Comparing conditioning regimens for autologous stem cell transplantation in lymphoma patients

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Background

Autologous hematopoietic stem cell transplantation (HSCT) is a potentially curative therapeutic approach for relapsed/refractory lymphomas. Although carmustine, etoposide, cytarabine, and melphalan (B-EAM) is the most commonly used conditioning regimen for high-dose therapy (HDT) before auto-HSCT, to date, there is no published prospective randomized study comparing different types of conditioning regimen. Here, we aim to compare between B-EAM and alternative alkylator -EAM backbone based regimen on the potential toxicities and survival in lymphoma patients.

Materials & Methods

Patients with relapsed refractory lymphoma, who underwent autologous HSCT between 2012-2017, were evaluated from three different highly active transplant institutions in Turkey. One hundred eighty adult lymphoma patients (age: 18-65 years) with a follow up time at least 6 months were included. Patients with B-EAM (n=139) high dose chemotherapy were compared with patients having received non-BEAM regimen; T- thiotepa (T) –EAM (n= 16), Bendamustine (Be)-EAM (n=12), Lomustine (L) –EAM (n=13) using the following matching factors: age, gender, lymphoma subtype, disease status at transplant, toxicity, overall survival, and causes of death.

Results

Totally 180 patients (109 males, 71 females) were identified: 139 patients and 41 patients were treated with BEAM and non-BEAM regimen, respectively. Patients’ baseline characteristics are detailed in **Table 1**. There was no statistically significant difference between mean age and gender between groups. With regards to toxicities among groups; BEAM group had a significantly lower rate of mucositis and gastrointestinal toxicity than non-BEAM group (p=0.01 and p=0.002, respectively). Renal toxicity did not show difference among groups (p=0.92). Although BEAM group showed a lower rate of transplant related mortality at 100th day (5.5% vs. 11.4%), the difference did not reach to statistical significance. Estimated mean survival time for BEAM and Non-BEAM was 52.1±2.5 months and 18.8±1.5 months, respectively (p=0.2, log-rank test) (**Figure 1**). The significant difference in median follow/up times has to be taken into account.

Table 1.Demographic and clinical characteristics of lymphoma patients who had received either B-EAM or Non-BEAM conditioning.

Patients	B-EAM	Non-BEAM	P value
Median follow-up (months)	29.2	6.5	<0.0001
Age at HSCT, median (SD) (years)	46.6 (±15.1)	47.7 (±14.3)	0.67
Gender male n (%)	87 (62.6%)	22 (53.7%)	0.36
Entities n (%)			
NHL	94 (67.6%)	30 (73.2%)	0.56
HL	45 (32.4%)	11 (26.8%)	
Disease status at transplant, n (%)			
CR1	20 (15.9%)	6 (14.6%)	0.74
CR2	24 (19.0%)	6 (14.6%)	
PR	53 (42.1%)	20 (48.8%)	
Refractory	29 (23.0%)	9 (22.0%)	
Mucositis, n (%)	69 (49.6%)	31 (75.6%)	0.01
Renal, n (%)	6 (4.3%)	2 (4.8%)	0.92
Gastrointestinal system, n (%)	71 (51.0%)	32 (78.0%)	0.002
Transplant related mortality at 100 th day Yes (%)	6 (5.5%)	4 (11.4%)	0.25
No (%)	104 (94.5%)	31 (88.6%)	
Secondary malignancies			
Yes (%)	5 (3.6%)	0 (0%)	0.58
No (%)	134 (96.4%)	39 (100%)	
Last disease status			
CR (%)	41 (74.5%)	22 (73.3%)	0.9
Refractory&Relapse (%)	14 (25.5%)	8 (26.7%)	

Figure 1. Kaplan-Meier survival curves of BEAM vs alternative alkylator-EAM (Non-BEAM) group (log-rank analysis, p=0.2)

Discussion

Our study showed that EAM backbone (non-BEAM) conditioning regimens with alternative alkylating agents have similar results compared to B-EAM regimen in terms of efficacy, and toxicity. Prospective randomized controlled studies with large number of patients are warranted to find out the optimal backbone combination, which may establish as a standard regimen for HSCT in lymphoma patients.