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Case Report

Plasmodium Falciparum Malaria a Rare Cause of Anemia in A Newborn: Report of A Case to the Neonatology Unit of the Mali Hospital

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Abstract: ***Introduction:*** Malaria is a major public health problem in developing countries. In 2018, according to the WHO, there were an estimated 228 million cases of malaria through worldwide with a death toll of 405,000. However, congenital malaria is a rare event in endemic areas thanks to the protection provided by maternal antibodies transmitted to the newborn. We report a case of severe anemic malaria diagnosed and treated in the neonatology unit of the Mali Hospital. ***Observation:*** He was a month and 20 day old infant born by scheduled cesarean section hospitalized for pallor and fever. The onset of the disease dates back to the 5th day of life marked by a fever and pallor motivating hospitalization first in their health center then at the CHU Gabriel Touré where he was treated with antibiotics associated with blood transfusions for neonatal infection without success. Faced with the persistence of the signs, he was referred to us for better care. The diagnosis of malaria was made by performing a malaria RDT which confirmed malaria due to *P. falciparum.* He was put on artesunate at a dose of 3 mg / kg / d IVD for 7 days with an oral relay with artemether 20 mg / lumefantrine 120 mg for 3 days which led to clinical and parasitological improvement. ***Conclusion:*** Congenital and neonatal malaria is rare in malaria-endemic countries. Its diagnosis should be considered before any recurrent febrile hemolysis during the neonatal period and confirmed by a rapid and / or thick diagnostic test.

Keywords: plasmodium-falciparum-newborn-hospital of Mali

INTRODUCTION

Malaria is an erythrocytopathy caused by hematozoa of the genus Plasmodium (P) transmitted by the bite of an anopheles mosquito (Imbert, P., & Banerjee, A. 2002).

Malaria is a major public health problem in developing countries. In 2018, according to the World Health Organization (WHO) there were an estimated 228 million cases of malaria worldwide with a death toll of 405,000. Children under the age of five are the most vulnerable group with 67% of deaths (Paludisme [Internet]. cité 16 févr 2020).

The share of the global malaria burden borne by the WHO African Region is disproportionate. In 2018 93% of malaria cases and 94% of deaths due to this disease occurred in this Region (Paludisme [Internet]. cité 16 févr 2020).

In Mali in 2018, according to the annual report of the National Program to Combat Malaria, the number of cases of malaria recorded in health facilities in Mali was 1.8 million or 63.28% including 34.2% among children under five (Cellule de Planification et de Statistique. 2018).

However, congenital and neonatal malaria, which is defined as all of the clinical and biological manifestations consecutive to the presence of Plasmodium in the newborn, is a rare event in Sub-Saharan Africa (Dicko-Traoré, F. *et al.*, 2011).

This is explained by the fact that newborns are protected by specific antibodies transmitted by the mother to the newborn in these regions (Adja, E. A. *et*

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al., 2009 ; & WHO_MAL_88.1044_fre.pdf [Internet]. cité 15 févr 2020).

The aim of this work is to describe a case of late-diagnosed neonatal malaria treated in the neonatal unit of the Mali Hospital.

OBSERVATION

He was a one month and twenty day old infant who was admitted for intense pallor and respiratory distress. Her mother is a multiparous woman with a history of cesarean sections for scar uterus who had taken sulfadoxine pyrimethamine for the prevention of malaria in the 3rd, 4th and 6th months of pregnancy for the prevention of malaria. Despite these three doses she would have had a fever in the 7th month of pregnancy which would have been successfully treated with quinine salts as an infusion.

Our infant is the 5th child of five. Her siblings were doing well. He was born from a pregnancy well followed to term without major incidents. Born by scheduled cesarean in the local health center; he was resuscitated at birth. Her birth weight was 2800 g and her height was 51 cm. He was in his third hospital stay. A first hospitalization of 3 days took place at the health center at 7 days of life for febrile anemia and jaundice requiring a transfusion of whole blood. A week later, he was hospitalized a second time for the same reasons in the neonatology department of the CHU Gabriel Touré where he was transfused 3 times: twice with the red blood cell concentrate (CGR) group B + not phenotyped and once with the CGR group B + phenotyped. He was put on antibiotic (amoxicillin / clavulanic acid) because of 50 mg / Kg / 8 hours in direct intravenous (IVD) during 13 days.

Given the persistence of febrile hemolysis and at the request of his family, he was referred to us for better care.

At the entrance, it weighed 2,970 g with a size of 51 cm and a head circumference of 35 cm. He had a hyperthermia of 38.2 ° C. He had a very marked pallor against a background of general jaundice. He had polypnea at 61 cycles / min and 64% oxygen saturation in ambient air. The heart sounds were normal. The rest of the clinical examination was not particularly specific.

In total, this was a 50-day-old infant, born by cesarean section scheduled for scarred uterus and resuscitated who was admitted for recurrent pallor, fever and jaundice dating back to the neonatal period requiring non-phenotypic blood transfusions. We have raised two diagnostic hypotheses:

- A neonatal infection not properly treated;
- Neonatal infection associated with fetal-maternal incompatibility.
- Additional examinations were requested to support the diagnosis.
- The hemogram performed using an automatic machine showed anemia at 2.6 g / dl normoocytic, normochromic with hyperleukocytosis at 36400 / mm3 predominantly polynuclear neutrophil and thrombocytopenia at 34,000 / mm3. The reticulocyte count was 2795.500 / mm3 or 13.57%. The number of corrected white blood cells could not be done for technical reasons.
- Her blood group was phenotype positive B (D +, C-, E-, c +, e +, K-) and that of mother was O positive.
- Reactive protein C (CRP) was 181 mg / l.
- The total bilirubinemia was 145.8 µmol / l, indirect: 64.6 µmol / l and direct: 81.2 µmol / l. The haptoglobin level is missing.
- The search for irregular agglutins was negative.
- The blood culture was negative.
- The chest X-ray was normal.

We Retained The Diagnosis Of A Neonatal Infection.

A treatment combining oxygen therapy, transfusion of globular concentrate group B positive phenotyped at a rate of 20 ml / kg per 1 hour and antibiotic therapy based on ceftriaxone 100 mg / kg / day IVD in a single injection for 7 days, gentamycin 3 mg / Kg / d in slow intravenous (IVL) in a single injection for 3 days and paracetamol 15 mg / Kg / 6 hours in IVL.

After 3 days of treatment we observed the persistence of fever, and worsening of pallor, respiratory distress. To cover all the germs responsible for a neonatal infection we changed ceftriaxone to cefotaxime because of 200 mg / kg / day in IVD and in 3 administrations.

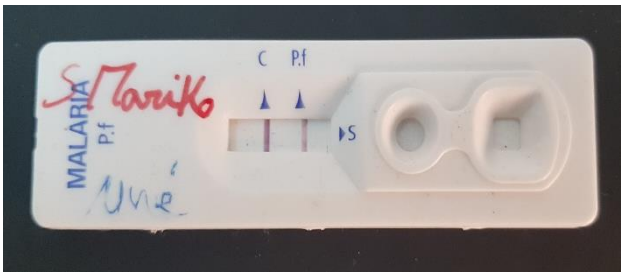

Figure 1: rapid diagnostic test for malaria positive for P. falciparum.

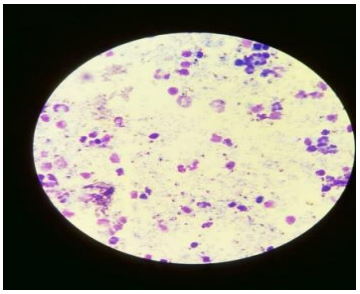

Figure 2: positive drop with 2617 P. Falciparum trophozoites.

Given the persistence of symptoms despite the change of antibiotic, a rapid diagnostic test (RDT) for malaria was carried out. He returned strongly positive to Plasmodium falciparum (Figure 1). It was supplemented by a thick drop GE) which returned strongly positive to 2617 trophozoites with P. falciparum / 200 leukocytes (figure 2) thus confirming a severe malaria anemic and hyperparasitemic form.

An anti-malarial treatment based on artesunate at a rate of 3 mg / kg in IVD, renewed at 12 hours, 24 hours and then daily for 7 days has been started. This treatment was associated with the transfusion of globular concentrate of group B positive at the rate of 20 ml / kg over 1 hour and the infusion of the glucose serum 10% at the rate of 100 ml / k / d. Hemoglobin and thick gout were checked on the 3rd, 7th and 14th day of treatment.

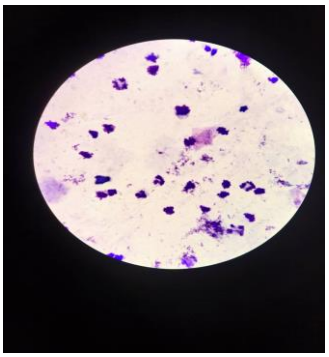

Figure 3: positive drop with 121trophozoites and 5 gametocytes / 200 leukocytes from P. falciparum.

On the third day of anti-malarial treatment we observed apyrexia, weight gain (+100 g). There was respiratory discomfort. The control hemoglobin level was 5.8 g / dl and the thick drop was positive for 121 trophozoites of P. falciparum (Figure 3). A second transfusion of group B phenotypic globular control at a rate of 20 ml / kg per 1 hour was associated with anti-malarial treatment.

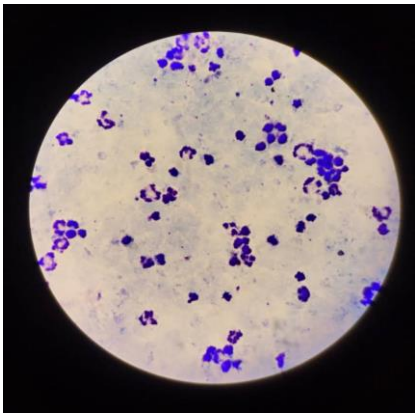

Figure 4: positive drop with 21 trophozoites of P. falciparum.

On the seventh day of treatment it was apyretic, improvement in respiratory distress with weight gain (+170 g). The hemoglobin level was 6.13 g / dl and the thick drop was weakly positive at 21 trophozoites of P. falciparum (Figure 4). The artesunate was stopped and the relay was taken with the combination artemether 20 mg / lumefantrine120 mg due to one tablet per day for 3 days.

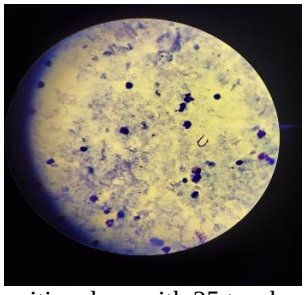

Figure 5: positive drop with 25 trophozoites and 1 gametocyte / 200 leukocytes from P. falciparum.

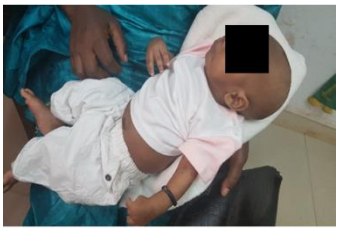

Figure 6: photo at the exit

On the fourteenth day of hospitalization, he was in good general condition, good coloring with a normal respiratory rate. The hemoglobin level was 6.1 g / dL, the white blood cells at 9,500 / mm3 and the platelets at 129,000 / mm3. The thick drop was still positive at 25 trophozoites and 1 gametocyte of P. falciparum (Figure 5). It came out with artemether 20 mg / lumefantrine 120 mg was taken again because of one tablet per day for 3 days orally (Figure 6).

DISCUSSION

Congenital malaria is an infection transmitted from mother to fetus via the transplacental route and concerns the four species of parasites mainly P. falciparum (7,8).

This mode of contamination and the absence of an exoerythrocytic fetal cycle, relate congenital malaria to trasfusional malaria. The placenta is a veritable zone of accumulation of parasites in the intervening spaces (Aujard, Y. 2011).

The prevalence of malaria placentitis greater than 30% in areas of holo or hyperendemia. The placenta is indeed, for reasons that are still poorly understood (role of the expression of chondroitin sulfate), a favorable site for schizogony. However, the infection is rarely symptomatic in newborns, the parasite usually disappearing within a few days from

peripheral blood without treatment. This natural resistance of the newborn to malaria infection seems to be based on two essential factors:

- Transplacental transmission of maternal antibodies;
- The presence of fetal hemoglobin unfavorable to the growth of P. falciparum in hemathias would explain the rapid disappearance of the parasites in the newborn and the low parasite densities during malaria infections in the first months (1).
- Newborn malaria is revealed in two forms:
- Asymptomatic congenital malaria, which corresponds to an infestation with the presence of plasmodium in peripheral blood in newborns less than seven days old. Healing is spontaneous for two to three days in this case.
- Symptomatic congenital malaria with clinical manifestations during the first seven days of life (9,10).

Symptomatic malaria is mainly described in non-endemic areas (Dicko-Traoré, F. *et al.*, 2011 ; & Adja, E. A. *et al.*, 2009). They are diagnosed in 24% of cases at birth and in 52% after 14th day of life (Aujard, Y. 2011 ; & Francisca, M. *et al.*, 2013). The symptomatology is not specific. The clinical signs motivating the thick gout are fever in 75% of the cases; splenomegaly (33%); hepatomegaly (16%); anemia (11%); pallor, jaundice and anorexia in 7% of cases. A high level of CRP can wrongly point to a bacterial infection (Aujard, Y. 2011).

In a non-endemic area, the diagnosis can be evoked in front of the notion of maternal malaria and / or the detection of the haematozoan in the haemogram (Aujard, Y. 2011). The parasitaemia possibly observed at birth in asymptomatic children born to malarial mothers has:

- A low parasitic density which can be responsible for negative thick drops;
- High transience: the thick drop is most often negative on the 2nd and 3rd day;
- Low vitality as evidenced by the rarity of observations of malaria disease (Aujard, Y. 2011).

Therapeutically, the antimalarials available for newborns are chloroquine and quinine salts. In the absence of resistant parasites and vomiting, treatment is based on oral chloroquine. Otherwise and or in case of cerebral malaria quinine is used intravenously or per os at a dose of 20-25 mg / kg / day (Adja, E. A. *et al.*, 2009 ; Aujard, Y. 2011 ; Nagalo, K. *et al.*, 2014 ; & Francisca, M. *et al.*, 2013).

Compared to artesunate, there are no fully established data in infants under 2 years of age, although some very young children could be treated without difficulty. The WHO does not, however, make any age difference in its 2012 recommendations in favor of the molecule. The working group considers that quinine or artesunate can be used indifferently in the treatment of severe malaria before 18 months (Comission Spécialisée Maladies Transmissibles. 2013).

In our observation, this was a 1 month, 20 day old infant born by scheduled cesarean section who was diagnosed with severe malaria one month after the onset of symptoms. During this time he was treated with antibiotics associated with blood transfusions for neonatal infection complicated by severe anemia. The diagnosis of malaria was made by carrying out a rapid diagnostic test for malaria and thick gout. The realization of a thick drop and a hemogram made it possible to define the severity of malaria, anemic and hyperparasitemic form. The plasmodial species was P. falciparum. The high reticulocyte count, free hyperbilirubinemia and normalization of platelets without platelet transfusion explained the hemolytic nature of anemia.

He was treated with artesunate at a dose of 3 mg / kg / day IVD for 7 days with an oral relay with artemether 20 mg / lumefantrine 120 mg for 3 days which resulted in clinical improvement but without clear parasitological improvement because on the 14th day of hospitalization the thick gout was still positive at 25 trophozoites and 1gametocyte / 200 leukocytes of P. falciparum hence the resumption of artemether 20 mg / lumefantrine120 mg for 3 days.

CONCLUSION

Congenital and neonatal malaria is rare in malaria-endemic countries due to the transplacental transmission of maternal antibodies and the presence of fetal hemoglobin unfavorable for the growth of plasmodium in hemathias of the newborn. Diagnosis and early management improve the prognosis. The diagnosis of congenital and neonatal malaria should be brought up before any sign of recurrent febrile hemolysis during the neonatal period and confirmed by a rapid and / or thick diagnostic test.

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