A-08: Anaemia associated with malarial infections in Sri Lanka: clinical and biochemical aspects

H K Alles[1], S Jayasinghe[1], S Bandara[2], N Gunawardana[2], K Gunawardana[2], R Sheriff[1], R Carter[3], K N Mendis[1]
(*[1]Malaria Research Unit, Dept. of Parasitology and Dept. of Clinical Medicine, Faculty of Medicine, Univ. of Colombo, Colombo 8, [2]General Hospital, Anuradhapura, [3]Div.of Biological Sciences, ICAPB, Univ. of Edinburgh*)

Anaemia is a known consequence of malarial infections, the basis of which is not exactly known although both immunological and non-immunological mechanisms have been implicated. It is a common cause of mortality and morbidity in African children. Malaria is also one of the major causes of anaemia in pregnancy in tropical Africa.

In this study the degree, extent and nature of the anaemia complicating *P.vivax* and *P.falciparum* malaria in a population of patients in Sri Lanka is described.

A total of 115 malaria patients in the General Hospital of Colombo (GHC) and Anuradhapura (GHA), and the Lady Ridgeway Hospital for Children (LRH) of whom 95 were *P.falciparum*, 14 *P.vivax* and 6 mixed infections due to both were included in this study. Their ages ranged from 6 months to 78 years.

In all patients a detailed history pertinent to malaria was obtained, structured clinical assessment was performed by a trained nurse or a medical officer and several haematological and biochemical investigations were performed; these included all standard indices of anaemia, serum bilirubin, white cell counts and parasite density assessments. Patients who had evidence of primaquine induced intra-vascular haemolysis (IVH) which leads to a severe anaemia, and pregnancy which results in haemodilution were excluded from this analysis.

For the purpose of this analysis, a haemoglobin (Hb) level of less than 10 g/dl has been considered anaemic.

Of these 115 patients 62 (53.9%) had no evidence of anaemia (Hb > 10g/dl), 37 (32.2%) had an Hb of between 7.5 and 10 g/dl and 16 (13.9%) an Hb of below 7.5 g/dl. The latter included 4 patients with severe anaemia (Hb < 5 g/dl) which led to a life-threatening condition.

There was no significant correlation between the degree of anaemia and the number of previous malaria infections or the parasite density in either species. The 0-5 year age group had a significantly lower haemoglobin level than other ages ($p < 0.001$).

The Hb level correlated positively with red blood cell count, Packed cell volume, Mean cell volume, Mean cell haemoglobin and Mean cell corpuscular haemoglobin ($p < 0.001$). The reticulocyte and white blood cell counts correlated inversely with Hb level ($p < 0.001$). Serum total bilirubin levels correlated positively with the Hb level ($p < 0.01$).

46.1% of these hospitalized malaria patients had evidence of anaemia, which was hypochromic and microcytic. Severe anaemia in children below 3 years of age is a life threatening complication of malaria in Sub-Saharan Africa, where transmission rates are very high. Anaemia detected in this study, was prevalent in all age groups and severe anaemia (Hb< 5 g/dl) was not confined to children. The incidence of anaemia however, was significantly higher in the 0-5 year age group, in our sample.

The changes in serum bilirubin were not consistent with haemolysis being a major cause of the anaemia; this suggests that dyserythropoiesis, the other etiological factor implicated in malarial anaemia may be the significant element underlying this pathology.

Malarial infections generally result in a reduction of all peripheral blood nucleated cell counts with the exception of monocytes. Results show however, that anaemia complicating malaria is associated with an elevation of total white counts; there was a significant negative correlation between the WBCC and Hb levels. This could reflect a common underlying and unexplained pathogenetic mechanism.