genitourinary tumours, prostate

PROGNOSTIC RELEVANCE OF IMAGING BONE METASTASES BY WHOLE BODY DIFFUSION-WEIGHTED MAGNETIC RESONANCE IMAGING (WBDWI) IN METASTATIC CASTRATION-RESISTANT PROSTATE CANCER (mCRPC)

R. Perez Lopez¹, D. Lorente¹, J. Mateo¹, M.D. Blackledge², S. Sideris¹, Z. Zafeiriou¹, A. Smith¹, R. Ferraldeschi³, P. Rescigno¹, M. Rata³, U. Naumann¹, D. J. Collins¹, G. Attard¹, M.O. Leach², D. Koh², J.S. de Bono¹, N. Tunaru¹
¹Drug Development Unit, The Institute of Cancer Research & The Royal Marsden NHS Trust, Sutton, UK
²Radiotherapy and Imaging, The Institute of Cancer Research & The Royal Marsden NHS Trust, Sutton, UK

Aim: Standard CT and bone scans provide inadequate assessment of the extent of bone disease in mCRPC. WBDWI is a magnetic resonance technique with high sensitivity and specificity for detecting bone metastases, allowing quantification of disease volume and assessment of tumor cellularity by assessing apparent diffusion coefficients (ADC). We hypothesized that volume of bony disease, quantified by DWI assessment, is a prognostic biomarker of overall survival in mCRPC.

Methods: mCRPC patients with bone metastases and WBDWI performed on a 1.5-T Siemens scanner between Jun-2010 and Jan-2013, prior to starting a new anticancer therapy, were selected. WBDWI and ADC maps were used to delineate volume of bone metastases (VBM) and represent ADC values on histograms. Clinical data were collected and correlated with VBM and ADC histogram variables. Survival (OS) analysis was performed with Kaplan-Meier analysis and Cox regression (SPSS). Correlations were calculated with Spearman’s rho coefficient (r).

Results: 43 patients were included in the study. Median OS was 12.9 months (m) (95% CI 8.7 – 16.1m). Median VBM was 503.1 mL (range: 5.6 to 2242 mL). Baseline CTC counts and bone scan index (BSI) were available for 21 (65.6%), and 32 (74.4%) patients respectively. VBM as a continuous variable was inversely associated with OS (p = 0.032). VBM with ADC > 775 µm²/s showed a significant inverse correlation with OS (p = 0.037), whereas VBM with ADC < 775 µm²/s, which overlaps with normal bone marrow, did not correlate with OS. VBM significantly correlated with other established prognostic factors: hemoglobin (r = -0.521, p < 0.001); PSA (r = 0.431, p = 0.004); LDH (r = 0.466, p = 0.002), alkaline phosphatase (r = 0.518, p < 0.001), CTC count (r = 0.596, p = 0.004) and BSI (r = 0.565, p = 0.001).

Conclusions: Volume of bone metastases estimated by WBDWI associates with OS in mCRPC. Studies of ADC value distribution provide valuable functional information on mCRPC.

Disclosure: All authors have declared no conflicts of interest.

© European Society for Medical Oncology 2014, Published by Oxford University Press on behalf of the European Society for Medical Oncology. All rights reserved. For permissions, please email: journals.permissions@oup.com.