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Aortic and tricuspid endocarditis in hemodialysis patient with systemic and pulmonary embolism

Endocardite aórtica e tricúspide em pacientes de hemodiálise com embolia sistêmica e pulmonar

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ABSTRACT

This is a case report of a 43-year-old Caucasian male with end-stage renal disease being treated with hemodialysis and infective endocarditis in the aortic and tricuspid valves. The clinical presentation was dominated by neurologic impairment with cerebral embolism and hemorrhagic components. A thoracoabdominal computerized tomography scan revealed septic pulmonary embolus. The patient underwent empirical antibiotherapy with ceftriaxone, gentamicin and vancomycin, and the therapy was changed to flucloxacilin and gentamicin after the

isolation of *S. aureus* in blood cultures. The multidisciplinary team determined that the patient should undergo valve replacement after the stabilization of the intracranial hemorrhage; however, on the 8th day of hospitalization, the patient entered cardiac arrest due to a massive septic pulmonary embolism and died. Despite the risk of aggravation of the hemorrhagic cerebral lesion, early surgical intervention should be considered in high-risk patients.

Keywords: Endocarditis/etiology; Renal dialysis; Embolism; Aortic valve; Tricuspid valve; Tomography, x-ray computed; Case reports

INTRODUCTION

Infective endocarditis (IE) is a severe infection that primarily involves the endocardium of the cardiac valve leaflets. IE is more frequent in hemodialysis patients than it is in the general population, and *S. aureus* is the main infective agent.

Neurologic involvement is a frequent complication of IE. Despite the formal surgical indications for cerebral embolism, the timing of surgical intervention is controversial, particularly in cases with a coexistent intracranial hemorrhage.⁽¹⁾

Here, the authors describe a case with an unusual location of IE in multiple valves in a patient on hemodialysis with severe systemic and pulmonary embolic presentation. Despite the administration of the appropriate antibiotic therapy, embolic events continued to occur with the deterioration of the patient's clinical status. The management of this patient was a challenge due to comorbidities and concomitant intracranial hemorrhage that precluded early surgical intervention.

Conflicts of interest: None.

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CASE REPORT

Here, the authors report a case of a 43-year-old Caucasian man with a medical history of end-stage renal disease due to hypertensive nephropathy and a 4-year history of hemodialysis. Prior to the initiation of hemodialysis, the patient underwent renal transplantation and rejected the allograft after 5 years due to voluntary discontinuation of immunosuppressive therapy. He was admitted to the hospital with fever, malaise, altered mental state and chest pain. Physical examination revealed cognitive impairment with incoherent speech, left arm weakness, exacerbated osteotendinous reflexes, the presence of the Babinski reflex on the right side and three episodes of complex partial seizures. He was medicated with valproic acid and fenitoin for seizure control.

Relevant laboratory findings included creatinine 13.17mg/dL, urea 203 mg/dl, potassium 7.4mEq/L, leucocytosis 20,000/dL, C-reactive protein 411.5mg/L, troponin I 2.7ng/mL and myoglobin 317IU/L.

An electrocardiogram showed ST segment elevation in DII, DIII, aVF, V2 and V3 with upward concavity and depression of the PR segment in DII, V2 and V3.

Transthoracic echocardiography revealed normal left ventricular dimensions and systolic function with no left atrial enlargement; furthermore, the right cavities were not dilated, and the right ventricular systolic function was preserved. A mild pericardial effusion with no evidence of vegetation in the valve leaflets was observed.

A computerized tomography scan of the brain revealed a right frontal cortical-subcortical lesion with ischemic and hemorrhagic components (Figure 1). Magnetic resonance imaging confirmed multiple hemorrhagic lesions in both cerebral hemispheres (Figure 2). A thoracoabdominal computerized tomography scan revealed septic pulmonary embolus and a splenic infarction. The diagnostic hypothesis was IE, and the patient underwent transesophageal echocardiography, which identified vegetations in the aortic and tricuspid valves of 9.13mm and 11.73mm in size, respectively (Figures 3 and 4), with mild aortic regurgitation and moderate tricuspid regurgitation. Empirical treatment with ceftriaxone, gentamicin and vancomycin was initiated. Blood cultures were positive for methicillin-sensitive *S. aureus*, and the empirical treatment was changed to flucloxacilin and gentamicin. Cerebral spinal fluid was unremarkable, and its culture was sterile. The pericardial effusion became bulkier and generated late diastolic inward motion of the right ventricular free wall and the right atrium, which necessitated pericardiocentesis.

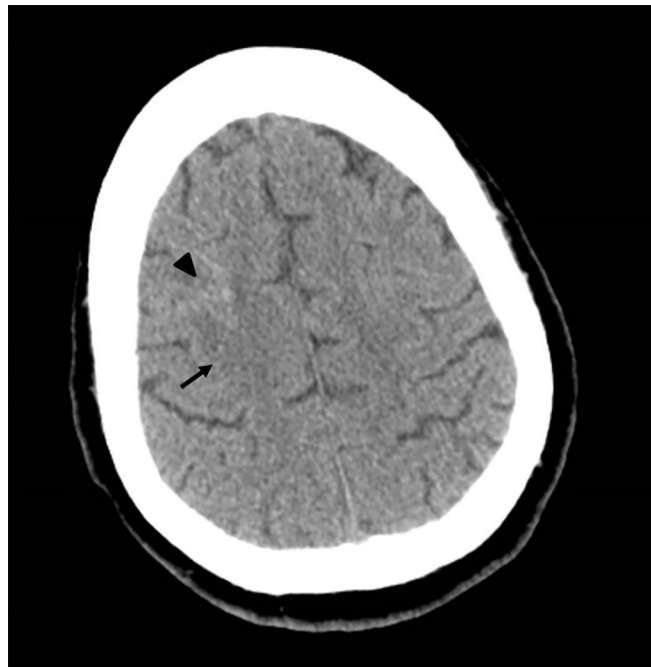


Figure 1 - Cortico-subcortical right frontal hypodensity (arrow) with mild hyperdensity (arrow head) - ischemic area with intracerebral hemorrhagic component observed on brain computerized tomography.

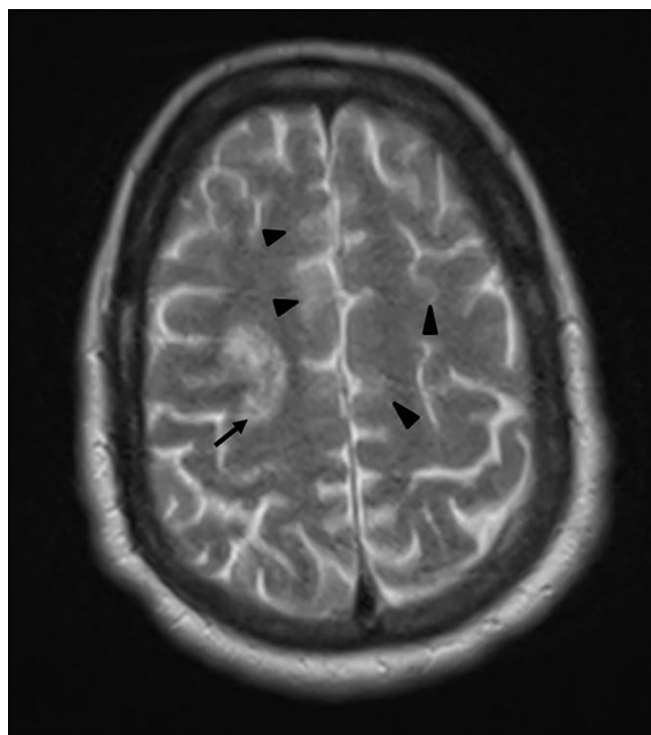


Figure 2 - Multifocal lesions distributed in both cerebral hemispheres (arrow heads) and a right frontal hemorrhagic component (arrow) observed on T2 brain magnetic resonance imaging.

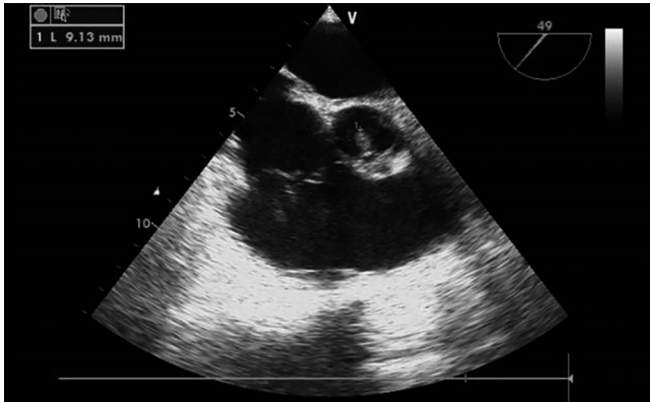


Figure 3 - Transesophageal echocardiography showing vegetation in aortic valve 9.13mm in size.

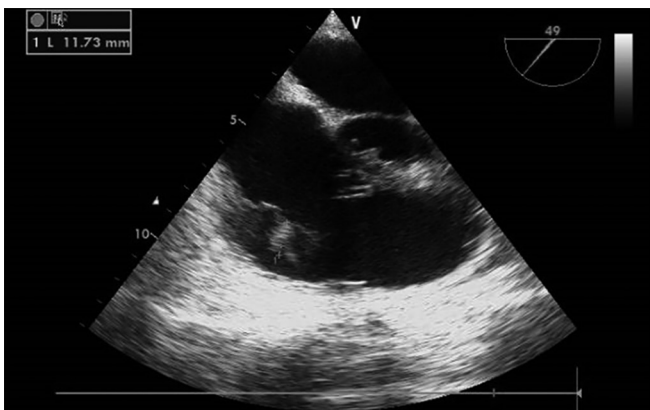


Figure 4 - Transesophageal echocardiography demonstrating vegetation in tricuspid valve 11.73mm in size.

Despite the administration of effective antibiotic therapy, cerebrovascular embolic events persisted with neurologic deterioration. The multidisciplinary team decided that the patient should undergo valve replacement after the stabilization of the intracranial hemorrhage. However, on the 8th day after hospitalization, the patient entered cardiac arrest and was recovered with advanced life support. Transthoracic echocardiography after resuscitation demonstrated an enlargement of the right cavities and right ventricular hypokinesia, and the presumed diagnosis was a massive septic pulmonary embolism. The patient re-entered cardiac arrest, and although fibrinolysis was performed and advanced life support was maintained for 40 minutes, the patient died.

DISCUSSION

In hemodialysis patients, IE has an incidence of 308/100,000 patients/year, and this is 50-180-fold higher

than the incidence in the general population.⁽²⁾ The risk factors in this group include recurrent bacteremia during hemodialysis, uremia, immune injury and premature degenerative heart valve disease due to abnormalities in calcium-phosphorus homeostasis and chronic inflammation.^(2,3) *S. aureus* is the main infective agent in IE and causes 50 to 80% of IE cases (50% of which are methicillin resistant).⁽³⁾ This reflects the rate of infection of hemodialysis intravascular devices and the fact that 50% of all hemodialysis patients are carriers of *S. aureus*. Despite the relationship between hemodialysis devices and IE in these patients, infection of right-sided valves is rare. The mitral valve is the most frequently infected valve (50%), followed by the aortic valve (40%). Tricuspid IE only constitutes approximately 10% of the cases. Multiple valves, usually the mitral and aortic valves, are involved in 20% of such cases.^(2,3) The degenerative disease of left-sided heart valves might explain the difference in incidence.⁽³⁾

Following cardiovascular disease, IE is the second most common cause of death in hemodialysis patients. The mortality of IE in these patients is 30 - 60%, which is considerably higher than that in the general population, probably due to the high prevalence of *S. aureus* and multiple comorbid conditions in hemodialysis patients. Age, diabetes, septic embolism involving cerebrovascular events, mitral valve involvement, great vegetation and *S. aureus* infection are factors that result in a poor prognosis in IE patients.⁽³⁾

The indications for valve replacement in the general population are defined in the European Society of Cardiology guidelines. However, there is no consensus regarding whether these guidelines are applicable to hemodialysis patients, and data regarding surgical decisions in these patients are lacking. According to the European Society of Cardiology guidelines for the management of IE, embolic events are an indication for surgical intervention. The brain and the spleen and lungs are the most frequent sites of embolism in left and right-sided IE, respectively. Embolism occurs in 22% to 50% of patients with IE. The predictors of embolism are vegetation size greater than 10mm, mitral location and infection with *S. aureus*.^(1,4,5)

The current guidelines indicate that after a transient ischemic attack or stroke, surgery should not be delayed, but following an intracranial hemorrhage, the guidelines state that surgery must be delayed for one month.⁽¹⁾ However, Yoshioka et al. suggested that the risk of neurological deterioration after surgery is relatively low,

even in IE patients who underwent valve replacement less than 2 weeks after intracranial hemorrhage.⁽⁶⁾ In patients who are on hemodialysis, perioperative mortality is high, probably because the patients who are selected for surgery have more severe disease and complications. It has been suggested that patients with high mortality risk should undergo earlier surgery than the general population should.^(3,5) In a recent study, patients who underwent surgery had a higher survival rate than those who did not.⁽²⁾

The size and mobility of vegetations are the most important factors associated with embolism; therefore, even in the absence of an embolic event, surgical treatment should be considered in cases with vegetation with a length of 15mm or 10mm and other predictors of a complicated course.^(1,7)

In addition to embolism, the other two main indications for surgery in the context of IE are heart failure and uncontrolled infection.

Heart failure in IE is caused by valve destruction and results in severe regurgitation, intracardiac fistulae or valve obstruction. Heart failure is more frequent in aortic IE than it is in mitral IE. The timing of surgery depends on the patient's clinical features. In cases of persistent pulmonary edema or cardiogenic shock, immediate intervention should

be performed. If severe valve regurgitation is well tolerated, a conservative approach with antibiotics is recommended, and surgery is indicated after resolution of IE.⁽¹⁾

A perivalvular abscess, pseudoaneurysm and fistulae are frequent complications of uncontrolled infection. The more common location of these complications is the aortic valve, particularly in the mitral-aortic intervalvular fibrosa. Unexplained fever or new atrioventricular block should raise the suspicion of perivalvular infection extension, and this should be confirmed by transesophageal echocardiography. In these cases, surgery is indicated as soon as possible. An intervention is also recommended in case of persistent fever or positive blood cultures and extracardiac abscesses, or if the IE is caused by a multiresistant organisms.^(1,8)

CONCLUSION

This clinical report describes a case with an unusual location of infective endocarditis in multiple valves in a patient on hemodialysis with severe embolic presentation. Although there is no consensus regarding the optimal timing for surgery, it seems that early intervention could prevent disease aggravation, despite the risk of hemorrhagic lesion exacerbation.

RESUMO

Este artigo relata o caso de um homem caucasiano de 43 anos de idade com nefropatia terminal em tratamento com hemodiálise e apresentando endocardite infecciosa das válvulas aórtica e tricúspide. O quadro clínico foi dominado pelo comprometimento neurológico, devido à embolia cerebral e a componentes hemorrágicos. Uma tomografia computadorizada tóraco-abdominal revelou um êmbolo séptico pulmonar. O paciente foi submetido à antibioticoterapia empírica utilizando ceftriaxona, gentamicina e vancomicina, sendo o tratamento modificado para flucloxacilina e gentamicina após o isolamento de *S. aureus* nas hemoculturas. A equipe

multidisciplinar determinou que o paciente deveria ser submetido à substituição de válvulas após estabilização da hemorragia intracraniana; contudo, no oitavo dia após a hospitalização, o paciente entrou em parada cardíaca causada por embolia séptica pulmonar maciça, vindo a falecer. Apesar do risco de agravamento da lesão hemorrágica cerebral, em pacientes de alto risco deveria ser considerado realizar precocemente uma intervenção cirúrgica.

Descritores: Endocardite/etiologia; Diálise renal; Embolismo; Válvula aórtica; Válvula tricúspide; Tomografia computadorizada por raios x; Relatos de casos

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