DEVELOPMENT AND VALIDATION OF A NOMOGRAM FOR PREDICTING OVERALL SURVIVAL OF PATIENTS WITH NON-METASTATIC NASOPHARYNGEAL CARCINOMA AFTER CURATIVE THERAPY

W. Liang1, G. Shen2, X. Wu1, Y. Zhang3, C. Zhao2, L. Zhang3
1Department of Medical Oncology, Sun Yat-sen University Cancer Center; State Key Laboratory of Oncology in South China; Collaborative Innovation Center for Cancer Medicine, Guangzhou, CHINA
2Department of Nasopharynx, Cancer Center, Sun Yat-sen University, Guangzhou, CHINA
3Department of Radiation Oncology, Cancer Center, Sun Yat-sen University, Guangzhou, CHINA

Aim: Nomograms are powerful methods for individually predicting prognosis of cancer patients through combining extensive significant prognostic factors. The aim of this study was to develop a nomogram to predict overall survival (OS) of non-metastatic nasopharyngeal carcinoma (NPC) patients who had undergone curative therapy (radiochemotherapy).

Methods: We retrospectively collected a consecutive cohort of 1520 NPC patients who received treatment at Cancer Center of Sun Yat-sen University during November 2000 to September 2003. Multivariate stepwise Cox regression analysis was used to identify prognostic factors which were then integrated to establish the nomogram. The predictive accuracy and discriminative ability was measured by concordance index (C-index) and risk group stratification. The nomogram was subjected to bootstrap internal validation as well as external validation with a separate cohort of 464 patients who received intensity modulated radiation therapy (IMRT) in our center.

Results: From 16 variables being examined, we identified 7 independent prognostic factors (age, T stage, N stage, body mass index, neutrophil-lymphocyte ratio, serum level of lactate dehydrogenase and alkaline phosphatase). A nomogram was built by incorporating these factors. The calibration curves showed that prediction of 1, 3, and 5-year OS were in good concordance with the actual observation in the bootstrap validation, but were slightly underestimated in the IMRT cohort. The C-index of the nomogram was statistically higher than that of the 7th edition TNM stage for predicting survival (0.68 vs. 0.62, P = 0.01). The stratification into different risk groups allowed significant segregation of survival curves in each TNM stage respectively, which could be also applied to IMRT cohort.

Conclusions: We developed and validated a novel nomogram that provided more accurate prediction for OS of non-metastatic NPC patients who had undergone curative therapy, compared with the TNM staging system. In addition, this prognostic model could project to patients who received IMRT. External validation is ongoing.

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