ASSESSMENT OF OUTCOME AND SAFETY PROFILE OF HIGH-DOSE BEAM AND BeEAM CHEMOTHERAPY FOLLOWED BY AUTOLOGOUS STEM CELL TRANSPLANTATION IN LYMPHOMA PATIENTS

K.KRAWIEC[1,2*], P.STRZAŁKA[1,2*], D.MIKULSKI[3,4], M.KOŚNY[4], O.RACIŃSKA[5], H.SOWUL[5], M.KĘDZIOR[5], W.SALAMON[5], M.CZEMERSKA[1,2], A.PLUTA[1,2], A.WIERZBOWSKA[1,2]

1. Department of Hematology, Medical University of Lodz, Poland, 2. Department of Hematology and Transplantology, Copernicus Memorial Hospital in Lodz, Poland, 3. Department of Biostatistics and Translational Medicine, Medical University of Lodz, Poland, 4. Department of Hematooncology, Copernicus Memorial Hospital in Lodz, Poland, 5. Medical University of Lodz, Poland.

* Both authors equivalently contributed

INTRODUCTION

The prognosis of patients with relapsed/refractory (r/r) lymphoma treated with conventional salvage regimens is unsatisfactory, therefore autologous hematopoietic stem cell transplantation (auto-HSCT) preceded by high-dose chemotherapy (HDT) is a mainstay in this treatment paradigm. Nevertheless, up to 50% of patients experience relapse despite HDT with subsequent auto-HSCT [1]. Information on reliable predictors of outcome in patients with relapse is unfortunately limited.

AIM

To compare the adverse event profile between BEAM (carmustine, etoposide, cytarabine, melphalan) and BeEAM (bendamustine, etoposide, cytarabine, melphalan) conditioning regimens and to evaluate predictors and treatment outcomes in lymphoma patients undergoing auto-HSCT.

METHOD

A single-center retrospective analysis of 82 patients (median age, 52 yr; IQR, 38–62) with lymphoma who received BEAM (47.6%) or BeEAM (52.4%) chemotherapy followed by auto-HSCT between 2015 and 2022.

	BEAM (N=39)	BeEAM(N=43)	Total (N=82)	*P*
Histology, n (%)				
- HL	12 (30.8)	18 (41.9)	30 (36.6)	
- DLBCL	6 (15.4)	9 (20.9)	15 (18.3)	*0.51*
- MCL	15 (38.4)	11 (25.6)	26 (31.7)	
- Other	6 (15.4)	5 (11.6)	11 (13.4)	
Prognostic index				
- IPS (HL), median (range)	1 (0.0-3.0)	2 (0.0-6.0)	2 (0.0-6.0)	*0.37*
- IPI (DLBCL), median (range)	2 (1.0-3.0)	1 (0.0-3.0)	1 (0.0-3.0)	*0.95*
- MIPI (MCL), median (range)	5.5 (4.0-9.0)	6 (3.0-7.5)	5.9 (3.0-9.0)	*0.14*
ECOG, n (%)				
- 0	10 (25.6)	7 (16.3)	17 (20.7)	
- 1	19 (48.7)	24 (55.8)	43 (52.4)	*0.23*
- 2	1 (2.6)	8 (18.6)	9 (10.9)	
- No data	9 (23.1)	4 (9.3)	13 (16.0)	
Prior treatment lines, n (%)				
- 1	13 (33.3)	14 (32.6)	27 (32.9)	
- 2	12 (30.8)	12 (27.9)	24 (29.3)	*0.42*
- 3	9 (23.1)	5 (11.6)	14 (17.1)	
- 4	2 (5.1)	5 (11.6)	7 (8.5)	
- 5	3 (7.7)	7 (16.3)	10 (12.2)	

Table 1. Patients' characteristics.

RESULTS

Survival analysis

- No differences were found in progression free survival (PFS), as well as in overall survival (OS) between BEAM and BeEAM regimens (Figure 1, 2).
- The median PFS for the whole cohort was 57 months, and the median OS was not reached.
- Two patients (2.4%) experienced transplant-related mortality (TRM) in BeEAM arm during the first 100 days after auto-HSCT (COVID-19 related deaths).

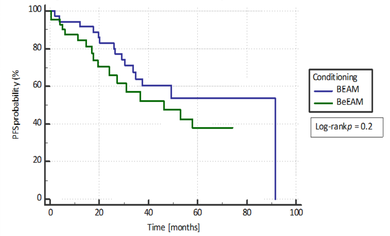


Fig 1. Kaplan-Meier progression free survival (PFS) probability depending on conditioning regimen.

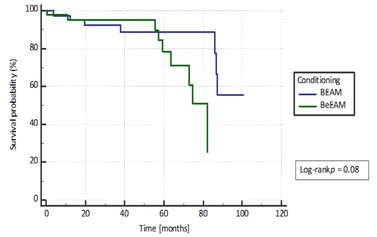


Fig 2. Kaplan-Meier overall survival (OS) probability depending on conditioning regimen.

Analysis of predictive factors

- A higher hemoglobin level (Hb) on the first day of hospitalization was a protective factor in terms of OS (HR=0.43; 95% CI: 0.23–0.78) and a predictor of PFS (HR=0.66; 95% CI: 0.45–0.96) (Figure A, D).
- Elevated C-reactive protein (CRP) on the first day of hospitalization (HR=1.03; 95% CI: 1.01–1.06) and longer duration of grade IV neutropenia (HR=1.15; 95% CI: 1.00–1.32) were predictors of poorer survival (Figure B, C).

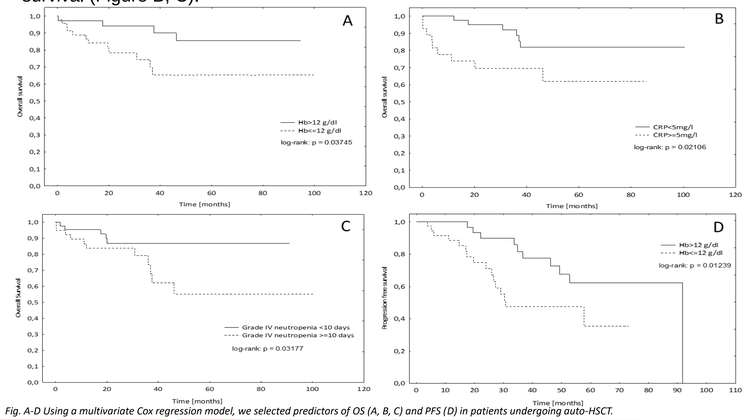


Fig. A-D Using a multivariate Cox regression model, we selected predictors of OS (A, B, C) and PFS (D) in patients undergoing auto-HSCT.

Analysis of the side effect profile

- In the toxicity profile analysis, during the post-HSCT period
  - 80.2% of patients experienced mucositis (BEAM - 69.2% vs BeEAM - 88.4%; P=0.034),
  - 57.5% febrile neutropenia (51.3% vs 60.5%; P=0.38),
  - 42.5% bacteremia (48.7% vs 34.9%; P=0.27),
  - 18.8% pneumonia (30.8% vs 7%; P=0.012) (Figure 4).

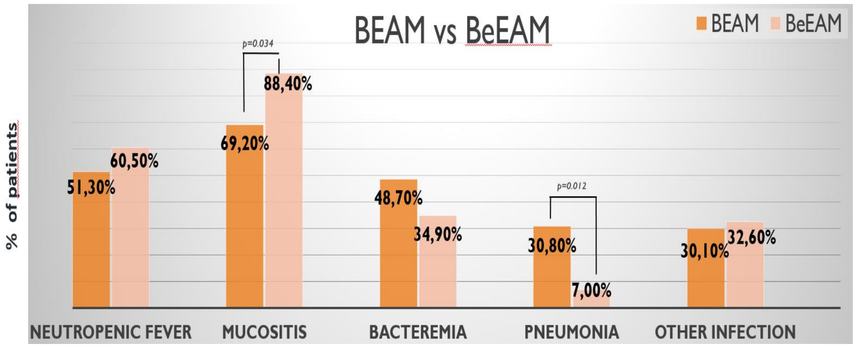


Fig 4. Comparison of the adverse effects profile of BEAM and BeEAM conditioning regimen.

CONCLUSIONS

- Conditioning treatment with the BEAM and BeEAM regimens is associated with comparable efficacy and treatment toxicity.
- Differences in the adverse effect profile included a higher incidence of pneumonia for the BEAM regimen and a higher incidence of mucositis for the BeEAM regimen.
- Simple laboratory variables, including Hb and CRP, proved to be independent predictors of OS.

REFERENCES

1. **Mina AA, et al.** Novel Therapies and Approaches to Relapsed/Refractory HL Beyond Chemotherapy. *Cancers (Basel). 2019 Mar 25;11(3):421.*

ACKNOWLEDGEMENTS

We are sincerely grateful to the patients as well as the medical staff for their contribution to this study.

CONTACT INFORMATION

kinga.krawiec@stud.umed.lodz.pl pstrzalka27@gmail.com