Conclusions: Second UCBT resulted in acceptable survival particularly in the recent years when used as a rescue for failed initial UCBT. Use of a CBU allows quick second transplants and thus decreases the overall duration of cytopenias. Second UCBT should be offered as a viable option for children with a failed first UCBT.

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Peripheral Blood Stem Cell Transplant in Aplastic Anemia

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Objective: We studied the outcome of heavily pre transfused aplastic anemia patients receiving peripheral blood stem cell transplant (PBSCT) from matched sibling donor.

Material: 72 consecutive blood/marrow stem cell transplants in 69 aplastic anemia patients over a period of 10 years in non HEPA filtered single rooms were recorded. Fludarabine 30 mg/m-2 D-10 to D-5, cyclophosphamide 60 mg/kg/day D-6 to D-5 and antithymocyte globulin 30 mg/kg/day D-4 to D-1 were used as conditioning regimen. Cyclosporine and methotrexate were used for graft versus host disease (GvHD) prophylaxis. ABO mismatched marrows underwent RBC depletion. No attempt to reduce antibody titres was done for ABO mismatched PBSCT.

Results: 63 patients underwent PBSCT; 2 underwent the procedure twice, 1 of whom had relapsed as acute myeloid leukemia. Of the 6 patients who received bone marrow stem cells, 2 relapsed and 1 underwent a successful PBSCT from the same donor. The median age of patients was 30 years (range 4-40 years); median time to transplant was 13.5 months (range 1-65 months); median transfusions before transplant were 22.5 (range 3-10). 28 (38.8%) patients had pre-existing infections at time of transplant. 65 patients received empirical antibiotics and 27 received empirical antifungals for febrile neutropenia during transplant. Positive blood culture for bacteria was recorded in 10 patients and a biopsy proven fungus (2 aspergillus, 2 mucor) in 4 patients; 5 other patients had possible fungal infection based on radiological features.

All patients and donors were CMV IgG positive at baseline. CMV reactivation was noted in 11 patients, 5 of whom were on steroids for GVHD; 3 patients subsequently suffered a graft failure.

55/72 (76%) patients are alive at median follow-up of 60 months ranging from 0-118 months. Acute GVHD was seen in 18/72 transplants (25%). 5 patients developed grade III-IV gut acute GvHD; 4 died. Chronic GvHD was seen in 32% of cases (20/62; 10 patients died before day 100). However these were mostly associated with dry skin and changes in pigmentation which generally subsided over time and well tolerated;1 patient had nephrotic syndrome at 3 years. Severe cGVHD as per NIH criteria was seen in only 5 patients. 17 patients had ABO major mismatch of which 5 patients developed PRCA. PRCA was managed with steroids and erythropoietin; the longest duration before recovery was 12 months. 17 patients died. Cause of early death (<day 100) were: acute GVHD 4, intracranial bleed 4, aspergillus 1, CMV 1, graft rejection 5 (more than 1 possible cause in some). Cause of death > day 100: chronic GVHD 1, graft rejection 2, tuberculosis 1.

Conclusions: PBSCT is safe in aplastic anemia patients whose transplant has been delayed and thereby heavily pre-transfused. The outcome and survival appear comparable to those achieved with historical bone marrow transplant data without apparent increase in morbidity on account of chronic GvHD.

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Pre-Conditioning Steroids and Hydroxyurea Followed By Reduced Toxicity Conditioning (RTC) with ATG-Bu-FLU Is Safe and Effective in Allo-Sib-HSCT in Adolescents and Adults with Sickle Cell Anemia (SCA)

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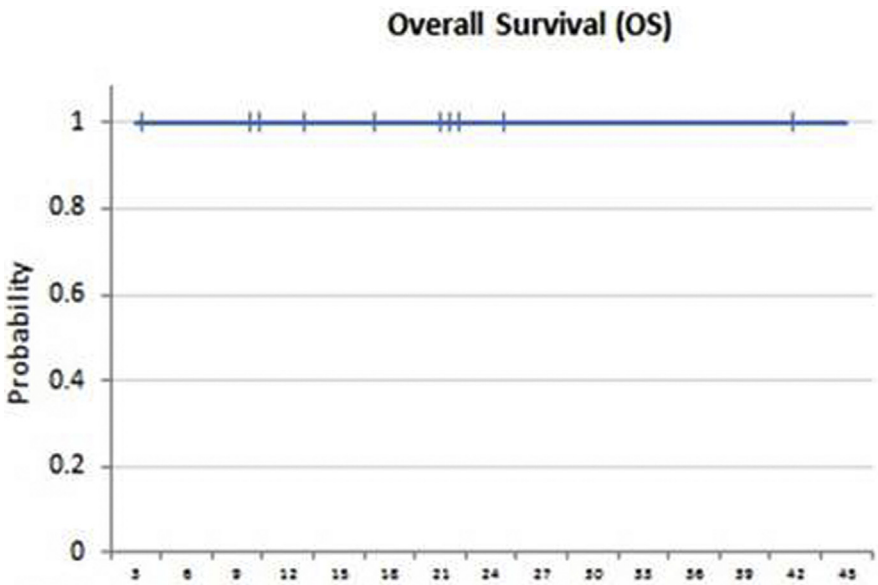

Figure 1a. Overall survival (OS) in months of 9 patients with SCA after Reduced Toxicity conditioning with ATG-BU-Flu and allo-sibling HSCT (median 22 mo; range 4-45 mo).

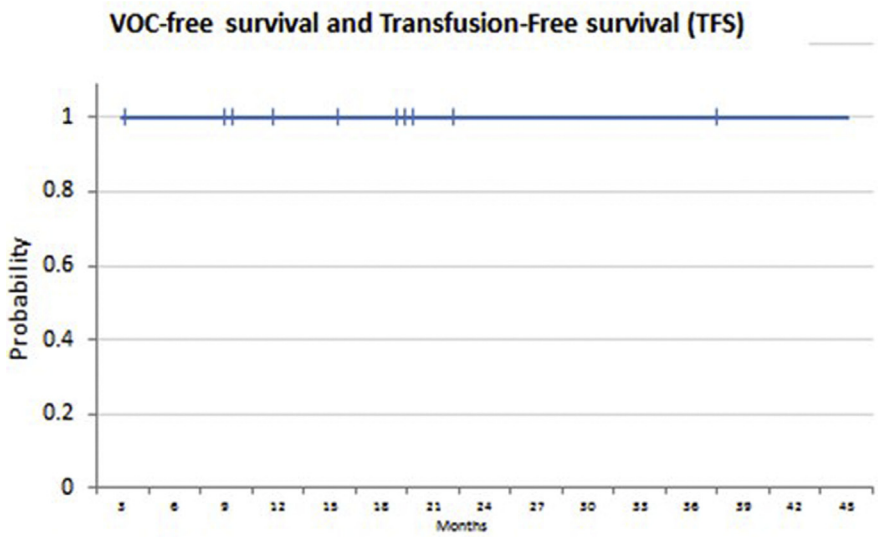

Figure 1b. VOC-free and transfusion-free survival(TFS) (in months) of 9 patients with SCA after reduced toxicity conditioning (RTC)with ATG-BU-Flu and allo-sibling HSCT (median 22 mo; range4-45mo).

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AIM OF THE STUDY: to assess safety and efficacy of pre-conditioning use of prednisone and Hydroxyurea and Fludarabine, iv-Busulfan and low dose ATG in young adults with SCA.

Patients and Methods: Nine consecutive SCA patients, median age 18 y (14-30y) transplanted between 23/1/11 and 1/7/14 from identical siblings (7 BM, 1 PB and 1 BM+PB), median CD34+ cell dose 5.8 x10_6/kg (2.7-8.2).Indications of HSCT were recurrent severe VOC (n:9; 100%), Acute chest syndrome (n: 3; 33%), stroke (2; 22%), AVN (n; 2; 22%. HLA-matching was 10/10 in all pairs 100%); 3 donors (33%) had sickle cell trait. One patient (11.1) rejected a previous allosib-HSCT after Campath-based NMA conditioning.

Preconditioning Phase: **a) Cytoreduction** with hydroxyurea **plus** prednisone 0.5 mg/kg every other day for >3 weeks.

CONDITIONING: FLU: 40mg/m2/d (d-9 to d-6), iv **Busulfan:** 0.8mg/kg q6h x14 doses (d-7 to d-4) (total 11.2mg/kg) and **ATG**(Thymoglobulin; Genzyme): 1.5mg/kg/d (d-4 to d-2) (total 4.5mg/kg); 2 patients received 5.5 mg/kg.

GVHD PROPHYLAXIS: Cyclosporine (CSA) (d-1 to d+9 months) and Methotrexate (15mg/m2 d+1, 10mg/m2 d+3 and d+6). Supportive care was as per institutional protocol.

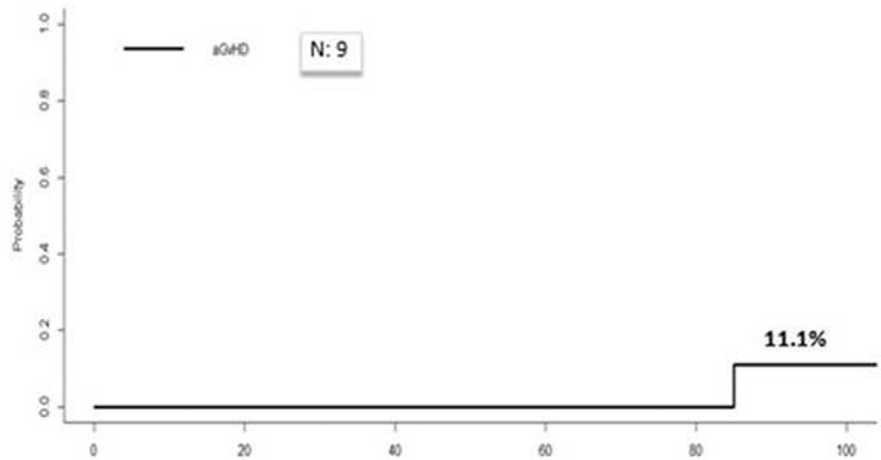

Figure 2a. Cumulative incidence of aGVHD after reduced toxicity conditioning with ATG-BU-FLU and allogeneic sibling HSCTfor patients with sickle cell disease (n:9).

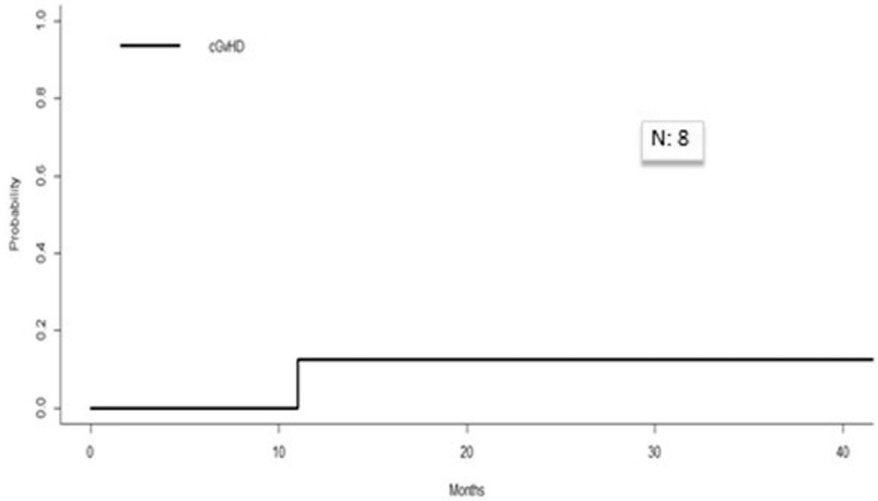

Figure 2b. Cumulative incidence of c-GVHD after reduced toxicity conditioning with ATG-BU-FLU and allogeneic sibling HSCT for patients with sickle cell disease (n:8).

Results: Median F/U was 22 mo (3.5-45 mo). All patients tolerated prednisone-hydroxyurea; only one episode of short (3days) neurtopenic fever occured before protocol evolution; no case of VOC or ACS or stroke or worsening of AVN (cumulative 109 weeks-patients).

There was no (0%) transplant related mortality (TRM) and all are alive (OS 100%) and free of VOC and transfusion (TFS 100%). **Engraftment**: ANC recovery occurred in all (100%) at a median of 19 days (range 0-26 d), Platelet recovery to 20,000/ul in 100% at a median of 16d (10-36) and to 50,000 in 100% at a median of 16d (11-50 d); 8 patients (89%) reached 50,000 in 21d. Hb electrophoresis changed to donor type. **Chimerism**: All patient (100%) had full (100%) myeloid chimerism. Lymphoid chimerism was high (>50% donor) in 6 (67%), intermediate in 1 (11%) and fluctuated between 15-31% in 2 (22%).

GVHD: One (11.1%) patient developed grade II a-GVHD, responded to steroids and only one (12.5%) of the 8 evaluable patients developed cGVHD that responded to steroids. **Peri-transplant morbidities**: Mucositis occurred in 4 (44%; grade I in 22%, grade II in 11% and Grade III in 11%); one (11%) patient bled due to gastritis, delayed serum sickness in 1 (11%). 4 (44%) had culture-neg neutropenic fever without sepsis and 1 (11.1%) developed line related infection. No reported invasive fungal disease or hemorrhagic cystitis.

Conclusions: Conditioning for allo-sib-HSCT for adults with SCA could safely and effectively be divided into: **1) Preconditioning phase** with steroids and Hydroxyurea to help reduce the chronic inflammatory status and **2)Reduced Toxicity Conditioning** with ATG-Bu-FLU which allowed engraftment of all patients with no peri-transplant mortality and low rate of acute and chronic GVHD.

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The Effect of Race, Socioeconomic Status, and Collection Center Size on Bone Marrow (BM) and Peripheral Blood Stem Cell (PBSC) Donor Experiences at National Marrow Donor Program (NMDP) Collection Centers

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Previous studies have identified risks of collection-related pain and symptoms associated with sex, BMI, and age in unrelated donors undergoing collection at NMDP centers. We hypothesized that other important factors (race, socioeconomic status [SES], and collection center experience as reflected by numbers of procedures performed) might affect rates of pain/symptoms in donors. We assessed outcomes by 5 race categories (see Table 1), 4 SES levels, and collection center volume. The study cohort included 2726 BM and 6768 PBSC donors collected between 2004 and 2009. Skeletal pain and 10 symptoms were measured and scaled 1-4 as published previously (Pulsipher, Blood 2013 121:197). Pain/symptoms are reported as peak levels over mobilization and collection (PBSC) or within 2 days of collection (BM) and at 1 week after collection. Generalized linear mixed models were used to fit logistic regression models with random effects by center; the 3 main effects of race, SES, and center volume were forced into the model, while other donor characteristics were added in a stepwise manner.

For PBSC donors, race was not associated with differences in pain/symptoms during collection or 1-week post donation. PBSC donors in higher SES levels reported higher peak

Table 1
Multivariate analysis of BM donors for grade 2-4 pain by race/sex: Odds Ratio (p-value).

(overall p-value)	Hispanic	Asian/ Pacific Islander	Black	White	Other/ Unknown
Male (<0.01)	0.75 (0.21)	0.61 (0.10)	1.91 (0.01)	1.0	0.63 (0.09)
Female (0.14)	0.81 (0.30)	1.04 (0.90)	0.57 (0.03)	1.0	1.29 (0.30)