Nigerian Journal of Clinical Practice
March 2010 Vol. 13(1):103-105

Case Report

BLACK WATER FEVER (BWF)? A CASE REPORT FROM THE SEMI-ARID NORTHEASTERN NIGERIA

***S Oguche, *Y Mava, **IM Watila, *** NB Molta**

*Departments of Paediatrics *College of Medical Sciences, University of Maiduguri Teaching Hospital, Maiduguri Nigeria, **State Specialist Hospital, Maiduguri, ***Unit of Parasitology, Department of Zoology, University of Jos, Jos Nigeria.*

ABSTRACT

Black Water Fever is an uncommon complication of *P. falciparum* malaria in our environment. The overall incidence in Nigeria is unknown but the frequency may be more than is reported. It is commonly associated with administration of suboptimal doses of quinine and development of acute renal failure. We present a case of BWF having occurred after the administration of quinine, which we treated successfully with artemether.

INTRODUCTION

Malaria remains the greatest threat to child survival in Africa[1] and in Nigeria it remains high on the priority list of health authorities.[2] Malaria manifests in very many ways and in its complicated form may terminate in death of the victim.[3] One of such complications is the Black Water Fever (BWF).[3] This entity was a recognized cause of death in non - immune adult expatriates visiting malaria endemic areas in the fifties and continues to be a threat especially where transmission is unstable.[4] BWF is a severe syndrome characterized by intravascular haemolysis, Haemoglobinuria, and acute renal failure that is classically seen in European expatriates chronically exposed to *Plasmodium falciparum* and irregularly taking quinine.[4] We report a case that fits the typical description of the disease from this semi-arid north eastern Nigeria and a review of literature on the subject to raise the awareness of clinicians who may have to resort to the use of quinine in view of the threat of drug-resistant malaria in our sub-region.

CASE REPORT

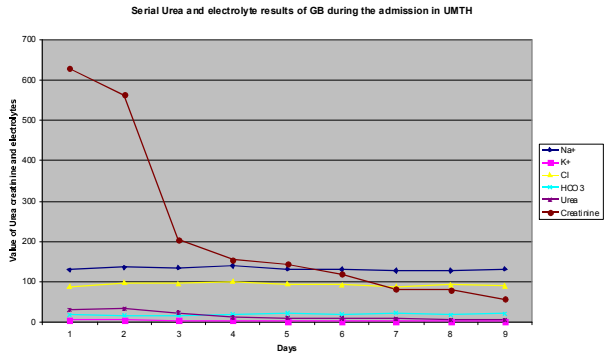
GB is an 11 year old junior secondary school girl referred from a secondary health care facility in the northeastern Nigeria to us in University of Maiduguri Teaching Hospital with a 4-day history of high grade intermittent fever, vomiting and abdominal pain. Prior to referral, she was empirically treated for malaria on out-patient basis with two doses of intramuscular chloroquine followed by oral formulation of the drug to complete the course of treatment. There was no improvement so she revisited the hospital where she had oral quinine prescribed. Twelve hours after the second dose of quinine she lapsed in to coma. This necessitated referral to the nearby Federal Medical Centre for further management. Following a rapid assessment, she had the quinine changed to intravenous rate-controlled infusion. GB began to convulse and had three episodes of generalized tonic clonic seizures with associated coca-kola coloured urine which prompted the discontinuation of the quinine therapy. Artemether was substituted. Coma lasted three days before regaining consciousness. She was not a known sickle cell disease patient. Her packed cell volume dropped to below 16 per cent and she had a single blood transfusion. She was referred to our hospital on account of markedly deranged renal function (Urea = 17.2, then 35.0 mmol/L and creatinine = 743 umol/L).

On arrival at the teaching hospital and oblivious of the history of quinine intolerance, the patient was challenged with an intravenous infusion of quinine by an unsuspecting intern. The recovering patient once more collapsed and resumed passing dark coca-kola coloured urine. Careful review in the ensuing hours revealed acutely ill, moderately pale but anicteric child. She was comatose (3/5 on the Blantyre coma scale). Temperature was 36.0 ^{o}C and the weight was 33.0 kg. Further examination revealed hepatomegaly (6 cm). Urinalysis was negative for blood. The cerebrospinal fluid (CSF) protein was 30 mg/dl, the relationship between CSF and blood glucose was normal and CSF culture was sterile. Quinine was discontinued. Blood film for malaria parasites (Giemsa stained[5]) was positive (Asexual forms of *P. falciparum* density was 16/ul), In addition to completing course of parenteral artemether, she was managed conservatively for the renal insufficiency. Subsequently her consciousness improved. Her packed cell volume post transfusion was 27 per cent. Total WBC was 13.6 x10^{9}/l. Urea, creatinine and electrolytes results form admission to time of discharge are shown in the graph below. GB

Correspondence: Dr S Oguche,

was discharged home having fully recovered clinically and on return of laboratory parameters to normal values.

Figure: **Serial Urea and Electrolyte Results of GB during the Admission in UMTH.**



DISCUSSION

Black water fever (BWF) is one of the complications associated with severe *P. falciparum* malaria.[3] It is characterized by a sudden extensive intravascular haemolysis leading to haemoglobinaemia, consequently haemoglobinuria and acute renal failure.[4] Although the cascade is triggered by administration of quinine to the patient, Halofantrine and Mefloquine may also precipitate BWF.[4] Massive intravascular haemolysis and associated haemoglobinuria has been reported in two adults with sickle cell anaemia.[6] However, GB is not a known case of sickle cell disease. While glucose 6-phoshate dehydrogenase deficient individuals challenged with oxidant drugs or chemical exposure may develop intravascular haemolysis and subsequent haemoglobinuria,[7] this possibility is remote in our patient who is a female. The patient in question had malaria which was not treated adequately for two weeks. She was given quinine which most probably fired the massive and extensive destruction of RBCs. The dark coloured urine, severe anaemia requiring blood transfusion and development of renal insufficiency that this patient presented with are glowing features of black water fever.[4,7] Quinine when administered in suboptimal doses, especially to non immune individuals have been observed to predispose to BWF. [4,8] Our patient was switched to artemether which was tolerated. Artemether is safe as alternative to quinine in patients with this type of dramatic abnormal clinical response to quinine.[9]

The convulsion she suffered could be explained by one of the following: first, she could have developed hypoglycaemia either because she had not being feeding well for days. Quinine is known to induce hypoglycaemia through plasma insulin surge.[10]

It is interesting that this patient recovered full renal function without resorting to dialysis. The creatinine and urea returned to normal levels within ten days. of conservative management and at a rate that made dialysis unnecessary. Some patients may not be this fortunate in view of significant renal involvement. The reported mortality rate from black water fever has improved from the previous high levels of the 50s.[4]

It is important for all physicians who manage malaria cases to be wary of this complication. The use of quinine should be reserved strictly for patients with severe malaria as quinine apart from having numerous side effects may precipitate black water fever. Currently there is increasing use of quinine as a result of the mounting evidence of malaria parasite resistance to the commonly used anti-malaria drugs. Judicious use of quinine will limit severe complications due directly to the drug or its indirect consequences.

Referral notes should contain details of patient management up to the time of referral. Most referral letters hardly mention drug treatment given to patients and this is not ethically sound. Doctors receiving referred patients should always read between the lines and in addition take a fresh detailed history including meticulous drug history. There are no short cuts to good patient management. In conclusion this short communication is to draw the attention of clinicians to the possibility of black water fever in real practice, to stress the rational use of quinine and the need for explicit referral notes.

ACKNOWLEDGEMENT

We wish to acknowledge with thanks the assistance of the staff of Emergency Paediatrics Unit (EPU) and the Paediatrics Medical Ward of the University of Maiduguri Teaching Hospital in meticulously managing this unusual case.

REFERENCES

1. **Korenromp EL, William BG, Gouws E, Dye C, Snow RW.** Measurement of trends in childhood malaria mortality in Africa: an assessment of progress towards targets based on verbal autopsy. Lancet Infect Dis. 2003 Jun; 3 (6): 349 58.

2. Nigeria Ministry of Health Reports.1980 1983.

3. World Health Organization.Severe and complicated malaria (2nd Ed.) Trans R Soc Trop Med Hyg. 1990; 84: 1- 65.

4. **Bruneel F, Gachot B, Wolff M, Regnier B, Danis M Vanchon.** Resurgence of black water fever in long-term European expatriates in Africa: report of 21 cases and review. Clin Infect Dis. 2001; 32(8): 1133-40.

5. World Health Organization. Bench aids for the diagnosis of human malaria. Giemsa staining Technique. 1985; 2; 450.

6. **Djibo A, Souna-Adamou A, Brah Bouzou S.** Black water fever in adults with sickle cell anemia. Two fatal cases. Med Trop (Mars). 2000; 60(2); 156-8.

7. **Tran TH Day, NP Ly VC, Nguyen TH, Pham PL, Bethell DB, Dihn XS, Tran TH, White NJ.** Black water fever in southern Vietnam: a prospective study of 50 cases. Clin Infect Dis. 1997 ; 25(5): 1275.

8. **Delacollette C, Taelman H, Wery M.** An aetiologic study of haemoglobinuria and black water in Kivu Mountains, Zaire. Ann Soc Belg Med Trop. 1995 ; 75(1) : 51-63.

9. **Khandelwal V, Udawat H, Kumhar MR, Goyal RK.** Black water fever treated with artemether. J Assoc Physicians India. 2001; 49: 1191-2.

10. **White NJ , Warrel DA, Chanthavanich P, Looareesuwan S, Warrel MJ, Krshna S, et al.** Severe hypoglycaemia and hyperinsulinaemia in falciparum malaria. N Eng J Med. 1983a; 309: 61- 66.