Eustachian Valve Fungal Endocarditis in Neonate

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Abstract:

Infective endocarditis remains a significant cause of mortality and morbidity, particularly in the neonatal intensive care unit. A mass of 6x9 mm in size was found on the Eustachian valve during *Candida* sepsis in a patient born in the 26th gestational week with birth weight of 1020 grams for threatened preterm labor. The treatment of the patient was switched to caspofungin and voriconazole because of continuing growth of *Candida* in the blood culture, although it was sensitive to amphotericin B in vitro. The mass on the Eustachian valve disappeared following six weeks of treatment with caspofungin. The patient was discharged on the 88th post-natal day. We report herein on the first case of neonatal fungal endocarditis in the newborn involving Eustachian valve.

Key words: Amphotericin B, Candidiasis, Endocarditis, Mycoses, Pregnancy.

Introduction

The frequency of endocarditis has been increasing with use of invasive procedures in neonatal intensive care units as well as increased survival of preterm infants. At the same time, rare causes have also started to play a role in the etiology of endocarditis. The immune status of low-birth-weight infants, prolonged use of antibiotics, and invasive procedures has created an appropriate environment for the occurrence of fungal infections. The agents are usually located on the right-hand side of the heart in endocarditis of catheter origin. Eustachian tube is located on the right atrium during fetal life and directs oxygen-rich blood from the inferior vena cava to the left atrium; it usually regresses until the first year of life [1]. The present case report is reported here because bacterial endocarditis involving the Eustachian valve has been very rarely reported in the literature, and our literature search revealed that *Candida* endocarditis has not been reported so far.

Case Report

A male infant of 1020 grams was born via cesarean section in the 26th gestational week because of threatened preterm labor. Prenatal steroid dose was completed for this infant, and he did not have early membrane rupture. His Apgar scores were 1 and 5 at 1 and 5 minutes, respectively. Arterial and venous umbilical catheters were inserted, and

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surfactant was applied and caffeine was started on the patient because of the diagnosis of respiratory distress. He was started on ampicillin-sulbactam and gentamycin after taking blood samples for culture owing to the worsened health status on the 2nd post-natal day. *Candida albicans* grew in the second phlegm culture taken on the 10th post-natal day while he was receiving mechanical ventilator support. Treatment was ordered with vancomycin, meropenem, and fluconazole. Fluconazole was substituted with amphotericin B because of the growth of *Candida* in the blood culture. Catheters on the umbilical artery and vein were removed.

In investigations to search for the focus of infection, echocardiography revealed a mass of 6x9 mm in size with liver density on the Eustachian valve in the inferior vena cava at the entry to the right atrium. Consecutive blood cultures showed that C. *albicans* was sensitive to fluconazole, amphotericin B, flucytosine, voriconazole, and caspofungin. On the 10th day of treatment, amphotericin B was discontinued because of continuing growth of C. *albicans* in blood cultures, although the agent was sensitive to amphotericin B based on the antibiogram. Treatment was started with voriconazole and caspofungin. Upon the lack of growth in blood cultures at the second week of treatment, voriconazole was discontinued at the end of the second week. Treatment with caspofungin was maintained until the sixth week. At the 6th week of treatment, there was complete disappearance of mass on echocardiography. After being supported by mechanical ventilation for 47 days, the infant was discharged on the 88th post-natal day.

Discussion

The involvement of the Eustachian valve, an embryonic remnant, is very rare, with only a few cases being reported during the neonatal period to the best of our knowledge. We believe that the present case is the first case of fungal endocarditis involving the Eustachian valve, while the reported agents have been bacterial in neonatal cases [2-3].

The main predisposing factor in children and adults is cardiac disease whereas the immunity of prematurity [4], invasive procedures, and catheter insertion are the main predisposing factors during the neonatal period [5-7]. Additionally, other predisposing factors such as prolonged use of wide-spectrum antibiotics and intestinal surgery also exist in fungal endocarditis, a rare complication of systemic *Candida* infections [8]. The fact that our patient had very low birth weight, received ventilator support, an umbilical catheter was inserted as an invasive procedure, and enteral nutrition was started late predisposed the occurrence of *Candida* infection and endocarditis.

Neonatal endocarditis is usually accidental diagnosis during echocardiography to find the focus of sepsis. Image of a mass suggesting vegetation in catheter-related endocarditis is found in right cardiac chambers, particularly in the right atrium. Markedly increased echogenicity and vegetative mass were found in two cases with reported involvement of the Eustachian valve [2-3]. The view of the hyperechogenic mass on the valve was evident in echocardiography for a fungal ball located on the Eustachian valve in our case. One of the cases of Eustachian endocarditis reported in the neonatal period died of multi-organ failure and the other one underwent surgical treatment despite shrinkage of the vegetation [2-3]. In the present case, endocarditis of the Eustachian valve was successfully treated with antifungal treatment and switching of the antifungal agent. The efficiency of amphotericin B administered alone in neonates is controversial as experimental comparative studies have shown different results [9-10].

In the present case, we saw that switching the antifungal treatment was effective although the patient was considered for surgical treatment

because of the presence of invasive candida infection as well as the growth of the fungus in repeated blood cultures. The change in treatment in our case was made because of continuing growth in cultures despite the removal of the catheters. Continuation of antifungal agents based on antibiogram report, affected the clinical course of endocarditis of the Eustachian valve and controlled the infection compared to other reported cases. We believe, however, that it would be possible to find the right therapeutic options with the increasing number of reported cases.

Conclusion

Fungal infections due to catheter applications in the neonatal intensive care units are frequently being seen. Lesions of endocarditis may be at very different locations and rarely involve the Eustachian valve which is an embryonic remnant. Early detection of the Eustachian valve involvement is of vital importance when focus is searched for fungal infections in the neonatal intensive care units.

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