Challenges to care: Survey of clinicians

- Many children appear asymptomatic with high levels of parasitemia due to chronic exposure to malaria parasite.
- Mothers with multiple children have difficulty caring for children with severe anemia as admissions mean time away from young children at home.
- Herbal remedies are used as an initial line of treatment, which may not be as efficacious as pharmaceuticals in eliminating parasites.
- Malaria symptoms can mimic fevers in its initial stages leaving many parents to treat with other medications like paracetamol initially.
- Many patients lack insurance and have to pay out of pocket. For many families living on a dollar or less a day, this poses significant challenges.
- Malnutrition substantially increases risk of death from malaria.
- Sickle cell anemia is prevalent in the region as many families intermarry and genes becomes more prevalent in the region.

Life cycle of Mosquito

- Malaria parasite invades liver and reproduces exponentially.
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Clinical manifestation of malaria

- Malaria parasite invades liver and reproduces exponentially.
- As parasite enters bloodstream, it causes lysis of red blood cells eventually leading to severe malaria from occurring.

Plasmodium undergoes sexual development in the mosquito

- Mosquito acquires gametocyte after biting human.
- Gametocytes differentiate into either male microgametes or female macrogametes in the mosquito.
- Fusion of male and female gametocytes form a zygote.
- Zygote becomes mobile and is termed an oocyst.
- Oocyst mature into an ookinette, a form that allows for excessive growth under the blood stream
- Ookinette differentiates into an oocyst, a form that allows for excessive growth and multiplication. Liver schizont or hypnozoite is formed depending on the species of malaria.
- Upon rupture, schizont becomes a merozoite and can spread throughout the blood stream

OBSERVATIONS AND SURVEYS OF SEVERE ANEMIA MALARIA

Background

Western Kenya has the highest prevalence of malaria in Kenya due to the proximity of Lake Victoria, warmer temperatures and an increased prevalence of P. falciparum. Children are the most vulnerable group affected by malaria. Half of asymptomatic children in Nyamira province carry malaria parasites in their blood.

Objectives

- Observe clinical and research methods relating to severe malaria
- Understand barriers to care for limiting individuals’ ability to receive treatment or to prevent severe malaria from occurring.

Life cycle of Mosquito

- Malaria parasite has 2 hosts: humans and mosquitoes
- 3 stages in the human: trophozoite, schizont, gametocyte.
- 4 stages in the mosquito: Gametocyte, zygote, oocyst, ookinete, oocyst.
- Plasmodium undergoes sexual development in the mosquito
- Mosquito acquires gametocyte after biting human.
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Research:

- Gained an in depth understanding of the life cycle of P falciparum
- Learned how to diagnose and detect malaria parasites and strains (P falciparum, P ovale, P malariae, P vivax) in blood smear using microscopy
- Learned the ELSA test strategies for detection of malaria-specific antigen
- Learned how to perform full hemogram for both research and clinical purposes using Giemsa staining and rapid malaria test

ASSESSMENT OF SUPPORTIVE CARE MEASURES IN BURKITT LYMPHOMA

Background

Burkitt lymphoma (BL) accounts for half of all pediatric cancers in equatorial Africa and is the leading cause of pediatric lymphomas in the region. The incidence is higher in holoendemic malaria areas with a suggestive etiology of malaria and Epstein Barr Virus (EBV) confection. Treatment of BL-cell lymphomas with aggressive chemotherapy and intensive supportive care can yield favorable prognoses with complete remission rates documented above 90%. However, in under-resourced settings, such favorable prognoses are not usually observed and remission rates linger between 50-70%. Reasons for this discrepancy vary and have been attributed to delays in diagnosis and initiation of treatment, abandonment of care, treatment-related toxicities, and scarcity of chemotherapy and supportive care treatments.

Clinical manifestation of malaria

- Malaria parasite invades liver and reproduces exponentially.
- As parasite enters bloodstream, it causes lysis of red blood cells eventually leading to severe anemia, splenomegaly and hepatomegaly if untreated.
- Parasitized red blood cells can sequester in the microcirculation of the brain leading to cerebral malaria. Patients with this condition often present with convulsions, impaired consciousness or coma.
- Treatment involves blood transfusions and IV malaria medication (Quartem/Artemether- Lumefantrine), and nutritional supportive care as needed.

Challenges/Major findings

- Limited resource availability played a significant role in comprehensive treatment of patients. For example, Cytarabine shortage was indicated in 7 out of 10 individuals. As a result of this, entire dosing courses of combination were skipped or partially given. In these cases, the other chemotherapy drugs for a given dose cycle was given without Cytarabine. Financial constraints also played a role in provision of comprehensive treatment as families were unable to afford tests or some medications.

Next Steps:

- Further assessment of these patients will be needed to see if this incomplete dosing impacted their remission.

Supportive care

Supportive care was provided on a case-by-case basis for patients depending on their symptoms and side effects. Common side effects of chemotherapy treatment include myelosuppression, nausea and/or vomiting, alopecia, mucositis, diarrhea. Chemotoxicity management regimens used were consistent with the Social Welfare Burkit Lymphoma National Guidelines’ and the Ogra Foundation’s ‘Burkit Lymphoma Ward Manual’. Examples of medications given to manage chemotoxicities are alfuzopurin given to manage tumor lysis syndrome and olsalazine given to manage nausea. FeSO4, folinic acid, and multivitamins were also given daily. Furthermore, patients in pain were given morphine and patients with fevers were given paracetamol.

Myelosuppression

Myelosuppressive delays in treatment were indicated in a few cases as expected with chemotherapy. Hemogram reports were taken weekly to assess blood cell parameters. Of particular concern were neutrophil, hemoglobin (Hb) and white blood cell (WBC) levels. Low levels of these parameters indicated that a child was not ready for treatment and had to be assessed the following week for chemotherapy eligibility. Length of the gaps between treatment dosing ranged between 2-4 weeks for both intravenous and intrathecal treatments. A few efforts were made to mitigate blood counts especially in instances where dosing was delayed for at least two consecutive weeks. For example, transfusions were used in some children to boost Hb levels. Other infusion methods perhaps to boost white blood cell infusions or neutrophil counts were unavailable.

Assessment

Performed chart review on small sample of students to assess current supportive care measures and observe trends in chemotoxicities. A total of ten charts were comprehensively reviewed. Patients ranged from 3 to 12 years of age and received a diagnosis of either Jaw Burkitt lymphoma or Abdominal Burkitt Lymphoma.

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