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Two Endogenous Endophthalmitis Cases Accompanying Nephrological Condition in Diabetic Patients

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Authors' contributions

This work was carried out in collaboration among all authors. Author HM contributed to the conception, design, and drafting of the manuscript, and led the clinical management of the patients. Authors SB and AB were responsible for the acquisition of clinical data and helped in the analysis of patient outcomes. Author FC contributed to the ophthalmological examination and interpretation of ocular imaging. Author MA provided significant input on the nephrological aspects and management of systemic infection. Author IB supervised the overall case management and critically revised the manuscript for intellectual content. All authors read and approved the final manuscript.

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Case Report

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ABSTRACT

Aims: This report aims to highlight the importance of prompt diagnosis and intervention in cases of endogenous endophthalmitis, with particular focus on its nephrological etiology and associated systemic infections.
Presentation of Case: Two cases of endogenous endophthalmitis were observed in patients with nephrological complications. Case 1 involved a 50-year-old man with end-stage renal disease on

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hemodialysis, who presented with severe visual impairment in the right eye due to *Staphylococcus aureus* sepsis from a hemodialysis catheter infection. Despite aggressive treatment with intravitreal and systemic antibiotics, the patient's visual prognosis was poor. Case 2 involved a 65-year-old woman with acute pyelonephritis and undiagnosed diabetes, presenting with unilateral visual loss and ocular inflammation. Systemic and intravitreal antibiotics, alongside corticosteroids, led to a favorable outcome with a final visual acuity of 7/10.

Discussion: Diabetic patients with nephrological conditions are particularly susceptible to endogenous endophthalmitis due to compromised immunity and increased risk of systemic infections. Both cases underscore the link between systemic infections, particularly in patients with renal or diabetic conditions, and endogenous endophthalmitis. Prompt recognition of ocular symptoms in patients with systemic infections is critical, as appropriate intervention can preserve visual function. The role of broad-spectrum antibiotics, intravitreal injections, and systemic infection control is emphasized.

Conclusion: These cases illustrate the importance of multidisciplinary intervention in managing endogenous endophthalmitis secondary to nephrological infections. While outcomes vary depending on disease severity and patient health, rapid diagnosis and treatment are vital to improving prognosis and preserving vision.

Keywords: Endogenous endophthalmitis; nephrological complications; systemic infection; hemodialysis; Staphylococcus aureus; intravitreal antibiotics; diabetes; ocular infection.

1. INTRODUCTION

Endogenous endophthalmitis is a serious, vision-threatening intraocular infection caused by hematogenous spread of the pathogens, usually due to distant systemic infections (Bhattacharjee et al., 2016). Patients with renal complications, such as those on hemodialysis or with urinary tract infections, are at heightened risk due to their compromised immune systems and frequent exposure to invasive procedures. Given that only early intervention can help preserve visual acuity, prompt recognition and management of this condition is important (Sharma et al., 2022). This article describes two interesting and rare cases that outline the nephrological etiology for endogenous endophthalmitis and the need for rapid diagnosis and treatment.

2. METHODS

The article presents two cases of management of endogenous endophthalmitis associated with nephrological conditions in diabetic patients. Clinical presentation, ocular examination, and ocular ultrasound findings confirmed the diagnosis. Blood cultures, cultures of vitreous samples, and polymerase chain reaction testing were done to identify the responsible organism. Immediate treatment involved intravitreal injections of vancomycin (1 mg/0.1 ml) and ceftazidime (2.25 mg/0.1 ml), combined with broad-spectrum intravenous antibiotics.

3. PRESENTATION OF CASE

3.1 Case 1

A 50-year-old man with end-stage renal disease and poorly controlled type 2 diabetes mellitus (HbA1c 9.5%) was recently placed on hemodialysis via a temporary dual lumen catheter. The patient presented to the emergency department with pain, swelling, and blurry vision in his right eye, accompanied with chills and fever for the past 3 days.

On ophthalmological examination, the patient's had only a perception of hand motion in the affected eye. Slit-lamp examination revealed swollen lids, conjunctival injection, corneal edema, anterior chamber hypopyon, and vitreous infiltration. Urgent ophthalmological consultation was obtained, and the diagnosis of acute endophthalmitis was confirmed. Further examination revealed erythema at the subcutaneous tunnel with mild drainage at the exit site of the catheter (Fig. 1).

Ocular ultrasound findings confirmed increased echogenicity within the vitreous cavity and thus supported the diagnosis of endophthalmitis. Based on a history of hemodialysis, the causative organism was suspected to be related to the hemodialysis catheter. Blood cultures at the time of admission were positive for *Staphylococcus aureus*, indeed indicating that the source was his hemodialysis catheter.

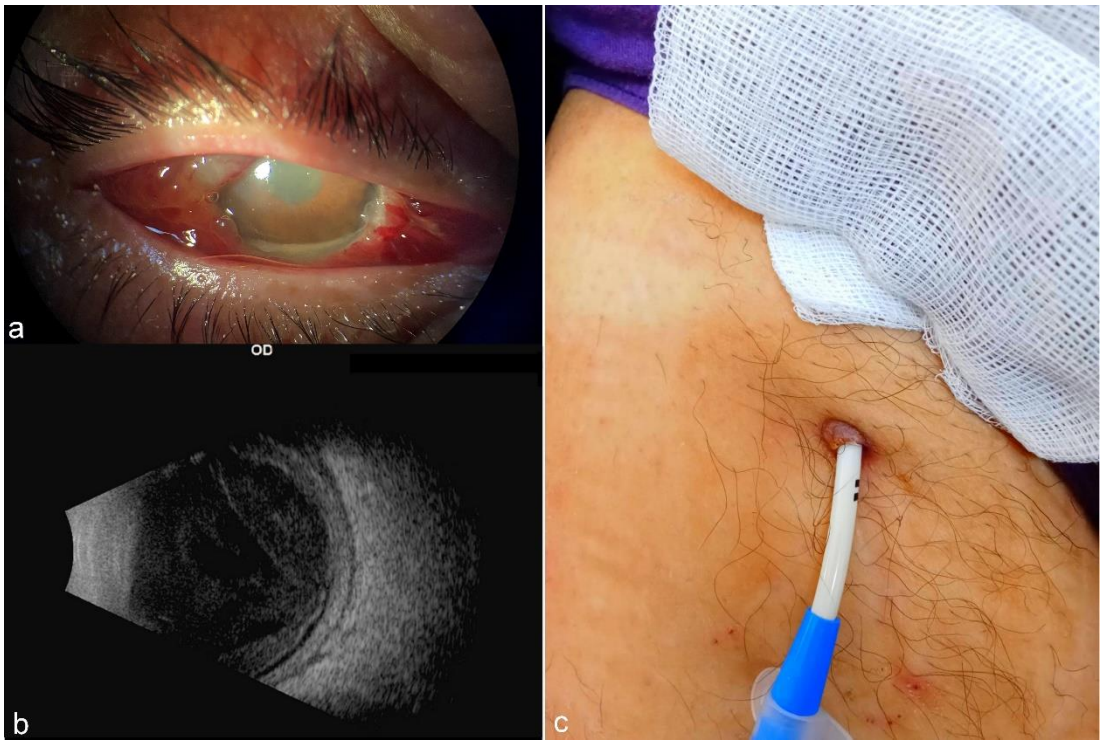

Fig. 1. a) Anterior segment photo of the patient showing conjunctival injection, corneal edema, and anterior chamber hypopyon
b) B-scan of the patient revealed vitreous opacity
c) Cutaneous examination revealed erythema at the subcutaneous tunnel, with mild drainage at the catheter exit site

The initial management included immediate intravitreal injection of antibiotics (Vancomycin 1 mg/0.1 ml, and Ceftazidime 2.25 mg/0.1 ml). Broad-spectrum intravenous antibiotics were also initiated immediately, along with removal of the hemodialysis catheter. Cultures of the vitreous sample and the hemodialysis catheter confirmed the presence of *Staphylococcus aureus*, which correlated with the blood culture. Polymerase chain reaction testing of the vitreous sample was performed to rule out other etiologies and confirmed the presence of *staphylococcus aureus*.

Despite timely intervention, the visual acuity in the affected eye continued to deteriorate. Two additional intravitreal antibiotic injections were administered at 48 hour intervals (Fig. 2). Treatment was maintained for 1 month, but the ophthalmological outcome was poor, with the formation of fibrin in front of the pupillary axis and phthisis bulbi.

3.2 Case 2

A 65-year-old woman was referred to our emergency department for unilateral painful red eye and sudden decrease in visual acuity in her right eye. These complaints began four days after she was diagnosed with acute pyelonephritis by the urology department after she reported left lumbar pain and fever. The patient had no prior history of diabetes mellitus and had not undergone regular medical check-up, which contributed to the delay in diagnosis.

Ophthalmological examination revealed a visual acuity limited to counting fingers at one-meter, conjunctival hyperemia with a perikeratic circle, corneal edema, and an important inflammatory reaction in the anterior chamber (Fig. 3a). The vitreous was dense with pre-macular organization that prevented detailed fundus evaluation. Ocular ultrasound showed increased echogenicity within the vitreous cavity, including dense vitreous opacities without retinal detachment.

In view of this clinical presentation, endogenous endophthalmitis was suspected. Urine culture revealed sensitive *Staphylococcus aureus*. Uroscan findings included the presence of

ureterohydronephrosis due to a pelvic pre-meatal ureteral microlithiasis (630 HU) and two bilateral caliceal lithiases with significant functional impact (Fig. 4).

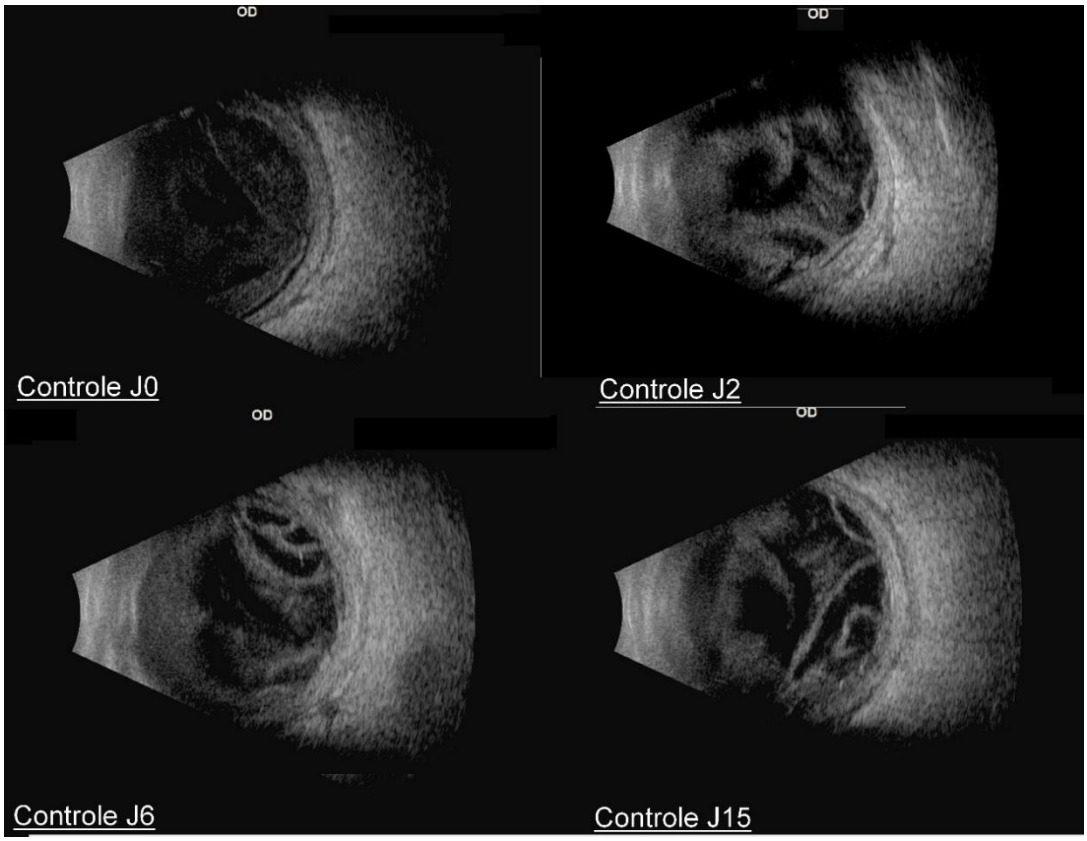

Fig. 2. The progression was marked by an increase in vitreous opacity, with a localized retinal detachment developing over time

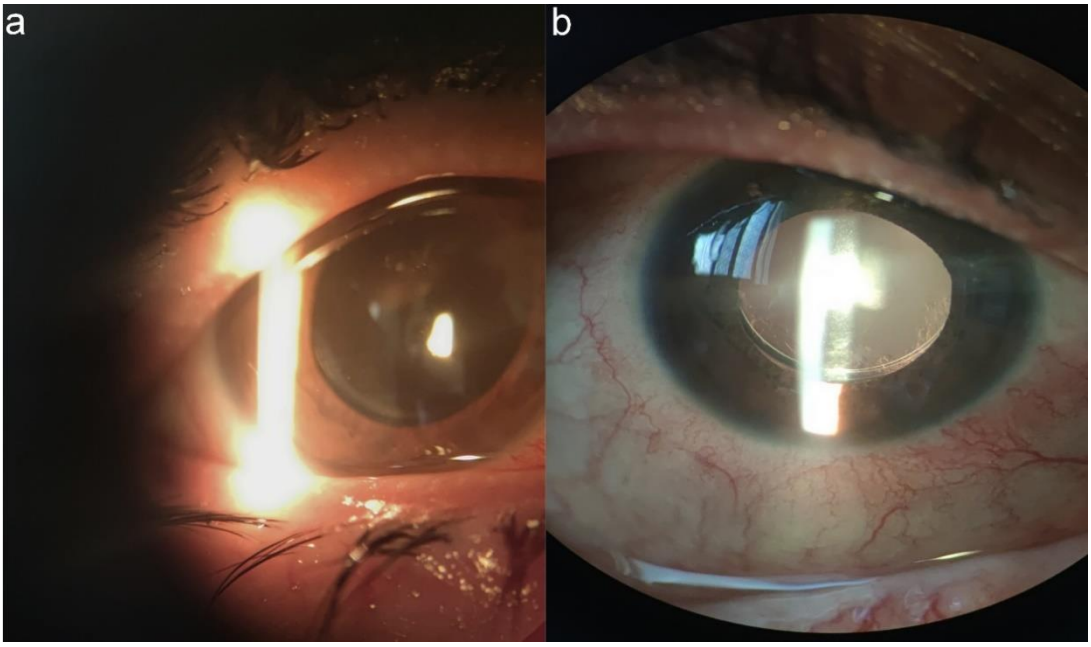

Fig. 3. a) Patient's clinical image upon emergency room admission
b) Clinical image post-recovery

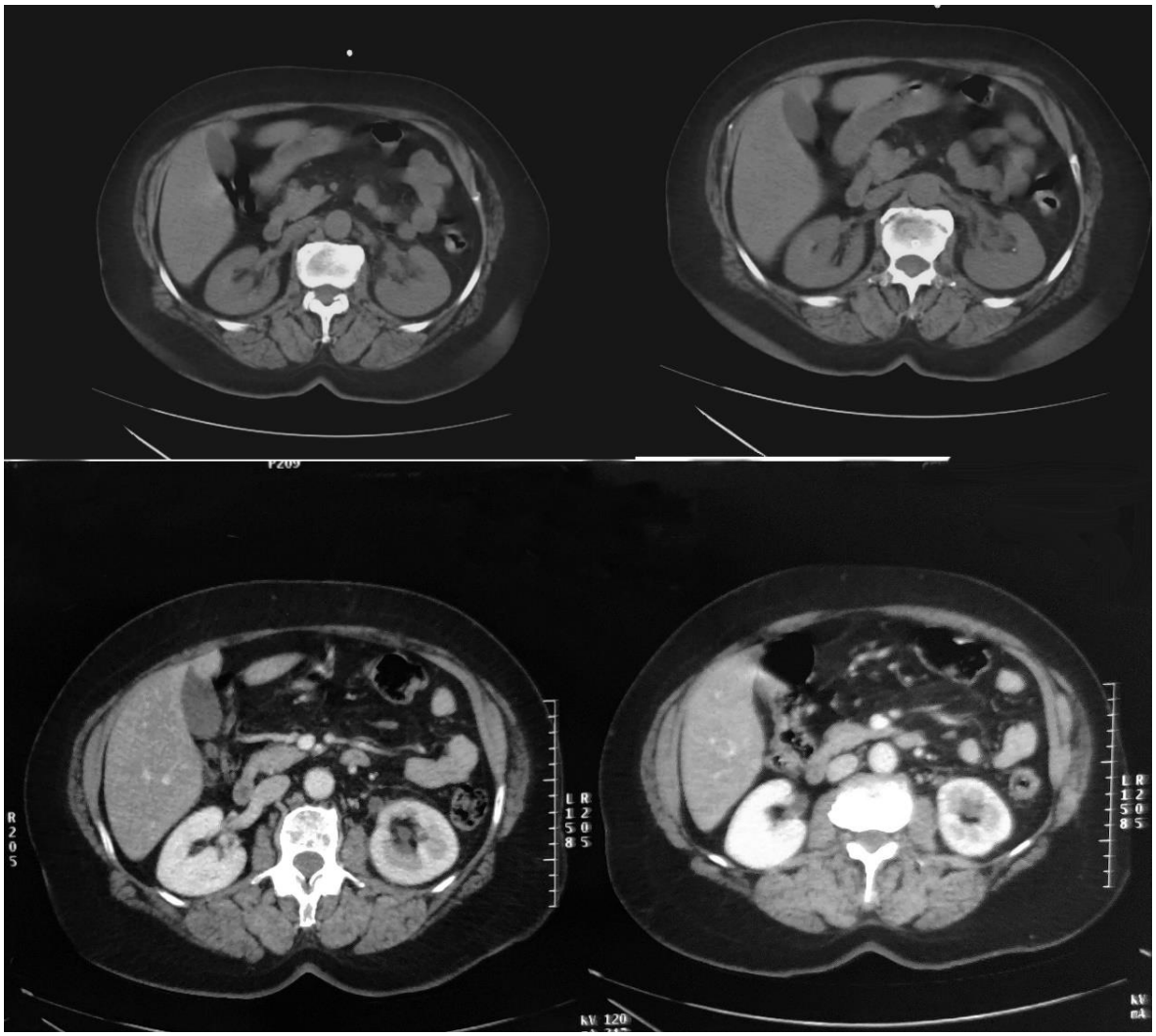

Fig. 4. Image depicting the uroscan findings of ureterohydronephrosis located upstream of a pelvic pre-meatal ureteral microlithiasis

The patient was treated with systemic antibiotics, specifically third-generation cephalosporins and gentamicin, resulting in a favorable clinical response. Ophthalmologically, she received two intravitreal injections of Ceftazidime (2.25 mg/0.1 ml) and Vancomycin (1 mg/0.1 ml) administered at 48-hour intervals, with fortified eye drops containing the same antibiotics, leading to notable improvement. Once infection control was achieved, both topical and systemic corticosteroid therapies were initiated, which significantly reduced the inflammatory signs (Fig. 3b).

Subsequent uroscan control revealed no dilation of the excretory cavities bilaterally and spontaneous expulsion of the lithiases, with resolution of renal suppuration due to systemic antibiotic therapy. Risk factor assessment identified previously undiagnosed diabetes, with a glycated hemoglobin level of 9%. Biological inflammation markers, including white blood cell count and C-reactive protein, normalized. Upon discharge, the patient's best visual acuity was recorded at 7/10. She was referred for follow-up care in nephrology and endocrinology.

4. DISCUSSION

The current study reports two unusual cases of unilateral endogenous endophthalmitis due to nephrological causes. Incidentally, the patients in both cases were diabetic, an underlying condition represented in the vast majority of patients with endogenous endophthalmitis (de Lima et al., 2012).

Endogenous bacterial endophthalmitis, also referred to as metastatic bacterial

endophthalmitis, represents a rare but severe ocular complication following a wide range of systemic infections, including those with hemodialysis catheters. The development of endophthalmitis in this setting represents a severe condition that needs to be identified early and treated promptly in order to preserve visual function.

The most common mechanism is hematogenous dissemination, where the bacteria ingress into the bloodstream and travel until they reach the eye (Bhattacharjee et al., 2016). Most instances of endogenous endophthalmitis are unilateral, with the right eye predominantly affected; this can be attributed to the more direct arterial supply from the right carotid artery (Saleem et al., 2007).

Endogenous or metastatic bacterial endophthalmitis is a rare complication but often devastating from systemic bloodstream infection, accounting for 2-8% of all cases of endophthalmitis (Okada et al., 1994). It is often associated with chronic medical conditions such as diabetes mellitus, chronic kidney diseases, several other chronic invasive procedures, non-ocular surgeries, the use of intravenous drugs, or even the prolonged use of central venous catheters (Lemley et al., 2007).

The diagnosis of metastatic staphylococcal endophthalmitis in our case is supported by the following observations: the endophthalmitis following a well-documented episode of staphylococcal sepsis, the exclusion of evidence for any other infecting organism, and the response to systemic and local antibiotic therapy. In cases of suspected endogenous endophthalmitis, cultures of blood, urine, aqueous humor, vitreous humor, and other clinically relevant fluids must be done (Ren et al., 2023). Blood cultures may be positive in up to 71% of patients with endogenous endophthalmitis, while vitreous and other aqueous humor cultures may be positive in 61% to 70% of cases (Sadiq et al., 2015). Such cultures are critical to establishing the diagnosis but must be obtained from all possible additional sites of infection, including catheters and draining lesions. Negative eye cultures are not uncommon (Jackson et al., 2014).

Endogenous endophthalmitis will require intravitreal antibiotic therapy in its acute management (Saleem et al., 2007). Systemic antibiotics are also used to control distant foci of infection and prevent a persistent state of bacteremia, thus minimizing the risk of involvement of the other eye. The use of an initial broad-spectrum antibiotic therapy with vancomycin and an aminoglycoside or a third-generation cephalosporin is indicated (You et al., 2024).

In severe cases presenting with marked vitreous cloudiness, retinal detachment, low initial visual acuity, and the presence of virulent organisms, vitrectomy proved to be beneficial Zhou (Zhou et al., 2019). Vitrectomy was also useful for the isolation of the responsible pathogen with a detection rate of 62.5%, comparable to the 57.1% positivity of blood cultures (Endogenous Endophthalmitis Associated, 2024). Corticosteroids are very controversial (Jackson et al., 2014); however, it appears to be effective in reducing the chances of enucleation/evisceration, particularly in conjunction with vitrectomy (Chen et al., 2022).

The Endophthalmitis Vitrectomy Study (EVS) provides consensus guidelines for the treatment of endophthalmitis, which centered primarily on postoperative cases but offered fundamental learnings that could be extrapolated to endogenous endophthalmitis (Results of the Endophthalmitis Vitrectomy Study, 1995). The EVS recommends immediate pars plana vitrectomy for patients presenting with visual acuity of light perception only. For patients with better visual acuity, initial treatment includes intravitreal antibiotic injections without vitrectomy.

Recent recommendations by the American Academy of Ophthalmology (AAO) stress that treatment needs to be individualized, according to the degree of severity of the infection and the patient's general health status (Doft , 2019). According to AAO, the necessity of prompt intravitreal administration of antibiotics and also refers to systemic ones, particularly in cases when systemic infections, such as pyelonephritis, are present.

Current research supports cautious use of intravitreal corticosteroids as an adjuvant alone in endophthalmitis to reduce intraocular inflammation and potentially improve visual outcomes (Xu et al., 2018). However, the use of corticosteroids still controversial because they may impair host immune responses and delay bacterial eradication.

This disease is generally associated with a poor prognosis and resulting in blindness for the

majority of patients, as seen in our first case. in the early stages, the prognosis is generally favorable, but in the presence of other risk factors can lead to a poor prognosis (Sadiq et al., 2015). Our second case had a good outcome with very satisfactory final visual acuity no doubt as a result of early systemic and local antibiotics.

5. CONCLUSION

Both cases indicate the importance of early suspicion and intervention in case of potential ocular complications during nephrological infections. Although they represent absolutely different patients' attitude and final results, both are united in the demonstration of the importance of timely and multidisciplinary intervention to save the vision.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

CONSENT

All authors declare that 'written informed consent was obtained from the patient for publication of this case report and accompanying images.

ETHICAL APPROVAL

As per international standards or university standards written ethical approval has been collected and preserved by the author(s).

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

Bhattacharjee, H., Bhattacharjee, K., Gogoi, K., Singh, M., Singla, B., & Yadav, A. (2016). Microbial profile of the vitreous aspirates in culture proven exogenous endophthalmitis: A 10-year retrospective study. *Indian Journal of Medical Microbiology*, 34(2), 153–158.

Chen, K. J., Chen, Y. P., Chen, Y. H., Liu, L., Wang, N. K., Chao, A. N., et al. (2022). Infection sources and Klebsiella pneumoniae antibiotic susceptibilities in endogenous Klebsiella endophthalmitis. *Antibiotics*, 11(7), 866.

de Lima, L. M., Cecchetti, S. A. de P., Cecchetti, D. F. A., Arroyo, D., Romão, E. A., Dantas, M., et al. (2012). Endophthalmitis: A rare but devastating metastatic bacterial complication of hemodialysis catheter-related sepsis. *Renal Failure*, 34(1), 119–122.

Doft, B. H. (2019). International practice patterns in the management of postprocedure endophthalmitis. *Ophthalmology Retina*, 3(6), 459–460.

Endogenous endophthalmitis associated with pyogenic liver abscess caused by *Klebsiella pneumoniae*. (2024). *PMC*. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6761334/

Endophthalmitis Vitrectomy Study Group. (1995). Results of the Endophthalmitis Vitrectomy Study: A randomized trial of immediate vitrectomy and intravenous antibiotics for the treatment of postoperative bacterial endophthalmitis. *Archives of Ophthalmology*, 113(12), 1479–1496.

Jackson, T. L., Paraskevopoulos, T., & Georgalas, I. (2014). Systematic review of 342 cases of endogenous bacterial endophthalmitis. *Surveys in Ophthalmology*, 59(6), 627–635.

Lemley, C. A., & Han, D. P. (2007). Endophthalmitis: A review of current evaluation and management. *Retina*, 27(6), 662–680.

Okada, A. A., Johnson, R. P., Liles, W. C., D'Amico, D. J., & Sullivan Baker, A. (1994). Endogenous bacterial endophthalmitis: Report of a ten-year retrospective study. *Ophthalmology*, 101(5), 832–838.

Ren, C., Li, Z., Meng, F., Du, Y., Sun, H., & Guo, B. (2023). Endogenous endophthalmitis caused by urinary tract infection: A case report. *Medicine*, 102(46), e36139.

Sadiq, M. A., Hassan, M., Agarwal, A., Sarwar, S., Toufeeq, S., Soliman, M. K., et al. (2015). Endogenous endophthalmitis: Diagnosis, management, and prognosis.

Journal of Ophthalmic Inflammation and Infection, 5(1), 32.

Saleem, M. R., Mustafa, S., Drew, P. J. T., Lewis, A., Shah, Y., Shankar, J., et al. (2007). Endophthalmitis, a rare metastatic bacterial complication of haemodialysis catheter-related sepsis. *Nephrology Dialysis Transplantation*, 22(3), 939–941.

Sharma, S. P., Bansal, R., & Kumar, S. (2022). Endophthalmitis: Types and recent trends in diagnosis. *Current Pharmacology Reports*, 8(2), 106–111.

Xu, D., Nagiel, A., Rahimy, E., & McCannel, C. A. (2018). Practice patterns of endophthalmitis treatment: An international survey of retina specialists. *Ophthalmology Retina*, 2(9), 979–980.

You, H., & Kim, J. (2024). Endogenous endophthalmitis from urinary tract infection caused by Group B Streptococcus: A case report. *Medicina*, 60(5), 700. https://doi.org/10.3390/medicina600500700

Zhou, Y., Wang, X., Shen, J., Lu, Z., & Liu, Y. (2019). Endogenous endophthalmitis caused by carbapenem-resistant hypervirulent Klebsiella pneumoniae: A case report and literature review. *Ocular Immunology and Inflammation*, 27(7), 1099–1104.

APPENDIX

CARE Checklist of information to include when writing a case report

Topic	Item	Checklist item description	Reported on Line
Title	1	The diagnosis or intervention of primary focus followed by the words "case report"	L1-2
Key Words	2	2 to 5 key words that identify diagnoses or interventions in this case report, including "case report"	L-14-16
Abstract (no references)	3a	Introduction: What is unique about this case and what does it add to the scientific literature?	L12-13
	3b	Main symptoms and/or important clinical findings	L12-13
	3c	The main diagnoses, therapeutic interventions, and outcomes	L12-13
	3d	Conclusion—What is the main "take-away" lesson(s) from this case?	L12-13
Introduction	4	One or two paragraphs summarizing why this case is unique (**may include references**)	L20-27
Patient Information	5a	De-identified patient specific information.	L32-33 / L67-68
	5b	Primary concerns and symptoms of the patient.	L33-35 / L68-70
	5c	Medical, family, and psycho-social history including relevant genetic information	L32 / L68-70
	5d	Relevant past interventions with outcomes	
Clinical Findings	6	Describe significant physical examination (PE) and important clinical findings.	L36-41/LL71-75
Timeline	7	Historical and current information from this episode of care organized as a timeline	
Diagnostic Assessment	8a	Diagnostic testing (such as PE, laboratory testing, imaging, surveys).	L49-53/L80-83
	8b	Diagnostic challenges (such as access to testing, financial, or cultural)	
	8c	Diagnosis (including other diagnoses considered)	L49-50/LL80
	8d	Prognosis (such as staging in oncology) where applicable	
Therapeutic Intervention	9a	Types of therapeutic intervention (such as pharmacologic, surgical, preventive, self-care)	L54-57/L87-92
	9b	Administration of therapeutic intervention (such as dosage, strength, duration)	L54-57/L87-92
	9c	Changes in therapeutic intervention (with rationale)	
Follow-up and Outcomes	10a	Clinician and patient-assessed outcomes (if available)	LL58-61/L93-98
	10b	Important follow-up diagnostic and other test results	LL58-61/L93-98
	10c	Intervention adherence and tolerability (How was this assessed?)	
	10d	Adverse and unanticipated events	
Discussion	11a	A scientific discussion of the strengths AND limitations associated with this case report	L102-104
	11b	Discussion of the relevant medical literature **with references**.	LL105-145
	11c	The scientific rationale for any conclusions (including assessment of possible causes)	LL105-145
	11d	The primary "take-away" lessons of this case report (without references) in a one paragraph conclusion	L149-152
Patient Perspective	12	The patient should share their perspective in one to two paragraphs on the treatment(s) they received	
Informed Consent	13	Did the patient give informed consent? Please provide if requested	Yes ☒ No ☐

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