

# Panophthalmitis Secondary to Septic Arthritis of the Knee - Case Report

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**Abstract:** *Septic arthritis is a rare disease but with a very poor prognosis due to the functional sequelae it entails and possible associated complications, including patient death. Unusually, it may be associated with ocular septic emboli. A 55-year-old male patient with septic arthritis of the right knee is presented, who, in the context of comorbidities such as obesity, type 2 diabetes and hypertension, developed left panophthalmitis. The knee was drained three times and, as a consequence of a septic focus in the eye, evisceration of the left eye was performed. After 8 weeks of hospitalization, he evolved favorably and was discharged.*

**Keywords:** Panophthalmitis, orbital evisceration, arthritis, knee joint (C01.150.252.289.900.675) (E04.540.760) (C05.550.114) (A02.835.583.475)

## 1. Introduction

Septic arthritis is defined as acute inflammation of the synovial membrane caused by endogenous or exogenous microorganisms. The knee is the most commonly affected joint<sup>(1-3)</sup>.

Gram-positive are, statistically, the most common pathogen, observed in 80% of cases, with Gram-negative organisms primarily affecting patients with associated comorbidities<sup>(2-5)</sup>. Panophthalmitis may progress to amaurosis and intraocular purulent collection even under antibiotic treatment, occurring in 54% of cases, necessitating ocular evisceration<sup>(6-8)</sup>. Endophthalmitis can be infectious or non-infectious, resulting from exogenous infection or endogenous dissemination. Infections originating from a septic focus result in hematogenous microbial dissemination and its progression depends on the patient's comorbidities<sup>(9-11)</sup>. The evolution of endophthalmitis is severe as it may lead to loss of the eyeball<sup>(12)</sup>. According to literature review, hematogenous spread from distant foci represents 2 to 8% of all cases of endophthalmitis<sup>(9, 13-15)</sup>. The main risk factors influencing infectious dissemination include diabetes, cancer, alcoholism, immunosuppression, abdominal-pelvic surgeries, endovascular procedures, and intravenous drug abuse. It is usually unilateral; however, 12% may be bilateral<sup>(9, 16, 17)</sup>.

According to the literature, septic arthritis of the knee ranks seventh as a cause of ocular embolism, following hepatic abscess, pneumonia or endocarditis<sup>(11, 12, 18, 19)</sup>.

## 2. Clinical Case

The patient, a 55-year-old male, presented to the emergency department and was referred to the Intensive Care Unit due to exertional dyspnea (functional class IV), sweating, nausea, dizziness, one episode of fever lasting 12 hours, associated

with edema, moderate pain, traumatic abrasion of 2 cm<sup>2</sup> on the anterior aspect of the right knee, and limited mobility for flexion and extension of the right knee. He is a merchant, married, and has completed secondary education. He presents multiple cardiovascular risk factors such as essential hypertension, type 2 diabetes (treated with oral antidiabetic drugs with poor adherence to treatment and scarce monitoring, glycosylated hemoglobin of 8.2%), obesity (BMI 31 kg/m<sup>2</sup>), sedentary lifestyle, and a dual-chamber pacemaker in the right ventricular apex for the past 2 years due to atrioventricular block. The clinical picture is interpreted as septic shock with a SOFA score of 6. Blood cultures and knee ultrasound were performed, revealing a homogeneous non-septated fluid collection in the supra-patellar anterior aspect, leading to surgical drainage of the affected knee. Transthoracic echocardiogram was performed to rule out cardiac vegetations. The initial synovial fluid culture was negative, the second reported Methicillin-sensitive Staphylococcus, and the third showed growth of Extended-Spectrum Beta-Lactamase (ESBL)-producing Escherichia Coli. Three sets of blood cultures were negative. Two additional knee debridements were performed during hospitalization due to recurrent intra-articular collection. The patient underwent knee arthroplasty 17 years ago and had a previous urinary tract infection with E. Coli treated on an outpatient basis prior weeks. During hospitalization, he suddenly developed left ocular globe amaurosis, left conjunctival hemorrhage, leukocoria, and corneal edema. Ophthalmological examination revealed null visual acuity, 360° hyperemia, total leukocoria, preserved extraocular movements, and low intraocular pressure upon digital compression. It was interpreted as left panophthalmitis, contralateral to the septic arthritis of the right knee. Treatment with intravenous ceftriaxone, vancomycin, and topical tobramycin was initiated (Figure 1 A). Subsequent ultrasound performed 24 hours after left ocular amaurosis showed vitreous cavity with medium reflectivity membrane echoes

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involving the entire vitreous cavity and thickening of the entire ocular wall. Hypopyon involving both anterior and posterior chambers was observed. The diagnosis of Panophthalmitis was made (Figure 1 B). Surgical intervention under general anesthesia was performed, and left ocular evisceration with closure of sclera in two flaps and placement of a high - density porous polyethylene prosthesis (18 mm) was carried out (Figure 2, A, B, C, D, E). He progressed favorably with negative ocular cultures. Once the intravenous antibiotic regimen was completed, and in the absence of comorbidities, he was discharged with oral antibiotic therapy. At the one - month postoperative follow - up, he showed good progress, despite reduced flexion in the right knee, undergoing physical therapy and planning for placement of a shell - type ocular prosthesis (Figure 3).

### 3. Discussion

Septic arthritis is a serious complication with severe consequences due to local joint involvement and potential distant septic metastases (2, 20). It can affect any joint; however, the knee represents 50% of cases (2, 4, 20). Clinically, it presents as local inflammation, pain, increased local temperature, functional impairment, and subsequent systemic compromise (2, 5 - 7). The most common isolated pathogens in arthritis are Gram - positive bacteria, with *Staphylococcus aureus* cited in 60% of cases and *Streptococcus* in 20% (2, 8, 21 - 23). Gram - negative organisms are more common in patients with comorbidities such as diabetes, drug addiction, or intestinal tumors, representing 1% of cases (24 - 26). Infectious entry can occur hematogenously, by contiguity, lymphatic spread, or direct inoculation (24 - 26). Once the joint is colonized, a local inflammatory process occurs with subsequent microbial tissue adherence, collagen destruction, and release of endotoxins or distant septic emboli. Enzymes like collagenase contribute to joint destruction (2, 27 - 29). The diagnosis of arthritis is based on clinical presentation, ultrasound, computed tomography and laboratory studies including blood and synovial fluid cultures (2, 30 - 33). An early diagnosis, supported by clinical, radiological, ultrasound, and culture findings, helps prevent associated comorbidities. The main treatment for arthritis with collections is drainage and culture. Drainage can be performed open or arthroscopically (2). Our patient required three open drainages, with synovial fluid culture positive for ESBL - producing *Escherichia Coli* (Blee); *Escherichia Coli* is named in honor of Theodor Escherich, who isolated it (33). Extended - spectrum beta - lactamases (ESBLs) have emerged as a result of antibiotic resistance and are primarily present in urinary tract infections, followed by gastrointestinal infections (32, 33). Septic emboli are potentiated in immunocompromised patients, such as our diabetic patient with inadequate follow - up (32, 33). Endogenous endophthalmitis (2, 9, 27) is a rare condition where microorganisms spread hematogenously to the eye, accounting for 2 - 8% of all endophthalmitis cases (9, 13, 27, 31, 32, 34). Based on age - related reports (9, 11, 13), the average age was 35 years. There is disagreement regarding which eye is most affected, with some authors reporting a higher prevalence in the right eye due to carotid blood flow dominance (13), while others report a higher prevalence in the left eye (9, 13, 27 - 30). With respect to gender, published series show that 53.7% corresponded to males (27). Once clinical panophthalmitis is established, the evolution is rapid, leading

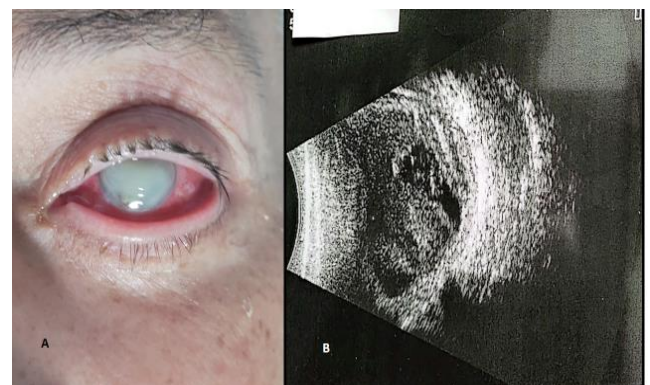
to amaurosis within days. Ultrasound is the gold standard diagnostic tool (9, 13, 17, 18). Initial treatment involves broad - spectrum antibiotic therapy, with 4<sup>th</sup> generation cephalosporins commonly used. However, intraocular content cultures are often negative due to prior antibiotic treatment for joint infection. Joint and blood cultures are essential for identifying the causative agent of ocular septic emboli (1, 9, 14). Antibiotic therapy is adjusted based on culture results (9). Panophthalmitis unresponsive to antibiotic treatment within 48 - 72 hours may require enucleation or evisceration. Evisceration involves removal of intraocular tissues while preserving the sclera and replacing them with an intraorbital implant (31, 32). Closure of the sclera can be done in 4 petals or 2, depending on the surgeon's preference (8, 21, 24). This procedure allows for the placement of an ocular shell while maintaining globe motility (27). Our approach involved closure in 2 flaps with an 18 mm porous high - density polyethylene implant (31, 32). The patient experienced no complications from the procedure, although potential complications include dehiscence, pain, infection, entropion, ectropion, prosthetic extrusion, etc (27, 32 - 36).

The prognosis of panophthalmitis can be severe, especially with delayed diagnosis, virulent organisms, particularly Gram - negatives resistant to antibiotics, and patient comorbidities. Some literature reviews (36 - 38) indicate that 26% of patients with this condition became blind in the affected eye (9, 15, 39, 40), and 54% of cases require ocular evisceration (6, 7, 8).

### 4. Conclusion

Panophthalmitis as a consequence of septic embolism from arthritis is uncommon but should not be overlooked, especially in cases of knee arthritis and in patients with comorbidities. Panophthalmitis is a serious intraocular infection that progresses rapidly and severely affects the eyeball. When associated with immunosuppression or Gram - negative infections, loss of the eyeball is the most frequent and irreversible outcome. Early diagnosis and appropriate antibiotic treatment are paramount.

### Figures



**Figure 1 A:** Left eye leukocoria and conjunctival hemorrhage consistent with panophthalmitis observed. **B:** A - B mode ocular ultrasound of the left eye. Vitreous cavity with echos of medium reflectivity with involvement of the entire vitreous cavity and thickening of the entire ocular wall. Hypopyon involving both anterior and posterior chambers. Diagnosis: Panophthalmitis.



**Figure 2 A:** Separators used to expose the surgical area. **B:** Intraocular purulent collection. **C:** Complete ocular evisceration. **D:** Closure of sclera in 2 flaps. **E:** Post - surgery with ocular conformer.



**Figure 3:** Postoperative results.

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