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IMPACT OF MELPHALAN DOSE AND CD34+ CELL INFUSION ON ENGRAFTMENT AND POST-TRANSPLANT COMPLICATIONS IN MULTIPLE MYELOMA

J. Kort MD[1,2], F. Oley PharmD[1], N. Naleid MD[1], L. Metheny MD[1,2], M. Gallogly MD[1,2], E. Malek MD[1,2], B. Cooper MD[1,2]

[1]University Hospitals Seidman Cancer Center, Cleveland, USA.

[2]Case Western Reserve University, Cleveland, USA

INTRODUCTION

Despite advances in therapy, MM remains incurable. ASCT is the standard upfront treatment for eligible patients, with high-dose melphalan (Mel200) as the preferred regimen. Reduced dose melphalan (MEL140) is used for older or unfit patients.

However, the impact of transplanted CD34+ cell dose on engraftment and post-transplant complications is unclear. Previous studies suggest a correlation between higher cell doses and platelet engraftment.

AIM

To investigate the impact of melphalan dose and infused CD34+ cell dose on time to neutrophil engraftment and post-transplant complications in MM patients undergoing ASCT.

METHOD

- A retrospective, single-center study included 233 MM patients who underwent ASCT at University Hospitals between 2015-2021.
- Patients were categorized based on CD34+ cell dose (<4x10^6/kg or ≥4x10^6/kg).
- Treatment-related toxicity was assessed through hospitalization duration, engraftment time, readmissions, and infections within the first 100 days post-ASCT.

RESULTS

Figure 1: *Probability of progression free survival based on CD34 cells infused during ASCT*

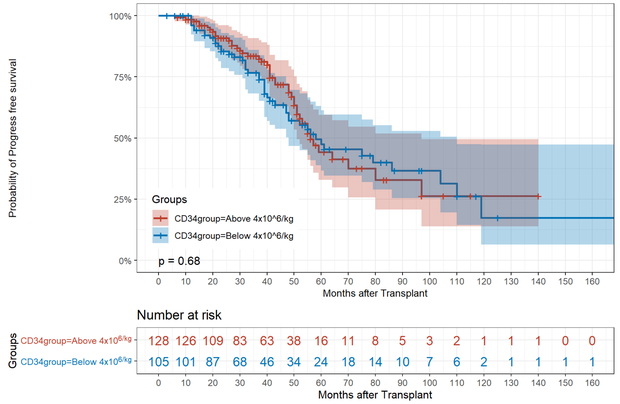


Table 1: *Characteristics and outcomes based on Melphalan dose and CD34+ dose given*

	MEL140			Mel200		
Characteristics	**Above 4x10^6/kg N = 49[1]**	**Below 4x10^6/kg N = 33[1]**	**p-value[2]**	**Above 4x10^6/kg N = 79[1]**	**Below 4x10^6/kg N = 72[1]**	**p-value[2]**
Age	67.81 (5.83)	68.12 (5.03)	0.8	58.50 (7.12)	58.15 (7.73)	>0.9
Race			0.021			0.4
Black	11(22%)	2(6.1%)		26(33%)	17(24%)	
White	38(78%)	29(88%)		52(66%)	53(74%)	
Sex (M)	32(65%)	26(79%)		50(63%)	41(57%)	0.4
BMI	29.94 (6.09)	30.37 (6.32)	0.7	29.98 (5.41)	31.92 (7.41)	0.2
High risk Cytogenetics	12(27%)	5(21%)	0.6	19(29%)	17(30%)	0.9
Status at transplant			0.038			0.071
SD-PR	8(16%)	12(36%)		17(22%)	25(35%)	
VGPR-CR	41(84%)	21(64%)		62(78%)	47(65%)	
GFR	49.22 (17.79)	53.15 (14.81)	0.3	59.23 (2.89)	58.89 (3.51)	0.8
Lines of treatment	1.51 (0.74)	1.79 (1.05)	0.2	1.43 (0.71)	1.64 (0.83)	0.069
Time to Engraftment (d)	10.73 (0.91)	11.50 (1.02)	**0.003**	11.01 (0.79)	11.15 (1.09)	0.5
Hospital stay (d)	15.22 (2.99)	15.61 (3.72)	0.9	14.57 (3.92)	14.86 (5.45)	>0.9
Readmissions	10(20%)	5(15%)	0.5	12(15%)	17(24%)	0.2
Infection	13(27%)	3(9.1%)	0.051	9(11%)	17(24%)	**0.047**

1 Mean (SD); n(%)

2 Wilcoxon rank sum test; Fisher's exact test; Pearson's Chi-squared test

RESULTS

- Median follow-up was 40 months, with a median age at transplant of 61.6 years.
- Patients receiving CD34+ cell doses <4x10^6/kg were more likely to have received multiple lines of therapy pre-ASCT.
- The risk of infection within 100 days was higher in the Mel200 group when receiving CD34+ cells <4x10^6/kg (24% vs. 11%, p=0.047), while no significant difference was observed in the Mel140 group.

CONCLUSIONS

- Higher infused CD34+ cell dose correlated with a shorter time to engraftment, especially in Mel140 recipients.
- CD34+ cell dose did not impact hospital stay or post-discharge readmissions, but **lower cell dose combined with Mel200 was associated with increased infection risk** and may be a surrogate marker for chemo tolerance.
- Further investigation with a larger cohort is necessary to better understand the interplay between the melphalan and CD34+ cell doses and their effects of toxicities and outcomes

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CONTACT INFORMATION

Jeries.kort@uhhospitals.org

University Hospitals, Seidman Cancer Centre
Case Western Reserve University
Cleveland, OH