SOHO ANNUAL MEETING 2024

Outcomes of Autologous Stem Cell Transplantation During Hospitalization for Multiple Myeloma With ESRD

Ani Gvajaia MD[1], Michael Imeh MD[1], Fidelis Uwumiro MBBS[2]
[1]Lincoln Medical and Mental Health Center, Bronx, USA. [2]University of Benin Teaching Hospital, Benin, Nigeria

NYC HEALTH+ HOSPITALS | Lincoln

INTRODUCTION

Autologous stem cell transplantation (ASCT) has significantly improved overall survival and disease-free intervals in patients with multiple myeloma (MM). However, coexisting end-stage renal disease (ESRD) in patients with MM presents unique clinical challenges, potentially influencing both ASCT feasibility and post-transplant outcomes.

AIM

Our study assessed the outcomes of ASCT in patients with MM by comparing patients with and without ESRD.

METHODS

- We identified adult hospitalizations for patients with MM who underwent ASCT from the 2016-2020 NIS database using ICD-10 diagnostic and procedure codes.
- For comparative analysis, the study cohort was dichotomized based on the presence or absence of coexisting ESRD, and results were determined using Chi-square tests, Student's t-test, and stepwise multivariable logistic regression analysis.

RESULTS

Table 1: **Baseline characteristics of hospitalizations for multiple myeloma with and without ESRD**

Variable	MM without ESRD (N=7,920)	MM with ESRD (N=420)	*P*-value
Age, mean age (SD), years	62 (8.8)	59.7 (9.9)	0.039
Female, n (%)	3,445 (43.5)	145 (34.5)	0.013
Race, n (%)			<0.001
White Americans	5,005 (63.2)	124 (29.6)	
Blacks	1,600 (20.2)	155 (37.0)	
Hispanics	681 (8.6)	57 (13.6)	
Asians/Pacific Islanders	182 (2.3)	21 (4.9)	
Native Americans	32 (0.4)	11 (2.5)	
Others	420 (5.3)	52 (12.4)	
Nonelective admissions, n (%)	283 (67.4)	345 (82.1)	0.003
Charlson comorbidity index *, n (%)			<0.001
2	3,501 (44.2)	0 (0.1)	
≥ 3	4,419 (55.8)	420 (99.9)	
APR-DRG: Illness severity subclass, n (%)			0.001
Minor LOF	32 (0.4)	0 (0.1)	
Moderate LOF	958 (12.1)	5 (1.2)	
Major LOF	4,078 (51.5)	224 (53.5)	
Extreme LOF	2,851 (36.0)	224 (45.2)	
APR-DRG: Risk of mortality subclass, n (%)			<0.001
Minor LOD	998 (12.6)	0 (0.1)	
Moderate LOD	3,675 (46.4)	90 (21.4)	
Major LOD	2,336 (29.5)	280 (66.7)	
Extreme LOD	911 (11.5)	50 (11.8)	

SD, standard deviation; APR-DRG, all patient refined-diagnosis related groups; LOD, likelihood of dying; LOF, loss of function
* Sundararajan's adaptation of the modified Deyo's Charlson Comorbidity Index (CCI). This adaptation classifies the CCI into four distinct groups, each indicative of escalating comorbidity and mortality risk. A CCI score surpassing 3 is associated with an approximate 25% 10-year mortality rate, whereas scores of 2 or 1 correspond to 10% and 4% 10-year mortality rates, respectively.

Table 2: Outcomes of ASCT in hospitalizations for multiple myeloma with and without ESRD

Outcomes	MM without ESRD (N=7,920), n (%) Unless Otherwise Specified	MM with ESRD (N=420), n (%) Unless Otherwise Specified	aOR* (95% CI)	*P*- value**
Primary outcome				
All-cause in-hospital mortality	554 (7.0)	45 (10.7)	1.12 (0.48-2.60)	0.792
Secondary outcomes				
MACEs [a]	498 (6.3)	79 (18.8)	1.42 (1.24-3.02)	0.010
Sepsis	491 (6.2)	35 (8.4)	1.08 (0.43-2.69)	0.868
Intensive care [b]	301 (3.8)	71 (16.9)	2.53 (1.24-4.38)	0.019
Acute renal failure	2,067 (26.1)	100 (23.8)	0.37 (0.20-0.68)	0.001
Length of hospital stay (days), mean	11.5	17.2		0.004
THC (US$), mean ± SD	152,871 ± 10,034	241,576 ± 38,021		0.029
Prolonged hospitalization [c]	768 (9.7)	85 (20.2)	1.86 (1.16-3.52)	0.013

MM, multiple myeloma; ASCT, autologous stem cell transplantation; ESRD, end-stage renal disease; ARDS, acute respiratory distress syndrome; aOR, adjusted odds ratio; THC, total hospital costs; US$, United States dollar; SD, standard deviation; CI, confidence interval; MACEs, major adverse cardiovascular events.
* Adjusted for age, sex, frailty, race, elective vs. nonelective admission, primary payer, hospital region and teaching status, Charlson comorbidity index, illness severity, and risk of mortality at time of admission.
** Significance level at values <0.05
[a] Presence of any one of the components of the 5-point MACEs, including acute myocardial infarction, non-fatal acute ischemic stroke, sudden cardiac death, unstable angina, or acute heart failure.
[b] Presence of ICD-10 procedure codes for mechanical ventilation, intubation, central venous catheterization, chest tube placement, and cardiopulmonary resuscitation.
[c] Hospitalization duration in the top decile of hospital stay (≥ 23 days)

- We analyzed 8340 hospitalizations for patients with MM who underwent ASCT.
- ASCT in hospitalizations for MM with ESRD did not correlate with in-hospital mortality (adjusted OR [aOR]: 1.12; 95% CI: 0.48-2.60; *P*=0.792).
- ASCT was associated with greater odds of major adverse cardiovascular events (MACEs) (18.8%; AOR: 1.42; 95% CI: 1.24-3.02; *P*=0.010), intensive care (16.9% vs 3.8%; aOR: 2.53; 95% CI: 1.24-4.38; *P*=0.019), longer mean hospital stay (17.2 vs 11.5 days; *P*=0.004), prolonged hospitalization (20.2%; aOR: 1.86; 95% CI: 1.16-3.52; *P*=0.013), and total hospital costs (US dollars; $241,576 vs $152,871; *P*=0.029).
- ASCT was associated with lower odds of acute renal failure in hospitalizations for MM with ESRD (23.8%; aOR: 0.37; 95% CI: 0.20-0.68; *P*=0.001).

CONCLUSION

ASCT was correlated with an increased likelihood of MACEs, more intensive care, and greater resource utilization in hospitalizations for MM with ESRD.

CONTACT INFORMATION

Ani Gvajaia- anigvajaia@gmail.com
Michael Imeh – mialechalex@gmail.com
Fidelis Uwimiro – fidelisuwumiro@gmail.com