Neulasta 12 mg. Absolute pre CD34 count was performed on peripheral blood upon recovery of neutrophils. If peripheral blood CD34 count was below 10/microL, Plerixafor 0.24 mg/kg/day with or without Neupogen 10mcg/kg/day was added. Absolute pre CD34 values prior to Plerixafor ranged from 0–6. Pre CD34 values after Plerixafor ranged from 6 - 303. Target CD34 yield per kg for NHL/HL patients was 2-5 X 10^6. Target CD34 yield per kg for MM patients was 5-10 X 10^6. Following this intervention 11 patients were able to successfully complete stem cell mobilization and achieve target yields. 2 MM patients did not meet the collection goal for 2 transplants but did have sufficient yield for one. Median total CD34 yield per kg was 6.9 X 10^6. Mean total CD34 yield for NHL/HL pts was 6.17 X 10^6 per kg. Mean total CD34 yield for MM pts was 10.59 X 10^6 per kg. Mean total MNC yield was 14.23 X 10^8 per kg for NHL/HL pts. Mean total MNC yield was 8.71 X 10^8 per kg for MM pts. Average time for neutrophil engraftment was 11.46 days. Average time for platelet engraftment was 19.91 days. There were no major complications associated with the above combination and no unanticipated side effects.

Combination of Plerixafor and Filgrastim can be safely and successfully administered to patients with inadequate peripheral blood pre-CD34 counts following chemotherapy based mobilization regimens. This will prevent delay in the transplantation process.

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Successful Autologous Cord Blood Transplantation in a Child with Acquired Severe Aplastic Anemia

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Background: Over 400 cases of pediatric severe aplastic anemia (SAA) occur annually in the United States. A growing number of children with SAA may have had their stem cells harvested through cord blood collection. We describe a 9-year-old male with SAA treated successfully with an autologous cord blood transplant following immunoablative chemotherapy. With increasing numbers of cord blood cryopreservations, the use of autologous cord blood in the treatment of SAA might be considered as initial therapy.

Methods: A previously healthy 9-year-old Hispanic male was diagnosed with acquired SAA. Due to ongoing transfusion support, and the lack of a sibling donor, anti-thymocyte globulin and cyclosporine was initiated. Six months following the start of immunosuppressive therapy, the patient had no marrow recovery. An unrelated bone marrow donor search revealed one 9 out of 10 matched unrelated bone marrow donor (HLA A antigen mismatch). One 10 out of 10 matched cord blood unit was available in the public cord blood registry and further inquiry revealed that this donated cord blood unit was an autologous unit. Given the lack of response to immunosuppressive therapy, the risks associated with the use of a mismatched unrelated donor hematopoietic cell transplantation (HCT), and the availability of the patients own cord blood unit, a decision was made to proceed with autologous cord blood HCT.

Results: The HCT preparative regimen included: fludarabine 30 mg/m2/day from Day -6 to Day -4 for a total dose of 90 mg/m2. Cyclophosphamide 60 mg/kg/day was given from Day -3 to Day -2 for a total dose of 120 mg/kg together with MESNA prophylaxis. This was followed by a day of rest on Day -1 and an infusion of 3.0 x 10e7 TNC/kg and 0.9 x 10e6 CD34+ /kg using an autologous cord blood unit on Day 0. His absolute neutrophil count exceeded 500 cell/uL on Day + 21 and has subsequently remained above this threshold without growth factor support. His platelet count was greater than 20,000 /uL on Day + 36 with his last platelet and packed red blood cell transfusion given on Day +20. The patient was discharged at Day +27 and remains transfusion independent at the time of his most recent clinical assessment at Day +100. His Lansky performance status was 100 at discharge and has remained so now at over 3 months following transplant.

Conclusion: To our knowledge, this is the first description of a successful application of autologous cord blood HCT in a pediatric patient with acquired SAA using an immunoablative preparative regimen consisting of fludarabine and cyclophosphamide. We found autologous cord blood HCT following an immunoablative combination of fludarabine and cyclophosphamide to be an effective and safe alternative to the potential complications as well as morbidity and mortality associated with the use of matched unrelated donor HCT or the use of other alternative donor HCT approaches.

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Redefining Engraftment Syndrome: The New Mayo Clinic Criteria

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Background: Engraftment syndrome (ES), characterized by noninfectious fever, rash, diarrhea, and/or respiratory symptoms during engraftment, can be associated with increased morbidity and resource utilization (e.g., IV antibiotics, hospitalization) after autologous stem cell transplant (ASCT). ES remains a clinical diagnosis, without confirmed biomarkers or standardized treatment recommendations. Herein, we describe the clinical, laboratory, and outcomes data from a large contemporary cohort of ASCT recipients and suggest new diagnostic criteria.

Methods: 526 consecutive patients who underwent ASCT at Mayo Clinic from 1/1/2009-12/31/2010 were included. Diseases included: multiple myeloma, 48%; NHL, 30%; amyloidosis, 12%; HL, 7%; and POEMS, 2%. Mayo Clinic criteria for ES was defined by a noninfectious fever of 38.3C from 4d prior to WBC 500/ul up until ANC 500/ul and at least one of the following: rash (erythematous with >25% trunk involvement), diarrhea (>3 loose stools/d), or pulmonary

symptoms (O2 requirement, RR > 24). ES characteristics and consequences were compared for Maiolino and Spitzer hybrid criteria (Maiolino criteria w/in 4d of ANC500 rather than 24 hours of first neutrophils) and Mayo Criteria (MC). Pretransplant characteristics, ASCT complications, and the dynamics of count recovery were all assessed.

Results: 146 (28%) had ES by MC while 48 (9%) had ES by Maiolino Criteria. Patients with ES by MC experienced longer hospital stays and received more IV antibiotics (Table 1). Patients with ES were more likely to have amyloidosis, a trend toward a higher pre-apheresis PB CD34+ count (p=0.053) and pre-apheresis PB WBC count (p=0.052); receive fewer days of G-CSF ($P < 0.0001$), and undergo fewer apheresis sessions to meet collection goals (p=0.012) with more CD34+/kg collected per apheresis (p=0.012). They were also less likely to have undergone chemomobilization. Too few patients perished within 30 days of ASCT (<1%) for meaningful statistical conclusions, although, 5 patients died within 30d, 3 of whom ES may have contributed. Patients with ES had shorter times to ANC500 and ANC1000 ($P < 0.0001$) as well as from WBC500 to ANC1000 ($P < 0.0001$). Patients on corticosteroids for other reasons had fewer episodes of ES (4% vs 29%; RR 0.133; $P = .003$).

Conclusions: Mayo ES criteria were better able to identify patients with increased resource utilization. As the rate of ES was significantly less in patients on corticosteroids for reasons other than ES, it is possible that prophylaxis with low doses of corticosteroids in patients at high risk of ES may result in decreased IV antibiotics use and hospitalization.

Table 1

	Mayo ES	No Mayo ES	*P* value	Maiolino ES	No Maiolino ES	*P* value
Days of IV antibiotics	11	8	<0.0001	10	10	0.28
Days hospitalized	6	0	<0.0001	3	2	0.69
Days before dismissal home	20	20	0.65	19	20	0.2

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Continuous Infusion Cyclophosphamide and Low Dose Total Body Irradiation (CICy/ldTBI) As a Conditioning Regimen for Tandem Autologous Transplant in Multiple Myeloma

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Multiple myeloma (MM) remains a largely incurable disease despite recent advances in biologic therapy. Autologous stem cell transplant (ASCT) is the cornerstone of management yet morbidity and transplant related mortality (TRM) remain concerns for patients and physicians alike. Between October 2001 and June 2008, 21 MM patients underwent tandem ASCT as part of a prospective phase II clinical study. After initial ASCT, disease response was assessed at post-transplant day 100 (D+100). Patients achieving ≥ very good partial remission (VGPR) were offered maintenance therapy. If patients achieved ≤ partial remission (PR), they were offered a second autologous transplant (ASCT2) with a novel conditioning regimen: Continuous IV cyclophosphamide (CICy) 1500mg/m^2/day on day -7 through day -4 followed by and low dose total body irradiation (ldTBI) given twice daily at 150 cGy on day -2 and -1. TBI was replaced by melphalan 140 mg/m^2 if patients had received prior radiation. Median duration of neutropenia with CICy/ldTBI was 10 days (range, 8-20). 15 patients (71.4%) developed febrile neutropenia. After fever, grade 1-2 diarrhea was the most common non-hematologic adverse event (42.9%). One patient each (4.8%) developed a limited subdural bleed, pulmonary embolus, neutropenic colitis, bacterial pneumonia, possible fungal pneumonia, hemorrhagic cystitis, and septic shock. 19 patients (90.5%) required transfusion support (red blood cells, platelets, or both) in the post-transplant period. All patients were alive at D+100 with no treatment related mortality. Three patients received CICY and melphalan. After ASCT2, four patients had entered complete remission (CR) (19.0%), seven achieved VGPR (33.3%), while six (28.6%) had PR. At 4 years after enrollment of last patient, the median progression free survival and overall survival was 21 (range, 7-101) and 38 (range, 12-128) months, respectively. In conclusion, this novel conditioning regimen is safe and effective alternative to high-dose melphalan, and may be useful in patients who do not benefit from first ASCT using other conditioning regimens.

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Deferred Dosing of Granulocyte Colony Stimulating Factors in Autologous Hematopoietic Transplantation for Multiple Myeloma

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In autologous hematopoietic stem cell transplantation (ASCT), G-CSF administered from day +7 until ANC recovery, expedites ANC recovery and reduces days of hospitalization by 1-2 days. To determine whether delayed and abbreviated G-CSF dosage could produce equivalent ANC recovery and thereby improve cost effectiveness of ASCT for myeloma, we delayed administration of G-CSF until WBC recovery had begun and was ≥0.20/uL. G-CSF so administered was labeled deferred G-CSF dosing (DGD), Patients in the conventional dosing group (CGD) received daily doses of 5 mg/kg G-CSF beginning day +7. The primary and secondary end points are listed in table-1. The Institutional Review Board approved retrospective chart analysis

A total of 117 patients with multiple myeloma received ASCT from January 2005 to September 2012. Of these, 65 patients received DGD and 52 received CGD. Patient, disease, and transplant-related variables were similar between 2 groups; patients in DGD received a larger dose of CD34+ cells/kg (median 4.49, range= 2.49-10.2 vs. median 3.79, range = 2.61-9.42, *p= 0.021*)

The CGD group received a median of 5 doses of G-CSF, while the DGD group received, a median of 0 (range 0-5, $P \leq .0001$) G-CSF doses (5μg/kg) when the WBC were