Risk Factors And Clinical Implications Of Hyperglycemia During Induction Therapy In Pediatric Acute Lymphoblastic Leukemia

Yassin Y. Taher [1], Leslie Lehmann [2], Manal Zamzam [3], Mona Atteya [4], Hala Reda [5], Abdullah Omar [6], Iman Sidhom [3], Alaa El-Haddad [3]

1. Paediatric Oncology Department, Children's Cancer Hospital Egypt (CCHE -5737), Cairo, Egypt
2. Stem Cell Transplant Center, Dana-Farber/Boston Children's Cancer and Blood Disorders Center, Boston, MA, United States.
3. Pediatric Oncology Department, National Cancer Institute Cairo University and Children's Cancer Hospital Egypt (CCHE-57357), Cairo, Egypt.
4. Endocrinology clinic, Children's Cancer Hospital Egypt (CCHE -5737) and Faculty of Medicine, Cairo University, Pediatric Department, Cairo, Egypt
5. Clinical Pathology Department, National Cancer Institute Cairo University and Children's Cancer Hospital Egypt (CCHE-57357), Cairo, Egypt
6. Department of Research, Children's Cancer Hospital Egypt (CCHE-57357), Cairo, Egypt

Introduction

Hyperglycemia during induction therapy in adult acute lymphoblastic leukemia (ALL) is associated with adverse outcomes, yet its impact in pediatric ALL remains incompletely understood.

Aim

This study aimed to determine the incidence of hyperglycemia in pediatric ALL, identify its associated risk factors, and evaluate its impact on invasive fungal infections and sepsis-related mortality during induction.

Objectives

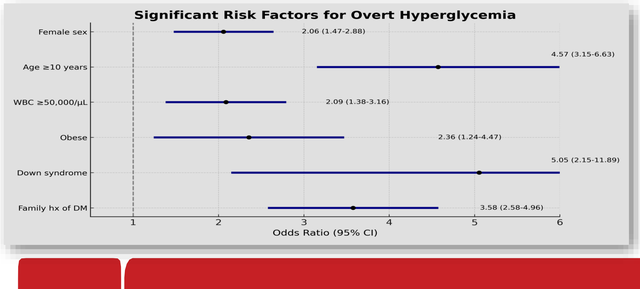
To assess the incidence, risk factors, and impact of hyperglycemia on invasive fungal infections, sepsis-related mortality, and recurrence in pediatric ALL patients during induction and early continuation therapy.

Methods

This retrospective study analyzed **1,711 pediatric ALL patients** treated between 2016 and 2019 at **a single tertiary care center**. Patients were categorized based on random blood glucose levels into overt **hyperglycemia (≥200 mg/dL), mild hyperglycemia (140–199 mg/dL),** and **euglycemia**.

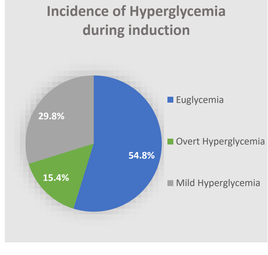
Conclusion

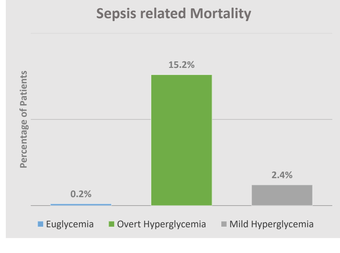
Hyperglycemia is a frequent and clinically relevant complication during induction therapy in pediatric ALL, significantly increasing the risk of invasive infections and sepsis related mortality. Recognizing high-risk patients and implementing close glucose monitoring and infection control strategies during treatment may improve outcomes in this vulnerable population.

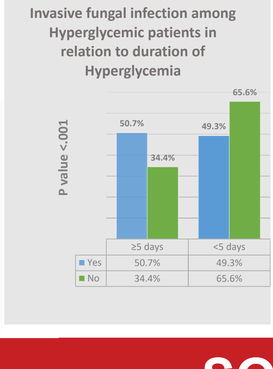


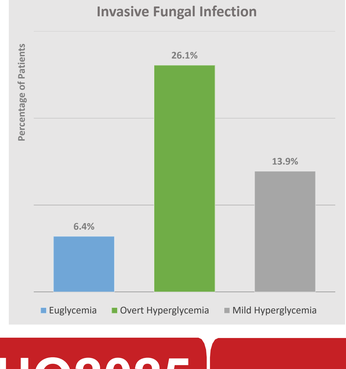
Results

Hyperglycemia was seen in 773 patients **(45.2%)** during induction, with 264 (15.4%) having overt hyperglycemia and 509 **(**29.7%) having mild elevation. Nearly 40% of those with overt hyperglycemia needed insulin. **Sepsis-related deaths** increased as blood sugar levels rose**: 0.2% in patients with Euglycemia** , **2.4% in those with mild hyperglycemia**, and **15.2% in those with overt hyperglycemia (P < 0.001).** Similarly, **invasive fungal infections** were more common with higher glucose levels, affecting **6.4% of the euglycemia group**, **13.9% of the mild group**, and **26.1% of the overt group**. In fact, proven fungal infections occurred in 9.5% of the overt group. Among hyperglycemic patients, those who required insulin, often due to more severe or longer lasting high blood sugar, had double the rate of sepsis-related deaths compared to those who didn't need insulin (13.3% vs. 5.7%, P = 0.004). Duration of hyperglycemia also made a difference: **patients who had high blood sugar for five days or more had a higher risk of fungal infections (24.6% vs. 14.3%)** and **sepsis-related deaths (12.8% vs. 3.0%) compared to those with shorter episodes (both P < 0.001)**. After induction, hyperglycemia came back in 5% of all patients during early continuation therapy, mainly in those who had already experienced overt hyperglycemia during induction (41 out of 82 recurrences).









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