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European Association of Urology



Review – Prostate Cancer

Prostate Cancer Nomograms: An Update

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Article info

Article history:

Accepted July 26, 2006

Published online ahead of print on August 11, 2006

Keywords:

Nomogram

Outcome

Prediction tools

Prognostics

Prostate cancer

Review

Abstract

Context: Selection of models for prostate cancer prognosis can be difficult for clinicians.

Objective: Describe and compare probability nomograms for prostate cancer that are based on logistic regression and Cox regression analyses.

Evidence Acquisition: Data on recently published (2001–2006) nomograms for prostate cancer were analysed for predictor variables, number of patients, specific features, accuracy estimates, and types of validation.

Evidence Synthesis: Criteria for nomograms include level of complexity, predictive accuracy, performance characteristics, model generalisability, and accuracy, validity, and performance characteristics. Limitations include the retrospective statistical methodology, need for updates to earlier nomograms, and presentation of predicted outcome into perspective. Predictors among the various studies were age, race, digital rectal examination, prostate-specific antigen (free, doubling time, slope, velocity), transurethral ultrasound findings, history of high-grade intraepithelial neoplasia or atypical small acinar proliferation of prostate, prostate and benign prostatic hyperplasia volumes, transition zone density, numbers of biopsy cores and positive and negative cores, Gleason score, biopsy Gleason sum, Gleason upgrading, clinical stage, extracapsular extension, positive surgical margins, seminal vesicle or lymph node invasion, delivery of radiation or hormonal therapy, androgen-deprivation therapy, and presence of androgen-independent prostate cancer. Accuracy rates for predicting a positive outcome were 75%, 73%, and 78% in three studies and those for repeat biopsy were 70% and 71% from two studies. A nomogram for saturation biopsy in 161 men had 70% accuracy. Prediction of specific pathologic features (8 studies) had accuracy rates of 64–88% in 16,936 patients. Biochemical recurrences had accuracy rates of 68–86% after radical prostatectomy ($n = 24, 160$) and 61–64% after radiation therapy ($n = 5466$). Accuracy rates in predictions of distant metastasis, life expectancy, androgen-independent prostate cancer survival, and overall survival after castration were, respectively, 93% 73%, 81%, and 71%/67% (internal/external validation).

Conclusions: Nomograms are available and require correct criteria for creating and using them.

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