and 13.2 cGy TBI. GVHD prophylaxis was with CSA/MMF. Thirty two percent were transplanted with one UCB unit and 68% with two units. Disease status at the time of transplant included: CR1 (46%), CR2 (45%), >CR2-relapse (9%). Sixty one percent of patients are alive at a median follow up of 737 days (range 44–2,322 days). Using survival tree and log rank analysis, weekly ALCs were analyzed to determine an ALC cut-point which gave two distinct groups based on transplant associated outcomes. In multivariate analysis an ALC $> 0.2 \times 10^9$/L at 4 weeks after UCB transplant was associated with significantly better disease free survival (DFS) (relative risk (RR) = 0.158, 69% vs. 33%, p = 0.0005) and overall survival (OS) at 2 years (RR = 0.125, 74% vs. 33%, p<0.0001). Similarly, at this same cut off (ALC > 0.2), patients were less likely to have treatment related mortality (TRM) (RR = 0.01, 7% vs. 67%, p<0.0001). For grade II-IV aGVHD, multivariate analysis showed that an ALC > 0.4 (at 4 weeks post-transplant) was associated with less aGVHD at D+100 (RR = 0.057, 28% vs. 61%, p = 0.0004). At 7 weeks after transplant, patients with an ALC > 1.2 10^9/liter was associated with a lower risk of relapse (univariate analysis 0% vs. 21%, p = 0.026). We next sought to determine whether any factor predicted better ALC recovery at four weeks post-UCB transplant. Multivariate analysis revealed that the only factor associated with more rapid ALC recovery was the use of two umbilical cord blood units. Double unit recipients had an ALC that was $+0.155 \times 10^9$/L higher at 4 weeks compared to single unit recipients (p = 0.039). Collectively, these data suggest that ALC is a readily available parameter for assessing risks for TRM, DFS, OS and relapse. Rapid ALC recovery may explain the observed benefits with double UCB transplant.

LATE EFFECTS/QUALITY OF LIFE

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THE IMPACT OF FULL DOSE TOTAL BODY IRRADIATION(TBI)-CONTAINING CONDITIONING ON CHRONIC KIDNEY DISEASE AND THROMBOTIC MICROANGIOPATHIC ANEMIA IN ALLOGENEIC HEMATOPOIETIC STEM CELL TRANSPLANTATION(HSCT)

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Background: Chronic kidney disease (CKD) and thrombotic microangiopathy (TMA) are potential late post-transplant complications in survivors of HSCT. CKD and TMA can have a significant impact on healthcare costs and quality of life. Both disorders have been associated with calcineurin inhibitors (CNI), TBI, older age, female gender, and graft versus host disease (GVHD), however, the contribution of each of these factors on development of CKD/TMA has not been well defined. T-cell depletion (TCD) of allografts as prophylaxis for GvHD has produced similar survival outcomes to those of conventional HSCTs in appropriately selected patients and can obviate the need for CNIs. The lack of CNI exposure offers a unique opportunity to study the role of TBI in the development of CKD/TMA.

Methods: Between 1/2001 and 1/2005, 102 adult patients received TCD myeloablative HSCTs at MSKCC and met inclusion criteria for this analysis which was approved by the IRB. Thirty-two patients received a non-TBI containing regimen (group A) and 70 received TBI (1375 cGy without kidney shielding) with chemotherapy (group B). Baseline and followup data were collected by a retrospective review of medical records. Renal function (estimated glomerular filtration rate [GFR]) was calculated using the Modified Diet in Renal Disease extended equation. TMA was diagnosed by kidney biopsy or by identification of multiple components of the clinical syndrome.

Results: Median followup for both groups was 21 months. Results and incidence of CKD and TMA are summarized below. Of note, pretransplant GFR was lower in group A vs B (p< 0.006). Incidence of CKD, TMA, and HTN was significantly higher in those patients receiving TBI (group B).

Conclusions: The data demonstrate a strong correlation between the use of TBI, in the absence of CNIs, and the development of post-transplant CKD and TMA, suggesting the need for clinical trials to prevent these complications when using TBI.

	Group A	Group B	P<
Pre-treatment GFR[1] (mean)	87.1 (SD=25.6)	102.3 (SD=23.9)	0.006
GFR at 6 months (mean)	72.3 (SD=21.9)	74.8 (SD=22.6)	NS (0.6)
GFR at 12 months (mean)	67.2 (SD=14.1)	61.6 (SD=19.8)	NS (0.13)
GFR at 18 months (mean)	67.9 (SD=10.2)	59.8 (SD=20.5)	0.02
GFR at 24 months (mean)	68.3 (SD=12.3)	60.5 (SD=22.0)	0.05
TMA[2]	0 (0%)	11 (15.7%)	0.016
HTN[3]	2 (6.3%)	18 (25.7%)	0.02
GFR<30 at 24 months	0 (0%)	6 (10.9%)	0.17

[1]Glomerular filtration rate.
[2]Thombotic microangiopathic anemia.
[3]Hypertension.

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RELAPSE AND MORTALITY IN YOUNG SURVIVORS 2.5 YEARS AFTER AUTOLOGOUS AND ALLOGENEIC HEMATOPOIETIC STEM CELL TRANSPLANTATION FOR SOLID ORGAN TUMORS AND MALIGNANT BLOOD DISORDERS

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We studied the mortality, relapse and transplant-related complications of 331 patients (age 6 month–19 years at transplant, median 8 years) with solid organ tumors (91 soft-tissue tumor and 18 brain tumor) and malignant blood disorders (200 leukemia and 22 lymphoma) after a bone marrow (n = 265), peripheral blood (n = 56), and cord blood (n = 10) hematopoietic stem cell transplant (HSCT). One hundred and forty-six patients remained relapse-free for 2.5 or more years after HSCT. Of these, 132 (90%) were alive at a median follow up time of 10 years (range; 2.5–27.0). Four (2.7%) relapsed between 2.7 and 13.4 years (median 6.1) after transplant. No patients with hematologic malignancies relapsed after 2.5 years of HSCT. Six patients (4.1%) died of complications related to the transplant: 3 from chronic pulmonary graft-versus-host disease and 1 each from presumed busulphan-induced chronic obstructive lung disease, cardiomyopathy, and non-GVHD interstitial pulmonary fibrosis. Three patients (2.1%) developed T-cell ALL, rhabdomyosarcoma and astrocytoma as second malignancies. For the external cause of death, one died from drug overdose at 5 years after the transplant. The 5- and 10-year probabilities of overall survival (from the 2.5-year mark) are 95% and 93% and the 5- and 10-year probabilities of relapse free survival (from the 2.5-year mark) are 98% and 95%. In multivariate analysis, peripheral blood stem cell (PBSC) as the source of stem cells and older age at HSCT unfavorably influenced the overall survival. Gender, age at HSCT, type of malignant disease, low or high risk category for relapse, stem cell source and TBI were not found to be predictive for relapse free survival. In conclusion, for young patients with malignancies who were relapse free 2.5 years after HSCT, the probability of cure was very high and the long term survival was excellent. Chronic pulmonary GVHD was the leading cause of late death. Toxicity related to high intensity chemotherapy and TBI potentially resulted to the lung toxicity and death in long term survivors.

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MEASURING THE SYMPTOM BURDEN OF ALLOGENEIC HEMATOPOIETIC STEM CELL TRANSPLANTATION IN PATIENTS WITH AND WITHOUT ACUTE GRAFT-VERSUS-HOST DISEASE

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Significance: Allogeneic hematopoietic stem cell transplantation (alloHSCT) is an intensive but potentially curative therapy for patients with life-threatening illnesses. During alloHSCT, patients