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ABSTRACT SHARING
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TOTAL BODY IRRADIATION (TBI)-FREE CONDITIONING FOR CHILDREN WITH HIGH-RISK OR RELAPSED ACUTE LYMPHOBLASTIC LEUKEMIA (ALL) UNDERGOING HAEMATOPOIETIC STEM CELL TRANSPLANTATION (HSCT)

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Introduction

Treatment advances in childhood ALL have resulted in greatly improved outcomes, with an overall survival rate currently at 90%. However, the subset of high-risk and relapsed ALL remain challenging diseases to treat, with significantly poorer prognoses than those in lower risk groups. Patients with high-risk or relapsed ALL can often still be cured, and conventionally undergo HSCT after a period of remission following multimodal chemotherapy. For older children, TBI serves as the primary myeloablative and immunoablative procedure in HSCT. However, its use is associated with side effects that include growth retardation, infertility and secondary malignancy. The use of a radiation-free conditioning regimen has been employed in our center since 2018 for patients with high risk or relapsed pre-B ALL in order to address and reduce known detrimental side effects associated with TBI.

Method

A total of 6 patients with high-risk (n=4) or relapsed pre-B ALL (n=2) underwent HSCT between August 2018 and August 2019 in our center. All received a preparatory regimen consisting of Busulfan (16mg/kg), Fludarabine (150mg/m2) and Thiotepa (10mg/kg). Stem cells were sourced from bone marrow for all patients, with 4 receiving from a haploidentical donor (HD), and 2 from a matched sibling donor (MSD). For patients who underwent haploidentical transplants, post-transplant cyclophosphamide was administered on days +3 and +4 as graft-versus-host disease (GvHD) prophylaxis.

Results

HSCT using non-TBI containing conditioning regimen in paediatric high risk or relapsed ALL is associated with an 83% disease-free survival at a median follow up of 13 months in our center. All patients achieved engraftment, at a median of 13 days. Grade 3 or 4 acute GvHD was not observed in any of the patients. Chemotherapy was well-tolerated, with no serious adverse events.

Conclusion

The use of a TBI-free conditioning regimen is feasible in paediatric ALL, with acceptable short-term outcomes. Longer term data is needed to determine the safety and effectiveness of this type of conditioning, although it is hoped that radiotherapy-free conditioning could be widely employed in the future for paediatric patients undergoing HSCT in order to reduce risks associated with TBI.