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**Case Report**

# Fungal endocarditis in neonate

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## ABSTRACT

Neonatal endocarditis is a rare but usually fatal disease. Fungal endocarditis is an uncommon complication of invasive fungal infections and is associated with a high burden of morbidity and mortality. It frequently occurs in premature infants. The majority of these infections are caused by *Candida* (60-70%) and *Aspergillus* species (20-25%). The diagnosis is difficult because the criteria that have suggested and used in adults are not readily applicable for neonates. The incidence of fungal endocarditis in a neonate is on the rise, reported in the last decade secondary to use of central venous lines, frequent use of broad-spectrum antibiotics and neonatal surgical interventions.

**Keywords:** Neonatal endocarditis, Fungal endocarditis, Infective endocarditis

## INTRODUCTION

Neonatal infective endocarditis has been described as a rare and almost uniformly fatal entity. Infective endocarditis (IE) has been found 0.2-3% of all neonatal autopsies.[1] The number of reported cases of fungal endocarditis children has increased, largely among neonates receiving intensive care.[2] Despite current treatment options, IE remains a serious problem with mortality rates 25-33% for neonates and 11% for children.[3]

## CASE REPORT

A full term baby girl was born through LSCS to an unbooked 26 years old primigravida mother with prolonged labor, meconium stained liquor and unremarkable antenatal history. The baby did not cry immediately after birth and the Apgar score was 3, 5, and 8 at 1, 5, and 10 minutes respectively. The baby aspirated meconium and needed ventilation since birth.

On examination at birth, the baby had prolonged CRT, tachypnea, chest retraction, grunting, and decrease tone with semi-dilated and sluggish reactive pupil. There were no congenital abnormalities and other systems were within normal limit. A probable diagnosis of meconium aspiration syndrome was made and managed accordingly. An umbilical venous catheter was inserted for better intravenous access. Blood culture and CRP taken at birth were negative and other investigations revealed total leukocytic count of $6900\times10^3$/dl, Hb and 12.2 gm/dl, Polymorph 60%, lymphocyte 30%, urea 45 mg/dl, creatinine 0.8 mg/dl, sodium 129 mmol/l, potassium 3 mmol/l, calcium 1.2 mmol/l, and pH was 7.02, pco2 10, sHco3- 6.7. X-ray chest AP view showed evidence of meconium aspiration. Antibiotic, IV fluid, calcium gluconate, inotropes were started. Phenobarbital loading was given for seizure on 1st day of life and levetiracetam added later for repeated seizure. Antibiotic upgraded to piperacillin plus tazobactam after sending repeat blood culture, keeping in mind possibility of septic shock. The patient required ventilation for four days. Blood culture was sterile with normal repeat septic screen along with persistent thrombocytopenia and anemia. The baby

required oxygen persistently and preductal- post ductal $spo_2$ gradient was more than 10%. A two-dimensional echocardiogram was done, which showed severe tricuspid regurgitation with persistent fetal circulation for which IV sildenafil was started. ET tip culture showed Klebsiella pneumoniae sensitive to meropenem. On day 7 of life, injection meropenem was added, and piperacillin-tazobactam stopped in view of sensitivity report.

Repeat 2D echocardiogram done on day 10, showed fetal circulation with severe tricuspid regurgitation with persistent PFO. Tablet bosentan was added and sildenafil switched over to oral with strict vital charting. On day 14 fetal circulation resolved on repeat 2D echo but a new vegetation of size 10×7 mm on the anterior septal leaflet of tricuspid valve was seen (Figure1). On examination, there was pallor and splenomegaly with normal liver. On cardiovascular examination murmur was present. The baby was stable and on breastfeed. Blood counts showed TLC $24.6\times10^3$/dl, Hb 10.2 gm/dl, platelets $184\times10^9$/l. Urine analysis showed no hematuria or fungal hyphae. Blood culture for bacteria taken 1 hour apart at the time of vegetation detection was sterile but fungal blood culture showed budding yeast cell and growth of *Candida Tropicalis* species.

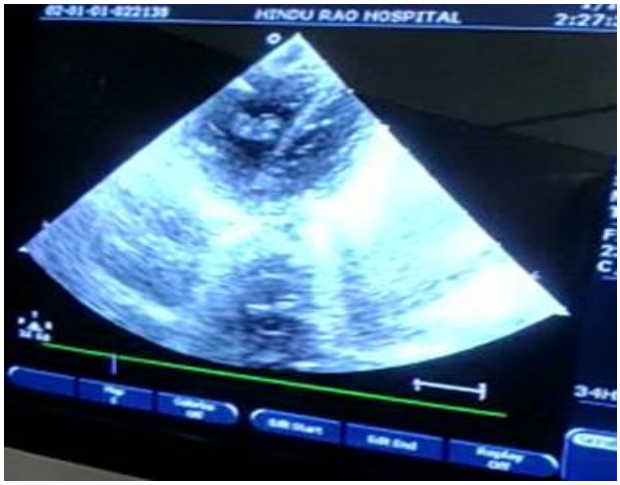


**Figure 1: Two-dimensional echocardiogram, subcostal four- chamber view showing a vegetation of size 10×7 mm on anterior septal leaflet of tricuspid valve projecting toward right ventricle.**

The patient was added vancomycin, amphotericin B plus fluconazole along with meropenem. CSF could not be done due to refusal by parents and fundus examination was normal. No abnormality was detected on USG of the abdomen and cranium. Over 20 days of admission baby received PRBC twice, platelets thrice, and FFP once for persistent anemia, thrombocytopenia, and deranged coagulation profile. In spite of antifungal treatment, on repeat 2D echo vegetation increased in size; 12×10 mm, hence baby was referred to a higher cardiac centre for surgical intervention and further management. She was loss to follow-up.

## LEARNING POINTS

- Infective endocarditis in the neonate has no specific presentation as in pediatric and adult patients.
- We should be more suspicious in a baby having intravascular catheter, umbilical venous catheter, and long time broad spectrum-antibiotic or those with persistent anemia and thrombocytopenia may be a suspect.
- Blood culture and 2D Echo is the cornerstone for the diagnosis of infective endocarditis.
- A high index of suspicion, early diagnosis, and treatment would affect the outcome favorably.
- It is treatable now; as earlier it was 100% fatal.

## DISCUSSION

Compared to adults, the mortality rate is high (70-90%) in children because of poor diagnosis, lack of effective antifungal antibiotics, and other underlying conditions[4], which could be possibly decreased if early diagnosis is made. The occurrence of fungal endocarditis is on rise, reported in the last decade in infants and children due to prolonged use of central venous line and broad-spectrum antibiotics.[5] Most of the patients (up to 80%) had umbilical or central vascular catheter similar to our patient.[5] Non-bacterial endocarditis is an important predisposing factor to IE, reported 8-10% of all neonatal autopsies and this can be a result of severe birth asphyxia, hyaline membrane disease, and PPHN.[1] Similar to this in our patient, there were PPHN, cardiac abnormality, severe birth asphyxia as a predisposing factor. Congenital heart disease is found in only 8% of neonatal IE in contrast to a higher frequency (up to 80%) in adult and older children.[6] The commonly reported etiological agents are Staphylococcus aureus, coagulase-negative Staphylococcus, and Candida albicans.[1] Candida albicans account two-third of fungal endocarditis[7]. The clinical and laboratory features reported in various combinations are hepatosplenomegaly, fever, skin abscesses, new or changing cardiac murmurs, congestive cardiac failure, presence of embolic phenomenon, arthritis, etc. Osier's nodes, Roth's spots or Janeway lesions, and clinical evidence of central nervous system involvement are more uncommon features of neonatal IE.[1] In this case we got leucocytosis, persistent thrombocytopenia, anemia, splenomegaly and changing murmur. In IE two-dimensional echocardiography has sensitivity 35 to 82% and can detect 1-3 mm of vegetation. With the increasing availability of two-dimensional echocardiography neonates with septicemia, especially if it is prolonged or recurrent, and skin pustules, hematuria, and thrombocytopenia, may warrant a cardiac scan to search for vegetations before a heart murmur has developed.[8] Liposomal amphotericin is generally the first line of therapy. Fluconazole is a fungistatic drug, often used in combination with amphotericin in fungal endocarditis and given for 6-8 week.[9] Clearance rates of 83-100% have been reported for the lipid preparations of amphotericin B, 72-97% for fluconazole, 81% for itraconazole, 85-

100% for caspofungin, and 72% for micafungin.[10] In some studies Candida species showed resistance to fluconazole and amphotericin-B and sensitivity to some newer antifungal agent as the echinocandins(caspofungin, micafungin, and anidulafungin). So newer agents can be used in combination with other antifungal agents in neonatal FE, but its efficacy is controversial.[11] Relapse of candidal endocarditis may manifest up to 2 years after the initial infection, so long- term follow-up is required.[1]

## CONCLUSION

The incidence of fungal endocarditis seems to have significantly increased in more recent years and has a poor prognosis, if not treated properly. Recognizing fungal endocarditis early is challenging due to its nonspecific symptoms, but with a high index of suspicion and understanding of the predisposing factors, an accurate diagnosis and subsequent treatment can be made.

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## REFERENCES

1. Daher AH. Infective endocarditis in neonates. Clinical Pediatrics. 1995;4:198-206.
2. Mayayo E, Moralejo J, Camps J, Guarro J. Fungal endocarditis in premature infants. Clinical infectious Diseases. 1996;22:366-8.
3. Fleming RE, Barenkamp SJ, Jureidini SB. Successful treatment of a Staphylococcal endocarditis vegetation with tissue plasminogen activator. J. Pediatr. 1998;132:535-7.
4. Ferrieri P, Gewitz MH, Gerber MA, Newburger JW, Dajani AS, Shulman ST, et al. Committee on rheumatic fever, endocarditis, and kawasaki disease of the American heart association council on cardiovascular disease in the young. unique features of infective endocarditis in childhood. Circulation. 2002;105:2115-26.
5. Tissieres P, Jaeggi ET, Beghetti M, Gervaix A. Increase of fungal endocarditis in children. Infection.2005;33:267-72.
6. Millard DD, Shulman ST. The changing spectrum of neonatal endocarditis. Clin Perinatol. 1988;15:587-607.
7. Sharma J, Nagraj A. Fungal endocarditis in a premature infant complicated by right atrial mycetoma and inferior venaca thrombosis images. Pediatr Cardiol. 2009;11(4):6-11.
8. O'Callaghan C, McDougall P. Infective endocarditis in neonates. Arch Dis Child. 1988;63:53-7.
9. Pana DZ, Dotis J, Losifidis E, Roilides E. Fungal endocarditis in neonates: a review of seventy-one cases(1971-2013). The Infectious Disease Journal. 2015;34(8):803-8.
10. Wiley JM, Seibel NL, Walsh TJ. Efficacy and safety of amphotericin B lipid complex in 548 children and adolescents with invasive fungal infections. Pediatr Infect Dis J. 2005;24:167-74.
11. Cuna CD, Rizzo V, Malaigia L, Biasini A. Successful medical treatment of Candida albicans endocarditis in an extremely low birth weight infant. J Clin Neonatol. 2017;6:94-6.

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