Case Report

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Septic Ocular Embolus Secondary to Bacteremia in a Patient With Chronic Kidney Disease

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ABSTRACT

Catheter- related bacteremia (CRB) presents as a complication in patients with stage V chronic kidney disease, due to the use of temporary vascular catheters for this purpose, being associated with infections by microorganisms that colonize the skin, most frequently Staphylococcus aureus, either methicillin-sensitive or resistant. This condition can be complicated by septic emboli in organs distant from the primary focus of infection, ranging from the lung, heart, to the eye, as exemplified by the case to be presented. Thus, CRB represents a serious condition, with a mortality rate of 18% at one month and 27% at 3 months, which must be managed early in order to eliminate the microorganism from the bloodstream as well as from other organs affected by it.

Keywords: Septic Embolus, Hypopyon, Catheter-Related Bacteremia, Chronic Kidney Disease, Dialysis

Introduction

Chronic kidney disease (CKD) is defined as a heterogeneous condition that leads to alteration renal structure and functionality, which can progress to a severe stage of reduced renal function, requiring renal replacement therapy or dialysis. According to the current KDIGO classification, this dysfunction progresses in decreasing order of renal function from stage I to stage V [1].

Stage V CKD is one of the predisposing to bloodstream infections due to the use of vascular access for dialysis, leading to the occurrence of catheter-related bacteremia (CRB). The microorganisms most frequently implicated in CRB include Staphylococcus aureus (SA), coagulase-negative staphylococci, Corynebacterium spp, Bacillus spp and Candida spp which are commonly found colonizing the skin [2-15]. Among the methods used for hemodialysis, these temporary vascular accesses represent a higher Risk of infection compared to arteriovenous fistulas [3].

Staphylococcus aureus bacteremia represents one of the serious causes of bloodstream infection, with a mortality of 18% at one month and 27% at 3 months [4]. This condition predominantly affects individuals with risk factors such as: age over 65 years, underlying chronic conditions including diabetes, dialysis-dependent kidney disease, rheumatoid arthritis, history of cancer, corticosteroids use, history of transplants and HIV, as well as intravenous drug users, carriers of intravascular catheters or prosthetic devices, these latter representing the most common risk factors. [5].

Once SA enters the bloodstream, it has the capacity to generate, through its virulence mechanisms, sepsis, endocarditis and septic emboli [6,7]. among these it can be responsible of producing osteomyelitis, septic arthritis, epidural abscesses, as well as endophthalmitis and skin lesions, although it more commonly affects the lungs, potentially affecting any organ in general [8,9].

Ocular involvement in bacteremia primarily presents as endophthalmitis or panophthalmitis [9]. Endophthalmitis can be endogenous or exogenous. endogenous endophthalmitis involves the hematogenous dissemination of a microorganism that crosses the blood- ocular barrier from a primary focus of infection, the most common origins include gastrointestinal or hepatic abscesses, urinary tract infections, endocarditis,

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meningitis, pneumonia and skin and soft tissue infections. [10]. Endogenous endophthalmitis is much less common than the exogenous form and may even be the first manifestation of sepsis [11].

Clinical signs include decreased vision, pain, absence of pupillary light reflex or leukocoria, hypopyon, vitritis, Tyndall effect, eyelid edema and ocular hypertension [12]. The microorganisms most frequently implicated SA, Streptococcus pneumoniae and Haemophilus influenzae [9]. Studies have demonstrated a clear benefit from the prompt use of antimicrobials targeted at the likely causative pathogens [13]. Early identification of pathogens and administration of specific antibiotics to rapidly control systemic and ocular infections are essential for saving the patient´s life and vision [9]. Vancomycin and ceftazidime constitute a good choice for empirical treatment of bacterial endophthalmitis [12].

CRB should be suspected in patients presenting with signs of systemic infection, such as fever, chills, hypotension, which may or may not be associated with local signs of infection at the insertion sites of these devices. Blood culture is the reference method for detecting the causative agent.

Complicated CRB encompasses its presentation associated with endocarditis, suppurative infections of venous access, the presence of septic emboli, extraluminal infections, septic shock, infection that does not resolve with management, or in immunocompromised patients, these being indicative of prolonged treatments and catheter removal. For initial empirical treatment in patients suspected of infection by methicillin-resistant Staphylococcus aureus (MRSA), the commonly used antibiotic is vancomycin, and as a second option, daptomycin, especially if associated with septic shock, acute kidney injury, previous vancomycin treatment within the last 3 months, or if the local prevalence of S. aureus isolates with vancomycin MIC ≥1.5 µg/ml is high. For infections caused by methicillin-sensitive Staphylococcus aureus (MSSA), the first option is oxacillin, followed by cefazolin. Regarding the duration of management, for uncomplicated MSSA infections, it is 14 days, and for complicated infections, it is 4 to 6 weeks; control blood cultures should be performed after 72 hours of antibiotic treatment to evaluate the need for continuation or other aspects of treatment in case of persistent infection despite management [14-15].

Case Report

This concerns a 50-year-old female patient with a history of stage V chronic kidney disease (CKD) on hemodialysis via a temporary right internal jugular catheter, hypertensive heart disease with an ejection fraction of 40%, chronic arterial hypertension, and non- insulin-dependent type 2 diabetes mellitus. She was admitted on September 12, 2023, with a clinical picture evolving over 3 days characterized by pain in the right dorsal region and edema in the lower limbs. Paraclinical tests showed leukocytosis, anemia requiring transfusion, and a chest CT scan revealing consolidation in the right basal region. Due to the pneumonic picture, antibiotic therapy was initiated with piperacillin + tazobactam and vancomycin adjusted for renal function. Blood cultures and urine cultures were taken, both positive for MSSA.

In search of the focus of bacteremia, a retro-catheter culture was also performed under suspicion of CRB, which tested positive for MSSA, confirming the diagnosis. As a positive finding on physical examination, on the second day of hospitalization, hypopyon was observed in the right eye. Therefore, management with moxifloxacin ophthalmic solution was initiated, considering that there was no other triggering factor and it was deemed to be a septic embolism at the ophthalmic level.

Furthermore, a transesophageal echocardiogram was performed, which ruled out the presence of cardiac vegetations, and a lumbar MRI was conducted, excluding spondylodiscitis, thus ruling out other sources of septic embolism. Additionally, the nephrology service recommended removing the hemodialysis catheter and dialyzing through a new catheter in the right femoral region. Infectious disease specialists adjusted the antibiotic management based on the organism's sensitivity profile and de-escalated antibiotic therapy to cefazolin. On the thirteenth day of hospitalization, the control blood culture was reported negative, leading to the patient's discharge due to clinical improvement

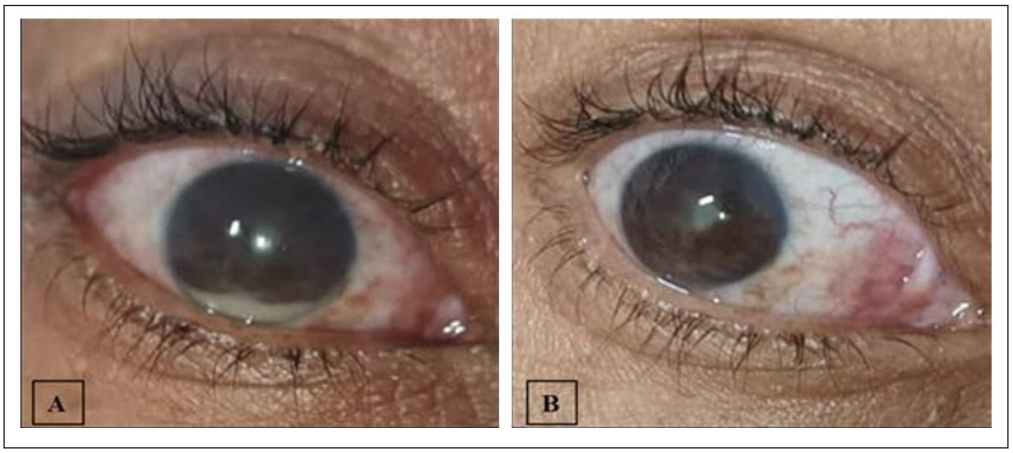

Figure 1: A. Hypopyon, showing the presence of purulent material in the anterior chamber of the eye. **B.** Patient´s evolution following management, demonstrating the absence of purulent material occupying the anterior chamber.

References

1. Gil Y, Bosch E, Gimena R, Durán C, Bouarich, H. Chronic Kidney Disease: Etiopathogenesis, Clinical Manifestations, Diagnosis, and Prognosis, Medicine-Continuing Medical Education Program Accredited. 2023. 13: 4730-4737.
2. Aguinaga A, Del Pozo J. Catheter-Associated Infection in Hemodialysis: Diagnosis, Treatment, and Prevention. Nefroplus. June 2011. 4: 1-10
3. Sullivan R, Samuel V, Le C, Khan M, Alexandraki I, et al. Hemodialysis Vascular Catheter-Related Bacteremia. Am J Med Sci. 2007. 334: 458-465.
4. Tabah A, Laupland KB. Update on Staphylococcus aureus bacteremia. Curr Opin Crit Care. 2022. 28: 495-504.
5. Abraham L, Bamberger DM. Staphylococcus aureus Bacteremia: Contemporary Management. Mo Med. 2020. 117: 341-345.
6. Srzić I, Višnja N, Tunjić D. Sepsis definition: what's new in the treatment guidelines. Acta Clin Croat. 2022. 61: 67-72.
7. Kwiecinski J, Horswill A. Staphylococcus aureus bloodstream infections: pathogenesis and regulatory mechanisms. Current Opinion in Microbiology. 2020. 53: 51-6.
8. Kumbar L, Yee J. Current Concepts in Hemodialysis Vascular Access Infections. Adv Chronic Kidney Dis. 2019. 26: 16-22.
9. Tang X, Li hui Y. A rare ocular complication of septicemia: a case series report and literature review. BMC infectious diseases. 2023. 23: 522.
10. Asencio M, Huertas M, Carranza R, Celis J, González F, et al. Endogenous endophthalmitis: case report and brief review of a serious ocular disease. Rev Chilena Infectol. 2013. 30: 516-521.
11. Solarte I, Otto S, García P. Endophthalmitis and septicemia due to Klebsiella pneumoniae. Acta Med Colomb. 2001. 26: 256-258.
12. Cubillas a, Sampedro a, B. Domínguez a, I. Carrio b, V. Bango b y J.J. Barbóna. Bacterial Endogenous Endophthalmitis: Report of 2 Cases. Spanish Society of Ophthalmology. 2017. 92: 280-282.
13. Evans T. Diagnosis and Management of Sepsis. Clinical Medicine. 2018. 18: 146-149.
14. Frances M. Molecular Methods for the Diagnosis of Septicemia. Elsevier. 2017. 35: 586-592.
15. Chaves F, Garnacho-Montero J, del Pozo JL, Bouza E, Capdevila JA, et al. Diagnosis and Treatment of Catheter-Related Bloodstream Infection: Clinical Guidelines of the Spanish Society of Infectious Diseases and Clinical Microbiology and the Spanish Society of Intensive and Critical Care Medicine and Coronary Units. Med Intensiva. 2018. 42: 5-36.