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Infection-related mortality in multiple myeloma patients who underwent Hematopoietic cell transplantation

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INTRODUCTION

- The management of multiple myeloma (MM) has undergone significant evolution, with hematopoietic cell transplantation remaining a pivotal therapeutic approach. However, post-transplantation infections stand out as common and worrisome complications.

AIM

- To identify demographics and comorbidities in hospitalized patients have undergone HCT and were admitted for infections
- Measure outcomes and identify predictors of infection-related mortality.

METHODS

- Retrospective study used data from the National Inpatient Database spanning 2016 to 2020.
- Analysis was conducted using STATA BE 18.0, with the use of International Classification of Diseases (ICD) 10 codes.
- The chi-square test and multivariate logistic regression were employed while considering potential confounders such as age, gender, race, comorbidities, and alcohol use.
- The variance inflation factor (VIF) was used to assess multicollinearity.

Results

- 15,961 MM patients who underwent bone marrow transplants (BMT) were hospitalized from 2016-20

Demographics- Table1

- The mean age for this cohort was 63.6 ± 9.2 years with 41.7% females. 65.6% belonged to the white race.
- Hypertension was the most prevalent comorbidity (34.1%), followed by smoking (25.6%), 15.6% had chronic kidney disease (CKD) and 4.5% of patients had congestive heart failure (CHF).
- The incidence of infection was 49.4%, with 14% presenting with fever and 16% with neutropenia.
- The average length of the stay was 6.8 ± 8 days.

Outcomes: Mortality, Length of Stay, and Hospitalization Cost- Table 2

- There was a significant association between infection and mortality (OR, 3.42; CI, 2.86-4.09).
- Increasing age and CHF were also associated with inpatient deaths.
- CKD was not significantly associated with infection-related mortality.
- Infection and CHF were associated with prolonged hospital stays (OR, 1.39; CI 1.35-1.42 for infection; OR, 1.16; CI 1.09-1.24 for CHF) and increased hospitalization costs.
- Infection rates remained consistent at around 50% annually, with a slight decrease observed in 2020.

Baseline characteristics	N-15961 (%)
Age	63.620
Female	41.86
Race	
White	65.65
Black	18.00
Hispanic	7.74
Asian	2.16
Infection	49.36
Type 2 DM	2.55
Hypertension	34.11
CHF	4.59
Smoking status	25.65
Alcohol consumption	0.39
Obesity	6.62
CKD	15.60
DIED	4.38
LOS	6.89 Days
TOTCHG	$88,100

Table 1: Demographics

Outcomes	Death		(LOS)		Hospitalization cost	
	OR(95% CI)	P value	OR(95% CI)	P value	OR(95% CI)	P value
AGE	**1.02 (1.01 - 1.03)**	**<0.05**	0.99(0.997 - 1.001)	0.304	1.00 (0.99 - 1.00)	<0.05
FEMALE	0.90 (0.77 - 1.06)	0.21	1.02 (0.99 - 1.05)	0.178	0.98 (0.95 - 1.01)	0.182
Race						
White	0.87 (0.63 - 1.18)	0.37	0.95 (0.90 - 1.00)	0.047	0.96 (0.91 - 1.03)	0.244
Black	1.02 (0.72 - 1.45)	0.91	1.06 (0.99 - 1.12)	0.077	1.04 (0.97 - 1.12)	0.228
Hispanic	1.02 (0.69 - 1.53)	0.91	0.95 (0.88 - 1.01)	0.119	**1.10 (1.01 - 1.19)**	**0.023**
Asian	1.35 (0.78 - 2.32)	0.28	0.93 (0.84 - 1.04)	0.195	1.03 (0.92 - 1.16)	0.609
Infection	**3.43 (2.87 - 4.09)**	**<0.05**	**1.39 (1.36 - 1.43)**	**<0.05**	**1.35 (1.31 - 1.39)**	**<0.05**
Type 2 DM	0.68 (0.39 - 1.20)	0.19	1.02 (0.94 - 1.11)	0.582	0.99 (0.90 - 1.09)	0.821
Hypertension	0.60 (0.50 - 0.73)	<0.05	0.94 (0.91 - 0.97)	<0.05	0.92 (0.89 - 0.95)	**<0.05**
CHF	**1.62 (1.21 - 2.17)**	**<0.05**	**1.17 (1.10 - 1.24)**	**<0.05**	**1.28 (1.19 - 1.38)**	**<0.05**
Smoking status	0.82 (0.68 - 0.99)	0.04	0.89 (0.87 - 0.92)	<0.05	0.85 (0.83 - 0.88)	**<0.05**
Alcohol consumption	1.10 (0.34 - 3.59)	0.87	0.96 (0.78 - 1.19)	0.726	0.97 (0.77 - 1.22)	0.798
Obesity	0.85 (0.61 - 1.18)	0.33	0.99 (0.94 - 1.04)	0.685	**1.06 (1.00 - 1.13)**	**0.04**
CKD	1.07 (0.88 - 1.32)	0.5	1.00 (0.96 - 1.04)	0.968	0.96 (0.92 - 1.00)	0.083

Table 2: Outcomes

CONCLUSIONS

- In MM patients undergoing hematopoietic stem cell transplant:
- Infection along with certain comorbidities significantly increases mortality, length of stay, and cost of hospitalization.
- Prophylactic antibiotics are routinely used to prevent infection or if ANC <500 but there is a lack of consensus guidelines on managing infection and related complications in these patients.
- Further research is needed to risk-stratify patients and to explore more effective ways to tackle infection-related mortality.

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