



## The 65th ASH Annual Meeting Abstracts

## ORAL ABSTRACTS

## 652.Multiple Myeloma: Clinical and Epidemiological

## Exploring Autologous Hematopoietic Stem Cell Transplantation (HSCT) Utilization and HSCT Refusal Trends in Multiple Myeloma Patients: A Comprehensive Examination of NCDB Data from 2004 to 2020

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**Background:** Autologous hematopoietic stem cell transplantation (HSCT) remains standard of care in multiple myeloma (MM) in eligible patients and is proven to improve survival. However, a significant number of patients can decline HSCT as part of their treatment. Understanding the patterns and factors behind HSCT refusal is crucial for optimizing patient care and tailoring effective interventions.

**Methods:** A total of 43,653 patients MM patients recommended for HSCT from 2004 to 2020 were identified via the NCDB, after excluding cases with incomplete values. KM curves compared overall survival (OS) between HSCT and non-HSCT patients, with both groups receiving induction chemotherapy. Factors influencing HSCT refusal were determined using multivariate logistic regression with backward elimination. SAS version 9.4 was used to analyze the data.

**Results:** Among 43,653 patients recommended for HSCT only 1.95% (850 individuals) refused HSCT and 98.05% received HSCT. The patient characteristics are presented in Table 1. As noted in Figure 1, the median OS of MM patients who opted for induction chemotherapy followed by HSCT, had a much higher OS of 124 months, compared to the MM patients who declined HSCT and had chemotherapy alone with a median OS of 95 months. On multivariate logistic regression analysis patients aged 60-69 and those aged 70 and above demonstrated higher odds of refusing HSCT compared to those below 50 years, with OR of 1.50 ( $p = 0.0120$ ) and 3.26 ( $p < 0.0001$ ), respectively. Male patients exhibited decreased odds of HSCT refusal compared to females, with an OR of 0.84 ( $p = 0.0329$ ). Black patients showed a higher likelihood of HSCT refusal than White patients (OR = 1.38,  $p = 0.0022$ ). Hispanic patients were less likely to refuse HSCT compared to non-Hispanic patients (OR = 0.65,  $p = 0.0296$ ). Patients without insurance, those covered by Medicaid/other government insurance and Medicare, exhibited increased odds of HSCT refusal compared to private insurance with ORs of 2.23 ( $p = 0.0066$ ), 1.38 ( $p = 0.0366$ ) and 1.34 ( $p = 0.0048$ ), respectively. Moreover, patients with a Charlson-Deyo score of 2 or 3 had a higher likelihood of HSCT refusal compared to those with a score of 0 (OR = 1.48,  $p = 0.0024$ ). Patients treated at non-academic facilities were more likely to refuse HSCT than those treated at academic facilities (OR = 2.67,  $p < 0.0001$ ). Furthermore, patients with a median household income less than \$38,000 had increased odds of HSCT refusal compared to those earning \$63,000 or more (OR = 1.62,  $p = 0.0002$ ). Patients with incomes in the ranges of \$38,000-\$47,999 and \$48,000-\$62,999 also demonstrated higher odds of refusal with ORs of 1.39 ( $p = 0.0043$ ) and 1.34 ( $p = 0.0050$ ), respectively. The year of diagnosis exhibited a significant association with the likelihood of HSCT refusal: patients diagnosed in 2004-2007, 2008-2011 and 2012-2015 had lower odds of refusing HSCT compared to those diagnosed in the reference period (2016-2020), with ORs of 0.16 ( $p < 0.0001$ ), 0.56 ( $p < 0.0001$ ) and 0.75 ( $p = 0.0024$ ), respectively. Geographic location significantly influenced HSCT refusal, with the South Atlantic region (SA) as the reference category. Lower odds of refusal were observed in West South Central (OR 0.29,  $p < 0.0001$ ), Mountain (OR 0.53,  $p = 0.001$ ), East South Central (OR 0.63,  $p = 0.025$ ), and East North Central (OR 0.72,  $p = 0.01$ ) regions.

**Conclusion:** Our analysis of large real-world database shows that the HSCT significantly improves survival in MM and should be recommended for eligible patients. Furthermore, the study shows that the HSCT refusal rate in real-world is low at ~2% but still represents a missed opportunity to provide standard of care with room for improvement. Older patients (age >60), females, Blacks, non-Hispanics, patients with non-private health insurance, higher comorbidities, non-academic facilities, and lower income (<\$63,000/yr), were found to be associated with increased odds of declining HSCT. There was also geographic variation across the USA with higher HSCT refusal in the South Atlantic region compared to other regions. In addition, the increasing trend in HSCT refusal from 2004 to 2020 is likely due to advances in MM therapeutics due to the availability of novel agents and anti-CD38-immunotherapy. Our study suggests significant racial, economic, and geographic variation regarding the utilization of HSCT across the US which should be further studied in prospective studies.

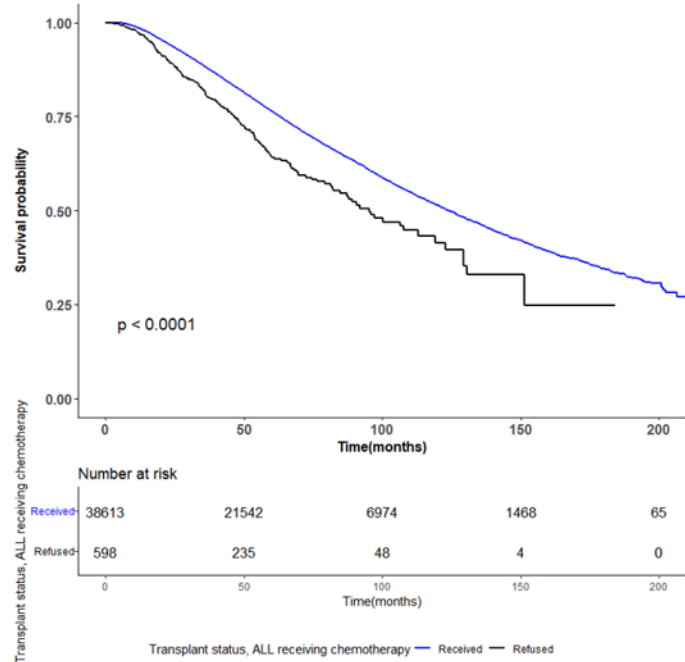
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**Table 1. Patient characteristics by transplant refusal.**

Variable	Transplant recommended N=43,653	Transplant given N=42,803	Refused transplant N=850	p value
<b>Age</b>				<0.0001
< 50 yrs.	6373(14.6)	6305(14.7)	68(8.0)	
50-59	14155(32.5)	14009(32.7)	146(17.2)	
60-69	18251(41.8)	17881(41.8)	370(43.5)	
70-79	4816(11.0)	4592(10.7)	224(26.4)	
80+	58(0.1)	16(0.04)	42(4.9)	
<b>Sex</b>				0.0563
Male	24922(57.1)	24464(57.2)	458(53.9)	
Female	18731(42.9)	18339(42.8)	392(46.1)	
<b>Race</b>				0.0001
White	34153(78.2)	33525(78.3)	628(73.9)	
Black	7452(17.1)	7262(17.0)	190(22.4)	
Other	2048(4.7)	2016(4.7)	32(3.7)	
<b>Spanish/Hispanic Origin</b>				0.0002
Non-Hispanic	40483(92.7)	39667(92.7)	816(96.0)	
Hispanic	3170(7.3)	3136(7.3)	34(4.0)	
<b>Insurance status</b>				<0.0001
Not insured	578(1.3)	560(1.3)	18(2.1)	
Private	26140(59.9)	25824(60.3)	316(37.2)	
Medicaid/other government	3527(8.1)	3460(8.1)	67(7.9)	
Medicare	13408(30.7)	12959(30.3)	449(52.8)	
<b>Charlson-Deyo score</b>				<0.0001
0	35297(80.9)	34671(81.0)	626(73.6)	
1	5566(12.7)	5442(12.7)	124(14.6)	
2+	2790(6.4)	2690(6.3)	100(11.8)	
<b>Facility type</b>				<0.0001
Non-academic	12981(30.5)	12491(30.0)	490(58.3)	
Academic	29564(69.5)	29214(70.0)	350(41.7)	
<b>Median income</b>				0.0006
Less than \$38,000	5306(14.2)	5187(14.2)	119(17.8)	
\$38,000 - \$47,999	7905(21.2)	7751(21.1)	154(23.1)	
\$48,000 - \$62,999	10228(27.4)	10034(27.4)	194(29.1)	
\$63,000 +	13865(37.2)	13665(37.3)	200(30.0)	
<b>No high school diploma</b>				0.1708
21.0% +	5669(15.2)	5567(15.2)	102(15.3)	
13.0% - 20.9%	8616(23.1)	8448(23.0)	168(25.2)	
7.0% - 12.9%	12248(32.8)	12019(32.8)	229(34.3)	
< 7.0%	10785(28.9)	10617(29.0)	168(25.2)	
<b>Year of diagnosis</b>				<0.0001
2004-2007	3778(8.7)	3767(8.8)	11(1.3)	
2008-2011	7194(16.5)	7115(16.6)	79(9.3)	
2012-2015	11936(27.3)	11721(27.4)	215(25.3)	
2016-2020	20745(47.5)	20200(47.2)	545(64.1)	
<b>Distance to treatment facility</b>				<0.0001
≤5 miles	4741(12.7)	4579(12.5)	162(24.3)	
5<distance≤10 miles	5339(14.3)	5212(14.2)	127(19.0)	
10<distance≤25 miles	9508(25.5)	9314(25.4)	194(29.1)	
>25 miles	17744(47.5)	17560(47.9)	184(27.6)	

**Figure 1. Comparative Kaplan-Meier Survival Curves for Patients Who Received HSCT vs. Patients Who Refused HSCT**  
(All patients were receiving chemotherapy)



**Figure 1**