

Unrelated umbilical cord blood transplant for adult acute lymphoblastic leukemia in first and second complete remission: a comparison with allografts from adult unrelated donors

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METHODS

Data Source

The CIBMTR is a voluntary working group of more than 450 transplantation centers that contribute detailed data on consecutive allogeneic and autologous HCTs to a Statistical Center at the Medical College of Wisconsin in Milwaukee and the National Marrow Donor Program Coordinating Center in Minneapolis. Participating centers are required to report all transplants consecutively and compliance is monitored by on-site audits. Patients are followed longitudinally.

Statistical analysis

Patient, disease and transplantation characteristics were compared using chi-square statistics for categorical variables (Table 1). The probability of overall survival was calculated using the Kaplan-Meier estimator.¹⁴ The probabilities of neutrophil and platelet recovery, acute and chronic GVHD, TRM and relapse were calculated using the cumulative incidence estimator to accommodate competing risks.¹⁵ For TRM, relapse was the competing risk and for relapse, the competing risk was transplant-related mortality. For hematopoietic recovery, acute and chronic GVHD, death without the event was the competing risk. For analysis of overall survival, death from any cause was considered an event. For analysis of leukemia-free survival, relapse or death from any cause was considered an event. In all analyses, data on patients without an event were censored at last follow-up.

Cox proportional hazard regression models were constructed for acute and chronic GVHD, TRM, relapse, leukemia-free survival and overall mortality.¹⁶ Results are expressed as hazard ratio (HR) with 95% confidence interval (CI). Multivariate

models were built using stepwise selection procedure. Proportional-hazards assumption was tested for all variables considered in multivariate analysis and there were no violations. We first tested for differences in outcome between PBPC and BM by HLA-match. Having established there were no significant differences between 8/8 PBPC vs. 8/8 BM and 7/8 PBPC vs. 7/8 BM (data not shown), categories were collapsed to create the following two categories: 8/8 PBPC or BM and 7/8 PBPC or BM. The main effect term, donor source (8/8 PBPC or BM vs. 7/8 PBPC or BM vs. CB) were held in all steps of model building, regardless of level of significance. First order interactions between the main effect and the other variables were tested in multivariate models and there were none. Other variables tested include: patient age (16 – 35 vs. >35 years), recipient CMV serostatus (seropositive vs. seronegative vs. not reported), lineage (T-cell vs. B-cell vs. not reported), white blood cell count (low vs. high vs. not reported), cytogenetics (high risk vs. low/intermediate risk vs. not reported), time to achieve first CR (< 8 vs. ≥8 weeks), disease status (first CR vs. second CR with duration of first CR less than 12 months vs. second CR with duration of first CR between 12 and 24 months vs. second CR with duration of first CR greater than 24 months), conditioning regimen (TBI-containing vs. non-TBI containing), GVHD prophylaxis (cyclosporine-containing vs. tacrolimus-containing), transplant period (2002 – 2005 vs. 2006 – 2010). All analyses were performed using SAS, version 9.3 (Cary, NC).