



HYPERLEUKOCYTOSIS: EMERGENCY MANAGEMENT

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ABSTRACT

Hyperleukocytosis is defined as peripheral blood leukocyte count exceeding 100000/mm³. Acute leukemia is the most common etiology in pediatric practice. Hyperleukocytosis is a medical emergency. The increased blood viscosity, secondary to high white cell count and leukocyte aggregates, results in stasis in the smaller blood vessels. This predisposes to neurological, pulmonary or gastrointestinal complications. In addition, patients are at risk for tumor lysis syndrome due to the increased tumor burden. Initial management includes aggressive hydration, prevention of tumor lysis syndrome, and correction of metabolic abnormalities. A red cell transfusion is not indicated in a hemodynamically stable child, as it adversely affects the blood viscosity. Leukapheresis is the treatment of choice for a very high count, or in patients with symptomatic hyperleukocytosis. The technical expertise required, a relative difficult venous access in younger children, risk of anticoagulation and possible non-availability of the procedure in emergency hours are limitations of leukapheresis. However, it is a rewarding procedure and performed with relative ease in centers that perform the procedure frequently. An exchange transfusion is often a practical option when hyperleukocytosis is complicated with severe anemia. The partial exchange aids in correcting both, without the risk of volume overload or hyperviscosity, which are the limitations of hydration and blood transfusion, respectively. Etiology and management of hyperleukocytosis in relevance to the pediatric emergency room is outlined.

INTRODUCTION

Hyperleukocytosis is defined as peripheral blood leukocyte count exceeding 100000/mm³. It typically occurs in haematological malignancies. Hyperleukocytosis complicates the course of leukemia in 5-22% children

DIFFERENTIAL DIAGNOSIS

Hyperleukocytosis should be differentiated from leukemoid reaction, when a high total leukocyte count [TLC](typically >50000/mm³) occurs in the presence of non-malignant disorders. It is observed in certain infections, including pertussis, staphylococcus aureus, pneumococcus, tuberculosis and varied inflammatory conditions.

COMPLICATIONS OF HYPERLEUKOCYTOSIS

Hyperleukocytosis is an emergency as it may cause several complications, resulting in morbidity or mortality. Vascular obstruction can occur, leading to organ damage from tissue hypoxia, thrombosis or hemorrhage. Metabolic derangements are common due to high blast count. A CNS bleed, leukostasis or thrombosis, Pulmonary leukostasis, Gastrointestinal hemorrhage, Tumor lysis syndrome.

PATHOPHYSIOLOGY

There is an increase in blood viscosity, secondary to high TLC and leukocyte aggregates, resulting in stasis in the smaller blood vessels. Damaged endothelium of the vessel and leukemic blasts, precipitating leukostasis. Hyperleukocytosis usually occurs in the presence of TLC exceeding 300000/mm³ in ALL, and more than 200000/mm³ in AML. Several factors may result in symptoms at a lower TLC. These include severe anemia, thrombocytopenia, renal dysfunction, superimposed infection, dehydration and acidosis. The symptoms may be more pronounced, and occur at lower TLC in children with monocytic leukemia.

INVESTIGATIONS

Complete blood count, peripheral smear, cytochemical stains.

Coagulogram, A blood gas analysis, A chest radiograph. Blood samples for uric acid and blood gas.

MANAGEMENT

Initial management is directed towards aggressive hydration, use of allopurinol for prevention of TLS and prevention or correction of metabolic abnormalities. The definitive management involves reduction of the tumor load by chemotherapy.

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