Case Report

# Endogenous Presumed Bacterial Endophthalmitis of the Right Eye Following Cellulitis of the Right Leg

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## Abstract

Endogenous endophthalmitis is a very rare but potentially devastating intraocular inflammation resulting from haematogenous spread of pathogens to the eye. We present a case of a 26-year-old male adult who had a nail puncture injury to the sole of his right foot and developed swelling of the that foot and leg associated with severe pain and fever five days later. While being managed in a private clinic as a case of cellulitis of the right leg, he developed ocular pain, redness and diminution of vision in the right eye but was attended to five days later by the ophthalmologist who made a diagnosis of endogenous presumed bacterial endophthalmitis in an already blind right eye secondary to septicaemia. With 15 days of systemic antibiotics, the ocular and systemic findings resolved. The eye became pthisical on follow-up. Endogenous endophthalmitis is associated with poor visual prognosis and early intervention is the only sure way to improve visual outcome.

**Keywords:** Cellulitis, endogenous endophthalmitis, presumed bacterial, septicemia

## Introduction

Endogenous endophthalmitis, also known as metastatic endophthalmitis, is an uncommon but potentially devastating intraocular infection in which pathogens reach the eye via the blood stream.[1]

The incidence of endogenous endophthalmitis worldwide is estimated to be 2–15% of all cases of endophthalmitis.[2] Endogenous endophthalmitis can occur at any age; however, Wong *et al.*[3] and Connell *et al.*[4] have reported a mean age of 55 and 57.5 years, respectively. Moreover, they reported no sexual predilection, but some series have reported a slightly more preponderance for males at 53.8%.[4] The right eye is twice as often prone for a focus of infection than the left because of more proximal and direct blood flow to the right carotid artery.[5] Bilateral involvement occurs in approximately 25% of the cases.[6]

Common risk factors include diabetes mellitus, malignancy, lymphoproliferative disorders, intravenous drug abuse, parenteral alimentation, and prolonged urethral and intravenous catheterization. Other risk factors include end-stage renal disorders and chronic obstructive airway disorders (COPD). The common sources of infection include endocarditis, urinary traction infection, joint infections, and gastrointestinal tract infection. Lebovitch *et al.*[7] found diabetes mellitus, COPD, and end-stage renal disease to be the most common risk factors. Okada *et al.*[8] reported endocarditis and gastrointestinal tract infection as the sources of infection. Schielder *et al.*[9] in a case series of 21 patients found indwelling catheters and diabetes mellitus as the most common risk factors.

There is a wide spectrum of pathogens responsible for endogenous endophthalmitis. Lebovitch *et al.*[7] and Okada *et al.*[8] have found Streptococcal species as the most common infective pathogens, whereas Jackson *et al.*[10] in their case series found Staphylococcus species as the predominant organism. However, Okada *et al.*[8] found *Staphylococcus aureus* as the single most common organism in their study. *Klebsiella pneumoniae* and *Pseudomonas aeruginosa* were found to be the most common gram-negative organisms associated with endogenous endophthalmitis.[3,9] Fungal organisms commonly implicated in endogenous endophthalmitis include *Aspergillus*[8] and *Candida* spp.[7,9]

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Diagnosis is largely clinical with supplementary investigations such as vitreous tap for smear and culture and blood cultures.

The incidence of endogenous endophthalmitis has been found to be on the rise due to longer lifespan and long-term intravenous access.[11] Though the outcome in cases of endogenous endophthalmitis is not very encouraging, prompt recognition and aggressive treatment are the key to prevent severe loss.

To our knowledge, this was the first reported case of endogenous endophthalmitis in our locality and one of the very few reported cases in Nigeria.

## Case Report

A 26-year-old male tailor, an apparently healthy adult with secondary education, had an accidental nail puncture on his right foot. Following this incident, he approached a patent medicine store where he was given intramuscular tetanus toxoid, oral antibiotics (Cap Ampiclox 500 mg q.d.s), and tablet ibuprofen 400 mg b.d. However, 5 days later, he developed a severe swelling of the foot and leg with associated pain, fever, and altered sensorium. He was consequently taken to a private clinic where he was found to have cellulitis of the right leg and foot with septicemia. He was placed on intravenous meropenem 500 mg 8 hourly, intravenous metronidazole 500 mg 8 hourly, and intravenous pentazocine. In addition, he was rehydrated with dextrose saline. After five on admission, he was found not to be responding well to treatment and subsequently transferred to a government-owned Secondary Health Facility.

At the private clinic, he developed diminution of vision in the right eye, which was associated with pain, redness, and tearing. No attention was given to the ocular complaints. Five days after the onset of ocular symptoms, he could no longer see with the right eye.

He was not a known diabetic and hypertensive. In addition, he was neither consuming alcohol nor tobacco products. He was not previously admitted for any medical or surgical condition.

At the Secondary Health Facility, an ophthalmologist was then invited to review him.

On general examination, he was looking acutely ill, well oriented in time, place, and person, febrile with a temperature of 38.6°C, and moderately pale.

He was tachypneic with a respiratory rate of 34 cycles per minute, but the chest was clinically clear. His pulse rate was 118 beats per minute, regular and full volume. The blood pressure in supine position was 160/80 mmHg. The abdomen was normal. He had indwelling catheter that was draining clear urine. On musculoskeletal examination, extensive sloughing of the skin of the right leg and foot with exposed calcaneum of the foot [Figure 1] was noted.

On ocular examination, the visual acuity was no light perception in the right eye and 6/9 in the left eye. The lid was moderately ptotic with mild purulent discharge, the globe was mobile in all directions of gaze, there was moderately diffuse conjunctival injection with chemosis, and there were multiple nodule-like protrusions on the sclera (intraocular abscess). The cornea was edematous with no evidence of ulceration. There was total hypopyon precluding any further evaluation of the eye [Figure 2]. The left eye was essentially normal.

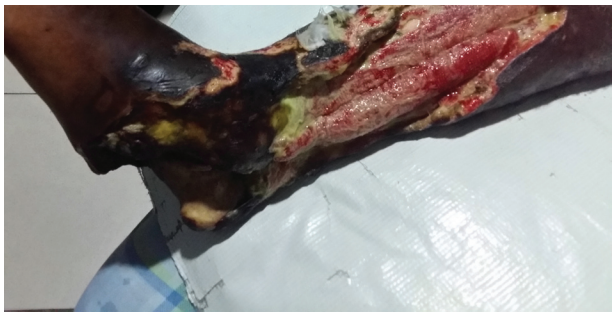

**Figure 1:** Sloughing of the skin of the right leg and foot with exposed calcaneum

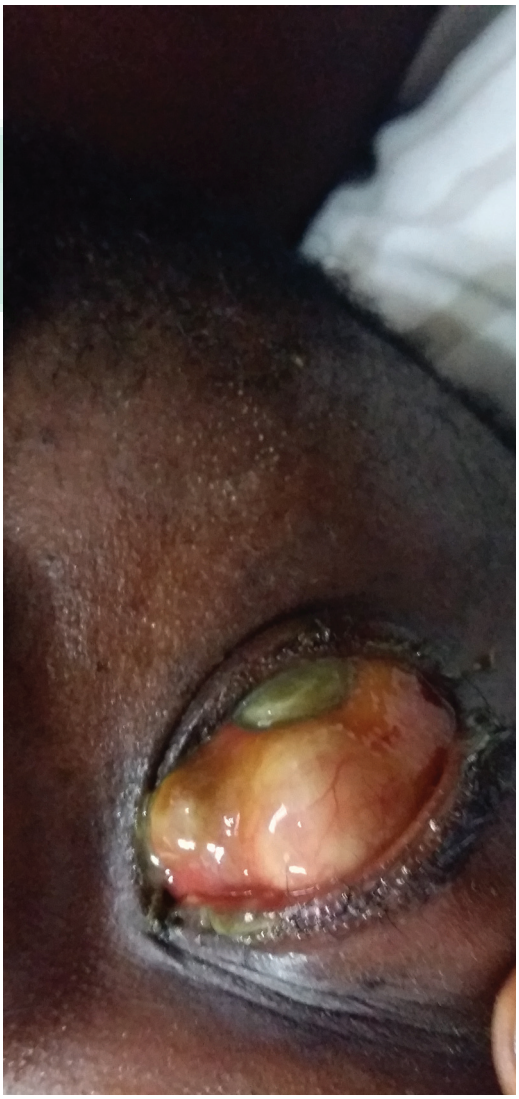

**Figure 2:** Total hypopyon and protruding intraocular abscess

Hematological investigation showed anemia and marked neutrophilia; blood chemistry for electrolytes, urea, and creatinine was normal [Table 1]. Random blood sugar was 6.5 mmol/L. Serological tests showed that hepatitis B and C surface antigens, as well as those for human immunodeficiency virus (HIV) 1 and 2, were negative. Liver function test showed the derangement of aspartate transaminase (AST), alanine aminotransferase (ALT), and alkaline phosphatase (ALK) [Table 1]. Blood culturing using thioglycolate and tryptone soya broth media yielded no bacterial growth.

Vitreous and anterior chamber tap for culture using thioglycolate and tryptone soya media yielded no bacterial growth. No wound culturing was performed from the affected leg. This regrettably was a drawback of this case report.

He was managed as a case of overwhelming septicemia secondary to ascending cellulitis of the right leg and endogenous endophthalmitis. He was placed on broad-spectrum antibiotics – IV ceftriaxone 1 g 12 hourly, IV metronidazole 500 mg 8 hourly, IV gentimicin 80 mg 8 hourly, and IV ciprofloxacin 200 mg 12 hourly. He also had other supportive management methods to correct anemia in addition to local wound management.

Within 15 days of empirical intravenous antibiotics, both the clinical and laboratory parameters improved. The intraocular abscess and the hypopyon resolved remarkably [Figure 3]. The eye became phthisical as noted on follow-up.

**Table 1: Laboratory results at presentation to the government hospital**

| Test type | Result | Normal range |
|---|---|---|
| WBC*/differential | | |
| Total count | 22 × $10^9$/L | (4–12 × $10^9$) |
| Granulocytes | 79% | (60–70%) |
| Lymphocytes | 19% | (20–60%) |
| Mid | 2% | (3.0–14%) |
| Packed cell volume | 28% | (40–54%) |
| ESR | 130 mm/h | Male (3–5 mm/h) |
| Liver function test | | |
| AST (SGOT) | 36 iu/L | (0–12 iu/L) |
| ALT (SGPT) | 22 iu/L | (0–12 iu/L) |
| ALK phosphatase | 422 iu/L | (40–170 iu/L) |
| Electrolytes/urea/creatinine | | |
| $Na^+$ | 140 mmol/L | (135–155 mmol/L) |
| $K^+$ | 5.1 mmol/L | (3.4–5.3 mmol/L) |
| $Cl^-$ | 100 mmol/L | (98–106 mmol/L) |
| Urea | 9.5 mmol/L | (1.7–9.1 mmol/L) |
| Creatinine | 95 mmol/L | (60–120 mmol/L) |

ALK = alkaline phosphatase; ALT = alanine aminotransferase; AST = aspartate transaminase; ESR = erythrocyte sedimentation rate; SGPT = serum glutamic-pyruvic transaminase; *WBC = white blood cell; SGOT = Serum glutamic-oxaloacetic.

## Discussion

Generally, blood cultures are the most frequent means of establishing a diagnosis of endogenous endophthalmitis.[9,10] However, in this case, the blood culture did not yield any growth. We strongly presumed that the cause of the intraocular infection in this case was bacterial in origin because of the satisfactory response of the patient to intravenous antibiotics. It should be noted that the patient had been on antibiotics for a minimum of 10 days before the blood sample was collected for culture. Also noted in this patient were the negative culture results obtained from the vitreous and aqueous tap. The reason may not be too different from the picture we obtained from the blood culture. Besides, studies have shown that not all cases of endogenous endophthalmitis had blood and vitreous cultures yielding specific etiological findings.[8-10,12]

The microbial picture of reported cases varies from study to study. Jackson *et al.*[10] in their review of 267 reported cases from different regions of the world showed that gram-negative bacteria were common in Asia while gram-positive bacteria were common in North America and Europe. Connell *et al.*[4] reported more fungal isolates in 41 culture-positive patients out of 64 (27; 65.1%), followed by gram-negative organisms (8; 19.5%) and then gram-positive organisms in 6 (14.6%) patients. Uhumwangbo and Osaguoma[13] reported a mixture of *Candida* and *Haemophilus* species in their only reported case.

Endogenous endophthalmitis is associated with poor visual prognosis because of delayed diagnosis and intervention as noted in this case.[8,10] There is need for early ophthalmological consultation when patients with sepsis complain of ocular symptoms such the diminution of vision, pain, and redness. Schielder[9] reported that 18 eyes out of 21 eyes they managed only achieved a visual acuity of 3/60 or better. Jackson *et al.*[10] in their review of 267 patients with endogenous endophthalmitis and their experience with 19 patients reported that majority of the patients ended up with blindness even with adequate treatment. Uhumwangbo and Osaguoma[13] reported a final visual acuity of hand movement in a 55-year-old man they managed with endogenous endophthalmitis in Benin City, Nigeria. A high index of suspicion and prompt intervention in patients suspected with endogenous endophthalmitis are required if

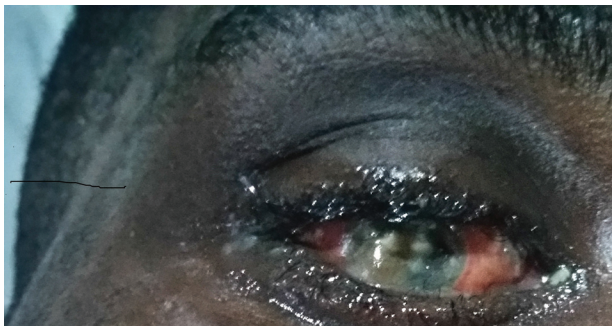

**Figure 3:** Resolution of the hypopyon and intraocular abscess

good visual outcome is to be achieved. Systemic antibiotics are said to be more valuable in endogenous endophthalmitis than in postoperative or traumatic endophthalmitis. In addition, intraocular antibiotic injection and vitrectomy make only a limited contribution to its successful treatment.[12] Kernt and Kampik[12] opined that that the data from the endophthalmitis vitrectomy study may not be applicable to endogenous endophthalmitis because the spectrum of organisms differs significantly in endogenous endophthalmitis. We also noted resolution in our patient following the use of only systemic antibiotics. We never used intravitreal antibiotics in this patient because the patient had completely lost vision in that eye before the ophthalmic consultation. However, we considered not using intravitreal antibiotics in this patient as a shortcoming in our management.

The right eye was involved in this patient as shown in other reported patients.[5] The right eye is generally twice more likely to be affected than the left because of the direct blood flow from the carotid artery.[5]

Majority of the reported cases of endogenous endophthalmitis were seen among the middle-aged and elderly patients;[3,4,7] however, our patient was a healthy young adult with no predisposing factor. Perhaps, the offending microbial organism was very virulent judging from the degree of soft tissue damage to the leg within a relatively short time [Figure 1].

## Conclusion

Endogenous endophthalmitis is associated with poor visual outcome especially when not recognized on time. This case highlights the need for quick ophthalmological consultation in patients with septicemia along with ocular symptoms to preserve vision.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

## References

1. Chee SP, Jap A. Endogenous endophthalmitis. Curr Opin Ophthalmol 2001;12:464-70.
2. Pulliafito CA, Baker AS, Haaf J, Foster S. Endogenous bacterial endophthalmitis. Review of 36 cases. Ophthalmology 1982;89:921-9.
3. Wong JS, Chan TK, Lee HM, Chee SP. Endogenous bacterial endophthalmitis. An East Asian experience and a reappraisal of a severe ocular affliction. Ophthalmology 2000; 107:1483-91.
4. Connell PP, O'Neill EC, Fabinyi D, Islam FM, Buttery R, McCombe M, *et al.* Endogenous endophthalmitis – 10 year experience at a tertiary referral centre. Eye 2011;25:66-72.
5. Greenwald MJ, Wohl LG, Sell CH. Metastatic bacterial endophthalmitis: A contemporary reappraisal. Surv Ophthalmol 1986;31:81-101.
6. Arevalo JF, Jap A, Chee SP, Zeballos DG. Endogenous endophthalmitis in developing world. Int Ophthalmol Clin 2010;50:173-87.
7. Lebovitch I, Lai T, Raymond G, Zadeh R, Nathan F, Selva D. Endogenous endophthalmitis: A 13-year review at a tertiary hospital in South Australia. Scand J Infect Dis 2005;37:184-9.
8. Okada AA, Johnson RP, Liles WK, D'Amico DJ, Baker AS. Endogenous bacterial endophthalmitis Report of a ten-year retrospective study. Ophthalmology 1994;101:832-8.
9. Schielder V. Culture proven endophthalmitis: Clinical features and visual acuity outcome. Am J Ophthalmol 2004;137:725-31.
10. Jackson TL, Eykyn SJ, Graham EM, Stanford MR. Endogenous bacterial endophthalmitis: A 17-year prospective series and review of 267 reported cases. Surv Ophthalmol 2003;48:403-23.
11. Graham DA, Kinyoun JL, George DP. Endogenous *Aspergillus* endophthalmitis after lung transplantation. Am J Ophthalmol 1995; 119:107-9.
12. Kernt M, Kampik A. Endophthalmitis: Pathogenesis, clinical presentation, management, and perspectives. Clin Ophthalmol 2010;4:121-35.
13. Uhumwangbo OM, Osaguoma VB. Endogenous endophthalmitis with mixed infection. Case Report. Afr J Med Health Sci 2013; 12:44-6.