Sequential Whole-Body Magnetic Resonance Imaging for Evaluating Treatment Response in Patients With Newly-Diagnosed Multiple Myeloma

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Introduction

Whole-body MRI (WBMRI) is recommended at diagnosis of multiple myeloma (MM) to differentiate symptomatic from asymptomatic disease. The role of sequential WBMRI during treatment remains unclear.

Aim

Evaluation of disease response and skeletal complications using WBMRI at baseline and 2 months after treatment initiation in newly diagnosed MM (NDMM).

Methods

This prospective cohort study included NDMM patients who underwent WBMRI at diagnosis and 2 months after treatment initiation. All participants provided informed consent, and the study was IRB-approved.

Results

Data from 78 NDMM patients were analyzed, baseline characteristics are portrayed in **Table 1** and the results after first line treatment and follow up are presented in **Table 2.**

Variables	No of patients (N=78)
Age (years)	68 (32-89)
Females (n, %)	26 (32.1)
Hb (g/dL)	12.3 (7.6-15.2)
Cr (mg/dL)	1 (0.4-10.0)
Ca (mg/dL)	9.4 (8.2-15.4)
B2 microglobulin (mg/dL)	3.6 (1.6-61.7)
LDH (U/L)	155.5 (80-360)
Alb (g/dL)	3.9 (2.9-39.0)
Urea (mg/dL)	40.5 (17-168)
ALP (IU/L)	72 (27-359)
M-peak (g/dL)	2.84 (1.0-9.5)
BM infiltration (%)	45 (5-100)
Heavy chain (n)	
IgG	47
IgA	18
IgD	1
Light chain (n)	
kappa	4
lambda	2
ISS (n)	
1	23
2	14
3	16
PS (n)	
0	20
1	32
2	13
3	3
MRI pattern (n, %)	
focal	38 (48.7)
normal	19 (24.4)
variegated	9 (11.5)
diffuse	8 (10.3)
diffuse/focal (mixed)	4 (5.1)
PMD (n, %)	17 (21.8)
Fracture (n, %)	21 (26.9)

Table 1. Baseline patient characteristics
ISS, Multiple Myeloma International Staging System; PS, performance status; PMD, paramedullary disease

Variables	No of patients (N=78)
First-line treatment (n, %)	
Anti-CD38	43 (55.1)
VRd	17 (21.8)
Other	18 (23.1)
Follow-up (months, median – range)	16.5 (3-27)
First response, at least PR (n, %)	73 (93.6)
Best responses (n, %)	
CR or better	7 (9.0)
VGPR	44 (56.4)
PR	22 (28.2)
MR	1 (1.3)
SD	1 (1.3)
Time to best response (months, median – range)	2.7 (0.8-17.8)
WBMRI responses at 2 months post diag. (n, %)	
CR	13 (16.7)
nCR	31 (39.7)
PR	11 (14.1)
SD	3 (3.8)
PD during follow-up (n, %)	
Serum-assessed	2 (2.6)
WBMRI-assessed	1 (1.3)
PDM response (n, %)	16 (94.1)
New fracture (n, %)	12 (15.4)
recurrent	7 (8.9)

Table 2. First line therapy and follow up
VRd, bortezomib/lenalidomide/dexamethasone; CR, complete response; nCR, near CR; VGPR, very good partial response; MR, minimal response; SD, stable disease; PD, progressive disease.

- Interestingly, nCR WBMRI responses were associated with VGPR serum responses (OR 2.72, 95%CI: 1.05-7.49).
- Although ISS stage at baseline was associated with serum response (Fisher's, p=0.025), it was not associated with WBMRI response (p=0.646).
- Imaging pattern at diagnosis was significantly associated with WBMRI response (p=0.022) but not with hematologic response (p=0.697).
- The presence of new fractures in second WBMRI was not associated with disease progression. Specifically, patients with a fracture at baseline had 5.02 (95% CI: 1.37, 19.99) times the odds to present with a new one at the second WBMRI, while imaging patterns at diagnosis had no correlation with new fractures.

Summary

Sequential WBMRI can complement hematological assessments in NDMM, identify early signs of refractoriness, and predict skeletal events. Its prognostic value warrants further evaluation with longer follow-up.

References

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