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**Profile of anemia in acute lymphoblastic leukemia patients on maintenance therapy and the effect of micronutrient supplementation**

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**Abstract**

**Background:**Anemia is a common finding and important cause of morbidity in patients with acute lymphoblastic leukemia (ALL) at diagnosis or during the course of its protracted treatment. We studied profile of anemia in ALL patients on maintenance therapy and evaluated specific micronutrients as cause of this anemia.

**Patients and methods:**ALL patients who were on maintenance therapy and had grade ≥ 2 anemia were recruited for the study. Serum iron studies, folate, and vitamin B12 were done to identify micronutrient deficiency and to initiate supplementation with specific components if found to be deficient. Toxicities, improvement of anemia, micronutrient levels, and disease outcome were studied after 3 months.

**Results:**From March 2015 to September 2016, 105 ALL patients were found to be on maintenance fulfilling the inclusion criteria. Overall, the proportion of anemia was 80%(N = 84). Majority had normocytic normochromic anemia (71%). Macrocytic anemia was seen in 18% and microcytic hypochromic in 9.5%. In patients with anemia of grade ≥ 2 (N = 84), 38 patients (45%) had biochemical deficiency of serum folate, and 7 (8%) had vitamin B12 deficiency. No biochemical evidence of iron deficiency was found. Supplementation of deficient micronutrients improved anemia: mean hemoglobin significantly increased from 8.06 ± 1.63 to 10.78 ± 1.53 (p < 0.001) at 3 months; and reduced treatment toxicities, mean number of febrile neutropenia episodes (p = 0.007), and treatment interruptions of > 2 weeks (p = 0.002) were lowered. Patients with anemia had significantly more relapses (N = 14,64%) compared to patients without anemia (N = 8,36%), (p = 0.040).

**Conclusion:**Timely identification and correction of micronutrient deficiencies causing anemia in ALL patients on maintenance can enhance treatment outcomes.

**Keywords:**ALL; Anemia; Folate; Iron; Micronutrient; Vitamin B12.