Methods: The study cohort consists of 117 consecutive patients (28 matched siblings, 25 unrelated and 64 haplo) with 115 leukemia, 1 SAA, and 1 NHL. The median age is 20 years (3-62). Conditioning regimens: 1) Ara-C+BUCY (n = 14); 2) Ara-C+ BUFlu (n = 12). In addition, Haplo and URD received either 3) Ara-C+ BUCY +ATG (n = 54) or, 4) Ara-C+BUFlu+ATG. (n = 32) followed by unmanipulated G-CSF mobilized bone marrow and/or peripheral blood (G-BMPB or G-PB). 5 patients used other regimen. GVHD prophylaxis: CSA, MMF and short-term MTX. Multiple linear regression models were used for cost analysis. Variables considered were: transplant type (Sibling vs. URD vs. Haplo), quality of life (QOL), D/R sex match, patient age by decade, comorbidity, diagnoses, disease status pre-transplant, conditioning regimen, graft type, MNC, $CD34^+$cells, ANC and platelet engraftment, AGVHD and death.
Results: The median follow-up was 603 days (range 62 -1134). Clinical outcomes are shown in the following table.

Table 1. Clinical Outcomes after transplantation

	Sibling	URD	Haplo	P
TRM 100 day	0 (0-0)%	9 (2-24)%	5 (1-12)%	0.0634
TRM 1 year	12 (3-27)%	15 (4-32)%	14 (7-24)%	0.9488
Relapse 100 day	11 (3-25)%	4 (0-16)%	3 (1-10)%	0.4640
Relapse 1 year	23 (10-40)%	19 (9-41)%	9 (3-18)%	0.2187
DFS 100 day	89 (70-96)%	87 (65-96)%	92 (82-97)%	0.7817
DFS 1 year	65 (43-80)%	67 (37-84)%	77 (63-86)%	0.4721
Survival 100 day	96 (77-99)%	91 (69-98)%	94 (84-98)%	0.7430
Survival 1 year	84 (63-94)%	78 (49-91)%	83 (70-90)%	0.8780

The overall median cost (range) within 100-day of transplant was 52,373USD (13,627 – 262,716). The mean cost (95% CI) of HLA matched sibling, URD and haplo was 59,015 USD (45,537-72,493), 61,970 USD (47,701-76,224) and 63,373 USD (54,463-72,284) (P = 0.8674), respectively. Multivariate cost analysis indicated that QOL ≤ 80, conditioning including Flu or Flu+ATG and acute GVHD 2-4 correlated with increased cost.
Conclusion: These data suggest that transplant type (Sibling vs. URD vs. Haplo) does not significantly effect on the clinical outcomes and 100-day cost of transplantation. Future studies with more patients and longer follow-up are warranted.

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TOTAL DONOR CHIMERISM IN THE DAY 21 BONE MARROW PREDICTS SUSTAINED DONOR NEUTROPHIL ENGRAFTMENT FOLLOWING DOUBLE UNIT CORD BLOOD TRANSPLANTATION (CBT)

Avery, S.[1], Voss, M.H.[1], Gonzales, A.M.[1], Lubin, M.[1], Castro-Malaspina, H.[1], Kernan, N.A.[2], Scaradavou, A.[2], Hedvat, C.[3], Stevens, C.E.[1], Barker, J.N.[1] [1] Memorial Sloan-Kettering Cancer Center; [2] Memorial Sloan-Kettering Cancer Center; [3] Memorial Sloan-Kettering Cancer Center, New York, NY

Delayed or failed engraftment is a concern after CBT, even when using double unit grafts. Therefore, we analyzed the ability of the day 21 bone marrow (BM) composition and percent donor chimerism to predict sustained donor neutrophil engraftment in 56 recipients of myeloablative double unit CBT. Patients (median age 29 years, range 2-64) were transplanted for hematological malignancies, predominantly acute leukemia. Units had infused cell doses of 2.7 × 10^7 TNC/kg/ 1.2 × 10^5 CD34+ cells/kg for the larger unit, and 1.9 × 10^7 TNC/kg/ 0.7 × 10^5 CD34+ cells/kg for the smaller unit, with a donor-recipient HLA-match of 6/6 (n3), 5/6 (n59), and 4/6 (n50). The cumulative incidence (CI) of neutrophil engraftment was 95% (95% confidence interval: 89-100), with 47 patients engrafting with 1 unit and 6 engrafting with 2. The percentage of total myeloid precursors in the day 21 BM aspirate (median 40%, range 0-87), and the percent cellularity in the day 21 BM biopsy (median 5%, range 0-80), were both associated with neutrophil engraftment (Table 1). However, the most critical predictor of engraftment was the percent total donor chimerism (unit#1 + unit#2, median 100%, range 65-100), regardless if 1 or 2 units were present (Table 1). Sustained engraftment was seen in 98% of the 41 patients who were 100% donor at day 21 with a median day to absolute neutrophil count (ANC) ≥ 0.5 of 22 days. By contrast, only 87% of the 15 patients < 100% total donor engrafted [median day to ANC ≥ 0.5 31 days with a relative risk (RR) 0.3, p = 0.001]. Patients who were < 90% donor had especially poor engraftment (Table 1). The association between total donor chimerism and engraftment was independent of the percentage of myeloid precursors or BM cellularity. In patients (n = 37) without engraftment by day 21, a sub-group of particular clinical concern, day 21 total donor chimerism was also significantly associated with subsequent engraftment success (p = 0.003). No patient demographic was associated with total donor chimerism, and the only significant graft characteristic was the infused CFU dose of the engrafting unit (p = 0.002). These findings demonstrate the critical importance of the day 21 BM total donor chimerism and are of practical significance in the care of double unit CBT recipients. Further, they give interesting insights into double unit biology and suggest that the hematopoietic potential of the engrafting unit underlies the ability to generate complete donor chimerism.

Table 1. Cumulative incidence (CI) of neutrophil engraftment and median day to ANC >0.5 according to day 21 bone marrow composition and chimerism (n = 56).

Day 21 BM Characteristic	CI Engraftment by BM Characteristic Sub-group (Day ANC ≥ 0.5) (RR , p value)			P Value for CI Comparison
% Total Myeloid Precursors in Aspirate (n=56)	**<10% (n=18)** 95% (27 days) (RR 0.44, p=0.017)	**10-50% (n=18)** 89% (27 days) (RR 0.47, p=0.028)	**>50% (n=20)** 100%(22 days) Reference	0.017
% Cellularity in Core (n=56)	**<5% (n=21)** 91% (30 days) (RR 0.39, p=0.005)	**5-9% (n=15)** 100% (27 days) (RR 0.83, p=0.596)	**>10% (n=20)** 95%(21 days) Reference	0.005
% Total Donor Chimerism (n=56)	**<90% (n=6)** 67% (38 days) (RR 0.16, p=0.001)	**90-99% (n=9)** 100% (29 days) (RR 0.42, p=0.026)	**100% (n=41)** 98% (22 days) Reference	0.001

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THE T-CELL EPITOPE (TCE) ALGORITHM FOR CLASSIFYING HLA-DPB1 MISMATCHES DOES NOT PREDICT CLINICAL OUTCOMES IN HSCT

Askar, M., Flanagan, P., Rybicki, L., Kalaycio, M., Pohlman, B., Andresen, S., Dean, R., Duong, H., Copelan, E., Bolwell, B., Sobecks, R. Cleveland Clinic

A number of reports suggested the relevance of HLA-DPB1 matching for the outcomes of allogeneic hematopoietic stem cell transplantation (HSCT). An algorithm for determining DPB1 mismatch permissiveness based on T-Cell Epitopes (TCE) has been proposed (Zino et al, Blood 2004). According to this algorithm, all DPB1 alleles are categorized in 3 (TCE3) or 4 (TCE4) groups based on antigenicity. Accordingly DPB1 mismatches are classified as permissive; non-permissive in GvHD; or non-permissive in HvG direction.

Objective: To determine whether TCE classification is associated with HSCT outcomes. The outcomes considered in this analysis are failure to engraft, acute GvHD, chronic GvHD, and overall survival.

Methods: We analyzed 144 unrelated donor (≥ 7/8 allele matches at A, B, C, DRB1) allogeneic transplants performed in our center between 1999-2009. HLA-DPB1 mismatches were assessed using both TCE3 and TCE4 versions of the algorithm. Recursive partitioning analysis with a log-rank splitting method was used to categorize TCE variables into groups that best predict each outcome. Cox proportional hazards analysis was used to identify prognostic factors for each outcome.

Results: Graft failure was significantly highest among recipient with permissive DPB1 mismatches (AHR 9.87, 95% CI 1.21-80.3, P = 0.03) compared to recipients of zero mismatched, GvHD non-permissive, and HvG nonpermissive DPB1 mismatched donors. Acute GvHD was significantly higher in all DPB1 mismatches regardless of TCE classification (AHR 1.93, 95% CI 1.11-3.34, P = 0.02) compared zero DPB1 mismatch. There was no significant association between TCE classification and chronic GvHD, or overall survival.