Effect of Non-Selective Beta Blocker Use on Post-Allogeneic Stem Cell Transplant Outcomes in Patients with Myeloid Neoplasms: A Trinetx-based Retrospective Cohort Study

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BACKGROUND

Preclinical data suggest that nonselective beta-blockers (NSBBs) may impair hematopoietic regeneration after Allogeneic stem cell transplant (allo-SCT) by disrupting sympathetic nervous system-hematopoietic stem cell signaling (Nishino et al., Cancer Discov. 2025). However, its real-world impact in patients with myeloid neoplasms undergoing allo-SCT remains unclear.

METHODS

- Conducted a retrospective cohort study using the TriNetX Global Collaborative Network. Adult patients (≥18 years) with myeloid neoplasms (MN) who underwent allo-SCT were included and stratified into two cohorts based on post-allo-SCT NSBB use.
- Cohort 1 - MNs + allo-SCT+ NSBB use (n= 1509) and Cohort 2 - MNs + allo-SCT without NSBB use (n= 5584). Performed (1:1) propensity score matching (including age, GVHD ppx, comorbidities, conditioning regimen, etc.) to avoid potential confounding.
- The follow-up was 730 days. Compared outcomes using Kaplan-Meier analysis, reporting hazard ratios (HRs) and log-rank p-values.

RESULTS

- After propensity score matching, each cohort had 1011 patients with median age of 57 years. 80% had myeloid leukemia, 34% myelodysplastic syndrome, and 5.5% Chronic myelomonocytic leukemia.
- There were no statistically significant differences in the risk of thrombocytopenia (HR 0.856, p = 0.194), anemia (HR 0.807, p = 0.107), or neutropenia (HR 1.043, p = 0.794) between groups.
- All-cause mortality was significantly higher in the NSBB group (HR = 1.217; 95% CI = 1.048 - 1.413; p = 0.010) than in those not on it.
- Post-allo SCT relapse rate (HR 0.950, p = 0.684) and ER visits (HR 1.013, p = 0.925) did not differ significantly between groups.

CONCLUSION

- Nonselective BB use was not associated with significant increases in post-transplant cytopenias, but was associated with higher all-cause mortality.
- This mortality signal in current propensity-matched analysis, although intriguing and consistent with the results of Nishino et al., cannot rule out the potential role of residual confounding or higher baseline morbidity among patients requiring NSBB therapy.
- Prospective studies are needed to clarify whether this association is causal, to further guide clinicians in medication reconciliation around allo-SCT.

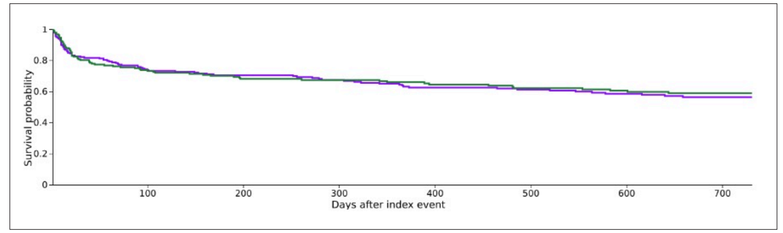


Figure 1: Kaplan-Meier survival curve comparing neutropenia in patients with Myeloid neoplasms post-transplant with and without beta-blocker use.

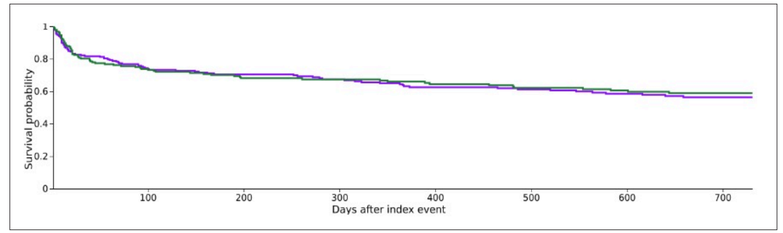
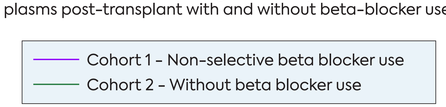


Figure 2: Kaplan-Meier survival curve comparing thrombocytopenia in patients with Myeloid neoplasms post-transplant with and without beta-blocker use.



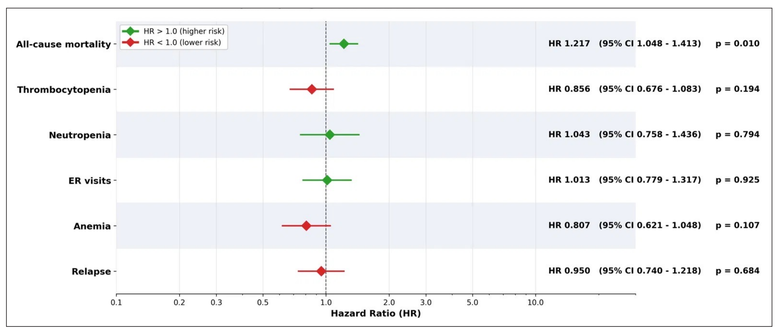


Figure 3: Outcomes of non-selective beta-blocker use in Myeloid neoplasms post-allogeneic transplant: Forest plot depicting hazard ratios and 95% confidence interval.

REFERENCES

1. Nishino J, Hu W, Kishtagari A, et al. Nonselective β-adrenergic receptor inhibitors impair hematopoietic regeneration in mice and humans after hematopoietic cell transplants. *Cancer Discov*. 2025;15(4):748-66. doi:10.1158/2159-8290.CD-24-0719.
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