An end of life prognostic score for patients with metastatic prostate cancer receiving palliative radiotherapy

J. Donaghy1, A. Lopes2, M. Ali1, R. Davda1, J. Mascoll1, J. Forgenie1, S. Howard1, U. McGovern1, H. Payne3, A. Mitra1, M. Linch3

1Oncology, University College London Hospital, London, UK, 2Oncology, Cancer Research UK & University College London Cancer Trials Centre, London, UK, 3Oncology, UCL/UCLH NIHR Biomedical Research Centre, London, UK

Background: Radiotherapy can provide symptomatic relief in the palliative management of patients with metastatic prostate cancer (mPC) however this would not usually be offered to those patients with a prognosis of less than three months. This study aims to determine the predictive value of a set of routinely collected parameters with respect to prognosis in these patients.

Methods: A retrospective analysis of 101 patients with metastatic prostate cancer who received palliative radiotherapy between 2009 and 2012 was performed. The variables measured were haemoglobin (Hb; g/dl), age (years), prostate-specific antigen (PSA; ng/ml), PSA doubling time (months), neutrophil:lymphocyte ratio (NLR) and albumin (g/L). Each variable was measured within the 3 months preceding radiotherapy. The dataset was split randomly into a training set (n = 59) and a validation set (n = 29).

Overall survival univariate cox models were performed in the training set using each of the variables above. Those variables with a p-value < 0.10 were then included in an overall survival multivariate cox model performed in the training set. The overall survival multivariate cox model was then applied to the validation set. For each patient in the validation set a prognostic score was obtained and patients were classified by the event of interest (death within 3 months of radiotherapy).

Results: Hb, age, NLR ratio and albumin were associated with survival in the training set. The multivariate cox model identified that high Hb values (HR: 0.90 [95%CI: 0.72; 1.11]) and albumin values (0.89 [95%CI: 0.83; 0.95]) were associated with decreased risk of death and increase in age (1.04 [95%CI: 1.00; 1.08]) and NLR (1.02 [95%CI: 0.92; 1.12]) were associated with higher risk of death. A prognostic score nomogram was derived from this model with a prognostic performance, measured using area under ROC curve, of 86% (95%CI 73%; 100%).

Conclusions: This prognostic score allows for accurate prediction of survival in patients with mPC and could be a valuable tool to assist routine clinical decisions surrounding radiotherapy, chemotherapy and enrollment in clinical trials with respect to the end-of-life setting.

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