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Neonatal Transfusion Malaria: A Growing Clinical Problem

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Summary

Sodeinde O and Dawodu AH. Neonatal Transfusion Malaria: A Growing Clinical Problem. *Nigerian Journal of Paediatrics* **1985: 12:57.** Two cases of neonatal transfusion malaria are presented. The main clinical features were fever, diarrhoea, recurrent apnoea, anaemia and metabolic acidosis. Both patients responded satisfactorily to chloroquine therapy. The report highlights some of the unusual clinical presentations associated with the disease and the need for appropriate guidelines on the management of infants at risk.

Introduction

IN areas of stable malaria, congenital and neonatal malaria are rare diseases.[1 2] However, transfusion malaria which is a well recognized disease in adults,[3] has received little attention in infants and children.[4] In the tropics, the frequent use of blood that may contain malaria parasites makes transfusion malaria a potentially important medical problem in children as well as in some categories of adults. These include pregnant women and patients on steroid or cytotoxic drug therapy and visitors from non-endemic areas. We therefore, report these two cases of transfusion malaria in neonates seen recently in our hospital, to highlight some of the unusual clinical features that may be associated with the disease especially in preterm infants. It is also to emphasize the need for surveillance and correct therapeutic and preventive measures among infants at risk.

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Case 1

A 650g female infant, born at a private hospital after 26 weeks gestation, was referred to the University College Hospital, Ibadan, on account of extreme prematurity. On admission, there were features of prematurity. In addition, she had hypothermia and mild respiratory distress with reduced air entry into both lungs. The chest radiograph was however, normal. Based on a clinical suspicion of septicaemia, her blood, urine and cerebrospinal fluid were cultured and a course of cloxacillin at 100mg/kg/day and gentamycin at 5mg/kg/day was started. In addition, she received intravenous fluids and routine incubator care. Except for mild jaundice, she responded well to treatment until the 4th day of life when she had 3 episodes of apnoea. After excluding respiratory and metabolic problems, a diagnosis of apnoea of prematurity was entertained and intravenous aminophylline was added to her treatment.

On the seventh day of life, 8ml of packed cell transfusion was given to correct anaemia which was probably caused by frequent blood collections for laboratory tests. By day 9, apnoea had ceased and on day 10, aminophylline and antibiotics were stopped after all the cultures were reported sterile.

However, on day 12, mild apnoea recurred. Metabolic acidosis was found and treated but apnoea recurred on day 16 and worsened thereafter. The cultures were repeated and antibiotics were recommenced. Metabolic acidosis was again treated but the apnoea persisted until two days later when a blood film examination revealed numerous rings of *Plasmodium falciparum*. She was given one dose of intramuscular chloroquine at 5mg/kg body weight. The frequency of apnoea was reduced within 24 hours and stopped completely, 48 hours after the administration of chloroquine. Repeat blood film examination 72 hours after chloroquine treatment showed no malaria parasites. She grew satisfactorily after this. The cultures were again sterile and antibiotics were stopped after a seven-day course. Before discharge, she was given two further blood transfusions but each transfusion was followed immediately by an oral course of chloroquine at 10mg/kg/day for 2 days. Neither apnoea nor malaria parasitaemia recurred.

Case 2

A 3.3 kg male infant was born at term and was healthy at birth. On the third day of life, he developed jaundice which was eventually shown to be due to ABO blood group incompatibility between mother and child. The jaundice responded satisfactorily to phototherapy but he developed anaemia which required blood transfusion on the 6th day of life. He was not given chloroquine and he was discharged in a healthy condition two days later.

Twenty-two days after the blood transfusion, he was brought back to hospital with a one-day history of fever, diarrhoea and a mild cough. His temperature was 38.5^{0}C but he was still active and the rest of the physical examination was normal. He was given oral chloroquine at 10mg/kg/day for 2 days. A blood film made before commencing this treatment showed numerous rings of *Plasmodium falciparum*. His symptoms cleared completely within 48 hours of therapy and a repeat blood film showed no malaria parasites. He remained well over a two-month follow-up period.

The Table summarises the main features in the two cases.

TABLE

Main Features of Transfusion Malaria in Two Cases

	Case 1	*Case 2*
Gestation	26 weeks	40 weeks
Birth weight	0.65kg	3.3kg
Use of malaria prophylaxis in pregnancy	Not known	Yes
Age at diagnosis	18 days	28 days
Incubation period	5 days	22 days
Main clinical features	Recurrent neonatal apnoea, metabolic acidosis, fever	Fever, diarrhoea, cough

Discussion

The explanations offered for the rarity of congenital and neonatal malaria in endemic areas include the presence of foetal haemoglobin[5] [6] and the protective role of transplacentally acquired antibody.[2] Theoretically, neonatal malaria can occur if the infection is overwhelming,[7] as in the direct introduction of parasites during blood transfusion,[3] or if the immunity is depressed. Moreover, some doubt has been expressed about the protective role of maternally derived antibody against neonatal or congenital

malaria.[8] Consistent with the above view, is the recent increase in the number of reports of congenital and neonatal malaria.[9–12]

It is possible that malaria parasites were present at birth in our patients, since cord blood samples were not examined for parasites. However, each patient had at least, one blood film examination as part of the routine investigation of hospitalized neonates. Since neither patient had parasitaemia at this stage, it is more likely that parasites were introduced during the blood transfusion.

The clinical features of neonatal malaria have been reported to include fever, jaundice, anaemia and hepatosplenomegaly.[9] Neither of our patients had jaundice or hepatosplenomegaly; but fever and some degree of anaemia were present. In addition, case 2 had diarrhoea and cough while case 1 had metabolic acidosis and recurrent neonatal apnoea. This appears to be the first reported case of neonatal apnoea associated with malaria. Since not all blood donors in our environment are screened for malaria, the disease should be considered in the differential diagnosis of a sick neonate who has had blood transfusion. This would eliminate delay in diagnosis and treatment.

The correct treatment for neonatal malaria is not certain. The World Health Organization[13] recommend oral chloroquine at 25mg/kg body weight given over 3 days for children, but other workers[4] have suggested 5mg/kg/day for three consecutive days for neonates. Our first case was cured by a single intramuscular dose of chloroquine at 5mg/kg body weight, while the second case responded to oral chloroquine at 10mg/kg/day for 2 days. Therefore, there is a need to study the chloroquine pharmacokinetics in neonates in order to formulate correctly, the dosage schedule.

As good antenatal care becomes more widespread, the use of malaria chemoprophylaxis will increase. It has recently been shown that maternal use of malarial chemoprophylaxis leads to a lowering of the maternal antibody titres at term, in the sera of such mothers and correspondingly lower titres in their paired cord sera.[14] Although the babies of mothers who had received malaria chemoprophylaxis could have higher birth-weights, they may also have lower resistance to malaria. This is even more important among the preterm infants who usually have lower transplacental transfer of antibody when compared with term infants.[15]

Since donor screening and treatment of positive donors is likely to be tedious and cost ineffective, preventive treatment of transfused patients is a reasonable alternative. For this reason, it is desirable to have an estimate of the frequency of transfusion malaria in infancy and childhood in our environment, in order to determine the cost-benefit of routine antimalaria chemotherapy for all infants and children who have received blood transfusion. Such a study is in progress in our institution. Meanwhile, we recommend a policy of careful surveillance and prompt treatment of all malaria positive or sick infants and children who have recently received blood transfusion.

References

1. Bruce-Chwatt LJ. Malaria in African infants and children in southern Nigeria. *Ann Trop Med Parasitol* 1952; **46:** 173–200.
2. Williams AIO and McFarlane H. Immunoglobulin levels, malarial antibody titres and placental parasitaemia in Nigerian mothers and neonates. *Afr J Med Sci* 1970; **1:** 369–76 .
3. Bruce-Chwatt LJ. Transfusion malaria. *Bull WHO* 1974; **50:** 337–46.
4. Miglani N, Gupta BD and Gupta GL. Congenital and neonatal malaria. *Indian Pediat* 1979; **16:** 637–8.
5. Cohen S, MacGregor IA and Carrington S. Gamma globulin and acquired immunity to human malaria. *Nature* 1961; **192:** 733–7.
6. Wilson RJM, Pasvol G and Weatherall DJ. Invasion and growth of Plasmodium falciparum in different types of human erythrocytes. *Bull WHO* 1977; **55:** 179–86.
7. Audu IS and Collis WRF. Malaria in childhood: Modern concepts of immunity, treatment and prophylaxis. *Clin Pediat* 1965; **4:** 357–63.
8. Khan AQ and Talibi SA. Epidemiological assessment of malaria transmission in an endemic area of East Pakistan and significance of congenital immunity. *Bull WHO* 1972; **46:** 783–92.
9. Patwari A, Aueja S, Berry AN and Ghosh S. Neonatal malaria: a clinico-hematological profile. *Indian Pediat* 1978; **15:** 847–9.

10. Quinn TC, Jacobs RF, Mertz GJ, Hook EW and Lochsley RM. Congenital malaria: A report of four cases and a review. *J Pediat* 1982; **101:** 229–32.

11. Rambajan I. The first case of congential/neonatal malaria from Guyana, South America. *Trop Geogr Med.* 1983; **35:** 181–2.

12. Wetsteyn JC, Grimberg MT and Van Tinteran HL. Congenital malaria in the Netherlands. *Trop Geogr Med.* 1983; **35:** 183–5.

13. World Health Organisation. Chemotherapy of malaria and resistance to antimalarials. *Technical Report Series No.* 529. *Geneva: WHO*, 1973.

14. Ibeziako PA and Williams AI. The effect of malaria chemoprophylaxis on immunoglobulin levels of pregnant Nigerian women and the newborn. *Br J Obstet Gynaecol* 1980; **87:** 976–82.

15. Bellanti JA and Boner AL. Immunology of the fetus and newborn. In: Neonatology, Pathophysiology and Management of the newborn. Avery GB, ed. Philadelphia: J B Lippincott Co, 1981: 701–22.

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