Table 1

Systems	Symptoms
G-I	Nausea vomiting abdominal pain cramping
Respiratory	Cough dys/tachypnoea hypoxia SOB TRALI
Cardiac	Hypo/hypertension brady/tachycardia arrhythmia chest heaviness/pain MI cardiac arrest
Neuro	Amnesia seizure stroke numbness uc
Other	Fever chills flushing headache hypothermia anxiety vertigo allergy visual neuropathy back pain

Cause of SCIAR is either the graft (DMSO, cell content, volume, clumping) or the patient (age, gender, disease).

Objective: To acquaint transplant infusionists with SCIAR causative factors and associated symptoms to guard for AE during infusion.

Method: Study of published literature as available on PubMed website in the last 7 years.

Result: 11 articles by authors from diverse nations were reviewed. Only 1 publication is from USA. Reports are for autologous cryopreserved HPC-A (including few allogeneic or marrow products). 3 studies reported SCIAR after DMSO wash. Data size is from 51-952 infusions. AE ranges from 0.6 to 67%. Various symptoms are reported.

Discussion: Minor AE are attributed to DMSO, AE from washed cells to granulocyte or TNC content of graft. Cordoba R *et al* have reported 67% SCIAR despite DMSO wash. 7 years ago, Donmez A *et al* (Turkey) suggested restriction of infusion to <100 E+9 TNC; and Wang JW *et al* (China) advised fractionated infusions (vs. single infusion) in pediatric patients. Khera N *et al* (USA) have compared 2 groups over 2 years reporting 0.6% SCIAR on infusion of <1.63 E+9 TNC/Kg/day, fractionating infusions on different days.

Conclusion: Despite multiple variables, transplant centers can lower incidence of SCIAR by restricting graft dose.

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Severe Mucositis with Bendamustine Etoposide Ara-C and Melphalan (Be-EAM) As Conditioning Regimen in Non-Hodgkin Lymphoma (NHL) Patients Undergoing Autologous Stem Cell Transplantation (AutoSCT)

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Introduction: Bendamustine is effective for front-line or salvage therapy in patients (pts) with NHL. Benda-EAM conditioning has been used in heavily pre-treated relapsed/refractory lymphoma pts undergoing autologous stem cell transplantation (AutoSCT) and is noted to be a safe and effective regimen. We report our experience with using Be-EAM conditioning regimen for AutoSCT with special note on the toxicity profile.

Methods: Data from 22 consecutive patients (pts), undergoing AutoSCT using the Be-EAM [Bendamustine200mg/m2 daily D-7,-6, Etoposide 200mg/m2 daily D-5 to -2, Ara-C 200mg/m2 Q12 D-5 to -2 and Melphalan 140mg/m2 on D-1], treated at our institution between 2011 and 2013, were collected. Demographics, indication for AutoSCT, time to engraftment (TE), side effect profile, tolerability and outcomes were analyzed. WHO oral mucositis score was used for grading mucositis.

Results: 22 pts (average age 60.36 yrs, range: 39-72 yrs) were identified and analyzed as a retrospective cohort with a follow-up duration of 26.1 months (Range 9-43 mos). 15 (68%) pts were male and 7 (32%) pts female. 72.7% were Caucasian. 8 (36.4%) pts had ≥2

Table 2

Article	Infusions	AE %	Finding/Symptoms	AE Cause	Suggestion/Conclusion
Feb 07 Donmez A, Turkey	194 Allo 25	25 0	Non cardiac > cardiac	Vol infused DMSO TNC	≤ 100 E+9 TNC
Apr 07 Wang JW, China	Ped 70	x	G-I	Single vol infusion	Fractionated infusion
Jun 07 Mueller LP, Germany	51	2	Cardiac ^DMSO	Neurotoxicity unrelated to DMSO vol	DMSO safe in neurologic disease
Jul 07 Calmels B, France	490 (washed)	14	x	TNC	Improve apheresis quality
Nov 07 Foïs E, France	952 (washed)	19	x	TNC Clumps	AE ^TNC
Dec 07 Cordoba R, Spain	144 (washed)	67	Allergic > G-I > Respiratory	Granulocyte Clumping	≤ 6.065 E+9 granulocytes
2007 Milone G, Italy	HPC-A 157 HPC-M 22	31 5	Cardiac ^vol/kg & inf time Non cardiac ^age & non-MNC	Age Non-MNC	≤ 5.0 E+8 non-MNC
Jul 08 Bojanic I, Croatia	215	57	1 symptom 21% >1 36%	Female gender Multiple myeloma Granulocyte	AE ^graft composition & disease
Jul 10 Curcioli AC, Brazil	114 Allo 47 Haplo 5	58	DMSO but not DMSO vol	DMSO	Good documentation required
Oct 10 Martìn-Henao GA, Spain	423	25	G-I Respiratory Seizure 0.7%	AE ^granulocyte	x
Feb 12 Khera N, USA	(Comparative) 2006-07: 288 2008-09: 479	4 0.6	Infusions increased 4 fold	x	≤ 1.63 E+9 TNC/Kg/Day Multiple infusions

comorbidities. Indication for AutoSCT included relapsed/refractory follicular lymphoma, diffuse large B cell lymphoma and lymphoplasmacytic lymphoma and upfront consolidation for mantle cell lymphoma. 8 (36.4%) pts underwent AutoSCT as consolidative therapy and 14 (63.6%) pts for relapsed/refractory disease. Therapies prior to AutoSCT were 1-3 regimens. Time to engraftment was 11.7±1.79 days for neutrophils and 15.32±2.6 days for platelets. Be-EAM-related toxicities included nausea, emesis, diarrhea, neutropenic fever and mucositis. 13 (59%) pts had severe mucositis (Grade 3/4) with 5 pts developing neutropenic enterocolitis including 1 patient with pneumatosis intestinalis. Overall, 18 (81.8%) pts were in CR and 2 (9%) pts had minimal disease at D100. 5 (22.7%) pts had relapsed disease. 4 (18.2%) pts died from relapsed or progressive disease.

Conclusion: Bendamustine based conditioning is an effective regimen in patients with NHL undergoing autologous stem cell transplantation as previously reported. It has the potential of causing severe mucositis irrespective of age, comorbidities, disease type or number of prior therapies. This regimen although moderately tolerated should be used cautiously especially in patients who have had prior therapies that can affect the gastrointestinal tract.

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Pegfilgrastim and Planned Plerixafor for Autologous Stem Cell Mobilization Is Safer Than and As Effective As Chemo-Mobilization in Patients with Hematological Malignancies

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Introduction: We have previously shown that as compared with chemo-mobilization (CHM) cytokine mobilization (CTM) is associated with a better chance of achieving a target autologous stem cell dose for patients with multiple myeloma (MM). We now review our experience of autologous stem cell mobilization using a similar strategy for all patients referred for an autologous transplant (auto-SCT).

Table 1
Primary Endpoint Analysis

	Chemo-mobilization (N=19)	Cytokine mobilization (N=55)	p-value
Median total CD34 cells/kg collected (in millions/kg):			
Myeloma	14.9	8.37	**0.01**
Non-myeloma	4.47	5.03	0.71
Median number of apheresis days (mean):			
Myeloma	1 (1.75)	1 (1.76)	0.99
Non-myeloma	2 (1.67)	1 (1.59)	0.89
Target dose achieved:			**0.05**
Yes	16 (84.2%)	51 (92.7%)	
No	3 (15.8%)	4 (7.3%)	
Median day 1 CD34 collection (in millions/kg):			**0.01**
Myeloma	NA	6.86	
Non-myeloma	NA	3.67	

Methods: We analyzed consecutive patients who received an auto-SCT for hematological malignancies at our center from July 2010 to June 2013. CHM was achieved with cyclophosphamide (4 g/m2), pegfilgrastim (12 mg) and plerixafor (0.24 mg/kg once daily until target dose collected or maximum of 4 days apheresis). CTM was achieved with pegfilgrastim and plerixafor. We recorded the total CD34+ cells/kg collection, number of apheresis days, and if the prescribed dose of CD34+ cells/kg was achieved. The prescribed cell dose in patients with MM is 6.0 x 106/kg, and 3.0 x 106/kg for all other hematological malignancies. We compared the median total CD34+ cells/kg dose collection (Wilcoxon test), the mean number of apheresis days (Poission), and target stem cell dose collection (non-inferiority test on two proportions). We also compared day 1 stem cell collection in the CTM group based on disease (myeloma vs. non-myeloma) (Wilcoxon test). Finally, we analyzed the probability of successful stem cell dose collection if the target collection dose was higher than our own criteria.

Results: A total of 74 patients were included. Fifty-three patients had a diagnosis of MM and twenty-one patients had other hematological malignancies, non-Hodgkin (n=15) and Hodgkin lymphoma (n=2). There was no statistically significant difference in age, gender, number of prior induction treatment, prior treatment with lenalidomide and time from diagnosis to transplant between the two groups. In the CHM group, 7 (47%) were hospitalized from complications of mobilization regimen, whereas no patients were hospitalized in the CTM group ($p<0.001$). There was no statistically significant difference in neutrophil or platelet engraftment between CHM and CTM. Multivariate analysis did not reveal predictive factors which lead to >1 apheresis attempts. Table 1 describes the primary outcomes.

Conclusion: Cytokine-mobilization with pegfilgrastim and planned plerixafor is an effective strategy for stem cell mobilization in patients being considered for autologous transplant.

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Pre-Transplant Serum Biomarkers Predict Early Relapse in Classical Hodgkin Lymphoma Patients Undergoing Autologous Stem Cell Transplantation

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Background: Serum biomarkers in classical Hodgkin Lymphoma (cHL) reflect both tumor biology and burden in the non-transplant setting. We sought to determine the prognostic value of cHL serum biomarkers in predicting early relapse following autologous stem cell transplantation (ASCT).