DIAGNOSIS, SURVIVAL, AND PROGNOSTIC FACTORS IN ACUTE MYELOID LEUKEMIA IN THE UNITED STATES: A RETROSPECTIVE COHORT STUDY

Manas Pustake MD[1], Avi Harisingani MD[2], Yagnapriya Ammakola MD[3], Mostafa Eysha MD[1], Atulya Khosla MD[3], Saif Syed MD[4]

1Texas Tech University Health Science Center, El Paso, TX, USA.
2Loyola MacNeal Hospital, Berwyn, IL, USA.
3Corewell Health Hospital, Royal Oak, MI, USA.
4Indiana University School of Medicine, Indianapolis, IN, USA

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Introduction

Acute myeloid leukemia (AML) is a hematologic malignancy characterized by highly heterogeneous patient outcomes, influenced by a complex interplay of biological, clinical, and sociodemographic factors. While therapeutic advances have been made, large-scale population-based studies are essential to quantify survival trends and delineate the independent prognostic impact of socioeconomic and demographic variables, which is critical for improving risk stratification and addressing disparities in care equity.

Objectives

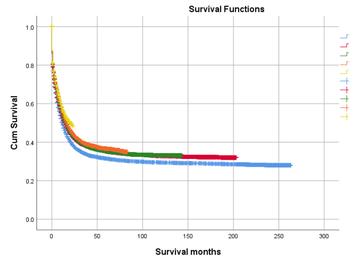
To evaluate temporal trends in survival and identify the independent prognostic impact of clinical and sociodemographic factors in a large, contemporary cohort of US patients with acute myeloid leukemia.

Methods

This retrospective cohort study utilized data from the Surveillance, Epidemiology, and End Results (SEER) database. Patients aged 15-99 years diagnosed with AML between 2000 and 2021 were included. Cases with incomplete follow-up or identified solely by autopsy/death certificate were excluded, yielding a final analytical cohort of 69,551 individuals. Descriptive statistics were analyzed using Jonckheere-Terpstra and Cochran-Mantel-Haenszel tests for trends. The primary outcome was overall survival (OS), analyzed via the Kaplan-Meier method with log-rank tests for comparisons. Univariate and multivariate Cox proportional hazards models were employed to identify prognostic factors, estimating hazard ratios (HRs) for variables including age, sex, race, marital status, median household income, rural-urban residence, chemotherapy administration, and diagnosis period (grouped into 5-year intervals).

Results

The study population had a mean age of 64.95 years and was 54.6% female. Kaplan-Meier analysis demonstrated a significant improvement in survival over time (log-rank χ^2=254.551, p<0.001), with median OS increasing from 5.0 months (95% CI: 4.8–5.2) for the 2000-2004 cohort to 8.0 months (95% CI: 7.7–8.3) for the 2015-2019 cohort. A significant survival advantage was also observed for females over males (median OS 7.0 vs. 6.0 months; log-rank χ^2=109.310, p<0.001). On univariate analysis, all examined variables were significant predictors of survival (p<0.001). The strongest risk factors were not receiving chemotherapy (HR=3.055), increasing age (HR=1.039 per year), and diagnosis in an earlier time period (e.g., 2000-2004 vs. 2020-2021: HR=1.216). Multivariate Cox regression confirmed several independent prognostic factors for poorer survival: absence of chemotherapy (adjusted HR=2.007, p<0.001), advanced age (aHR=1.032 per year, p<0.001), male sex (aHR=0.915 for female reference, p<0.001), lower county-level median income (aHR=0.988 per unit increase, p<0.001), Black race (aHR=1.078 vs. White, p<0.001), and divorced or single marital status (e.g., aHR=1.076 for divorced vs. widowed, p<0.001). The model also confirmed the persistent independent survival benefit for patients diagnosed in more recent eras.



Discussion

These findings underscore that biological factors are inextricably linked with social determinants of health, and that disparities in AML survival are a multifactorial challenge. The results emphasize the urgent need for equitable access to treatment and targeted interventions for vulnerable populations, including males, Black individuals, those of lower socioeconomic status, and unmarried patients, to mitigate these persistent disparities and improve overall survival outcomes.