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Commentary

Overview of Haploidentical Transplantation with PT-Cy

Norhane Nadour*

Department of Transplantation, Sorbonne University, Paris, France

DESCRIPTION

The use of Haploidentical Transplantation (haplo-HCT) with Post-Transplant Cyclophosphamide (PT-Cy) has emerged as a significant treatment modality for patients with Acute Myeloid Leukemia (AML). This approach allows for the use of partially matched family donors, addressing the shortage of fully matched donors. Understanding the prognostic factors influencing outcomes in this setting is crucial for optimizing patient management and improving survival rates. Haplo-HCT involves the transplantation of hematopoietic stem cells from a donor who shares one haplotype with the recipient. PT-Cy is administered post-transplant to mitigate Graft-*Versus*-Host Disease (GVHD), a common complication that can significantly impact patient outcomes. The combination of haplo-HCT and PT-Cy has shown promising results, particularly in patients with AML, who often face poor prognosis due to the aggressive nature of the disease.

Prognostic factors

Recent studies have identified several prognostic factors that influence the outcomes of haplo-HCT with PT-Cy in AML patients. These factors can be categorized into patient-related characteristics, transplant-related factors, and disease-specific variables.

Patient-related factors

Age at transplant: Advanced age is consistently associated with poorer outcomes in hematopoietic stem cell transplantation. In a study involving 1,939 adults with AML, age was found to be a significant predictor of Overall Survival (OS) and Leukemia-Free Survival (LFS)

Older patients often have comorbidities that can complicate the transplant process and recovery.

Performance status: The pre-transplant performance status of the patient, often assessed using the Eastern Cooperative Oncology Group (ECOG) scale, is an important predictor of post-transplant outcomes. Patients with better performance status tend to have improved survival rates.

Comorbidities: The presence of comorbid conditions can adversely affect transplant outcomes. Comorbidities can increase the risk of complications and influence the choice of conditioning regimen.

Transplant-related factors

Donor type: The choice of donor plays a crucial role in transplant outcomes. Haploidentical donors, while offering a viable option, may present different risks compared to Matched Unrelated Donors (MUDs) or Matched Sibling Donors (MSDs). Studies indicate that outcomes can vary significantly based on the donor-recipient CMV serostatus and other immunological factors

Conditioning regimen: The type of conditioning regimen used prior to transplantation can significantly influence engraftment and survival. Myeloablative Conditioning (MAC) is associated with better outcomes in certain patient populations compared to Reduced-Intensity Conditioning (RIC). The choice of conditioning regimen must be tailored to the individual patient's risk profile.

Graft source: The source of stem cells-Bone Marrow (BM) or Peripheral Blood Stem Cells (PBSC)-also impacts outcomes. Studies have shown that PBSC grafts may lead to faster engraftment but can also be associated with a higher incidence of GVHD.

Disease-specific factors

Disease status at transplant: The remission status at the time of transplantation is a critical factor. Patients in Complete Remission (CR) at the time of haplo-HCT have better outcomes compared to those with active disease. In the aforementioned study, 72.5% of patients were in CR1, which contributed to the overall favorable outcomes observed

Cytogenetics and molecular markers: The cytogenetic profile of the leukemia can provide insights into prognosis. Certain

Correspondence to: Norhane Nadour, Department of Transplantation, Sorbonne University, Paris, France, E-mail: norhane.nadour@etu.fr

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genetic abnormalities are associated with poorer outcomes and may necessitate more aggressive treatment approaches.

Secondary AML: Patients with secondary AML, which arises from prior chemotherapy or other hematological conditions, tend to have worse outcomes compared to those with de novo AML. In the analyzed cohort, secondary AML was associated with a higher risk of non-engraftment and poorer survival rates.

Outcomes and future directions

The cumulative incidence of primary graft failure in haplo-HCT with PT-Cy has been reported to be around 6%, which is lower than that observed in T-cell-depleted haplo-HCT. The overall survival rates at two years post-transplant are approximately 60.9%, with leukemia-free survival at 55.2%. These outcomes highlight the potential of haplo-HCT as a viable treatment option for AML patients. Looking ahead, further research is needed to refine the selection of patients for haplo-HCT, optimize conditioning regimens, and improve post-transplant care. Ongoing studies are exploring the role of novel agents in conjunction with haplo-HCT and PT-Cy, as well as the long-term effects of this treatment modality on quality of life and survival.

CONCLUSION

Haploidentical transplantation with post-transplant cyclophosphamide represents a significant advancement in the treatment of acute myeloid leukemia. Understanding the prognostic factors that influence outcomes is essential for optimizing patient care and improving survival rates. As research continues to evolve, the integration of these factors into clinical practice will enhance the effectiveness of haplo-HCT and provide hope for patients facing this challenging disease.