Comparative Efficacy of Carfilzomib-Based Versus Bortezomib-Based Regimens in Newly Diagnosed Multiple Myeloma: A Systematic Review and Meta-Analysis of Randomized Trials

SOHO 2026 ANNUAL MEETING

Vasu Malhotra[1], Shreya Ghanshyam Patel[1], Khoa Tran[1], Jacob Jernigan[1], Ardit Feinaj[1], Devesh Amin[1], Kenneth H. Shain[2]

[1]Lakeland Regional Health Medical Center, Lakeland, FL [2]H. Lee Moffitt Cancer Center and Research Institute, Tampa, FL

Lakeland Regional Health GRADUATE MEDICAL EDUCATION

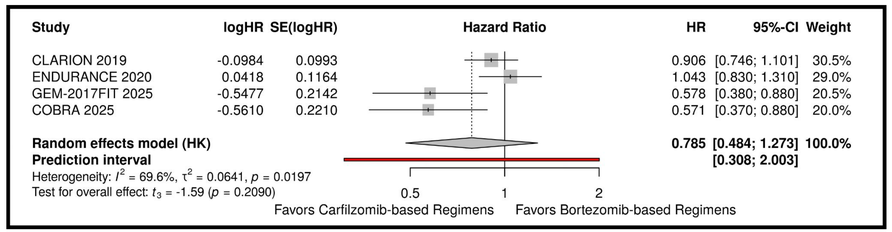
INTRODUCTION

Proteasome inhibitor–based triplet regimens are the cornerstone of frontline therapy for NDMM. Bortezomib-based regimens such as VRd remain widely adopted standards, while carfilzomib, a second-generation proteasome inhibitor with greater selectivity, has demonstrated the potential to induce deeper responses in regimens such as KRd. However, randomized trials comparing these approaches have yielded heterogeneous results, particularly regarding survival outcomes. A pooled analysis is necessary to clarify comparative efficacy and inform optimal frontline treatment selection.

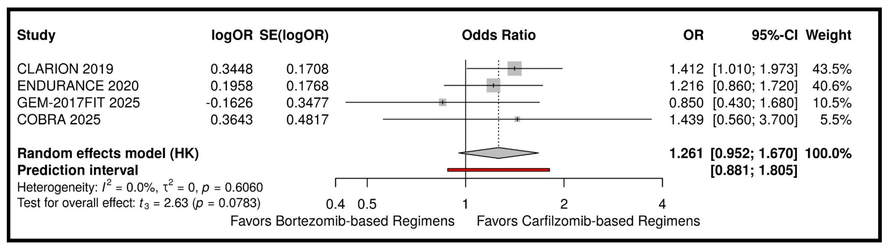
METHODS

A systematic literature search was conducted across PubMed-MEDLINE, Embase-OVID, CENTRAL, ClinicalTrials.gov, and Web of Science through March 1, 2026. Randomized phase III trials comparing carfilzomib-based with bortezomib-based regimens in NDMM were included. PFS was the primary outcome, while ORR and ≥CR were secondary outcomes. Hazard ratios (HRs) for PFS and odds ratios (ORs) for response outcomes were extracted or derived from reported data. Pooled estimates were calculated using a random-effects inverse-variance model, with heterogeneity assessed using the I^2 statistic.

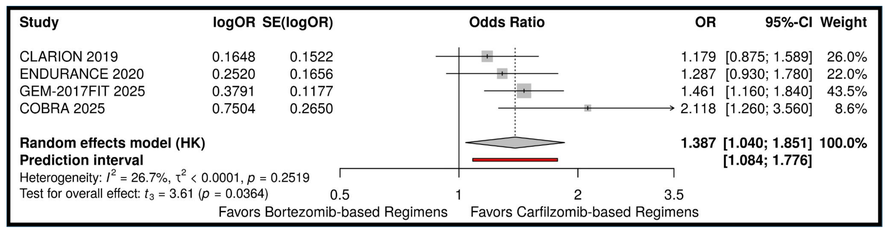
Progression-Free Survival (PFS)



Overall Response Rate (ORR)



Complete Response or Better (≥CR)



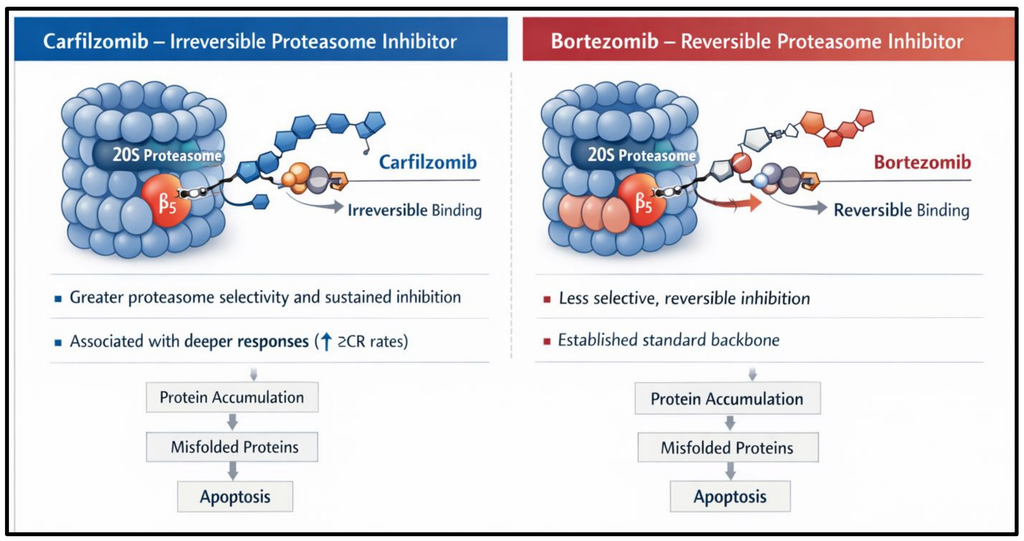


Figure 1 Summary of Pooled Outcomes

RESULTS

Four randomized trials in NDMM were included. There was no statistically significant difference in PFS between carfilzomib-based and bortezomib-based regimens (HR 0.79; 95% CI, 0.48–1.27), with substantial heterogeneity (I^2 = 69.6%). Carfilzomib-based regimens demonstrated a trend toward higher ORR (OR 1.26; 95% CI, 0.95–1.67; I^2 = 0%). Notably, carfilzomib-based therapy was associated with significantly improved rates of deep response (≥CR) (OR 1.39; 95% CI, 1.04–1.85; I^2 = 26.7%).

CONCLUSIONS

Carfilzomib-based regimens achieve significantly greater depth of response compared with bortezomib-based regimens in NDMM, although this advantage does not translate into a statistically significant PFS benefit. These findings suggest that deeper responses may not uniformly correlate with improved long-term outcomes and highlight the need for further studies.

CLINICAL IMPLICATIONS:

Carfilzomib-based regimens increased ≥CR rates compared with bortezomib-based regimens, although this did not translate into a statistically significant PFS benefit

Improved ≥CR without clear PFS benefit likely reflects trial heterogeneity and the fact that deeper responses do not always translate into longer disease control

These findings may support consideration of carfilzomib-based therapy when depth of response is prioritized, balanced against patient-specific toxicity and comorbidity considerations

Limited number of randomized trials and events likely underpower detection of PFS differences, highlighting the need for larger, adequately powered studies

Future studies should evaluate proteasome inhibitor backbone within daratumumab-containing regimens