DONOR-ASSOCIATED FACTORS SHAPE OUTCOMES AFTER UNRELATED ALLOGENEIC HAEMATOPOIETIC STEM-CELL TRANSPLANTATION IN CHILDREN: SINGLE-CENTRE ANALYSIS OF 143 TRANSPLANTS

Natalia Sidorova, Sergey Semochkin, Elena Skorobogatova, Lyudmila Olkhova, Elena Machneva, Yuliya Nikolaeva, Mikhail Antoshin

Pirogov Russian National Research Medical University, Moscow, Russian Federation

Background: In paediatric malignancies, the success of unrelated allogeneic haematopoietic stem-cell transplantation (allo-HSCT) is influenced not only by HLA identity but also by additional donor-associated factors. Quantifying their impact could refine donor choice and improve survival.
Aim: To determine the influence of donor sex, ABO mismatch type, CMV serostatus, and 9/10 versus 10/10 HLA matching on engraftment, graft-versus-host disease (GVHD) and survival.
Methods: We conducted a retrospective study of 143 consecutive unrelated allo-HSCTs in 140 children (median age 8 years, range 0.7–17) treated between November 2003 and April 2019 for acute myeloid or lymphoblastic leukaemia. Conditioning intensity and GVHD prophylaxis followed EBMT paediatric recommendations. Engraftment, acute (aGvHD) and chronic GVHD (cGvHD), graft failure, overall survival (OS), and relapse-free survival (RFS) were assessed.
Results: Neutrophil recovery occurred in 137/143 grafts (median 19 days). aGvHD (grade II–IV) developed in 47 % of patients and was not linked to any donor variable. cGvHD was least frequent with a male-to-female donor–recipient pairing (16 %) and with a minor ABO mismatch (17.5 %) ($p = 0.023$ and $p = 0.024$, respectively). Graft failure was highest with a mixed ABO mismatch (23.5 %) and absent with a minor mismatch ($p = 0.009$). 1-year OS was significantly lower in CMV-seronegative donor–recipient pairs and in sex-mismatched pairs (both $p < 0.05$). Five-year OS and RFS were 57.3% and 53.9% overall; survival did not differ significantly between 10/10 and 9/10 HLA matches (57.0% vs 51.5%, $p = 0.46$). In multivariate analysis, only cGvHD independently predicted late mortality.
Conclusions: Donor-associated variables influenced distinct outcome domains. Minor ABO mismatch and a male-to-female donor–recipient pairing reduced chronic GVHD and virtually eliminated graft failure, whereas mixed ABO mismatch markedly increased rejection risk. CMV-seronegative pairs and sex-mismatched pairs experienced significantly lower 1-year overall survival, highlighting an early vulnerability not evident in longer-term analyses. In contrast, 9/10 HLA-matched grafts provided long-term survival comparable to fully matched donors when modern GVHD prophylaxis was employed.