



## Endogenous Endophthalmitis due to Escherichia Coli: case report

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**Background:** Endophthalmitis is a rare and severe form of ocular inflammation due to infection of the intraocular cavity. The diagnosis of endophthalmitis is based on inflammatory signs of the anterior segment, initially mild, which can evolve and affect the posterior segment in more severe forms. Therefore, it is necessary to be attentive to clinical signs because, if not treated timely and properly, it can lead to an irreversible visual loss. (1) The classification of endophthalmitis is related to the route of infection, i.e., exogenous or endogenous. Exogenous endophthalmitis results from a direct inoculation of the infectious agent into the ocular cavity either through intraocular surgery, penetrating trauma or contiguous spread from adjacent tissues. Endogenous endophthalmitis occurs through the hematogenous route, where the agent reaches the eye from a distant infectious focus.(1). Endogenous endophthalmitis is the much less common form of endophthalmitis and is associated with a potentially fatal systemic source or a major risk factor for infection, including genitourinary infection, abdominal surgery, recent hospitalization, indwelling catheter, intravenous drug use, among others. It occurs more commonly in immunosuppressed patients such as young or advanced age, diabetes mellitus (DM), presence of malignancy, patients using corticosteroids or non-corticosteroid immunosuppressive agents.(1-4). Generally, gram positive bacterial infections such as *Staphylococcus* and *Streptococcus* species (spp) are responsible for most cases of endogenous endophthalmitis worldwide. Gram-negative bacteria, such as *Klebsiella* spp, found more frequently in Asia (2-3), are not as frequent in our environment and, even rarer, are endophthalmitis secondary to *Escherichia coli*, where few reports have been observed.(4). *Escherichia coli* is a Gram-negative rod-shaped bacterium, classified as a member of the Enterobacteriaceae family within the Gammaproteobacteria class. *Escherichia coli* can grow rapidly under ideal growth conditions, replicating within 20 min.(5) Endogenous endophthalmitis is rarely a complication of *Escherichia coli* septicemia arising by the hematogenic route and,(6-8) the aim of this report is to present a case of endogenous endophthalmitis due to bacterium *Escherichia coli* as the causative agent and its development.

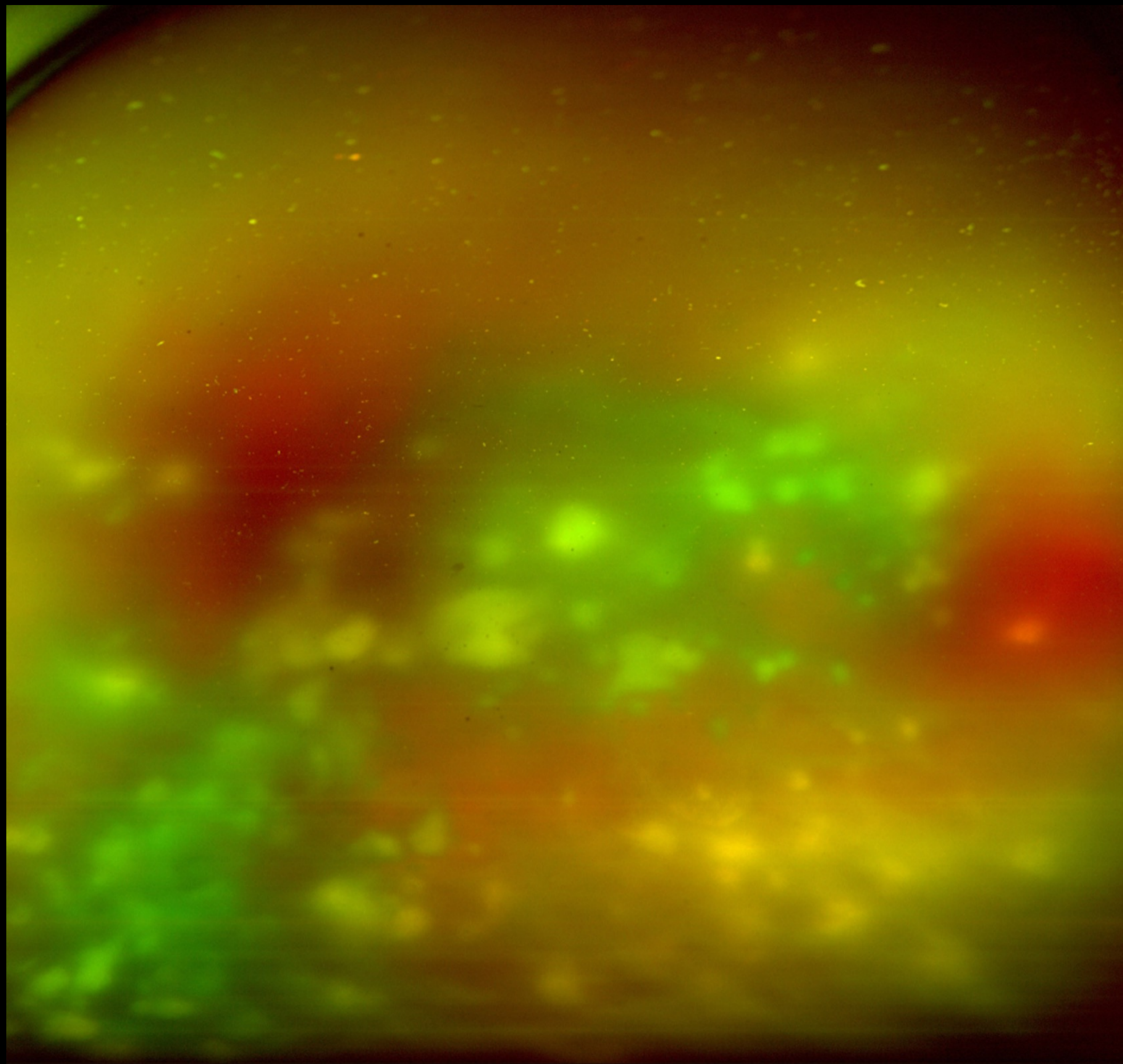
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**Case Report:** Male, 59 y/o, physician, using sirolimus and azathioprine due to previously renal transplant recipient, catheterized due to bladder atresia, with a history of recurrent E. coli urinary tract infection. He was referred to our service complaining of acute visual impairment in his left eye, preceded initially by floaters. He reported that in the last urinary infection, accompanied by fever (February/2021), he was hospitalized under a broad-spectrum antibiotics in addition to voriconazole, having tested positive for COVID one week after hospitalization, evolving with severe pulmonary impairment and remaining hospitalized for 47 days. Few days after he was discharged, had another urinary infection due to Proteus mirabilis. Ten days after treatment of this infection, he presented another one and two weeks later, he started to present floaters and evolving photophobia and visual acuity (VA) worsening. Corticosteroids and mydriatics drops were initiated by the first ophthalmologist attendant and then referred to our service. At baseline evaluation (June/2021) he was again presenting fever and under ciprofloxacin due to a new urinary tract infection and presented at ophthalmological evaluation: VA in the right eye: 20/25, left eye: hand movement; biomicroscopy in the right eye showed no anterior chamber reaction and nuclear cataract 1+, the left eye showed no conjunctiva hyperemia but presented anterior chamber reaction of 3+/4+ and cortico-nuclear cataract 2+/4+, funduscopy showed no changes in the right eye, and intense vitritis (4+/4+) with some clusters of white flakes suggestive of hyphae in the left eye, preventing proper evaluation of the retina (Figure 1).

Posterior 23g vitrectomy was promptly indicated in the left eye. Vitreous culture was obtained at the beginning of the surgery and intravitreal injection of ceftazidime, vancomycin and amphotericin B was performed at the end of surgery. Vigadexa and mydriacyl eye drops were prescribed, as well as fluoconazole and clavulanate as recommended by her attending physician. Few days later the culture was positive for Escherichia coli.

After vitrectomy, there was no recurrence of the infection, the retina remained attached and the macula was free of lesions, despite the VA of 20/200 due to the posterior subcapsular cataract. After systemic stabilization, phacoemulsification was then performed with visual acuity improvement





**Figure 1-** Baseline Retinography showing intense vitritis and diffuse White lesions in the vitreous cavity



**Figure 2-** Retinography after posterior vitrectomy and after phacoemulsification with final visual acuity of 20/40



**Discussion:** Endogenous endophthalmitis can occur at any age and has no sex predilection. It usually occurs in patients with immunosuppressed systems, but it has also been reported in healthy patients. (9-14). Our patient was immunosuppressed, with constant use of catheter due to bladder atresia and previous kidney transplant, with recurrent urinary infections, a fact that probably contributed to the occurrence of this rare condition and endophthalmitis by E. coli.

Endophthalmitis symptoms include decreased vision, affecting nearly all patients, eye pain or discomfort and a red eye are also common although not universal complaints. Systemic symptoms such as fever are absent in exogenous but often present in endogenous endophthalmitis cases(10-15). Our patient presented with a complaint of low visual acuity, in addition to fever that could be misinterpreted as due to urinary tract infection.

Vitrectomy is often indicated due to the virulence of the pathogens and the severe endophthalmitis these produce, and systemic treatment includes therapy for the underlying infection and intravitreal antibiotics for the endophthalmitis. Prognosis is poor in the majority of cases. In a series of 75 EBE patients (89 eyes) treated between 2001 and 2012, only 41% of eyes recovered 20/200 vision or better, while 19% of eyes were enucleated or eviscerated (11 -16). Vitrectomy was associated with a better visual prognosis and a lower rate of evisceration or enucleation.

Endogenous endophthalmitis is rarely a complication of Escherichia coli septicemia arising by the hematogenic route. Only a few cases have been reported in the literature (6-8) and patients with endogenous endophthalmitis due to E. coli have certain common characteristics: they are generally diabetic and the urinary tract is the most frequent source of infection, as in this case. The other reported sources are conjunctiva and gallbladder (9-12). E. coli endophthalmitis has a rapid and devastating course, with an almost universally poor prognosis. Of the 4 bilateral and 14 unilateral cases, only 7 eyes were saved despite intensive therapy. One eye achieved a visual acuity of 20/50, while the other recovered eye had no better visual acuity than hand movements or light perception. (10 -16).

**Conclusion:** Endogenous endophthalmitis is a serious eye infection that may develop as a result of a distant infectious focus, such as transient bacteremia or long-term catheter-related fungemia, as in this case. The identification of infectious signs allied to the patient's clinic are fundamental for the diagnosis and institution of the treatment. Escherichia coli, despite being a rare infectious agent, should be considered as a potential diagnosis in these patients. Prompt and adequate diagnosis and treatment are essential for a better visual prognosis.

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