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abstract

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Induction Complications and End-of-Induction MRD Outcomes in Acute Lymphoblastic Leukemia

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Introduction: Despite advances in the treatment of ALL, disease activity and chemotherapy-related toxicity remain significant concerns, particularly during the induction phase of therapy.

Methodology: This study included 53 newly diagnosed children with ALL who received chemotherapy at Almojtaba Hematology and Bone Marrow Transplant Center (BMTC) from August 1, 2023, to December 30, 2024. During the induction phase, patients were treated according to the Children's Oncology Group Total XV protocol.

Results: Of the 53 participants, 29 were female (54.7%) and 24 were male (45.3%). T-cell ALL was diagnosed in 14 patients (26%), with 4 of them (7.5%) remaining MRD-positive at day 42. In comparison, only 3 patients (5.6%) with B-cell ALL were MRD-positive at day 42. The most common complication observed during induction was adjustment disorder, affecting 9 participants (15.7%), followed by local skin infection (cellulitis) in 5 patients (9.4%), pneumonia in 4 (7%), hyperglycemia in 3 (5.2%), hypertension in 3 (5.2%), and systemic infections in 2 (3.5%). Acute renal failure with tumor lysis syndrome, sepsis, and cardiac dysfunction were each observed in 1 patient (1.7%). There was no significant association between MRD status at day 42 and the presence of underlying comorbidities such as hypothyroidism, agammaglobulinemia, Gracile syndrome, congenital heart disease, or other conditions.

Additionally, no statistically significant association was found between sex and MRD outcomes at day 15 and day 42 (p-values = 0.068 and 0.076, respectively. The induction mortality rate was 1.7%.

Conclusion: Most complications encountered during the induction phase of pediatric ALL treatment are manageable and typically arise due to the aggressive nature of the disease, the intensity of chemotherapy, or the presence of pre-existing comorbidities. While these complications may cause temporary treatment interruptions, they generally do not affect overall induction outcomes. The majority of patients achieve remission by the end of induction, with MRD negativity by day 42.