

INFECTIVE ENDOCARDITIS IN A NEONATE

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Acute infective endocarditis (IE) is reported in a full-term female neonate, who was large for gestational age, with hypertrophic cardiomyopathy. She was suffering from meconium aspiration syndrome and had needed ventilation from birth. She developed nosocomial infection with *Klebsiella pneumoniae* and repeat echocardiogram showed vegetations in the right side of the heart.

The patient continued to deteriorate despite antibiotic therapy and expired after three days of IE. Autopsy could not be done. Emphasis is laid upon a high index of suspicion and early diagnosis. To our knowledge, infective endocarditis in neonates has not been previously reported from Saudi Arabia.

Case Report

The patient was a full-term baby girl born to a 33-year-old G₆, P₅ mother, by ventouse delivery. The infant had shoulder dystocia, and the liquor was meconium stained. The Apgar scores were 2, 5 and 8 at one, five, ten minutes respectively. The baby suffered from meconium aspiration and needed ventilation from birth. Her weight, length and OFC were 4.5 kg, 56 cm and 35 cm respectively. Although she looked like an infant of a diabetic mother, the mother was not diabetic, which was reconfirmed by doing glucose tolerance test and glycosylated hemoglobin.

On examination at birth the baby had Erb's palsy, hepatomegaly 4 cm BCM and splenomegaly of 3 cm BCM. There were no congenital abnormalities and systemic examination did not reveal any other abnormality. Umbilical artery catheter was inserted for monitoring of blood gases. Blood culture taken at birth was negative and other investigations revealed total leukocytic count of $19.3 \times 10^9/L$, Hb 186 g/L, platelets $351 \times 10^9/L$, urea 4.1 mmol/L, creatinine 91 $\mu\text{mol/L}$, sodium 135 mmol/L, potassium 3.3 mmol/L, calcium 2.4 mmol/L, phosphorus

2.6 mmol/L, and magnesium 1.3 mmol/L. The baby had hypoglycemia during the first 24 hours, which was corrected by a push of 10% dextrose followed by increasing the rate of infusion. Chest x-ray showed evidence of meconium aspiration. Initial echocardiogram was done to rule out any element of persistent fetal circulation. It showed that the patient had septal hypertrophy. Cranial and abdominal ultrasonography was normal.

The baby was on antibiotics (amikacin and ampicillin), ventilation and intravenous fluids from day one. After one week antibiotics were stopped, umbilical catheter was removed and she was started on nasogastric feeding. On the ninth day she developed clinical features of sepsis in the form of lethargy, mottled skin, and increase in oxygen requirement. The patient was started on cefotaxime and amikacin after taking the necessary cultures.

Blood culture grew *Klebsiella pneumoniae*, sensitive to cefotaxime, cotrimoxazole, and cefoxitin. It was resistant to other antibiotics, which included ampicillin, cephalixin, chloramphenicol, gentamicin, tobramycin, amikacin, aztreonam and piperacillin. CSF was normal. She received intravenous antibiotics for two weeks. Repeat blood culture taken after seven days of starting antibiotics was negative. She was extubated at the age of 15 days.

Two days after antibiotics were stopped, the patient developed signs and symptoms of congestive cardiac failure in the form of tachypnoea, tachycardia, gallop rhythm, systolic murmur, increase in liver size and respiratory distress, and so she was reventilated. Repeat echocardiogram showed 7-mm vegetations on the right side of the heart on the tricuspid valve, and the persistence of septal hypertrophy. Blood counts showed total leukocytic count of $49.3 \times 10^9/L$, Hb 156 gm/L, platelets $35 \times 10^9/L$, and urine analysis showed microscopic hematuria. Fundal examination was normal—there were no features of embolic phenomenon anywhere in the body. The patient was started on ceftazidime and vancomycin and two blood cultures were taken one hour apart. Both grew *Klebsiella pneumoniae* sensitive to ceftazidime, cotrimoxazole and cefotaxime. The resistance pattern was the same as before. Ceftazidime was continued and cotrimoxazole was added. The baby continued to deteriorate in spite of antibiotic therapy and other

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supportive treatment. She died three days after the diagnosis of infective endocarditis. Autopsy was not done.

Discussion

Acute infective endocarditis in neonates was until recently considered a rare and usually fatal disease.¹ But increasing awareness and early diagnosis of the disease has confirmed that it occurs more frequently than suspected and that fatality could be decreased.

In neonates it has been more frequently reported to occur in a normal heart, in those patients admitted to NICU who required central venous catheters for parenteral nutrition. Congenital heart disease is found in only 8% of neonates with infective endocarditis, compared to 80% in older children and adults.^{2,3} Our patient had hypertrophic cardiomyopathy. Though this combination has not been described before, it could be only a coincidental occurrence. She also had an umbilical arterial catheter rather than the commonly described association of central venous lines. This indicates that the venous line is not an essential predisposing factor.

The etiological agents commonly reported are *Staphylococcus aureus*, coagulase-negative *Staphylococcus* and *Candida albicans*. Other organisms reported with lesser frequency are *Enterococci*, *Pseudomonas aeruginosa* and *Serratia marcescens*. *Klebsiella* has been very rarely reported as a cause of acute infective endocarditis, and then as a part of mixed bacterial growth.³⁻⁷

The clinical presentation is variable and nonspecific, leading to difficulties and delays in diagnosis unless a very high index of suspicion is observed. 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. Osler's nodes, Roth's spots or Janeway lesions, and clinical evidence of central nervous system involvement are more uncommon features of neonatal IE.⁶

Echocardiogram generally shows vegetation in the right side of the heart and is usually positive in about 67%-75% of cases. Transesophageal echocardiogram has been reported to give a yield up to 90% in the pediatric population. Positive blood culture on two or more occasions, with underlying heart disease and a history of central venous catheter, should raise strong suspicion.^{4,6-8}

The blood counts may reveal leukopenia or leukocytosis. Thrombocytopenia was reported in all twelve patients in one of the series.⁹

Patients have been given antibiotic therapy for 24 to 59 days, depending upon the response.⁶ It can take up to three

months for vegetation to resolve.¹⁰ Rastogi et al. recommended four weeks of antibiotic therapy after bacteremia has been resolved.⁴

Serial echocardiogram has been recommended in all neonates with systemic candidiasis or persistent positive blood cultures, especially if intracardiac lines were inserted for parenteral nutrition or those with septicemia or disseminated intravascular coagulation, particularly when there is a cardiac murmur.^{8,11,12}

Prognosis depends on early diagnosis and the status of the patient at the time of diagnosis, and effective treatment with appropriate antibiotics. Antibiotics are needed in a higher concentration than with routine sepsis, because they have to penetrate the vegetation to reach the enmeshed bacteria.⁸ Still the mortality reported at present is 25%-60%, but could possibly be decreased further if early diagnosis is made.^{6,8,11,12}

In conclusion, infective endocarditis in neonates is not as rare as was thought earlier. With the advent of neonatal intensive care and use of long IV-lines, especially for parenteral nutrition, more and more cases of IE are diagnosed. Neonates with IE usually do not have underlying structural heart anomalies. All neonates with persistent or recurrent sepsis in an intensive care setting should be worked up for IE. A high index of suspicion, early diagnosis and treatment may affect the outcome favorably. The empirical antibiotic therapy cannot be standardized and depends on the local microbial experience of the unit.

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