morning on collection one hour prior to the collection time. All patients received 0.24mg/kg/day of Plerixafor. There were no side effects observed. Only one of the patients required a second dose of Plerixafor and five patients had not reach the required CD34 count of 4 x 10^6 cells/kg.

**Conclusions:** Plerixafor was used at The London Clinic recently with favourable outcomes. The target for all cases was CD34+ cells 4 x 10^6 cells/kg recipient body weight. Two patients responded extremely well with a CD34+ count of 21.79 x 10^6 cells/kg and 15.16 x 10^6 cells/kg achieved. Three patients had a poor outcomes, where the collection was below 3 x 10^6 cells/kg of CD34+ count was collected. The other seven patients met the target required of CD34+ count of 4 x 10^6 cells/kg or above.

According to this study Plerixafor has improved PBSC outcome with seven patients out of 12 in this study.

**Due to the small numbers this study it is thus far inconclusive but it would be sensible to say Plerixafor made a difference for our 11 patients. An Ongoing study with new patient experiences is needed. More than one dose of Plerixafor was required for heavily pre-treated patients who are historically poor mobiliser of PBSC.**

**ANALYSIS OF TOXICITY PROFILE OF CBV VS BEAM IN LYMPHOMA PATIENTS AFTER AUTOLOGOUS STEM CELL TRANSPLANT – A SINGLE INSTITUTION RETROSPECTIVE REVIEW**

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**Introduction:** Several preparative regimens are used in Hodgkin lymphoma (HL) and non-Hodgkin lymphoma (NHL) patients prior to autologous hematopoietic stem cell transplant (HSCT). These include CBV (cyclophosphamide, etoposide and carmustine), BEAM (carmustine, etoposide, cytarabine and melphalan) or TBI based regimens. This study retrospectively compares the toxicities of CBV vs BEAM in lymphoma post-HSCT in our institution.

**Methods:** We retrospectively reviewed the charts of 77 lymphoma patients who underwent autologous HSCT between 1999 and 2010. 35 patients received CBV between 1999 and 2005 (11 HL and 24 NHL) and 42 patients received BEAM between 1999 and 2010 (12 HL and 30 NHL). CBV consisted of cyclophosphamide 7200 mg/m², etoposide 1600 mg/m², and carmustine 300 mg/m². BEAM consisted of carmustine 300 mg/m², etoposide 1600 mg/m², cytarabine 1600 mg/m², and melphalan 140 mg/m². Lung toxicity was defined as a 15% drop in adjusted DLCO (carbon monoxide diffusing capacity) on pulmonary function test (PFT) or respiratory symptoms requiring steroids within six weeks post-HSCT. Clinically significant lung toxicity was defined as respiratory symptoms requiring steroids or leading to death.

**Results:** Lung toxicity occurred in 10/42 (23.8%) of BEAM and 13/35 (37.1%) of CBV patients (p = 0.203). However, clinically significant lung toxicity occurred in 3/42 (7.1%) of BEAM (one of which was lethal) and only in 1/35 (2.9%) of CBV patients (p = 0.621). All 4 clinically significant lung toxicities occurred in HL. Cardiac toxicities were comparable (11.9% after BEAM vs 8.6% after CBV; p = 0.722). Time to engraftment defined as neutrophils > 500 (12.9 days after CBV vs 11.3 days after BEAM; p = 0.031), platelet (65.7% after CBV vs 51.0% after BEAM; p = 0.002) and infections requiring intravenous antibiotics (60.0% after CBV vs 14.3% after BEAM; p < 0.001) were higher after CBV. Severe mucositis requiring parenteral nutrition was comparable (21.4% after BEAM and 14.3 after CBV p = 0.418).

**Conclusion:** HL patients, especially those who received BEAM, appear to be at higher risk of clinically significant lung toxicity compared to NHL patients. Prior bleomycin may have contributed to this. Most patients who had a 15% decline in DLCO post HSCT did not experience clinically significant lung toxicity. Therefore, the value of post HSCT PFT is unclear and close monitoring of high risk patients for symptoms is warranted. Finally, the time to engraftment and other toxicities favored BEAM.

**G-CSF DOSE ESCALATION STARTING DAY 8 AFTER SALVAGE RICE CHEMOTHERAPY RESULTS IN ADEQUATE AND PREDICTABLE AUTOLOGOUS PERIPHERAL BLOOD STEM CELL COLLECTION IN RELAPSED/REFRACTORY LYMPHOMA**


**Introduction:** Optimal dosing and timing of G-CSF for stem cell mobilization after salvage treatment (Rice chemotherapy, Ifosfamide, Carboplatin and Etoposide) for relapsed/refractory lymphoma is unclear. Common G-CSF regimens have doses ranging from 5-16 mcg/kg/d starting one to several days after chemotherapy until a predetermined variable is reached to initiate peripheral blood stem cell collection.

**Patients and Methods:** We performed a retrospective analysis of stem cell collection with G-CSF after salvage RICE for consecutive patients with relapsed/refractory lymphoma at our center. Our earlier practice was augmenting stem cell mobilization with 16 mcg/kg/d G-CSF from Day 1 to final day of collection to achieve WBC > 10,000/mm³ prior to initiating stem collection (Standard dose group). We observed difficulties in terms of adequacy and timing of collection with this method. We modified the regimen to G-CSF at 5 mcg/kg/d from Day 1 to 7, followed by dose escalation to 16 mcg/kg/d on Day 8 until final day of collection, and a planned peripheral blood stem cell collection beginning Day 12 (Dose escalation group).

**Results:** Standard dose group: Three patients (2 DLBCL, 1 Hodgkin’s lymphoma) received salvage RICE for 2 to 3 cycles. Peripheral blood stem cell collection resulted in CD34+ yields of only 0.3 to 3.0 x 10^6 per kg in 5 to 6 apheresis sessions initiated between day 11 and day 16.

Dose escalation group: Four patients (2 DLBCL, 1 T cell rich B cell lymphoma, 1 Hodgkin’s lymphoma) received salvage RICE for 2 to 4 cycles. Peripheral blood stem cell collection resulted in more than sufficient CD34+ yields (all > 3 x 10^6 per kg, range 3.80 to 7.10 x 10^6) in only 1 to 3 apheresis sessions initiated on day 12.

**Conclusion:** A timed escalation to high dose G-CSF on day 8 salvage RICE chemotherapy for relapsed/refractory lymphoma resulted in superior CD34+ cells for collection with fewer apheresis requirements and a predictable apheresis start day.

**OPTIMIZING THE EFFICACY OF PLERIXAFOR AS A SALVATION OPTION IN POOR MOBILIZERS FOLLOWING CHEMOTHERAPY PLUS G-CSF MOBILIZATION**

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**Introduction:** Recent data of the combination of G-CSF (G) with Plerixafor (P) has established its efficacy in stem cell mobilization for autologous transplants. However, there is limited data about the utility of plerixafor in patients who are being mobilized with chemotherapy and G.

**Methods:** In this study we describe our experience with the use of plerixafor as a salvage option in 12 patients (6 Non-Hodgkin Lymphoma, 3 Multiple Myeloma, 2 Hodgkin Lymphoma, 1 Swings Sarcoma) who fail to optimally mobilize CD34+ cells (< 10 CD34+ cells/ul at neutrophil recovery) after G. Patients received Cyclophosphamide (CY) (3-4 g/m²) followed by G (10 mcg/kg) from D1 to D10. Data was collected on mobilization and transplant outcomes and analyzed utilizing SPSS version 13.0.

**Results:** The median age was 60 years (range 18-76). 75% were males. Patients had received a median of 2 lines of therapy (range 1-3) prior to stem cell mobilization. Following failure to mobilize with G post CY, at neutrophil recovery patients received a median of 2.5 doses of P (range 1-8). The average number of apheresis sessions was 4.2 and the total number of CD34+ stem cells collected was 4.0 x 10^6/kg. Utilizing a cut-off of 2 x 10^6 CD34+/kg, one patient who received P had an unsuccessful harvest. Three NHL patients required > 4 doses of P, but all eventually collected > 2 x 10^6 CD34+...
cells/kg. The mean peripheral CD34 count prior to the use of P was 3.3/μL, and increased to 8.8/μL after its use.

**Conclusion:** Our limited single-center outcomes data suggests that the addition of P as a salvage agent may improve mobilization outcomes in poor mobilizers. Further evaluation is needed to combine P with Cy+G in terms of optimal timing and dosing of chemotherapy utilized.

**S209**

**SUCCESSFUL AUTOLOGOUS STEM CELL TRANSPLANTATION AFTER 21 YEARS OF CRYOPRESERVATION**

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**Introduction:** Successful transplantation of cryopreserved hematopoietic stem cells can be regularly achieved provided sufficient numbers of cells are administered. The duration of hematopoietic stem cell viability is unclear. Evidence of autologous repopulation has been seen in 14-years after bone marrow transplant and 12 years after peripheral stem cell transplant. We report a successful autologous transplantation 21 y after cryopreservation.

**Case:** The patient is a 43 year old man found to have follicular lymphoma with bone marrow involvement in 1989 at age 22. He achieved complete remission after treatment with two cycles of Chlorambucil. Bone marrow (BM) procurement and cryopreservation was performed at that time for possible subsequent infusion. The procured BM consisted of a total cell count of 1.21 x 10⁸ cells/kg body weight with a total volume of 354 ml. Equal parts of 20% DMSO were combined with marrow to a final concentration of 10% DMSO. The BM was stored in the liquid phase of nitrogen until date of infusion 21 years later. Our patient relapsed in 1996, and underwent treatment in 2006 with six cycles of Fludarabine and Rituximab, achieving a complete remission. He continued Rituximab maintenance and then developed pancytopenia. Work-up confirmed MDS with 5q- and t(6q21;17p13) in 20/20 cells by karyotype analysis. Assessment of previously cryopreserved marrow was undertaken showing no evidence of cytogenetic or histological changes. The patient was prepared with Busulfan IV at 0.8/kg q 6 hours x 4 days and Cyclophosphamide 60mg/kg IV x 2 days. The BM was infused and samples from the infused marrow showed 65-75% viability by Trypan blue assay. White cell engraftment occurred on day 17 and platelet reached 20,000/μL by day 30.

Follow-up 2 months post transplant revealed WBC of 2.6 x10³/μL, Hgb 9.8 gr/dl and platelets of 43,000/μL. The patient was prepared with Busulfan IV at 0.8/kg q 6 hours x 4 days and Cyclophosphamide 60mg/kg IV x 2 days. The BM was infused and samples from the infused marrow showed 65-75% viability by Trypan blue assay. White cell engraftment occurred on day 17 and platelet reached 20,000/μL by day 30.

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**Conclusion:** Our limited single-center outcomes data suggests that autologous stem cell transplantation (SCT) for AML. Adoptive transfer of leukemia-specific cytotoxic T lymphocytes (CTL), such as PR1-specific CTL, might be used to treat persistent leukemia after SCT by enhancing graft versus leukemia (GVL) while minimizing graft versus host disease (GVHD). A limitation of this approach is the limited persistence of adoptively transferred T cells in the recipient, due in part to the lengthy ex vivo expansion of low frequency cells necessary to obtain a sufficient cell number. We chose to study PR1-CTL derived from umbilical cord blood (UCB) based on our observation that UCB PR1-CTL are increased 100- to 1,000-fold compared to adult peripheral blood (PB), suggesting UCB might be a rich source of PR1-CTL. Because UCB is associated with a decreased risk of GVHD, in part because of the predominance of naive T cells, it may also be a preferred platform to transfer GVL with minimal risk of GVHD. We found the frequency of PR1-CTL in UCB to be 0.007 to 0.345% (mean 0.117%; n = 57) of CD8+ cells compared with a frequency of < 0.001% in healthy adult PB. Therefore, we hypothesized that a sufficient number of PR1-CTL from UCB could be obtained by PR1/HLA-A2 tetramer-based cell sorting and infused without further expansion to mediate GVL. To test this, CD8+ T cells from HLA-A2+ UCB units were first enriched via whole blood negative immunodensification separation. Enriched cells were sorted (> 98% purity) into PR1-CTL and PR1-CTL-depleted CD8+ cells (PDC) and briefly activated ex vivo for 48 hours with soluble anti-CD3/anti-CD28 + IL-2. After 48 hours, PR1-CTL specifically lysed PR1-pulsed T2 cells although 95% of PR1-CTL and PDC retained a CCR7+CD45RA+ naive phenotype. Next, 1 x 10⁵ cells were infused into NOD/SCID mice engrafted for 7 days with 2-4 x 10⁶ human AML blasts. Three separate experiments were performed. Two donor T lymphocytes that could be expanded ex vivo to provide a potent T cell therapy.