A RETROSPECTIVE STUDY ON THE SUCCESS RATE OF CHEMOTHERAPY-BASED STEM CELL MOBILIZATION IN COMBINATION WITH G-CSF IN A NATIONAL TRANSPLANT CENTRE IN MALAYSIA

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INTRODUCTION

- High-dose chemotherapy combined with autologous stem cell transplantation(ASCT) has been widely adopted in the treatment of haematologic malignancies.
- Successful acquisition of peripheral blood stem cells(PBSC) is the premise of successful ASCT.

AIM

- To study the baseline characteristics of patients and the outcome of stem cell mobilization and to identify the factors influencing haematopoietic stem cell mobilization.

METHOD

- The clinical data of 147 patients between January 2019 and December 2021 in Ampang Hospital were retrospectively analysed.
- Autologous PBSC were mobilized using G-CSF during chemotherapy, and collected using a continuous flow cell separation instrument.
- Statistical analysis was conducted using SPSS (version 23.0; SPSS Inc.), and $p<0.05$ was considered to indicate a statistically significant difference.

CONCLUSIONS

- A prospective study with a larger cohort is warranted for further verification of the factors associated with successful stem cell mobilization for a more efficient and cost-effective ideal protocol.

Patient characteristics	Patients, n(%)	Mobilization, n(%) Success	Mobilization, n(%) Failure	p-value
Number	147 (100.0)	115 (78.2)	32 (21.8)	
Age, years[a]	42.0 (14.0-70.0)	37.0 (14.0-70.0)	49.5 (24.0-66.0)	0.006
Sex[b]				0.722
• Male	73 (49.7)	57 (49.6)	15 (46.9)	
• Female	74 (50.3)	58 (50.4)	17 (53.1)	
Histopathology[c]				0.559
• DLBCL/HGL	74 (50.3)	58 (78.4)	16 (21.6)	
• HL	31 (21.1)	26 (83.9)	5 (16.1)	
• Low grade NHL	7 (4.8)	5 (71.4)	2 (28.6)	
• MM	15 (10.2)	13 (86.7)	2 (13.3)	
• MCL	7 (4.8)	5 (71.4)	2 (28.6)	
• T-NHL	6 (4.1)	5 (83.3)	1 (16.7)	
• Leukaemia	7 (4.8)	3 (42.9)	4 (57.1)	
Status of disease[c]				0.001
Newly diagnosed	46 (31.3)	39 (84.8)	7 (15.2)	
First relapse/refractory	85 (57.8)	72 (84.7)	13 (15.3)	
>first relapse	15 (10.2)	4 (26.7)	11 (73.3)	
Post-transplant	1 (0.7)	0 (0.0)	1 (100.0)	
G-CSF duration (days)[b]				0.003
• 1-6	75 (51.0)	66 (88.0)	9 (12.0)	
• >6	72 (49.0)	49 (68.1)	23 (31.9)	
Treatment courses[b]				<0.001
• 1-8	111 (75.5)	96 (86.5)	15 (13.5)	
• >8	36 (24.5)	19 (52.8)	17 (47.2)	
Number of prior treatment lines[b]				<0.001
• 1-2	126 (85.7)	109 (86.5)	17 (13.5)	
• >2	21 (14.3)	6 (28.6)	15 (71.4)	
High dose MTX/Ara-c[b]				<0.001
• Yes	19 (12.9)	6 (31.6)	13 (68.4)	
• No	128 (87.1)	109 (85.2)	19 (14.8)	
Chemo-mobilization regimen[c]				0.008
• CTX	47 (32.0)	30 (63.8)	17 (36.2)	
• DHAP	36 (24.5)	34 (94.4)	2 (5.6)	
• ICE	24 (16.3)	18 (75.0)	6 (25.0)	
• CHOP-like	17 (11.6)	16 (94.1)	1 (5.9)	
• Etoposide	5 (3.4)	3 (60.0)	2 (40.0)	
• GDP	6 (4.1)	4 (66.7)	2 (33.3)	
• R-EPOCH	5 (3.4)	5 (100.0)	0	
• HyperCVAD part B	4 (2.7)	4 (100.0)	0	
• Others	3 (2.0)	1 (33.3)	2 (66.7)	

Table 1. Baseline characteristics of patients and the outcome of stem cell mobilization
[a]Mann-Whitney U test (median value)
[b]Chi-square test
[c]Kruskal-Wallis test

		Successful Mobilization		
		Univariate	Multivariate		
Prognostic factors		P-value	P-value	OR	95% CI
Older age		0.005	0.042	0.004	0.000-0.008
Disease status (>first relapse)		<0.001	NS	-	-
G-CSF administration duration (longer than 6 days)		0.002	0.016	0.143	0.027-0.259
Treatment courses (>8)		<0.001	NS	-	-
Number of prior lines (>2)		<0.001	0.003	0.338	0.120-0.557
High dose MTX/Ara-c		<0.001	0.005	0.274	0.086-0.462

OR, odds ratio; CI, confidence interval; NS, not significant; G-CSF, granulocyte-colony stimulating factor; MTX/Ara-c, methotrexate/cytarabine

Table II. Univariate and multivariate statistical analysis of factors influencing mobilization failure

RESULTS

- The median CD34+ cell count collected from all patients was 3.36×10^6/kg.
- >2.0×10^6/kg CD34+ cells were obtained in 115 patients (78.2%), and >5.0×10^6/kg cells were successfully collected from 46 patients (31.3%).
- Out of 26 (17.7%) who had failed prior G-CSF stem cell mobilization, 11 had successful chemo-mobilization.
- Almost all myeloma cases (87.5%) had successful mobilization using cyclophosphamide after prior G-CSF failure.
- DHAP was found to be the most successful salvage regimen in stem cell mobilization when compared to ICE and GDP ($p=0.016$, Kruskal-Wallis test).