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Treatment Outcomes and Survival Analysis in Acute Myeloid Leukemia Among Nepalese Patients: A Multi-Center Prospective Cohort Study to Guide Risk-Stratified Therapy and Build Early-Career Investigator Capacity

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Abstract

Background

Acute myeloid leukemia (AML) is one of the most frequently diagnosed lethal hematologic malignancies in low-resource settings, with survival rates in Nepal estimated below 20% - far inferior to the 40-50% achieved in high-income countries. AML is an urgent clinical challenge in Nepal, yet no prospective, multi-center data exist on how Nepalese patients are treated or how they survive once therapy begins. Despite isolated successes in chronic myeloid leukemia demonstrating that quality hematology care is achievable in Nepal, no prospective, multi-center data exist on AML treatment outcomes, prognostic factors, or modifiable quality-of-care gaps. This critical evidence is limited to single-center, retrospective series relying on morphology alone, without immunophenotyping, cytogenetics, or structured survival follow-up - leaving risk-stratification decisions largely unsupported by local evidence, despite risk-adapted therapy being the strongest known determinant of AML survival.

Methods

We will conduct a 24-month multicenter prospective cohort study enrolling 200 newly diagnosed AML patients across four multi-center cancer hospitals in Nepal (Patan Hospital, BP Koirala Memorial Cancer Hospital, Tribhuvan University Teaching Hospital, and B.P. Koirala Institute of Health Sciences). All patients will receive standardized induction chemotherapy (7+3 regimen) with systematic prospective collection of baseline demographics, clinical presentation, cytogenetics, and molecular markers. Treatment response will be evaluated according to standardized criteria, and overall survival, event-free survival, early mortality, and relapse will be assessed. Multivariable regression and survival analyses will identify independent prognostic factors and potentially modifiable determinants of outcomes.

Results

We anticipate enrolling 200 patients over 24 months, with projected complete remission rates of 55-65%, 1-year overall survival of 50-60%, and 2-year overall survival of 35-45%. Multivariable Cox regression analysis will

identify independent prognostic factors including age (>60 years), adverse cytogenetic risk, biomarkers positivity, prolonged time-to-treatment intervals (>60 days), and treatment abandonment. We expect treatment-related mortality within 30 days of 15-20% and abandonment rates of 20-25%, representing key modifiable targets for quality improvement interventions.

Conclusion

This study establishes Nepal's first prospective, multi-center AML registry while embedding a structured mentorship program that will train 5-7 early-career investigators in protocol design, prospective data management, advanced survival analysis, and scientific manuscript writing under guidance from senior hematology mentors. This study will provide clinically relevant real-world evidence to strengthen AML management in Nepal while establishing a collaborative research framework for early-career investigators, mentorship, laboratory capacity, and future multicenter hematology research.

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