Summary

Acute leukemia is a malignant disease which is characterized by disordered differentiation of either lymphopoietic stem cells (acute lymphoblastic leukemia), or hemopoietic stem cells (acute myeloid leukemia) .

The leukemias are the most common malignant neoplasms in childhood, accounting for about 41% of all malignancies that occur in children <15 year of age.

Children with acute leukemia generally present with signs and symptoms that reflect bone marrow infiltration and extramedullary disease. Because the bone marrow is replaced with leukemic blasts, patients present with signs of bone marrow failure, including anemia, thrombocytopenia, and neutropenia. Clinically, the manifestations include fatigue and pallor, petechiae and bleeding, and fever .

Hepcidin, predominantly produced in the liver, has turned out to be a key iron regulator in humans by binding to ferroportin, the only known cellular iron exporter in vertebrates, and causes its internalization, thus decreasing iron efflux from iron exporting tissues into plasma.

Hepcidin expression is up-regulated by iron; by cytokines (IL-1 and IL-6); and by the bone morphogenetic proteins (BMPs). It is down-regulated by anemia and hypoxia.

Dysregulation of hepcidin or its receptor ferroportin results in a spectrum of iron disorders. In inflammatory disorders and infections, cytokine-induced hepcidin excess contributes to development of anemia of inflammation, characterized by hypoferremia and anemia despite adequate iron stores.

A normocytic, normochromic anemia is common in patients with a variety of inflammatory disorders, including malignancy.

Generally, the chronic anemia associated with cancer is characterized by an inadequate production of Epo for a given hemoglobin/hematocrit as well as an inadequate response of the erythroid marrow to endogenous Epo. In addition, there is impaired release of iron from stores as a result of increased hepcidin production.

This study was carried out on 25 children with acute leukemia admitted to national cancer institute in cairo., fifteen males and ten females. Their ages ranged from 1-15 years. Ten children of matched age and sex were taken as a reference group.

Patients and reference groups were subjected to detailed history taking and thorough clinical examination : specially for pallor, fever, bone ache, hepatosplenomegaly and lymphadenopathy

Routine laboratory assessment was done measuring CBC, bone marrow examination ,Immunophenotyping of marrow samples,LDH, ESR, serum iron and ferritin.

Specific investigations were done measuring serum hepcidin with ELISA.

The summary of the results were as the following :

The majority (16) of patients (64%) aged between 2-10 years with male to female ratio 1.2:1.Manifestations of bone marrow failure in the form of pallor and bleeding tendancy represent the most common initial clinical presentations followed by manifestations of extramedullary involvement in the form of hepatoslenomegaly .Regarding the **FAB** morphological classification L_2 morphology was the most common subtype 55% of cases.As regared immunophentyping (75%) of cases were B-lineage and (25%) were T-lineage, precursor-B was present in70% of the total ALL cases. As regard FAB classification of AML patients more than 70% of cases was M2 and M3.The study of complete blood picture of the patients shows

leukocytosis was present in more than one half of patients with ALL with initial leukocytic count greater than 50000/mm^2 is present in approximatly 20% of patients and (Hb < 10 gm/dl) excists in appoximatly 80% of patients at diagnosis while thrombocytopenia occurs in approximatly 75%. of their patient.Serum ferritin increase while serum iron decrease in pediatric patients with acute leukemia .Serum hepcidin in pediatrics patients with acute leukemia was elevated. There was significant positive correlation between serum hepcidin and ferritin. There was significant negative correlation between serum hepcidin and hemoglobin . There was significant negative correlation between serum hepcidin and iron .

We concluded that:

- Elevated serum hepcidin in pediatrics patients with acute leukemia may lead to functional iron deficiency which may play a role in the etiology of anemia in cancer patients.
- The role of hepcidin in explanation of anemia specially of hematological malignancy is not clear.

- Hepcidin is one of contributing factors of anemia in acute leukemia.