fungemia. In panophthalmitis, the infection spreads from the eyeball to the soft tissues surrounding the orbit. The majority of endophthalmitis patients start

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off abruptly, with symptoms lasting a few hours to several days. Endophthalmitis is a medical emergency since it can cause permanent vision loss if treatment is delayed.[2]

Direct injection of antibiotics into the eye is the primary treatment for endophthalmitis. After a vitreous humor sample has been cultured, the injection is carried out. Intravitreal vancomycin 1 mg/0.1 mL normal saline plus ceftazidime 2.25 mg/0.1 mL or amikacin 0.4 mg/0.1 mL are examples of broad-spectrum antibiotics that can be used empirically. Depending on the results of the culture, a further intravitreal injection of vancomycin or ceftazidime may be given if there is no improvement after 48 hours of delivery. The second component of this treatment is vitrectomy. Vitrectomy is helpful in clearing the vitreous humor and is the quickest way to clear the infection in eyes with severe endophthalmitis.[2] The effectiveness of vitreotomy has been demonstrated by studies showing a significant improvement in visual acuity and a 50% reduction in the frequency of severe vision loss compared to vitreous tap or biopsy in a subgroup of patients with initial light perception-only vision.[4] The use of additional systemic antibiotics may be considered in severe endophthalmitis. The capacity of systemic antibiotics to cross the blood-retinal barrier (BRB), which is essential for treating intraocular infections, affects how effective they are. It has been demonstrated that certain antibiotics, such moxifloxacin and imipenem, can more successfully pass through the BRB than others, like amikacin and vancomycin. One study, however, did not find a statistically significant correlation between better visual outcomes and systemic antibiotic therapy. As a result, there is still debate on the use of extra systemic antibiotics to treat endophthalmitis.[5] The prognosis for endopthalmitis is still poor despite the quick advancements in vitroretinal surgery.[6] Furthermore, vitreoretinal surgery is not yet widely available in many regions in Indonesia, making vitreotomy and intravitreal antibiotic administration limited to specific areas.

CASE REPORT

A 28-year-old male patient experienced pain in his right eye after being hit by metal shavings while grinding without wearing eye protection. Shortly after being hit by metal fragments, the patient went to the nearest puskesmas but was only doused with normal saline. He was then referred to a local hospital outside Java, but the hospital did not have an ophthalmologist. After an examination, the patient was informed that the fragments were not found in his right eye. He was given atropine sulfate eye drops twice daily. In the first week after the incident, the patient noticed that her right eye was swollen and could not be opened, and it was watery, but the pain was still minimal. In the second week after the incident, the pain increased, and his right eye appeared completely white and swollen, making it difficult to open, even though he was already using atropine sulfate eye drops regularly, with the patient experiencing purulent discharge, so the patient decided to seek treatment at a regional hospital in a regency in Central Java.

The patient came to the emergency room with increasing pain in his right eye and could only distinguish between light and dark. Before the incident, the patient had no vision problems. The patient's general physical examination moderate pain, with a clear mental status. An abnormal physical examination of the patient's right eye revealed 1/~ vision with poor light perception. Extensive infiltrates covered the entire corneal surface. A desmetocele was present, as indicated by a positive fluorescein test. The discharge was mucopurulent. Other findings could not be assessed due to the cloudy cornea. Based on anamnesis and physical examination, the patient's right eye was diagnosed with exogenous endophthalmitis with impending perforation. The patient was then hospitalized to monitor the progress of the patient's right eye. At the hospital, the patient was given atropine sulfate 1% eye drops twice a day, one drop in the right eye, moxifloxacin eye drops every hour in the right eye, eye ointment containing a combination of polymyxin B, neomycin, and gramicidine 4 times a day, cefotaxime injection twice a day, 1 gram intravenously, dexketoprofen injection twice a day, 50 mg intravenously, and acetazolamide 250 mg orally once a day. The patient was treated in the ward for 5 days. When discharged, the patient's right eye showed no signs of worsening. When the patient was discharged, the patient was given atropine sulfate 1% eye drops twice a day, one drop in the right eye, moxifloxacin eye drops every hour in the right eye, eye ointment containing a combination of polymyxin B, neomycin, and gramicidine 4 times a

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day, acetazolamide 250 mg orally once a day, potassium chloride 600 mg orally once a day, levofloxacine 500 mg twice a day, and sodium diclofenac 50 mg twice a day.

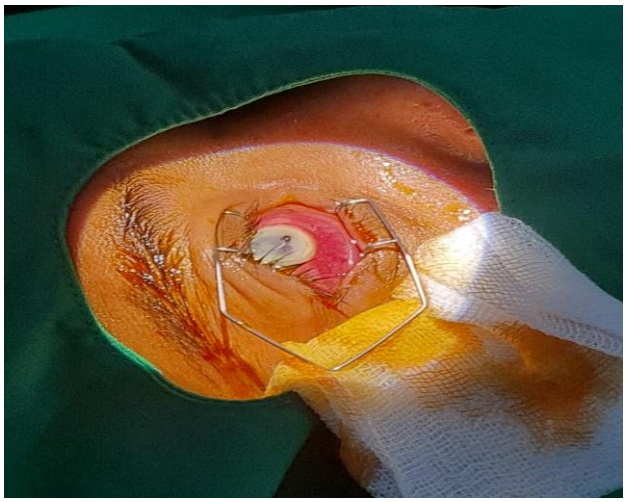

Figure 1. OD Exogenous Endophthalmitis with Impending Perforation when first admitted to the hospital.

The patient's eye development was monitored weekly through outpatient visits. The patient's right eye condition seemed to be unchanged over the first week following their discharge from the hospital. The patient's right eye worsened in the second week following discharge, necessitating re-admission. In line with the compos mentis stage, the patient's general physical examination showed no signs of pain. An improper physical examination of the patient's eyes revealed poor light perception and 1/~ vision. Infiltrates, corneal rupture with iris prolapse, and corneal staphyloma were observed in the patient's right eye. The patient's right eye was found to have a perforated corneal ulcer based on anamnesis and physical examination, and bulbar evisceration under general anesthesia was scheduled. During evisceration, thick, yellowish vitreous humor was found. Following surgery, the patient received eye drops containing polymixin B, neomycin, and dexamethasone four times a day in the right eye, methylprednisolone 16 mg orally twice a day, coamoxiclav 625 mg orally three times a day, and mefenamic acid 500 mg three times a day. The patient was discharged from the hospital the day after bulbar evisceration, and the patient had no significant complaints. The patient presented for an outpatient check-up three days after being discharged from the hospital, without complaints regarding the eyes.

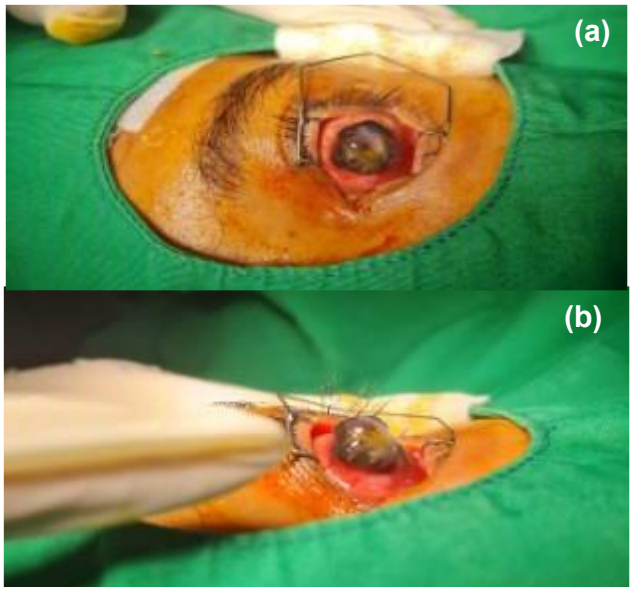

Figure 2. OD perforated corneal ulcer during the patient's second hospitalization: (a) front view and (b) side view

Figure 3. OD anopthalmia after bulbar evisceration

DISCUSSION

It was reported that the patient developed these symptoms after being hit by metal shavings while grinding. Based on the history, the cause of the endophthalmitis in this patient was determined to be exogenous. This case includes post-traumatic endophthalmitis. Some of the microorganisms that enter the eye in post-traumatic endophthalmitis are probably ocular surface flora. However, other pathogens from the external environment can enter the eye through traumatic wounds.[7] In cultures from post-

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traumatic endophthalmitis, polymicrobial cultures were obtained with a high rate of bacillus species cultures. No single antibiotic can effectively treat every bacterium that causes endophthalmitis, according to a study by Moloney et al. For suspected bacterial endophthalmitis, current guidelines for empirical treatment with intravitreal vancomycin and ceftazidime are suitable, especially for the Australian population.[8]Intravitreal voriconazole should be used empirically to treat organisms resistant to amphotericin B if fungal involvement arises, such as in eyes with a history of trauma, suspicion of endogenous etiology, or clinical signs suggestive of a fungal etiology. Intravitreal voriconazole is advised for the empirical treatment of organisms resistant to amphotericin B. [8] [6]In patients with endophthalmitis, a vitreous tap/biopsy is advised instead of pars plana vitrectomy when visual acuity is restricted to counting fingers, according to EVS standards. The recovery of visual acuity in endophthalmitis is influenced by time.[9]A study by Rahmayanti et al. found that vitrectomy performed in patients with onset less than 7 days resulted in better visual acuity compared to patients with onset more than 7 days. [10] However, if vision is better than light perception, vitrectomy and intraocular antibiotics alone are not beneficial.[9] In this patient, the onset was 2 weeks when he came to the emergency room, so likely, this patient's visual acuity will not improve even after being referred for a vitrectomy.

The goal of therapy in this patient was to prevent the progression of corneal perforation, so the patient was given topical antibiotics, moxifloxacin eye drops every hour in the right eye, eye ointment containing a combination of polymyxin B, neomycin, and gramicidine 4 times a day in the right eye, and intravenous antibiotics, cefotaxime injection twice a day, 1 gram intravenously. The patient was given dexketoprofen by infusion twice a day, 50 mg intravenously, to reduce pain, and acetazolamide 250 mg orally once a day to reduce intraocular pressure. Anticycloplegics such as atropine sulfate 1% eye drops are given to these patients to relieve ciliary body spasm. After being given these medications and closely monitored, the progression of the corneal perforation remained stagnant until the first-week visit. At the second-week outpatient visit, the progression of the corneal perforation accelerated to the point of corneal staphyloma. Because none of the topical fluoroquinolones tested including moxifloxacin 0.5% achieved intravitreal levels high enough to surpass the minimum inhibitory concentration (MIC90) for 90% of isolates of the species most frequently responsible for bacterial endophthalmitis, therapy failed. However, for a wide range of important pathogens, the MIC90 was significantly exceeded in the aqueous humor. In other words, topical fluoroquinolones cannot effectively stop infection in the vitreous humor.[11] To relieve infection in the vitreous humor, intravitreal antibiotic injection is required, and if necessary, vitrectomy, which requires special expertise that is not available at this hospital.

The objective of the patient's treatment shifted to preventive in order to prevent sympathetic ophthalmia (SO) after corneal staphyloma was discovered in the patient's right eye during an outpatient visit in the second week following hospital discharge. A rare bilateral granulomatous panuveitis, sympathetic ophthalmia typically follows surgery or penetrating or perforating eye damage. It can cause blindness in both eyes. To prevent the occurrence of SO or at least make this disease relatively benign, enucleation of the injured eye is performed within 2 weeks after the injury.[12] However, in this patient, evisceration was performed, not enucleation, because evisceration provides a more anatomically, functionally, and cosmetically acceptable orbit than enucleation. Evisceration is a safe procedure with a low risk of sympathetic ophthalmia. However, because of the residual uveal tissue in the scleral emissary canal, there is a small chance that hence may still happen during evisceration, hence the patient's left eye needs to be closely watched. [13]

CONCLUSION

Severe inflammation of the intraocular fluid and tissue is the hallmark of endophthalmitis, a potentially serious illness that reduces vision. Endogenous and exogenous are the two types of endopthalmitis pathophysiology. An infection that spreads hematogenously from other organs is the cause of endogenous endopthalmitis. Conversely, exogenous endophthamitis is brought on by microorganisms from the outside world. The main component of endophthalmitis therapy are direct antibiotic injection into the eye, and vitrectomy. Vitrectomy is helpful in clearing the vitreous humor and is the quickest way to

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clear the infection in eyes with severe endophthalmitis. Topical antibiotics are inadequate to relieve infections, especially in the vitreous humor. Early treatment has a significant impact on the patient's prognosis and vision improvement.

ETHICAL APPROVAL

There is no ethical approval for this case report.

CONFLICT OF INTEREST

The authors declare no conflict of interest for this case report.

FUNDING

There is no specific funding was provided for this case report.

AUTHOR CONTRIBUTIONS

Investigation, Ardhita Felicia Tanuhariono; and Oktarina Nila Juwita; data collecting, Ardhita Felicia Tanuhariono; writing—original draft preparation, Ardhita Felicia Tanuhariono; writing—review and editing, Oktarina Nila Juwita; and Shirly Gunawan; supervision, Oktarina Nila Juwita; and Shirly Gunawan**.**

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