Autologous Stem Cell Transplantation for Multiple Myeloma: Real-World Outcomes from a Tertiary Centre in Pakistan

M.Khan[1], K. Awais[1], N. Shahbaz[1], M.A. Khan[1], J. Rehman[1], S. Hamayun[1], H. Javed[1], Y. Abbas[1], A. Akram[1], T. Ghafoor[1], R. Iftikhar[1]
[1]Armed Forces Bone Marrow Transplant Centre (AFBMTC), Rawalpindi, Pakistan

INTRODUCTION

High dose chemotherapy followed by autologous stem cell transplantation (ASCT) remains the standard consolidation strategy for transplant eligible newly diagnosed multiple myeloma (TE-NDMM). Data from low-and middle-income countries (LMICs) is limited, especially where anti-CD38 based induction is inaccessible.

METHODS

Design: Retrospective single-centre cohort

Centre: AFBMTC, Rawalpindi, Pakistan

Period: 2001–2025 | n = 127 patients

Endpoints: OS, PFS (Kaplan-Meier); CIR (Aalen-Johansen / Fine-Gray); TRM day 100

Statistics: Log-rank; Cox PH (univariate + multivariate); Fine-Gray competing risks; PH verified via Schoenfeld residuals

Software: R v4.5 (survival, cmprsk, survminer)

Ethics: IRB approved; all patients consented

PATIENT CHARACTERISTICS

Characteristic	Value
n	127
Median age (IQR)	51 (41–58) years
Male : Female	2.17 : 1
ISS I / II / III	45.2% / 23.8% / 31.0%
R-ISS I / II / III	23.7% / 39.5% / 36.8%
ISS available	84/127 (66.1%)
R-ISS available	38/127 (29.9%)
Lytic lesions	85 (66.9%)
Plasmacytoma	36 (28.3%)

RESULTS

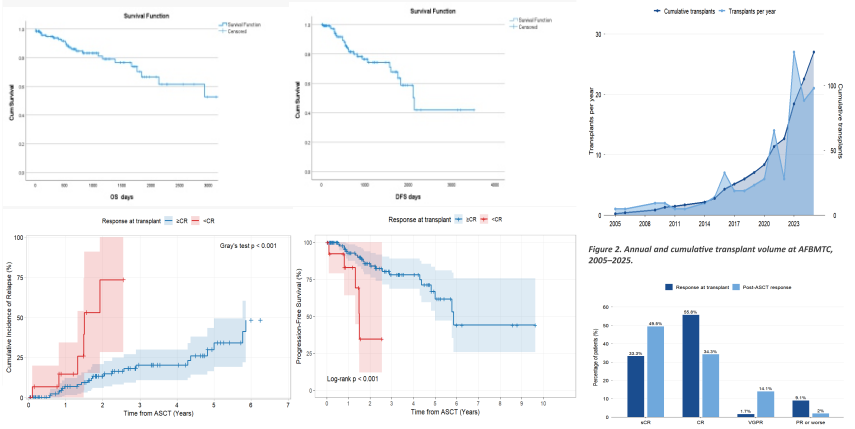

Figure 1. Survival outcomes following ASCT. (A) OS, (B) PFS, (C) CIR with death as competing risk, (D) PFS stratified by resp onse at transplant (≥CR vs <CR, log-rank p<0.001). Shaded areas: 95% CI; tick marks: censored patients.

Figure 2. Annual and cumulative transplant volume at AFBMTC, 2005–2025.

Figure 3. Distribution of response depth at transplant (n=120) and post-ASCT (n=99).

84.6%	79.9%	2.52%	18.3%
2-Year OS	2-Year PFS	Day-100 TRM	2-Year CIR

TREATMENT SUMMARY

Parameter	n (%)
IMiD-based triplet (VRd)	76 (61.8%)
Alkylator triplet (CyBorD)	30 (24.4%)
Daratumumab quadruplet	2 (1.6%)
Mel200 conditioning	95 (78.5%)
Mel140 conditioning	24 (19.8%)
Neutrophil engraftment	Day 11
Platelet engraftment	Day 12
Maintenance therapy	111 (87.4%)
Consolidation therapy	28 (22.0%)

MULTIVARIATE ANALYSIS

Variable	Outcome	HR (95% CI)	
Age <60 vs ≥60	OS	0.37 (0.14–0.95)	**0.039**
Age <60 vs ≥60	PFS	0.23 (0.09–0.57)	**0.002**
≥CR at transplant	OS	0.31 (0.11–0.86)	**0.025**
≥CR at transplant	PFS	0.20 (0.07–0.60)	**0.004**
≥CR at transplant	CIR	0.22 (0.07–0.73)	**0.014**
≥CR post-ASCT	CIR (uni)	0.34 (0.13–0.88)	**0.027**

KEY FINDINGS

- **Depth of response at transplant (≥CR)** was the single most consistent independent predictor of OS, PFS, and CIR
- **Age <60 years** independently predicted superior OS (HR 0.37, p=0.039) and PFS (HR 0.23, p=0.002).
- **2-year OS 84.6% and PFS 79.9%** are comparable to novel-agent-era cohorts, despite daratumumab use in only 1.6%.
- **Day-100 TRM 2.52%** confirms ASCT safety in an LMIC setting with appropriate patient selection.
- **ISS/R-ISS were non-significant,** likely reflecting limited power (R-ISS available in 29.9%) — not absence of effect.

CONCLUSIONS

ASCT achieves outcomes comparable to high-resource transplant programmes when disease control is optimised prior to transplant. In the absence of MRD monitoring, bispecific antibodies, and CAR-T cell therapy for relapse, optimising pre-transplant response is the single most impactful target for improving long-term outcomes in LMIC transplant programmes.

ACKNOWLEDGEMENTS

We thank the patients and their families, and the nursing and allied health staff of AFBMTC. We acknowledge the Pakistan Blood and Marrow Transplant Group and the Plasma Cell Dyscrasia Working Party. No external funding. Authors declare no conflicts of interest.