Giant Cardiac Mass Detected to an Infant with Normal Fetal Echography and No Systolic Murmur in Early Postnatal Evolution

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ABSTRACT
Infected endocarditis is rare in children and is rarer on a normal structural heart in an infant without any surgical intervention. Most cases are related to a pre-existing congenital lesion, the most frequent etiology are Gram-positive cocci and the most feared are fungal agents. This report presents a 7-month-old infant with fungal endocarditis on a normal structural heart. The diagnosis was suspected on clinical examination and was confirmed by echocardiography and positive blood cultures. His particular clinical evolution after medical and surgical treatment illustrates a severe disease with poor prognosis which may be a complication of neonatal intensive care procedures.

Unusual cause of fungal endocarditis in a previously healthy infant: neonatal hospitalization in intensive care unit.

INTRODUCTION
The incidence of infective endocarditis has significantly increased in recent years, and this disorder has a high mortality (56-70%) (1).

Gram-positive cocci are responsible for most cases of endocarditis followed by Gram-negative cocci. In pediatric population the HACEK group (Haemophilus, Actinobacillus, Cardiobacterium, Eikenella, Kingella) is more common, affecting more frequently previously damaged valves, in neonates or immunocompromised patients (2,3).

One of the most rare and severe forms of endocarditis is fungal endocarditis (1,4).

CASE REPORT
A 7-month old infant that displayed normal fetal development visited our clinic for an altered general condition and fever that began...
4 days prior to admission. The infant had a history of neonatal sepsis that was treated with intubation and mechanical ventilation for 6 days and broad-spectrum antibiotics. Subsequently, the infant showed normal evolution and development.

Clinical examination on admission revealed a febrile, mediocre general condition, with intense mucocutaneous pallor, polypnea, a small petechiae on the right forearm, and an impalpable pulse in the brachial artery. The skin was slightly cool on the right upper limb extremity, but no motor deficiency of the hand was observed. The oxygen saturation was 96%, with no pulmonary rales, and blood pressure was 85/60 mmHg. We detected a diastolic rumble, a relatively loud first heart sound, a protodiastolic noise suggesting a “tumor plop”, and moderate hepatosplenomegaly.

Laboratory tests on blood drawn at admission revealed: platelets = 9000/mm$^3$, hemoglobin = 6.8 g/dl, white blood cell count = 23000/mm$^3$, C-reactive protein = 54 mg/l, positive procalcitonin, and slightly increased transaminase levels. Blood cultures were positive for Candida hemulonii, detected 5 h after inoculation, which was sensitive to Fluconazole, Amphotericin B, and Voriconazole.

Echocardiography revealed a giant vegetative mass with irregular contours (Figure 1). It was inhomogeneous, hyperechoic, and attached to the posterior wall of the mitral valve. Its approximate size was 2.0 × 1.8 cm, and it prolapsed into the left ventricle through the mitral valve orifice at every diastole (Figure 2). It caused severe mitral stenosis and mild pulmonary hypertension. Systolic function was normal for both ventricles, and no masses were attached to the other valves.

A Doppler echocardiogram of the right upper limb vessels showed no detectable flow in the distal brachial artery. Interrogation of the proximal flow at that level suggested arterial occlusion/subocclusion.

Based on clinical and laboratory examinations, we established a diagnosis of endocarditis with C. hemulonii and sepsis.

One day after admission, during a psychomotor agitation episode with tachycardia up to 200 beats per minute, the patient presented a clinical picture of acute pulmonary edema with cardiopulmonary arrest in asystole. He was resuscitated for 10 min and subsequently developed posthypoxic, severe encephalopathy. He received antifungal treatment with Fluconazole and supportive therapy. The blood cultures remained positive for C. hemulonii and the echocardiogram remained unimproved. Abdominal ultrasonography showed multiple splenic abscesses that may have been associated with areas of infarction.

Given the fungal endocarditis associated with the giant vegetation at the mitral valve, the first choice intervention was judged to be surgi-
cal resection of the vegetation. The surgery team replaced the mitral valve with a metal prosthesis (St. Jude 19). Valve preservation was not possible, due to the tight attachment of the vegetation to the posterior aspect of the mitral valve.

After surgery, recovery was relatively favorable, under treatment with Fluconazole and anticoagulant therapy. Seven weeks after surgery, the patient experienced an episode of sepsis that started with respiratory distress and was complicated with cerebral hemorrhage, based on clinical and laboratory findings. The evolution was severe, and mechanical ventilation was delivered for 3 weeks. With the installation of vegetative status, it was difficult to control infection and maintain hemodynamic parameters within normal limits. Normal function of the mitral prosthetic was maintained by treating with low-dose fractionated heparin (0.1 mg/kg/day).

The patient was discharged in response to family demand and died after one week.

**DISCUSSION**

Over the past two and a half decades, with the introduction of central venous catheters in infants and children, and the associated use of high glucose concentrations and hyperalimentation, Candida endocarditis has been widely recognized (5,6). One of the most frequent complications is embolization. Moreover, the most common consequence of vegetation emboli is stroke. In addition, embolization appears to pose a much greater risk to the mitral valve than aortic valve endocarditis (7-9). The best treatment has not been established, but both surgical and antifungal therapy have shown good results in patient outcome (6,10).

The incidence of infective endocarditis is 2 cases per 100,000 population per year. In children reports suggest a prevalence of 0.8 to 3.3 of 1000 children hospital admissions. From all cases of pediatric endocarditis, the fungal cases represent 1.1% with an incidence of 1.5 to 4 cases in 10 million children (11,12). In some reports, fungal endocarditis cases occurred preferentially during the second period and there were more common in children with noncardiac diseases (1). In this report factors associated with fungal endocarditis were the use of broad-spectrum antibiotics (p<0.001) and the presence of an infected central venous catheter (p=0.01)(1). 25% of infants and children with fungal systemic infection have also cardiac involvement (12).

There are published reviews about fungal endocarditis. Most of them conclude that the risk factors for fungal endocarditis are low birth weight, prematurity, age less than 1-year old usually in the absence of congenital heart disease and the use of broadspectrum antibiotics for prolonged time or/and central venous catheters and immunodeficiency (1,11,12). The etiology of fungal endocarditis is different between full-term neonates (<1 year old) and premature age. In the full-term neonates (<1 year old) the Candida spp accounts for more than 64% and Aspergillus spp for 21%.

Our case is uncommon, because the patient had fungal endocarditis with an unusual risk factor: a history of neonatal sepsis. The fungal insemination was probably related to the neonatal period. It is notable that the infection progressed very slowly without symptomatology, until the vegetation caused fungal dissemination. This event led to significant transmitral flow obstruction and caused clinically manifest peripheral emboli. Also, transmirtal flow obstruction led to cardiorespiratory stop due to impossibility of maintaining cardiac output in terms of marked tachycardia and short diastole. We were not able to demonstrate any immunodeficiency state, but this was suspected since the patient presented two systemic infections and fungal etiology of endocarditis.

**CONCLUSION**

Fungal endocarditis remains a serious pathology with unpredictable evolution despite the antifungal and surgical therapy.

In pediatric patients fungal endocarditis is usually related to congenital heart diseases or immunosuppression, but it should also be seen as a possible outcome of neonatal intensive care procedures and therapy.

Conflict of interests: none declared.
Financial support: none declared.

Acknowledgment: This paper is partly supported by the Sectorial Operational Programme Human Resources Development (SOPHRD), financed by the European Social Fund and the Romanian Government under the contract number POSDRU 141531.
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