

Stem Cell Transplant for Multiple
Myeloma: A Single Center Experience
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Autologous Stem Cell Transplantation (ASCT) is the preferred treatment for the management of multiple myeloma after initial 4-6 months of induction treatment. It has been considered the frontline therapy for eligible patients with multiple myeloma because it results in higher complete remission rates and longer event-free survival than conventional chemotherapy [1,2] and increased overall survival in some studies [3]. Therefore, the use of ASCT for multiple myeloma has increased with the proportionate increase in survival [4,5] Multiple myeloma currently represents the most common indication for ASCT. We retrospectively analysed the data of multiple myeloma patients who underwent stem cell transplant at our centre.

A total of 106 patients underwent stem cell transplant in the Department of Hemato-oncology and Bone Marrow Transplantation, from July 2010 to December 2016. The study was approved by institutional review board. Informed consent was taken from all patients prior to the transplant. The transplants were conducted in Hepa-filtered rooms. Patients received Granulocyte-Colony Stimulating Factor (G-CSF) 10µg/kg/day for the stem cell mobilization, 33 patients were also given plerixa for (0.24mg/kg/dose), because of poor mobilization by G-CSF alone. Stem cell harvests were done in the apheresis room of the blood bank on day 4 or 5 of G-CSF. Twenty four patients underwent harvest on two days (day 4 and day 5). The conditioning regimen used for ASCT was melphalan (200mg/m² or 140mg/m²). Three patients underwent allogeneic stem cell transplantation. One patient underwent sibling matched allogeneic transplant and one patient underwent haploidentical transplant, both after relapse from previous autologous stem cell transplantation. Third patient underwent upfront allogeneic stem cell transplant as he had myelofibrosis associated with multiple myeloma. All patients received supportive care with supersaturated calcium phosphate mouth rinse, growth factors, antimicrobials and blood products as per hospital policy. Allogeneic SCT patients received GVHD prophylaxis as per protocol.

There were 73 males and 33 females. Median age was 52 years (range 31-73yrs) (Table 1). Two patients were HCV positive and none were HBV positive. Patients were initially given induction chemotherapy followed by consolidation with ASCT. Most common induction therapies received before transplants were cyclophosphamide/bortezomib/dexamethasone (40%), bortezomib/dexamethasone (17%) bortezomib/lenalidomide/dexamethasone (17%) and others. The median CD 34+ stem cell dose harvested was 4.76x10⁶ /kg (range 1.18-14.2 x10⁶ /kg). Median hospital stay was 22 days (range 15-65 days). Mucositis was the most common complication. Six (5.6%) patients developed engraftment syndrome three of whom required treatment with steroids. One patient developed acute stage IV autologous gut GVHD after transplant and recovered completely with intravenous methylprednisolone. The patient who underwent haploidentical SCT died 2 years after SCT because of relapse and progressive disease, and the patient who underwent sibling matched SCT died on day 109 with relapse and sepsis. Post ASCT patients were monitored regularly with complete hemogram, liver and kidney function tests and serum protein electrophoresis. Figures 1 and 2 shows the overall and event free survival of the patients. Transplant related mortality was 3%.

Even in the era of novel agents, ASCT is considered the standard of care for transplant eligible patients with multiple myeloma. American Society for Blood and Marrow Transplantation has recommended ASCT within 12 months of diagnosis [6] In the retrospective analysis done at our transplant centre, seventy one (66.6%) patients received transplant within one year of diagnosis. The most common subtype of myeloma was IgG-kappa and the most commonly used initial induction therapy prior to ASCT was combination of cyclophosphamide, bortezomib and dexamethasone. The median age of multiple myeloma patients in India is 55 years, which is a decade less than that in Western countries, [7] the median age of our cohort of patients was 52 years. Thirteen patients (12.4%) were less than 40 years age and 18 patients (17%) were more than 60 years old, and age per se was not a contraindication for ASCT, as has been reported earlier also [8] Plerixafor along with G-CSF was used in 31% patients as they had poor mobilization with G-CSF alone and this resulted

Table 1: Characteristics of patients who underwent stem cell transplant for multiple myeloma.

Total patients		106
Males		73
Females		33
Median age	52 years (range 31-73yrs)	
Age group		
≤ 40 yrs		13
40-60yrs	75	75
>60 yrs		18
Disease status at transplant		
CR		42
VGPR		49
PR		15
ECOG Performance status		
0		19
1		82
2		5
Multiple myeloma ISS stage		
Stage 1		33
Stage II		16
Stage III		19
Data N/A		9
Myeloma subtype		
IgGk		46
IgGλ		21
IgA k		9
IgA λ		5
Kappa light chain		12
Lambda light chain		4
Non secretory		2
Data N/A		7
Time from diagnosis to Auto SCT		
≤ 6 months		43
6-12months		27
>12 months		36
Number of lines of therapies received before Auto SCT		
One		76
Two		24
Three		4
Four		2
Stem cell transplants		
Autologous	104	104
Allogenic	2	2
Median CD34 stem cells	4.76x106/kg (range 1.18-14.2 x106/kg)	
Neutrophil engraftment (day, range)	10 (7-19 days)	
Platelet engraftment (day, range)	15 (8-53 days)	
Conditioning regimens		
Mel 200		90
Mel 140		8
Flu+Mel		1
Flu+Cy+TBI		1
Mucositis		
Grade I-II		69
Grade III-IV		37
Outcome		
Alive		79
Expired		12
Relapsed		15

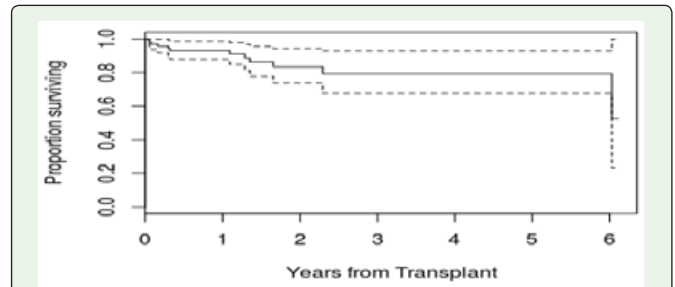


Figure 1: Kaplan-Meier curves showing the overall survival and the event free survival of patients transplanted for multiple myeloma. OS after 1 year is 93.1% and after 2 years is 83.4%.

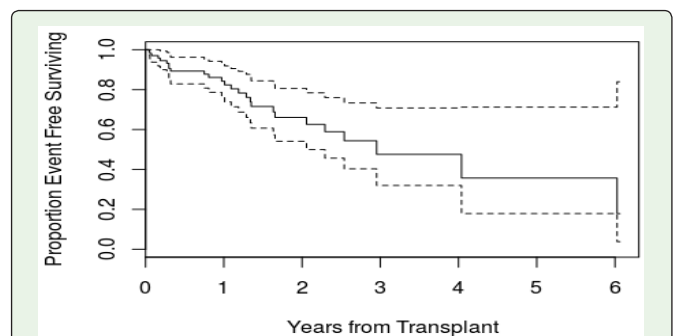


Figure 2: Kaplan-Meier curves showing the overall survival and the event free survival of patients transplanted for multiple myeloma. EFS after 1 year are 84.2% and after 2 years is 66.1%. Median EFS is 3 years (with 95% CI = 2 - NA years).

in increased number of patients being able to undergo the transplant. The standard recommended conditioning regimen is melphalan 200mg/m² and it was well tolerated by most of our patients with only eight patients requiring 140mg/m². The overall survival and the event free survival were comparable to those reported in literature [3,4]. The common toxicities were mucosal ulcerations and infections. The major cause of mortality post SCT was relapse and progressive disease.

Autologous stem cell transplant is a feasible option for patients with multiple myeloma in developing countries and should be considered early in the management of such patients with results comparable to that reported in western literature.

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