Prospective Evaluation of 460 Patients from Total Therapy II – Identification of Characteristics on Baseline MRI Examinations of Prognostic Significance - Importance of Focal Lesions (FL) in Multiple Myeloma (MM)

Ronald Walker, MD,1 Bart Barlogie, MD, PhD,2 Joth Jacobson, MS,1 John Shaughnessy, PhD,1 Joshua Epstein, PhD,1 Edgardo Angtuaco, MD,1 Elias Amaissie, MD,1 Choong-Kee Lee, MD,1 Raymond Thelert, MD, PhD,1 Frits van Rhee, MD, PhD,1 Maurizio Zangari, MD, PhD,1 Ernest Ferris, MD,1 and Guido Tricot, MD, PhD2
1Myeloma Institute for Research and Therapy, 2Department of Radiology, University of Washington, Seattle, WA 98101-1468

Abstract

MM frequently presents with focal plasmacytoma lesions (FL) superimposed on diffuse infiltration which can be recognized on MRI by conspicuous FL lesions. These lesions have been shown to correlate with standard prognostic factors (SPFs), on overall survival (OS) and event-free survival (EFS). However, the role of FL in this context has been poorly defined. This study investigated the influence of multiple characteristics on MRI examinations of patients with multiple myeloma (MM), with or without correlation to standard prognostic factors (SPFs), on overall survival (OS) and event-free survival (EFS).

Introduction

MM frequently presents with focal plasmacytoma lesions (FL) superimposed on diffuse infiltration of the marrow which presents with both focal and diffuse disease patterns. FL lesions have been associated with inferior survival. The current study investigated the influence of multiple characteristics on MRI examinations of patients with MM, with or without correlation to standard prognostic factors (SPFs), on overall survival (OS) and event-free survival (EFS). FL lesions can be associated with or develop into osteolytic lesions (OL), as recognized on standard X-rays, typically unapparent on standard radiographs. OL are strongly associated with poor overall survival and event-free survival.

Methods

All MRI examinations were done on a commercial 1.5 Tesla whole-body MRI scanner (Signa, General Electric Medical Systems, Milwaukee, WI, USA) with standard commercial coils for the region being imaged (e.g., calculation muscle, spine, bone marrow). The examinations were performed with standard parameters and included T1-weighted and STIR (short-tau inversion recovery) sequences for the presence of hyper-, iso- or hypointense masses. Images were scored for the presence of hyper-, iso- or hypointense masses. Images were scored for the presence of hyper-, iso- or hypointense masses. Images were scored for the presence of hyper-, iso- or hypointense masses.

Results

Of the various parameters evaluated on the MRI examinations, the only parameters that were statistically significant (p < 0.05 for adverse prognosis) in terms of both OS and EFS were the presence of 1 or more FL and the presence of cytogenetic abnormalities (CA). Four-year estimates of OS were 88% for FL < 5 FL, 57% for 5–20 FL, and 37% for FL ≥ 21 (p=0.0002). Similarly, 4 yr OS was 78% with ≤ 5 FL compared to 42% for 5–20 FL and ≤ 5 FL < 50% for FL ≥ 21 (p=0.0001). Similarly, 4 yr OS was 78% with ≤ 5 FL compared to 42% for 5–20 FL and ≤ 5 FL < 50% for FL ≥ 21 (p=0.0001). Similar estimates were observed with Cox multivariate regression for potential associations with standard prognostic factors (SPFs) revealed superior significance of the presence of FL (p ≤ 0.009) and EFS (HR 1.9, CI 1.3, 2.6, p=0.009) and OS (HR 1.9, CI 1.1, 3.2, p=0.049) and EFS (HR 1.9, CI 1.3, 2.6, p=0.009) and OS (HR 1.9, CI 1.3, 2.6, p=0.009).

Conclusion

We conclude that the presence of FL and FL ≥ 21 is present in 68% of patients with MM and 78% of patients with MM. FL are strongly associated with poor overall survival and event-free survival. FL are strongly associated with poor overall survival and event-free survival. FL are strongly associated with poor overall survival and event-free survival.