Efficacy and Feasibility of Pediatric-Inspired Regimens in AYA-ALL: Real-World Data from Pakistan

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Introduction

Pediatric-inspired regimens (PIR) have significantly improved survival in adolescents and young adults (AYA) with acute lymphoblastic leukemia (ALL), as demonstrated by CALGB 10403[1], GRAALL[2], and the Nordic-Baltic[3] study groups. However, outcome data from low- and middle-income countries (LMICs) remain limited. This study reports the feasibility and long-term survival outcomes of AYA-ALL patients treated with a PIR protocol in a single-center LMIC setting.

Objectives

To evaluate, in AYA-ALL patients treated with a pediatric-inspired regimen:

Remission induction rate

2-year Overall Survival (OS)

2-year Disease-Free Survival (DFS)

2-year Cumulative Incidence of Relapse (CIR)

2-year Cumulative Incidence of Non-Relapse Mortality (CI-NRM)

Methods

Study design: Single-center, longitudinal observational study (March 2019–March 2025).

Setting: National Institute of Blood Diseases and Bone Marrow Transplantation, Karachi, Pakistan.

Population: Patients aged 16–40 years with newly diagnosed B- or T-cell ALL, ECOG ≤2.

Exclusions: Philadelphia-positive ALL, >2-week prior steroid exposure.

Treatment protocol: UKALL 2011 (PIR-based).

Outcomes assessed:

OS and DFS using Kaplan-Meier analysis

CIR and CI-NRM using competing risks methodology

Results

Total enrolled: 72 patients

Median age: 20 years (range 16–40); 77% male

Immunophenotype: 82% B-cell, 18% T-cell

Complete remission rate: 90.3%

Primary refractory disease: 5.6%

Induction mortality: 4.2% (all due to neutropenic sepsis)

MRD assessment: 84.1% MRD-negative (n=44)

Allogeneic transplant: n=6 due to persistent MRD

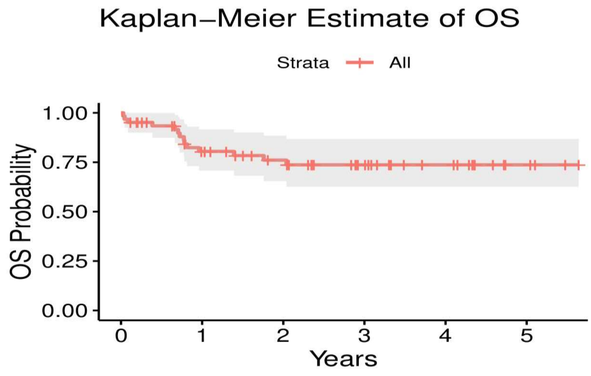
Median Duration of follow-up: 24.5 months

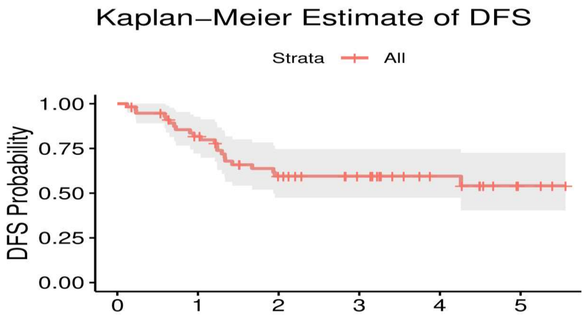
2-year Overall Survival: 76.1% (95% CI: 65.4–88.5%)

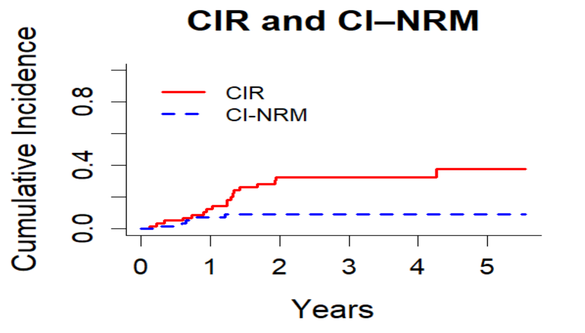
2-year Disease-Free Survival: 59.5% (95% CI: 47.4–74.7%)

2-year Cumulative Incidence of Relapse: 29%

2-year Cumulative Incidence of Non-Relapse Mortality: 9.5%







Discussion

Our findings demonstrate the feasibility and effectiveness of PIR in a resource-limited setting, with survival outcomes comparable to upper-income settings. However, higher non-relapse mortality, primarily infection-related, adversely impacted DFS. This underscores the need for enhanced supportive care infrastructure, particularly in infection prevention and early sepsis management.

Conclusion

This is the first long-term report from South Asia evaluating PIR in AYA-ALL. The results support the implementation of pediatric-inspired protocols in LMICs but highlight the critical importance of strengthening supportive care systems to further improve outcomes.

References

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