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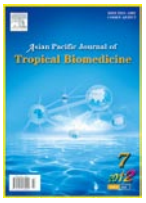

Document heading

Resolution pattern of jaundice among children presenting with severe malaria in rural South-West Nigeria

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ABSTRACT

Objective: To compare the pattern of jaundice resolution among children with severe malaria treated with quinine and artemether. **Methods:** Thirty two children who fulfilled the inclusion criteria were recruited for the study from two hospitals with intensive care facilities. They were divided into two groups; 'Q' and 'A', receiving quinine and artemether, respectively. Jaundice was assessed by clinical examination. **Results:** Sixteen out of 32 children recruited (representing 50%) presented with jaundice on the day of recruitment. The mean age was (7.00±2.56) years. On day 3, four patients in 'A' and six patients in 'Q' had jaundice. By day 7, no child had jaundice. **Conclusion:** The study has shown that both drugs resolve jaundice although artemether relatively resolves it faster by the third day.

1. Introduction

Malaria remains a major health concern in more than 100 countries especially in the tropics and subtropics where it is endemic. It affects 40% of people living in malaria endemic regions especially in sub-Saharan Africa where 90% of Malaria related deaths occur. Approximately 500 million people are affected annually, and about three million, mostly children, die of *Plasmodium falciparum* malaria-which is associated with various complications and significant mortality - each year[1,2].

Severe malaria is a medical emergency with devastating multi-systemic effect. It therefore requires urgent treatment in intensive care facilities with sensitive and safe drugs to prevent death. Even with modern ICU facilities in place, the mortality is still high[1,3].

It is more common in young children, pregnant women (worse in those in their first pregnancy) and non-immune individuals visiting the malarious areas[3]. It is characterized by severe malaria anemia, cerebral malaria, acute respiratory distress, hypoglycemia, circulatory collapse, disseminated intravascular coagulation, generalized convulsions, hyperparasitemia and jaundice[4].

Presence of jaundice in falciparum malaria indicates a more severe illness with higher incidence of complications and mortality[1,5]. Jaundice is one of the common manifestations of severe malaria in adults with incidence varying from 10%-45% in different regions[5].

Jaundice in severe malaria is multifactorial. Some causes include Intravascular haemolysis of parasitized and non-parasitized RBCs, micro-angiopathic haemolysis associated with DIC, hepatic dysfunction, associated haemoglobinopathies (common in malaria-prone areas), drug-induced haemolysis, G6PD deficiency, *etc*[6].

In recent times, the clinical pattern of severe malaria presentation has changed including a significant increase in number of patients presenting with jaundice as reported by researchers in India 1 and Saudi Arabia[7]. We therefore seek to find out the jaundice resolution pattern (in children with severe malaria) in a rural setting of south-west Nigeria; where there is higher consumption of native medication before hospital presentation, paucity of medical laboratory

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facilities and specialized medical personnel[4], using artemether and quinine.

2. Materials and methods

2.1. Patients

A total of 32 Patients were recruited from Overcomers Specialist Hospital, Ilisan and General Hospital Ikenne, Ikenne local government area of Ogun state, Nigeria. The hospitals have facilities for resuscitating and handling emergency.

Patients who satisfied inclusion criteria (see below) were randomly distributed into two treatment groups – Artemether (A) and quinine (Q) upon admission to the ward. On enrolment, a brief history was obtained from accompanying adult (parent or guardian). Jaundice was assessed during clinical examination.

Ethical approval for the study was obtained from Olabisi Onabanjo University Teaching Hospital, Nigeria, Joint Ethical Review Committee and informed consent from the parents or guardians.

Inclusion criteria: (1) Children from either sex with age ranging from 1 year to 12 years; (2) Fever as well as temperature higher than 37.5℃ within the last 24 hours; (3) Presence of convulsion, vomiting, hypoglycemia, anemia and headache; (4) Informed consent obtained from the parents and guardians; (5) Assurance that patients will be resident within catchment of study for follow-up; (6) Absence of concomintant illness such as typhoid, bronchopneumonia, meningitis, urinary tract infection; (7) Absent history of administration of antipyrexia; (8) Blantyyre coma score <3.

Exclusion criteria: (1) History of blood transfusion in the last two months; (2) Presence of concomitant illnesses; (3) History of allergy to quinine and artemether; (4) Lack of informed consent.

Withdrawal criteria: (1) If any concomitant illness develop during the study; (2) If informed consent is withdrawn by patient or guardian; (3) If patient (or parents/guardian) is unwilling to continue in the study; (4) Failure to comply with protocol.

2.2. Jaundice monitoring

Clinical assessment of jaundice was done thrice daily (Observable jaundice with parasitemia >100 000 parasites/μL WHO criteria was met)[8].

2.3. Treatment

Quinine and Artemether were administered to groups 'Q' and 'A', respectively according to standard protocol[9] .

2.4. Statistical analysis

All calculations were done sing the SPSS-V15 statistical package for analysis of the data. The data were presented as Mean±SD, and statistical analysis was carried out using the student's paired t-test and ANOVA. Differences were considered to be statistically significant at an error probability of less than 0.05 (P<0.05).

3. Results

The children in the two groups showed no statistically significant difference in the presentation of jaundice (P< 1.00) and other symptoms of severe malaria on the day of recruitment.

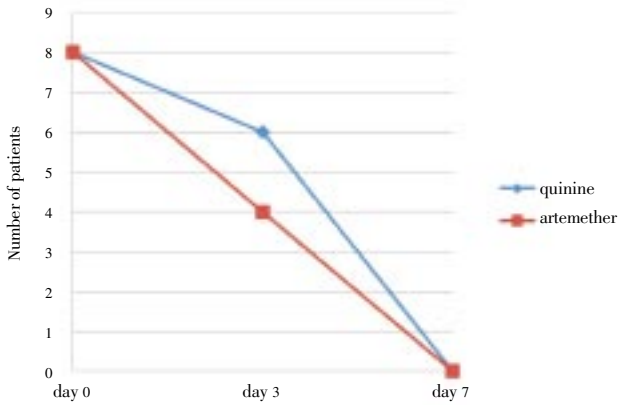

Figure 1. Graph showing the pattern of jaundice resolution in children with severe malaria treated with quinine and artemether.

Sixteen out of 32 children recruited (representing 50%) had clinical jaundice on the day of enrolment. Their mean age was (7.00±2.56) years. No mortality was observed in our study (Figure 1).

4. Discussion

The purpose of this research was to determine the pattern of resolution of clinical jaundice in children with severe malaria treated with quinine and artemether.

In our study, 50% of children with severe malaria presented with jaundice on the day of admission. Lower prevalence was recorded in other studies[1,10-17]. The disparity could be due to two things; our prevalence rate was estimated by computing jaundice presentation along with any other symptom of severe malaria, not just children presenting with jaundice alone as demonstrated in one study 1 as well as late presentation of patients especially in rural areas to healthcare facilities after they might have been fed with native (potentially toxic) concoction[4,18]. Our results however support other workers that have discovered an increased incidence of symptoms of severe malaria (including

jaundice)[6,7,19].

In the first few days of commencing treatment, artemether cleared jaundice faster than quinine. This may be connected with a faster parasitemia clearance rate observed with artemether relative to quinine[3,20]. Jaundice in severe malaria is thought to be more connected with liver dysfunction due to invasion by the schizonts of the malaria parasite; leading to impaired handling of bilirubin, than excessive intravascular hemolysis[5]. The time lag in patient presentation to the hospital could also influence jaundice resolution[11,19].

However, jaundice resolved completely on day 7 on both groups. This is in agreement with reports by other researchers that indicate prompt treatment of malaria is accompanied by resolution of jaundice (when present) within 1 – 2 weeks[5].

From the day of recruitment and immediate commencement of treatment (*i.e.* day 0) till complete resolution of jaundice (*i.e.* day 7), there was a steep fall in the number of patients with jaundice. This finding corroborates with the observation by other researchers[5].

There is still need to correlate clinical jaundice with serum bilirubin estimation. For this to be a reality there is need to put in place laboratory facilities in rural areas where the public health burden of malaria is highest[11]. Meanwhile, in these areas, clinical jaundice evaluation has should still be encouraged as some researchers in India have documented a decline in proper physical examination (jaundice inclusive) in rural medical practice[21].

Quinine is as efficacious as artemether in treating severe malaria therefore other factors needed be considered *e.g.* cost, drug resistance, on-going hemolysis, skilled personnel required for administration of medication in choosing the optimal medication for a patient.

Conflict of interest statement

We declare that we have no conflict of interest.

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