Differentiating Cerebral Malaria from Bacterial Meningitis in Resource-Limited Countries: A Literary Review

Bahadori Atessa, Wagner Noémie, Posfay-Barbe Klara

Geneva University Hospitals (HUG), Department of Paediatrics, Paediatric Infectiology Unit, Geneva, Switzerland

Background and aim

Differentiating cerebral malaria (CM) from bacterial meningitis (BM) is challenging due to the similarity of their clinical presentation, particularly in malaria-endemic regions.

Both entities have very high morbidity and mortality rates if left untreated or if treatment is delayed. CM, a form of severe malaria principally caused by *Plasmodium falciparum*, mostly affects children under 5 years of age with over 575'000 cases annually in sub-saharian Africa alone. Due to their similar clinical presentation, empirical therapy is often initiated for both diseases while awaiting necessary test results to make the diagnosis.

The aim of this study was to review the literature in order to identify potential symptoms, signs and routine biological features that can discriminate CM from BM in rural settings of developing countries. These findings could guide caretakers and thus reduce the burden of both diseases.

Method

A title and abstract search was conducted using multiple Internet databases, reviewing the available literature on diagnostic approaches for CM and/or BM in developing countries.

Results

23 articles were selected. The majority of studies were conducted in sub-saharian Africa. In malaria-endemic countries, co-infections with severe malaria and invasive bacterial infections are not uncommon (6.4 %).

Impaired consciousness, prolonged seizures, prostration and meningeal irritation signs were not useful in differentiating CM from BM. Malarial retinopathy was the only distinctive sign that could potentially discriminate between CM and BM, although this sign is not systematically present in CM.

A leukocyte count of > 100 / μ L in cerebrospinal fluid (CSF) was highly suggestive of BM. In the two studies where CSF leukocyte counts of > 10 / μ L were found in CM children without evidence of BM, neither specified if all patients had undergone bacterial cultures or antigen testing, nor if antibiotherapy was used before lumbar puncture was performed.

Conclusion

Retinal examination by trained caretakers may be useful in differentiating CM from BM in malaria-endemic regions. **An elevated leukocyte count in CSF is the most useful laboratory testing to discriminate between both diseases particularly when the leukocyte count is > 100 / μ L in the presence of negative malarial tests.** If the leukocyte count is low, repeating the lumbar puncture after 24 hours while continuing empirical therapy for both diseases may be useful.