Anemia management in pediatric Burkitt lymphoma patients at a regional referral center in Western Kenya

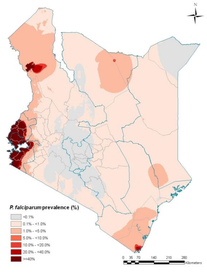
Sardis Harward, MS2 Ann Moormann, PhD

University of Massachusetts Medical School – Global Health Pathway, Kenya Medical Research Institute, Jaramogi Oginga Odinga Teaching and Referral Hospital

Introduction

- Endemic Burkitt lymphoma (eBL) is the most common pediatric cancer in sub-Saharan Africa
- eBL is associated with *Plasmodium falciparum*-mediated dysregulation of Epstein Barr virus T cell immunity
- Anemia with or without *P. falciparum* parasitemia has been associated with increased risk of death and relapse in eBL[1]
- Kisumu, Kenya experiences holoendemic *Plasmodium falciparum*, and endemic schistosomiasis and helminthic infections (both of which contribute to anemia prevalence)
- Myelosuppressive effects of cytotoxic chemotherapy to treat eBL can result in worsening anemia and/or immunosuppression

➢ Despite the clinical significance of anemia in eBL prognosis, hemoglobin monitoring and anemia management are highly variable among pediatric eBL patients



P. falciparum prevalence in Kenya, 2017

Jaw tumor characteristic of eBL

Setting

Obama Children's Hospital at Jaramogi Oginga Odinga Teaching and Referral Hospital (JOOTRH)

- Level 5 public hospital & regional referral center
- Catchment area of 5 million people
- Approximately 200,000 outpatient visits, 21,000 inpatient admissions annually

Objectives

- Chart review to determine causes of anemia among pediatric eBL patients receiving treatment at JOOTRH
- Describe current management of anemia in these patients
- Develop a clinical protocol to improve anemia management in the context of eBL treatment among these patients

Anemia Management in Pediatric Oncology Patients

➢ Current protocols for anemia management exist only for anemia in the setting of malaria (see right)

Among 25 reviewed patients with baseline Hb ≤8mg/dL

- All were administered folic acid and ferrous sulfate
- 18 patients underwent 65 blood transfusions (range 1-15, mean 3.6) at a mean Hb 6.1mg/dL
- Following blood transfusion, patients were reevaluated for anemia between 1 and 7 days following transfusion

➢ 6 malaria diagnoses were made in 5 patients at some point during their treatment course

➢ 1 patient was evaluated for schistosomiasis but all diagnostic assays were negative

➢ No patients were evaluated for soil transmitted helminth infections

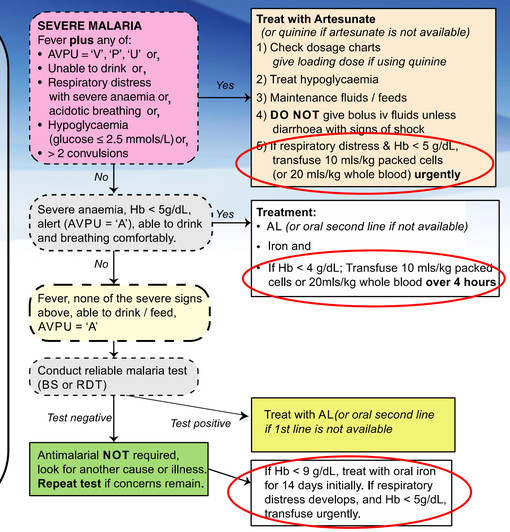
Guidelines for Pediatric Oncology Patients

Clinicians reported the following standard practices:

- Ferrous sulfate & folic acid supplementation initiated at admission for chemotherapy regardless of Hb
- Packed red blood cell transfusion for Hb <8mg/dL
- No protocolized Hb reevaluation following transfusion

Protocol for Anemia in Malaria

- Ferrous sulfate & folic acid supplementation @ Hb < 9mg/dL
- Blood transfusion @ Hb Hb < 4mg/dL OR < 5mg/dL with respiratory distress
- Palludrine for malaria prophylaxis in sickle cell anemia patients



Opportunities for Further Research

- Anemia management in non-eBL pediatric malignancies
- Impact of intensified case detection of infections that increase risk of anemia (malaria, schistosomiasis, soil transmitted helminths, others) among eBL patients
- Role for empiric anti-malarial therapy following packed red blood cell or whole blood transfusion
- Role for empiric anti-malarial prophylaxis throughout duration of eBL treatment
- Association of other micronutrient deficiencies and malnutrition status on eBL disease course and prognosis

Acknowledgements

This project would not have been possible without the support and mentorship of the following groups and individuals:

- Dr. Michael Chin and the UMMS Global Health Pathway
- Dr. Ann Moormann, Dr. Terry Vik, and Dr. Juliana Otieno
- Boaz Odwar, Pamela Omolo, and Erastus Kirwa
- Benjamin H. Kean Fellowship of the American Society of Tropical Medicine and Hygiene

References

1. Buckle G, Maranda L, Skiles J, et al. Factors influencing survival among Kenyan children diagnosed with endemic Burkitt lymphoma between 2003 and 2011: a historical cohort study. Int J Cancer 2016; 139(6):1231-1240. DOI 10.1002/ijc.30170.
2. Republic of Kenya Ministry of Health. Basic paediatric protocols for up to 5 years. 4th edition, February 2016.