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POSTER ABSTRACTS

722.ALLOGENEIC TRANSPLANTATION: ACUTE AND CHRONIC GVHD, IMMUNE RECONSTITUTION

Higher Infused CD34+ Cell Dose Does Not Influence Clinical Outcomes in Allogeneic Peripheral Blood Stem Cell Transplantation Using Post-Transplant Cyclophosphamide in Children with High-Risk Leukemia

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Background: The impact of infused graft cell dose on outcomes, including graft-versus-host disease (GVHD) and relapse, which have been major challenges in allogeneic hematopoietic stem cell transplantation (HSCT), remains unclear. Post-transplant cyclophosphamide (PTCy) has emerged as an effective and safe GVHD prophylaxis strategy, with improved GVHD incidence and relapse-free survival (RFS). Early practice of unmanipulated peripheral blood stem cell transplantation (PBSCT) using PTCy was commonly performed with a restriction on the CD34 $^{+}$ cell dose to minimize the risk of GVHD. However, recent studies demonstrated the protective effect of CD34 $^{+}$ cells on relapse, with no association with GVHD, thereby raising questions about the optimal cell dose. In this context, we aimed to study the impact of infused cell dose on outcomes in children with high-risk leukemia who underwent allogeneic PBSCT using PTCy.

Methods: A retrospective analysis was conducted on 50 pediatric patients (median age at diagnosis : 9.3 years, range, 0.3-17.3) with hematologic malignancy (33 acute myeloid leukemia, 12 acute lymphoblastic leukemia, and 4 myelodysplastic syndrome/myeloproliferative neoplasm, 1 other) in first or second remission between 2019 and 2023. They received their first allogeneic PBSCT and donors included matched or mismatched unrelated donors (n=12) and haploidentical family donors (n=38). Conditioning was myeloablative, and PTCy-based GVHD prophylaxis (50mg/kg/day on days 3 and 4) was used for all patients. The patients were divided into three groups based on infused CD34 $^{+}$ cell dose: high dose group (>10 $\times$ 10 ^{6}/kg, N=10), intermediate dose group (5-10 $\times$ 10 ^{6}/kg, N=24), and low dose group (<5 $\times$ 10 ^{6}/kg, N=16).

Results: The median age at HSCT was 11.6 years (range, 0.7-24.9). The median dose of infused CD34 $^{+}$ cells and CD3 $^{+}$ cells was 6.5 x 10 ^{6}/kg and 48.6 x 10 ^{7}/kg, respectively. There was a tendency for the mean dose of infused CD3 $^{+}$ cells to increase in the group with higher infused CD34 $^{+}$ cell dose: 47.6 x 10 ^{7}/kg for low dose group, 57.5 x 10 ^{7}/kg for intermediate dose group, and 73.4 x 10 ^{7}/kg for high dose group (P=0.053). Patients receiving a higher dose of CD34+ cells had significantly shorter median time to neutrophil engraftment (13 days in high dose group vs. 14 days in intermediate dose group vs. 17 days in low dose group, P<0.001). The time to platelet engraftment was similar among the three groups. There was no difference among high dose, intermediate dose, and low dose groups in the cumulative incidence (CI) of day+100 grades II-IV acute GVHD and moderate to severe chronic GVHD (grades II to IV acute GVHD: 60.0% vs. 63.6% vs. 73.3% [P=0.988], respectively; moderate to severe chronic GVHD: 22.2% vs. 29.2% vs. 25.0% [P=0.961], respectively). With a median observation period of 20.4 months (range, 3.0-46.8) from transplant, RFS and overall survival (OS) showed a non-significant trend towards a higher survival rate in the high dose group compared to the other groups (RFS: 76.2% in high dose group vs. 62.1% in intermediate dose group vs. 62.6% in low dose group, P=0.694; OS: 88.9% in high dose group vs. 63.0% in intermediate dose group vs. 76.0% in low dose group, P=0.788).

Conclusions: Higher number of infused CD34 $^{+}$ cell dose was associated with faster neutrophil engraftment. For patients in the high dose group (CD34 $^{+}$ cell dose > 10 x 10 ^{6}/kg with a relatively higher number of CD3 $^{+}$ cells), a non-significant trend toward a higher survival rate was observed, with no detrimental impact on GVHD. PBSCT in a pediatric patient from an unrelated or haploidentical adult donor may result in a high infused cell dose. Our findings suggest that restricting the number of infused CD34 $^{+}$ cell dose may not be necessary in the setting of allogeneic PBSCT with PTCy. Larger cohort studies are needed to confirm the potential benefits and drawbacks of a higher cell dose in children who receive PBSCT within a PTCy setting.

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