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Case Report (Open Access)

BILATERAL ENDOGENOUS ENDOPHTHALMITIS IN A CRITICALLY ILL PATIENT AS A COMPLICATION OF BACTERIAL SEPSIS

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ABSTRACT
Endogenous Endophthalmitis is a relatively rare condition resulting from haematogenous spread of microorganisms in which the initial focus of infection is at a site distal to the eye. Diagnosis of EE is especially challenging in critically ill patients as they may be too unwell to communicate visual symptoms.
We describe a rare case of bacterial EE in a 63-year-old female patient with diabetes mellites in the setting of urosepsis. She presented to emergency room with blurring of eyes, fever and altered sensorium. On evaluation her visual acuity was limited to perception of light in both the eyes. Ocular examination revealed bilateral conjunctival congestion and presence of hypopyon. Investigations revealed presence of urosepsis with urine and blood culture growing Escherichia coli. She was admitted to the ICU with the diagnosis of urosepsis, multiorgan dysfunction syndrome and endogenous endophthalmitis. She was managed with systemic and intravitreal antibiotics and other supportive care in the ICU. In spite of early and aggressive treatment her visual acuity deteriorated and she lost vision in both the eyes. We highlight how early ophthalmological examination can aid in the management of such critically ill patients.

Keywords: *Endogenous Endophthalmitis, Diabetes Mellitus, Urinary Tract Infection, Sepsis*

Abbreviations
EE- Endogenous Endophthalmitis, HIV- Human Immunodeficiency Virus, GCS- Glasgow Coma Scale, AST- Aspartate Aminotransferase, ALT- Alanine Aminotransferase ALP-Alkaline Phosphatase, ICU- Intensive Care Unit, VA- Visual Acuity

INTRODUCTION
Endogenous Endophthalmitis is a relatively rare condition resulting from haematogenous spread of microorganisms in which the initial focus of infection is at a site distal to the eye; it accounts for 2-8% of all endophthalmitis cases (Okada *et al.,* 1994). The disease is usually unilateral, but has been reported as bilateral in 5.2-28.6% of cases (Ratra *et al.,* 2015; Nishida *et al.,* 2015). EE is frequently associated with many underlying systemic risk factors. The most common risk factors include recent prolonged hospitalization, diabetes mellitus, immunosuppression (underlying malignancy, neutropenia and HIV), intravenous drug abuse, urinary tract infection, and indwelling catheter (Connell *et al.,* 2011; Jackson *et al.,* 2014).
Pathogenic microorganisms include both bacteria and fungi, however fungal organisms account for the majority of the cases (Connell *et al.,* 2011; Schiedler *et al.,* 2004). The organisms causing bacterial EE differ depending on the geographic location. In the developed world, gram-positive organisms

(Streptococci and Staphylococci) dominate the infection, whereas gram-negative organisms are more common in the Asian population (Connell *et al.,* 2011; Sharma *et al.,* 2014).
EE is an ophthalmic emergency, as delay in treatment results in poor visual prognosis. Any patient with suspected EE requires early identification of the causative organism and the underlying source of infection. Diagnosis of EE is challenging in critically ill patients as most of them are too unwell to communicate the visual symptoms. Treatment involves both intravitreal and systemic antibiotics and, often surgical vitrectomy. Despite adequate treatment visual prognosis is often poor, and blindness occurs in 30-45% of cases with some patients requiring enucleation or evisceration (Okada *et al.,* 1994; Jackson *et al.,* 2003).

CASE
A 63-year-old female known case of type 2 Diabetes mellitus presented to emergency department with history of blurring of vision in both eyes, fever, and altered sensorium. On clinical examination patient was drowsy with GCS of E3V4M6 with no focal neurological deficits. Her vitals were within normal limits and other systemic examination was unremarkable. Ophthalmology opinion was taken, on evaluation visual acuity was limited to perception of light in both the eyes. Ocular examination revealed bilateral conjunctival congestion, anterior chamber haziness with bilateral hypopyon. Fundoscopy showed bilateral lens haziness, vitreous exudation and retina could not be visualized. Bedside ultrasound examination revealed bilateral vitreous exudates, choroidal thickening with intact retina on both sides.

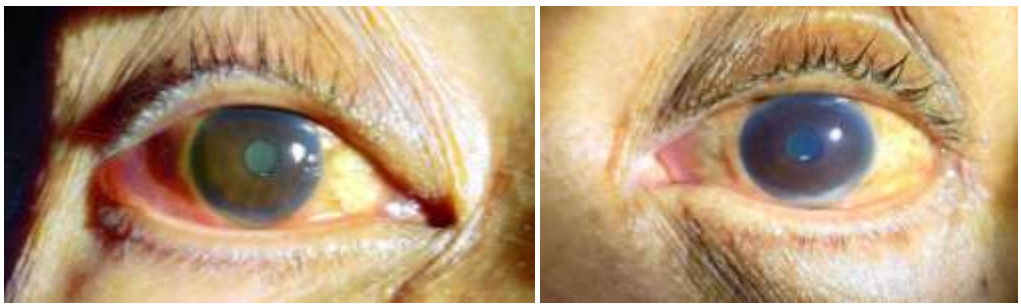

Figure 1: Ocular examination showing bilateral hypopyon

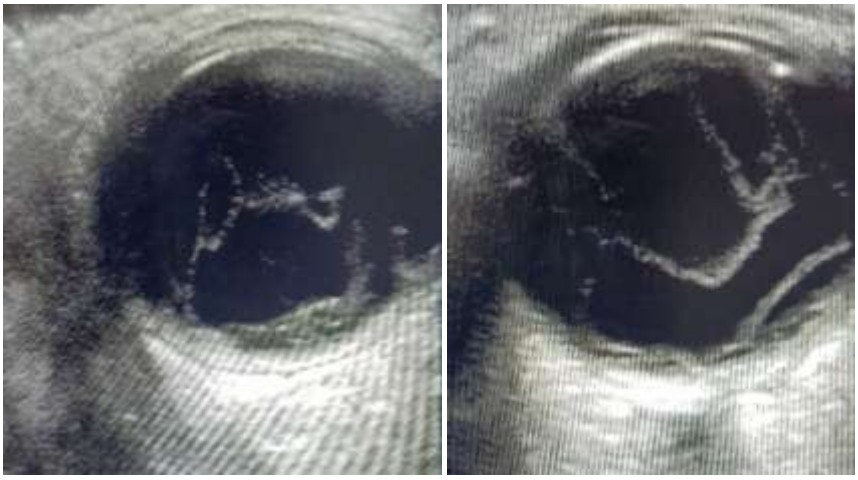

Figure 2: Ultrasound images showing bilateral vitreal exudates

Laboratory evaluation showed elevated total counts (27200 per cumm with 98% neutrophils), thrombocytopenia (60000 per cumm), elevated creatinine (2.43 g/dl), deranged Liver function tests (Total bilirubin 2.30 mg/dl, AST 39 U/L, ALT 36 U/L, ALP 560 U/L) and urine examination revealed plenty of pus cells. Blood and urine cultures showed Escherichia coli. She was admitted to the ICU with the

diagnosis of urosepsis with multiorgan dysfunction syndrome and bilateral endogenous bacterial endophthalmitis.

She was managed with a renal adjusted dose of Meropenem for the urosepsis and other supportive care in the ICU. An Intravitreal injection of 200 µg moxifloxacin each was administered for both the eyes. Clinically she improved with resolving sepsis, improved renal functions and sensorium. On follow-up examination, inflammation of the eyes and hypopyon was resolving, but her visual acuity continued to deteriorate. In spite of early diagnosis and aggressive management she lost vision in both the eyes at the time of discharge.

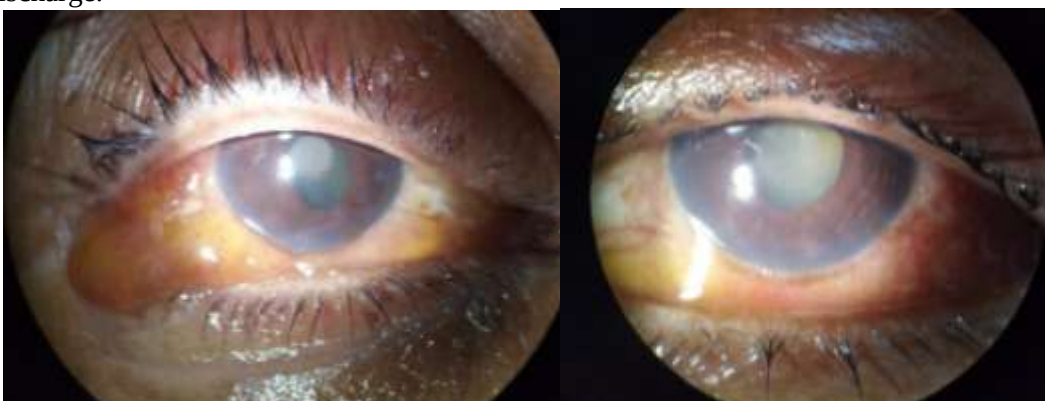

Figure 3: Ocular examination showing resolving hypopyon after the treatment

DISCUSSION

Endogenous Endophthalmitis results from metastatic spread of microorganisms from the primary site of infection. Once the diagnosis is suspected, the primary source of the infection needs to be identified with careful evaluation. The most common presumptive source of Endogenous Bacterial Endophthalmitis has been reported as infectious endocarditis followed by gastrointestinal and genitourinary tract infection (Okada *et al.,* 1994). EE following bacterial infection differs in different geographic areas based on the organism responsible. In the Western world, Gram-positive organisms (*Streptococci* and *Staphylococci*) are predominantly responsible for the infection, whereas in developing countries (Asian), Gram-negative organisms are responsible (Connell *et al.,* 2011; Sharma *et al.,* 2014).

EE is most commonly associated with underlying systemic condition. The most common systemic condition associated with bacterial endophthalmitis was diabetes mellitus followed by hypertension, cardiac disease, gastrointestinal disorders, and urological diseases (Okada *et al.,* 1994). Jackson *et al.,* (2003) also reported that the most common predisposing medical condition was diabetes mellitus (62%) including type II diabetes (42%) in a literature review and its presence was significantly associated with poor VA. In another study the most common predisposing condition for EE was also diabetes mellitus. The same study reported urinary tract as the most common source of infection followed by liver abscess, soft tissue abscess and pneumonia (Wu *et al.,* 2012). Our patient had type 2 diabetes mellitus and urinary tract infection as an underlying risk factor for EE.

A wide range of microorganisms are known to cause EE depending on geography, age of the patient, predisposing condition, and source of sepsis. Gram positive organisms such as Staphylococcus aureus, *Streptococcus pneumoniae* and other Streptococcal species are the most common causes of EE in the west (Jackson *et al.,* 2014). In India there are only few retrospective studies of culture proven cases of EE. In a 10-year retrospective study conducted in south India showed Pseudomonas as the most common organism (13.8%, 8 0f 58), followed by *Candida* (8.6%, 5 of 58) and *E. coli* (6.9%, 4 of 58) (Ratra *et al.,* 2015). In another study in South India by Bharathi *et al.,* (2010) among 9 cases of culture-proven EE, 7 isolates were Gram negative (*Pseudomonas aeruginosa, 2; Haemophilus influenzae, 2; Haemophilus parainfluenzae, 1; Neisseria meningitidis, 1; Klebsiella pneumoniae*, 1) and only 2 isolates were Gram positive (*Staphylococcus aureus* and *Streptococcus pneumoniae*) (Bharathi *et al.,* 2010). In our case *Escherichia coli* was isolated in the urine and vitreous cultures were sterile.

The main treatment for EE is aggressive systemic and intravitreal antibiotics and in some cases vitrectomy. In majority of the cases the visual prognosis is not good even after aggressive medical and surgical management. In a study by Ratra *et al.*, (2015) 20 eyes (32.8%) were lost, most of these eyes had infection with *Pseudomonas aeruginosa* and *Escherichia coli*, which are known to be more devastating. A study by Nishida *et al.*, (2015) reported Visual acuity of <20/200 in 9 (36%) of the eyes and 3 eyes required enucleation. In our patient VA deteriorated to "no light perception" during the follow-up, however patient did not require any surgical intervention.

In conclusion, EE is a diagnostic and therapeutic challenge especially in critically ill patients. The association of acute visual deterioration with a red eye in critically ill patients should raise the suspicion of EE. Bedside ultrasound examination of the eyes may help in early identification of the vitreous exudates. Urgent Ophthalmology consultation with early, accurate diagnosis and aggressive treatment is necessary to avoid poor visual outcome.

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