EVALUATION OF DIFFERENT CONDITIONING REGIMENS USED FOR LYMPHOMA PATIENTS UNDERGOING AUTOLOGOUS STEM CELL TRANSPLANT

Yasmin Ahmed Aboelmagd*, Hany Mohammed Hegab[1], Gihan Kamal Shams El Din[1], Mohamed Hamdy Attia[2], Gehad Hamada Fekry Hafez[2], Inas Abdel Moaty Mohamed Eid[2]

[1] Professor of internal medicine and clinical hematology Ain Shams University

[2]Associate Professor of Internal Medicine and Clinical Hematology, Faculty of Medicine, Ain Shams University

*Corresponding author: yasminaboelmagd@outlook.com | ORCID: 0000-0002-7574-8174

Introduction

Lymphoma encompasses a diverse group of hematological malignancies characterized by the clonal proliferation of lymphocytes at various stages of development. Representing approximately 5% of all cancers, lymphoma subtypes vary significantly in their clinical behavior, treatment strategies, and prognosis. Despite advancements in frontline therapies, a subset of patients either fail to respond adequately or experience relapse.

Autologous stem cell transplantation, preceded by high-dose chemotherapy, remains a standard therapeutic approach for patients with relapsed, refractory, or high-risk lymphomas. The conditioning regimen administered prior to ASCT is critical in disease eradication but also contributes significantly to transplant-related toxicity. Historically, the choice of conditioning regimen has been guided by institutional protocols, with limited head-to-head data available to inform the superiority of specific regimens.

Aim

This study aimed to evaluate and compare the effectiveness, toxicity profile, and survival outcomes of different conditioning regimens used in lymphoma patients undergoing ASCT at Ain Shams University Hospital.

Objectives

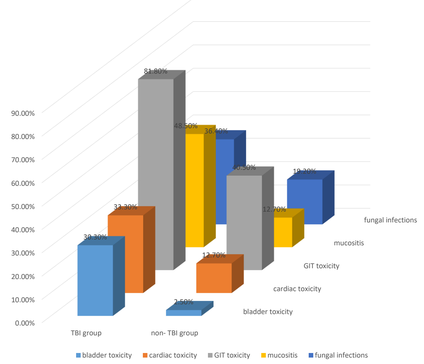
1. To assess the organ-specific toxicities (e.g., bladder, gut, cardiac) associated with each regimen using the Seattle score.
2. To evaluate the impact of conditioning regimens on engraftment success, including delayed or failed engraftment.
3. To investigate the incidence of post-transplant infections (bacterial, fungal, viral) in relation to conditioning.
4. To determine the relationship between conditioning received, toxicity grade and disease free and overall survival.
5. To analyze whether prior treatments, such as local radiotherapy, stem cell dose and number of chemotherapy regimens, influence outcomes in the context of conditioning.

Methods

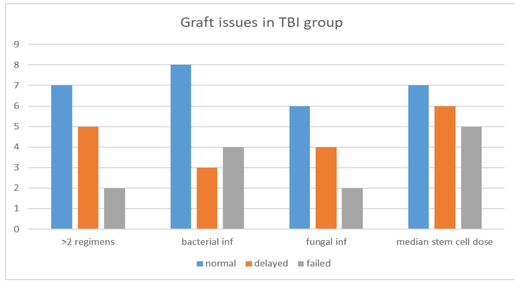
In this combined retrospective and prospective cohort study, 112 patients (55 with Hodgkin lymphoma and 57 with non-Hodgkin lymphoma) were followed over three years. Patients were grouped based on whether their conditioning regimen included total body irradiation (TBI) or not. Clinical outcomes, complications, and survival rates were assessed and compared between the two groups.

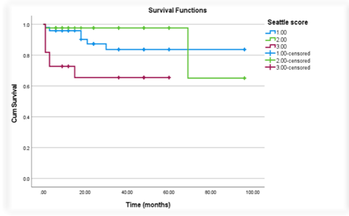
Results

Patients in the TBI group experienced significantly higher rates of bladder ($p<0.001$), gastrointestinal ($p<0.001$), and cardiac ($p<0.01$) toxicities. Additionally, fungal infections ($p=0.05$) and engraftment challenges ($p=0.01$) were more frequent among TBI recipients. The graft issues were related to the number of chemotherapy regimens received pretransplant (p value 0.01), lower stem cell doses (p value 0.05) as well as the development of bacterial (p value 0.03) or fungal (p value 0.05) infections. Delayed post-transplant complications were also more common in patients who had received local radiotherapy prior to TBI-based conditioning ($p<0.01$). Despite increased early toxicity, there was no significant difference in disease-free survival (DFS) or overall survival (OS) between the TBI and non-TBI groups.

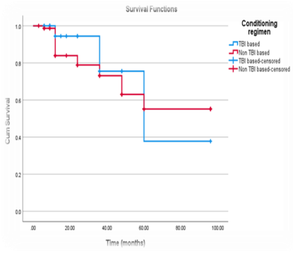


Results cont

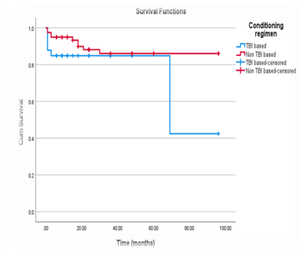




Seattle score effect on OS



DFS in relation to regimen



OS in relation to regimen

Summary

Non-TBI conditioning regimens demonstrated comparable efficacy to TBI-based protocols with fewer acute toxicities. While TBI remains a valid option, especially in high-risk cases, its use should be carefully considered due to the associated toxicity burden.

Discussion

Our results affirm the toxicity profile associated with TBI, particularly involving the gastrointestinal tract, bladder, and heart. TBI recipients also experienced higher incidences of severe oral mucositis, underscoring the intensive nature of radiation-based conditioning.

Despite these elevated toxicities, TBI did not confer a survival benefit over non-TBI regimens as disease-free and overall survival were similar. This aligns with findings from previous studies of the comparable efficacy of chemotherapy-only regimens. Nonetheless, the TBI group exhibited a numerically lower relapse rate, suggesting a potential, albeit not statistically confirmed, advantage in disease control.

Engraftment delays were more common in the TBI group, especially among patients with multiple prior chemotherapy regimens or lower infused stem cell doses. Emphasizing the importance of optimizing pre-transplant treatment and stem cell mobilization strategies. Moreover, the elevated incidence of fungal infections in the TBI cohort highlights the need for robust infection prophylaxis protocols in this group.

The Seattle score proved to be a valuable tool for predicting transplant-related toxicity and survival, with higher scores correlating with reduced OS. This supports its continued use in the ASCT setting for risk stratification and patient monitoring.

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