Nationwide Study: Assessing Hospitalization Outcomes Among Bone Marrow Transplant Patients With Graft-Versus-Host Disease

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Background:

- Graft-versus-host disease (GVHD) is a well-recognized complication following bone marrow transplantation, yet comprehensive data on in-patient outcomes are lacking.
- This study aims to evaluate the outcomes of GVHD in hospitalized bone marrow transplant patients.

Methods:

- Utilizing data from the 2016-2019 National Inpatient Sample (NIS) database, a retrospective analysis was conducted.
- Hospitalizations involving bone marrow transplantation were categorized into GVHD and non-GVHD groups.
- A range of factors including demographic details, hospital characteristics, and comorbidity index scores were considered.
- Univariable and multivariable logistic regression analyses were performed to calculate odds ratios, adjusting for confounding variables.

Outcomes associated with GVHD with adjusted analysis (Adjusted odds ratio/Coefficient)

Mortality	aOR=7.20 (95% CI: 5.54 to 9.36)	P= 0.000
Length of stay	Coefficient= 19.36 days (95% CI: 17.29 to 21.42)	P = 0.000
Total hospital charges	Coefficient= $453,733 (95% CI: $396,577 to 510,889)	P = 0.000
Sepsis	aOR=2.79 (95% CI:2.28 to 3.41)	P = 0.000
Pneumonia	aOR=3.30 (95% CI:2.57 to 4.24)	P = 0.000
Acute respiratory failure	aOR= 5.10 (95% CI:4.01 to 6.49)	P = 0.000
Intubation and mechanical ventilation	aOR=4.88 (95% CI: 3.75 to 6.34)	P = 0.000
Clostridium difficile infection	aOR= 1.45 (95% CI: 1.13 to 1.86)	P = 0.003
AKI	aOR=3.57 (95% CI: 2.97 to 4.29)	P = 0.000

References:
1.Michonneau D, Quignot N, Jiang H, et al. Clinical and economic burden associated with graft-versus-host disease following allogeneic hematopoietic cell transplantation in France. Bone Marrow Transplantation. 2023;58(5):514-525. doi:10.1038/s41409-023-01930-8
2.Holtan SG, Yu J, Paranagama D, et al. Disease progression, hospital readmissions, and clinical outcomes for patients with steroid-refractory acute graft-versus-host disease: A multicenter, retrospective study. Bone Marrow Transplant. 2022;57(9):1399-1404. doi:10.1038/s41409-022-01736-0
3.Graft-versus-host disease. LLS. (n.d.-a). https://www.lls.org/treatment/types-treatment/stem-cell-transplantation/graft-versus-host-disease#:~:text=Chronic%20GVHD%20may%20occur%20at,an%20allogeneic%20 stem%20cell%20 transplantation
4.Sabatelli L, Keränen M, Viayna E, et al. Burden of hospitalizations and outpatient visits associated with moderate and severe acute graft-versus-host disease in Finland and Sweden: a real-world data study. Support Care Cancer. 2022;30(6):5125-5135. doi:10.1007/s00520-022-06915-9
5. Agency for Healthcare Research and Quality. Overview of HCUP. https://www.hcup-us.ahrq.gov/overview.jsp. Accessed 15 October, 2023.
6. Khera R, Angraal S, Couch T, et al. Adherence to methodological standards in research using the national inpatient sample. JAMA. 2017;318(20):2011. doi:10.1001/jama.2017.17653
7. Sundararajan V, Henderson T, Perry C, Muggivan A, Quan H, Ghali WA. New ICD-10 version of the Charlson Comorbidity Index predicted in-hospital mortality. Journal of Clinical Epidemiology. 2004;57(12):1288-1294. doi:10.1016/j.jclinepi.2004.03.012
8. Horan JT, Logan BR, Agovi-Johnson MA, et al. Reducing the risk for transplantation-related mortality after allogeneic hematopoietic cell transplantation: how much progress has been made?. J Clin Oncol. 2011;29(7):805-813. doi:10.1200/JCO.2010.32.5001
9. El-Jawahri A, Li S, Antin JH, et al. Improved Treatment-Related Mortality and Overall Survival of Patients with Grade IV Acute GVHD in the Modern Years. Biol Blood Marrow Transplant. 2016;22(5):910-918. doi:10.1016/j.bbmt.2015.12.024

Results:

- Data from 13,999 hospitalizations were assessed, with 836 linked to patients with GVHD.
- Patients with GVHD had a mean age of 51.61 years, with slight variations in gender and race compared with patients in the non-GVHD group.
- Significant differences were observed in outcomes, with patients with GVD experiencing notably longer mean lengths of stay (41.40 days vs 21.31 days) and higher total hospital charges ($824,058 vs $335,765).
- After adjusting for confounders, GVHD significantly increased the risk of mortality (adjusted odds ratio, 7.20; 95% CI, 5.54-9.36), length of stay (19.36 days; 95% CI, 17.29-21.42), and total hospital charges ($453,733; 95% CI, $396,577-$510,889).
- Additionally, GVHD was associated with elevated risks of various medical conditions including sepsis, pneumonia, acute respiratory failure, intubation & mechanical ventilation, Clostridium difficile infection, and acute kidney injury.

Conclusions:

- Bone marrow transplant patients with GVHD face increased mortality rates, prolonged hospital stays, and higher hospital charges.
- They are also at a significantly higher risk of developing severe medical conditions.
- Effective management and close monitoring of GVHD are essential to improve patient outcomes and alleviate associated burdens.
- However, further prospective studies are required for a comprehensive understanding of outcomes in these patients.

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