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Nomogram for Predicting the Overall Survival of Osteosarcoma Patients

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ABSTRACT

Objective We aimed to developed an accurate prognostic nomogram for osteosarcoma. **Methods** A primary cohort of 255 osteosarcoma patients who were treated at the Musculoskeletal Tumor Center of Sun Yat-Sen University from 1998 to 2008, was retrospectively studied. The extended Cox model with time-dependent variable was used to identify significant prognostic factors. A nomogram was created based on these independent factors. Concordance index (C-index) and calibration curve were applied to the predictive evaluation of the nomogram. The results were also validated by bootstrap resampling and a prospective cohort on 55 patients enrolled from 2009 to early 2010 at the same institution. All of these statistical analyses were performed by R. **Results** Multivariate analysis of the primary cohort has identified six independent factors for overall survival, including age, pretreatment alkaline phosphatase (pre-ALP), Enneking stage, postoperative chemotherapy, surgery type, and progression, and all of them were selected into the nomogram. Good concordance of survival probability between nomogram-prediction and actual observation was shown by the calibration curves. The C-index of the nomogram for predicting survival, 0.76 (95% CI, 0.72 to 0.80), was statistically higher than that of the Enneking systems and other single independent factors. Of the validation cohort, the nomogram discrimination was more effective than the Enneking and American Joint Committee on Cancer (AJCC) seventh edition (C-index: 0.71 v 0.54 to 0.56; $P < .05$ for all). **Conclusion** The proposed nomogram proved to be more accurate in predicting prognosis of osteosarcoma patients.

Level of Evidence Level II, therapeutic study. See Guidelines for Authors for a complete description of levels of evidence