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Radiotherapy for localized prostate carcinoma. The correlation of pretreatment prostate specific antigen and nadir prostate specific antigen with outcome as assessed by systematic biopsy and serum prostate specific antigen.

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Abstract

BACKGROUND: The objective of this study was to correlate the failure pattern of localized prostate carcinoma after radiotherapy (RT) with pretreatment (preTx) PSA and post-RT nadir PSA, using systematic biopsies and serum PSA in the assessment of outcome.

METHODS: From January 1990 to February 1994, 207 patients treated with external beam RT were followed prospectively with systematic transrectal ultrasound-guided biopsies and measurements of serum PSA levels. Three hundred forty-three biopsies were performed, with 4-7 samples taken per session. The distribution of T classification was as follows: 19 patients had T1b, 15 had T1c, 34 had T2a, 79 had T2b/c, 53 had T3, and 7 had T4. Median follow-up was 36 months (range, 12-70 months). Failures were categorized as biochemical (chemF) (PSA > 2.0 ng/mL and > 1 ng/ mL over nadir), local (LF) (positive biopsy and PSA > 2), and distant (DF). The Cox proportional hazards model was used for multivariate analysis (MVA).

RESULTS: Overall, failures were seen in 68 of 207 patients: 20 LF, 24 DF, 7 LF + DF, and 17 chemF. In univariate analysis, failures correlated significantly with preTx PSA, post-RT nadir PSA, T classification, and Gleason's score (GS). The total failure rate was 12% for T1b, T1c, and T2a; 39% for T2b and T2c; and 60% for T3 and T4 ($P < 0.0001$). By evaluation with preTx PSA, at 36 months the total failure rate was 3% for preTx PSA < or = 5 ng/mL 16% for 5.1-10 ng/mL, 32% for 10.1-15 ng/mL, 42% for 15.1-20 ng/mL, 63% for 20.1-50 ng/mL, and 88% for > 50 ng/mL ($P < 0.0001$). By evaluation with post-RT nadir PSA, at 36 months the total failure rate was 4% for nadir PSA < or = 0.5 ng/ mL, 26% for 0.6-1 ng/mL, 33% for 1.1-2 ng/mL, and 92% for > 2 ng/mL ($P < 0.0001$). In MVA, nadir PSA ($P < 0.0001$) and T classification ($P < 0.0005$) were

independent predictors for any failure. LF occurred in 13% of patients (27 of 207). For these 27 patients, the categorization of T classification was: T1b/T1c/T2a, 7%; T2b/T2c, 16%; and T3/T4, 15% (P = not significant). In MVA, only nadir PSA (P = 0.0004) predicted for LF. DF occurred in 15% of patients (31 of 207). In MVA, nadir PSA (P < 0.0001) and T classification (P < 0.0001) predicted for DF, with pretreatment PSA of borderline significance (P < 0.05). To assess preTx predictors of outcome, post-RT nadir PSA was removed from the model. PreTx PSA then became the dominant variable to predict any failure (P < 0.0001), LF (P = 0.05), chemF (P = 0.0001), and DF (P < 0.003), while T classification also predicted for any failure (P = 0.03), chemF (P = 0.05), and DF (P < 0.0001).

CONCLUSIONS: Systematic prostate biopsies, performed as part of the rigorous followup of prostate carcinoma after RT, define the patterns of failure and confirm the prognostic value of preTx PSA, post-RT nadir PSA, and T classification. Prior to treatment, preTx PSA is the overwhelming independent predictor of failure, but it is surpassed by post-RT nadir PSA when this is added to the model.