quintile was associated with a 40% decrease in the risk of engraftment failure (OR 0.60, 95% CI 0.41-0.87). Even when adjusted for cell dose infused, a higher # of collected CD34+ cells was associated with decreased time to platelet engraftment (HR1.15, CI 1.00-1.32, p=.052), but not ANC engraftment (HR 1.07, p=.35). Positive blood cultures within 30 days of ASCT were associated with engraftment failure (p=.0035), while race, sex, # of collections for the transplanted dose and mobilization regimen did not appear to affect engraftment. We also observed that prior Imid use demonstrated a trend toward less engraftment failure (OR 0.41, 95%CI 0.17-1.01; p=.052).

Although a moderate correlation was observed between the variables CD34 cells collected and CD34 cells infused, a sensitivity analysis by omitting either variable did not identify a significantly different estimates.

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A Plerixafor-Based Strategy Allows Adequate Hematopoietic Stem Cell Collection in Poor Mobilizers: Results from the Canadian Special Access Program

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Background: The collection of a minimum number of hematopoietic stem cells (HSC), generally defined as 2 x 10^6 CD34+ cells/kg, is a prerequisite for proceeding to HSCT. Primary mobilization failure occurs in 5 – 40% of patients.[1-5] When used to unselected patients undergoing a first mobilization attempt, plerixafor plus GCSF allows more CD34+ cells to be mobilization with fewer aphereses than GCSF alone.[6, 7] There are no publications describing the patterns of plerixafor use at Canadian transplant centres, nor is there data to guide determinations of cost-effectiveness of mobilization using plerixafor from the Canadian perspective.

Methods: The objectives of this study were to: 1) Summarize the published studies of plerixafor-based mobilization during compassionate access programs, and 2) Describe the Canadian experience with plerixafor during its availability though Health Canada's Special Access Program (SAP). A literature search was performed and studies were grouped into three strategies: upfront, preemptive and salvage. In Canada, plerixafor was available through the SAP, and funded by Genzyme/Sanofi from September 2008 to December 2010.

Results: Thirteen articles were identified. In all but one study, plerixafor was used as part of a preemptive and/or salvage strategy. The proportion lf patients in whom a minimum of 2 x 10^6 CD34+ cells/kg was collected ranged from 37 – 100%. At the time of publication, 17 – 87% of patients had proceeded to transplantation.

Thirteen Canadian centres provided data on a total of 132 patients, the majority of whom had multiple myeloma or lymphoma, and had undergone a median of 1 prior mobilization attempt (range 0 – 3). Plerixafor was used preemptively in 23 (17%) patients and as salvage in 109 (83%) patients. In 96 (73%) patients, there was successful collection. Of the 23 patients in whom plerixafor was used preemptively, 19 (83%) had successful collections. Of the 109 patients in whom the drug was used as part of a salvage strategy, 77 (71%) had successful collections. Of the entire cohort, 99 (75%) of patients went on to receive an autologous transplant.

Discussion: Our study summarizes the published experience with plerixafor-based mobilization during compassionate drug access programs and describes the Canadian experience when plerixafor was freely available through Health Canada's SAP. Canadian practice was similar to published international experience.

Plerixafor use decreased significantly when it was no longer freely available. This may be a reflection of limited resources, a lack of belief in the preemptive use of plerixafor or knowledge of the most cost-effective way to use it. The pharmacoeconomics of mobilization likely vary from centre to centre and are affected by multiple factors such as the patient population, infrastructure, available resources, and who is paying for plerixafor.

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Target Value-Tailored Apheresis Can Improve Prediction of Product Hematopoietic Progenitor Cells Prior to Autologous Transplantation

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Background: Collection of a minimum number of hematopoietic progenitor cells (HPC), usually defined as 2 x 10^6 CD34+ cells/kg, is required to ensure timely neutrophil and platelet recovery.[1-4] The majority of centres use peripheral blood-mobilized HPCs as the source of progenitor cells for autologous transplantation,[5] but the method used to predict the final apheresis product CD34+ cell content, and thus the whole blood volume to process during apheresis collection, has not been standardized. In the mid-1990s, Mitterer et al. demonstrated on a 28-patient cohort that the correlation between the pre-apheresis peripheral blood CD34+ cell count and the number of CD34+ cells/kg collected could be used to determine the blood volume to process during apheresis to harvest the desired number of CD34+ cells/kg (target-value tailored, TVT, collection). Using this concept and local data, the Ottawa Canadian Blood Services Stem Cell Laboratory created a similar regression model to help determine the blood volume to process during apheresis collection.

Methods: We conducted a retrospective study of all peripheral blood HPC apheresis collections performed at the Ottawa Hospital from January 1, 2003 to December 31, 2011. Our objective was to validate the TVT approach, as modified by our institution.

Results: From 2003 to 2011, there were 815 peripheral blood HPC collections by apheresis. The majority, 696 (85.4%), were autologous collections and 119 (14.6%) were allogeneic donors. The most common diagnoses were multiple myeloma and aggressive non-Hodgkin lymphoma (NHL). The median age of the cohort was 51.1 (range 14.3 – 70.4) years. The median number of prior chemotherapy regimens was 1 (range 0 – 5). The majority of collections, 635 (93.7%), were first attempts.

The median pre-collection peripheral blood CD34+ cell count was 2.23 (interquartile range, IQR 1.07 – 5)/μL. The

median number of apheresis days was 1 (range 1 – 3). In 721 (88.7%) collections one day of apheresis was required to achieve the minimum number of HPCs. The median apheresis volume for day 1 collections was 20 (range 3.6 – 24) L. The correlation coefficient between the pre-collection peripheral blood CD34+ cell count and the final product CD34+ cell content is 0.69 ($p<.001$; Figure 1). The TVT estimate was highly predictive of the final product CD34+ count ($r=0.82$, $p<.0001$; Figure 2). A minimum of 2 x 10^6 CD34+ cells/kg was collected in 90.4% of collections.

Discussion: Using the correlation between the pre-collection peripheral blood CD34+ count and the final product HPC content, the TVT formula can accurately determine the blood volume to process during apheresis collection. This has resulted in reduced apheresis time, fewer apheresis days, and less nursing time. Ultimately, the TVT formula has allowed our program to improve our resource utilization by accurately predicating the required apheresis volume.

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Autologous Stem Cell Mobilization with Pegfilgrastim and Planned Plerixafor Is Equally Effective and Safer As Compared with Cyclophosphamide, Pegfilgrastim and Plerixafor

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Background: Autologous stem cell mobilization can be achieved using chemo-mobilization (CHM) or growth factors alone (cytokine-mobilization, CTM). Mobilization with pegfilgrastim and "just-in-time" plerixafor has been shown to be a successful strategy. Experience with pegfilgrastim and planned plerixafor is limited. We here describe our experience using two mobilization strategies with pegfilgrastim plus plerixafor (CTM) or cyclophosphamide, pegfilgrastim plus plerixafor (CHM).

Methods: We retrospectively identified patients who received an auto-SCT for a diagnosis of myeloma at TJU between July 2010 and June 2013. These 53 patients who had stem cell mobilization using either CHM (16 patients) with cyclophosphamide (4 grams/m^2), pegfilgrastim (12 mg) and plerixafor (0.24 mg/kg once daily until target dose collected or maximum of 4 days of apheresis), or CTM with pegfilgrastim plus plerixafor (37 patients). Plerixafor was only administered as an outpatient. We hypothesized that more patients in the CHM group reached the prescribed total CD34-positive stem cell collection as compared to the CTM group. To test this hypothesis we used the two-sample test on proportions. For the comparison of the median total CD34 cells/kg dose collection and the median number of apheresis days we used the Wilcoxon rank sum test and the t-test, respectively.

Results: There was no difference in patient age at transplant, sex, and myeloma subtype. The median number of prior induction therapies was similar; there was no significant difference in the prior exposure to lenalidomide, however as expected, bone marrow plasmacytosis was higher in the CHM group (6% vs. 2%). In the CHM group, 41% were hospitalized due to complication (typically neutropenic fevers) and thus only 9 patients (59%) received the planned dose of plerixafor as compared to 100% in the CTM group. There were no hospitalizations in the CTM group due to toxicity. CHM was associated with a significantly higher median total CD34+ cell collection (14.9 x 10^6/kg vs. 8.37 x 10^6/kg, $p=0.009$) (Table 2). CTM is associated with fewer collection days (median 1 day vs. 2 days, $p=.29$) and more patients achieving the target CD34+ cell dose of 6.0 x 10^6/kg (91.9% vs. 81.3%, $p=.26$).

Table 1.0 Collection of autologous stem cells

	Chemo-mobilization	Cytokine mobilization	p-value
Median CD34 cells/kg collected (in millions/kg)	14.9	8.37	.009
Median number of apheresis days (mean)	2 (2.13)	1 (1.76)	.29
Target dose achieved:	13 (81.3%)	34 (91.9%)	.26
Yes	3 (18.8%)	3 (10%)	
No			

Conclusion: The preferred method to mobilize autologous stem cells should be with pegfilgrastim and planned plerixafor since it is able to achieve the prescribed cell dose, is associated with less toxicity and risk of hospitalization. This analysis suggests that per 100 patients collected a total of 100 days of plasmaphresis could be avoided if all patients were mobilized with growth factors alone.

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Twenty Years of Autologous Stem Cell Transplantation in Diffuse Large B-Cell Lymphoma – a Single Center Experience

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Background: Patients (pt) with advanced stage and high International Prognostic Index (IPI) or relapsed/primary refractory diffuse large B-cell lymphoma (DLBCL) have an adverse prognosis and are frequently consolidated with autologous stem cell transplantation (SCT).

Aim: Evaluation of a single center experience with SCT in DLBCL.

Methods: Retrospective analysis of outcome of adult pt submitted to SCT in DLBCL, between October 1992 and December 2012. Data were collected from the database and the medical records.

Results: 152 SCT were performed in various histological subtypes of DLBCL, during this time period. Statistical analysis was performed in 113 pt with "classical" DLBCL and histological variants were excluded.

Median age at SCT was 49 years (16-67), 68 males/45 females. At diagnosis the majority of pt were in advanced stage (85%) and had an IPI 2 or 3 (47%, 30% respectively).