

FACTORS AFFECTING STEM CELL MOBILISATION IN INDIAN DONORS

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INTRODUCTION

- DKMS BMST Foundation India is a stem cell donor center that started working in May 2019.
- Out of 119 stem cell donations completed until the end of April 2024, 90 collections were performed at a single collection centre (Bangalore Medical Service Trust).
- The hematopoietic stem cells (HSCs) are mobilised from the marrow by granulocyte colony-stimulating factor (G-CSF) and then collected using the apheresis technique.
- There are significant variations in collect outcomes between individuals mobilised by G-CSF.
- We present the demographic characteristics of these 90 donors and their correlation to donor pre-procedure CD34+ count and CD34+ yield in the product.

METHOD

- We retrospectively collected and analyzed the donor demographics and pre-procedure hematological variables between January 2019 and April 2024.
- G-CSF at a dose of 10 µg/kg was given for five consecutive days, and the stem cells were collected on day 5.
- The CD34+ count and pre-procedure variables were recorded a day before collection. The procedures were performed on the Fresenius COMTEC cell separator.

TABLE 1: DONOR DEMOGRAPHICS AND PRE-PROCEDURE CD34+ COUNTS

PARAMETER	MEAN (RANGE)
Age	26.2(19-51)
Weight(kg)	77.4(51-130)
Height(cm)	155 (149-177)
Pre procedure CD34+ count (cells/µL)	75.5(19-207)
Product CD34+ count (cells/µL)	3191(1032-8137)
Yield in product (x10 ⁶ /kg patient weight)	16.9x10 ⁶ (5.3x10 ⁶ -51.1x10 ⁶)

RESULTS

- The mean donor age was 26.2 years, with a predominance of males (88.6%). It was the first PBSC mobilisation and stem cell donation for all donors.
- A day before the apheresis, the mean CD34+ count in donors was 75.5 cells/µL.
- The average product yield requested was 5x10⁶ CD34+ cells/kg of patient weight.
- The mean final product yield was 16.9x10⁶ CD34+ cells/kg (range 5.3x10⁶-51.1x10⁶) of patient body weight. (Table 1)
- There was no failed mobilisation case by both the definitions (CD34+ cell count < 10 cells/µL in the pre-procedure donor sample and product yield less than 2x10⁶ CD34+ cells per kg weight of the patient).
- Male sex, young donor age, and high BMI were associated with better CD34+ yield in the product.
- Only two donors had to donate on 2nd day due to procedural issues (low flow rate on the first day).

CONCLUSION

- All the donors had good stem cell mobilisation with no failure. Male sex, young donor age, and high BMI were associated with better CD34+ yield in the product.
- This study supports the findings of some previous studies that show that Asian stem cell donors mobilise very well with G-CSF.

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