Imaging: Prevention and Rehabilitation

Cardiovascular risk assessment in multiple myeloma patients undergoing carfilzomib therapy: a new risk prediction model for cardiovascular adverse events

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Background: Cardiovascular adverse events (CVAEs) are closely related to Carfilzomib (CFZ) therapy in multiple myeloma (MM), but validated management protocols are lacking. Moreover, the incidence, nature and risk factors for each type of CVAEs are incompletely characterized.

Purpose: To assess if the European Myeloma Network Guidelines (EMN) protocol is effective on cardiovascular risk assessment before CFZ starting. A prediction model for estimating the probability of CVAEs was developed and validated. Major and hypertensive-related CVAEs were investigated.

Methods: A perspective study on 116 MM patients scheduled for CFZ therapy was conducted from 2015 to 2020. Before CFZ starting, a baseline evaluation, according to the EMN protocol, was performed; during the follow-up, the incidence of CVAEs was detected. The potential risk factors for CVAEs were identified and a risk score was developed.

Results: The rate of all-grade CVAEs was 44.8% (24.1% CTCAE≥3): 14.7% experienced major CVEAs (41.2% arrhythmias, 23.5% acute ischemic cardiopathy as most represented) and 30.2% hypertensive-related CVAEs. At baseline, five independent predictors for all-CVAEs were identified: office systolic blood pressure (p = 0.003), 24-hours blood pressure variability (p = 0.004), left ventricular mass (p = 0.015), pulse wave velocity (p = 0.002) and global longitudinal strain (p = 0.033). The resulting CVAEs risk score allows to define the low- and high-risk groups, obtaining a sensibility of 94% in predicting CVAEs (AUC 0.76).

Conclusions: The comprehensive evaluation of EMN Guidelines is effective in CVAEs prediction. The use of CVAEs risk score will identify the higher risk patients, targeting appropriate follow-ups and organizing effective risk mitigation strategies.

Instrumental determinants with CVAEs

Parameters	No CVAEs N = 64 [N (%)]	CVAEs N = 52[N (%)]	P value
LV mass/BSA	85.30 ± 19.72	95.14 ± 21.75	0.013
LV hypertrophy [> = 95 g/m2 F > = 115 g/m2 M]	8 (12.7)	16 (30.8)	0.018
LV dilation	5 (9.3)	4 (8.9)	0.949
LV EF %	63.03 ± 6.56	61.96 ± 7.13	0.414
GLS %	-22.37 ± 2.56	-21.3 ± 2.46	0.029
LV Diastolic dysfunction	1 (1.6)	0(0)	0.362
PWV	7.41 ± 1.63	8.55 ± 1.855	0.002
PWV ³ 8.75 m/s	10 (17.5)	24 (54.2)	0.000

SBP Systolic Blood Pressure; ABPM Ambulatory Blood Pressure Monitoring; BPV Blood Pressure Variability; BSA Body Surface Area; SD Standard Deviation; EF Ejection Fraction; GLS Global Longitudinal Strain; LV Left Ventricle; PWV Pulse Wave Velocity

Abstract Figure. CVAEs risk score