Outcome of Allogenic Hematopoietic Stem Cell Transplantation for Pediatric Acute Lymphoblastic Leukemia: A Retrospective Analysis of a Single-center

Hongbo He, Jieyu Tian, Huyong Zheng and Maoquan Qin

1Hematology Center, Beijing Children’s Hospital, China

Background: Acute lymphoblastic leukemia (ALL) is a heterogeneous group of hematologic malignancies. Over the past several decades and with modern risk-adapted chemotherapy, the five-year survival rate in children with ALL has significantly improved (88.6%). Although the prognosis of most patients has improved, in the current intensive chemotherapy regimen, some patients still have a high risk of relapse. Allogenic hematopoietic stem cell transplantation (allo-HSCT) is a feasible treatment for high-risk patients who are prone to relapsed with standard chemotherapy alone or relapsed after complete remission (CR).

Materials and Method: Children with ALL who underwent allo-HSCT in Beijing Children’s Hospital, Capital Medical University, from January 2006 to December 2019 were retrospectively analyzed. Data relating to the clinical manifestations, engraftment, and prognosis of the children were extracted from medical records. All patients received allo-HSCT with a myeloablative conditioning regimen (vivo de-T regimen).

Results: Seventy-five patients, including 52 males and 23 females, with a medium age of 5.30 (0.52-14.30) years were enrolled in this study. The median time from diagnosis to transplantation was 1.64 (0.43-9.06) years. Fifteen patients accepted human leukocyte antigen (HLA) matched transplantation and 60 patients accepted haploidentical HSCT(haplo-HSCT). Before transplantation, 73 patients achieved CR and 2 patients didn’t achieve remission. The median following time was 41.0 (1.0-144.0) months. By the end of follow-up, 51 patients survived and 24 patients died or given up due to relapse. The five-year overall survival rate, event-free survival rate, and relapse rate were 67.77%, 57.30%, and 35.69% respectively. Acute graft versus host disease (GVHD) was observed in 40 patients and chronic GVHD was observed in 28 patients. The five-year OS of haplo-HSCT was higher than HLA matched-HSCT (p=0.048), but there was no significant difference in the engraftment time of neutrophils and platelets, the frequency of GVHD, and the relapse rate after transplantation (p=0.374, 0.193, 0.184, 0.121, and 0.293, respectively). The five-year OS of patients with MLL gene rearrangement was higher than other types (p=0.042). The type of donor, conditioning regimen, immunophenotype, and disease status before transplantation did not affect the outcome of transplantation.

Conclusion: Allo-HSCT was an effective treatment for children with ALL, with a high survival rate. Haplo-HSCT is superior to HLA matched-HSCT. The 5-year OS of patients with MLL rearrangement gene after HSCT is the highest and that of patients with BCR-ABL fusion gene is the lowest.

Keywords: Acute lymphoblastic leukemia, Allogenic hematopoietic stem cell transplantation, prognosis, Graft versus host diseases, Relapse