Comparative analysis of Pegfilgrastim and Filgrastim use in Myeloma Autografts

Manzoor Khan MBSS, MD, FCPS (Haem-onc), David Waldron MSc, ACP, Omid Khyber MD, Ferdaws Abu Jabal MD, MPhil, Sridhar Chaganti MD

University Hospitals Birmingham, Queen Elizabeth Hospital, West Midlands, United Kingdom

Background

Autologous stem cell transplantation (ASCT) is a standard of care for multiple myeloma (MM) patients, as recommended by ASCO and ESMO guidelines based on evidence demonstrating improvement in event-free survival (EFS) and overall survival (OS). However, post-transplant neutropenia remains a major complication, often resulting in prolonged hospitalizations and increased antibiotic use. Granulocyte-colony stimulating factors (G-CSF), such as filgrastim and pegfilgrastim, are commonly used to mitigate neutropenia. This study evaluates the impact of shifting from daily filgrastim administration (starting on day +7) to a single dose of pegfilgrastim (on day +1) in MM patients undergoing upfront ASCT.

Methods

This retrospective study analyzed 199 MM patients who underwent ASCT between January 2023 and December 2024. All patients received high-dose melphalan conditioning following induction with quadruplet chemotherapy or the RADAR trial regimen. CD34+ cells were mobilized using filgrastim alone or in combination with plerixafor then infused on day 0. Data was collected on neutrophil and platelet engraftment times, febrile neutropenia rates, and duration of hospital stay.

Results

Of the 199 patients, 138 received pegfilgrastim on day +1 and 61 received filgrastim starting on day +7. Neutrophil engraftment occurred at a mean of 13.8±1.90 days in the pegfilgrastim group, 13.13±0.80 days in the filgrastim group, and 13.90±2.77 days in the combined cohort (pegfilgrastim and filgrastim groups). There were no statistically significant differences observed. In the combined cohort, the median day of G-CSF initiation was day +10, predominantly influenced by timing in the filgrastim group. This accurately reflects the later G-CSF initiation typical of the filgrastim arm, in contrast to the fixed early dosing of pegfilgrastim. Pegfilgrastim treatment did not significantly reduce the incidence of febrile neutropenia compared to the combined cohort.

Baseline characteristics

	Peg Filgrastim 6 mg (n=138)	Filgrastim 300µg (n=61)
	Mean (Range)	Mean (Range)
Age in years	60.7 (33-78)	60.6 (43-76)
Gender (n, %)		
Male	74 (53.6)	32 (52.5)
Female	64 (46.4)	29 (47.5)
CD34+cells x106/kg	2.9 (2.0-6.2)	3.1 (2.0-5.7)

Type of MM, Type of chemotherapy and Type of response

	N	%
Type of Myeloma		
IgA Myeloma	30	15.1
IgG Myeloma	112	56.3
Light Chain Myeloma	9	4.5
Non-secretary Myeloma	2	1
Other	46	23.1

Type of chemotherapy		
DVTD	137	68.8
RADAR	36	18.1
VCD	4	2
DVRD	4	2
VRD	3	1.5
CVR	2	1
KarMMa-9	1	0.5
Others	12	6

Type of response		
Very good	143	71.9
Partial	35	17.6
Complete	6	3
Excellent	1	0.5
Stringent	1	0.5
Stable	13	6.5

Comparison of pure, conventional and combined filgrastim on neutrophil engraftment, platelet engraftment, length of stay and positive cultures

	n	%	Neutrophil engraftment in days (mean ± SD)	Platelet engraftment in days (mean ± SD)	Length of stay in days (mean ± SD)	Neutropenic sepsis in patients (n)
Pure Peg filgrastim only	55	27.6	13.80 ± 1.90	15.54 ± 2.37	14.10 ± 1.90	6
Conventional filgrastim	61	30.7	13.13 ± 0.80	14.32± 1.26	13.90 ± 1.02	0
Combined	83	41.7	13.90 ± 2.77	14.96 ± 4.08	14.45 ± 2.27	11
P-value	-	-	0.078	0.123	0.260	-

Neutrophil engraftment in days

Platelets engraftment in days

Length of stay in days

Conclusion

Pegfilgrastim administered on day +1 after ASCT was not associated with a reduction in febrile neutropenia episodes and a shorter hospital stay compared to filgrastim administered from day +7, despite similar neutrophil engraftment times. Early G-CSF administration with pegfilgrastim offers a practical and effective alternative for supportive care post-ASCT in multiple myeloma patients. An alternative approach may be to administer pegfilgrastim on day +5 post-transplant rather than day +1, which could better align with the expected neutrophil nadir and potentially optimize outcomes.

Key words

MM, ASCT, autologous stem cell transplant, pegfilgrastim, G-CSF, febrile neutropenia