

# Radical Prostatectomy, External Beam Radiotherapy, or External Beam Radiotherapy With Brachytherapy Boost and Disease Progression and Mortality in Patients With Gleason Score 9-10 Prostate Cancer

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**IMPORTANCE** The optimal treatment for Gleason score 9-10 prostate cancer is unknown.

**OBJECTIVE** To compare clinical outcomes of patients with Gleason score 9-10 prostate cancer after definitive treatment.

**DESIGN, SETTING, AND PARTICIPANTS** Retrospective cohort study in 12 tertiary centers (11 in the United States, 1 in Norway), with 1809 patients treated between 2000 and 2013.

**EXPOSURES** Radical prostatectomy (RP), external beam radiotherapy (EBRT) with androgen deprivation therapy, or EBRT plus brachytherapy boost (EBRT+BT) with androgen deprivation therapy.

**MAIN OUTCOMES AND MEASURES** The primary outcome was prostate cancer-specific mortality; distant metastasis-free survival and overall survival were secondary outcomes.

**RESULTS** Of 1809 men, 639 underwent RP, 734 EBRT, and 436 EBRT+BT. Median ages were 61, 67.7, and 67.5 years; median follow-up was 4.2, 5.1, and 6.3 years, respectively. By 10 years, 91 RP, 186 EBRT, and 90 EBRT+BT patients had died. Adjusted 5-year prostate cancer-specific mortality rates were RP, 12% (95% CI, 8%-17%); EBRT, 13% (95% CI, 8%-19%); and EBRT+BT, 3% (95% CI, 1%-5%). EBRT+BT was associated with significantly lower prostate cancer-specific mortality than either RP or EBRT (cause-specific HRs of 0.38 [95% CI, 0.21-0.68] and 0.41 [95% CI, 0.24-0.71]). Adjusted 5-year incidence rates of distant metastasis were RP, 24% (95% CI, 19%-30%); EBRT, 24% (95% CI, 20%-28%); and EBRT+BT, 8% (95% CI, 5%-11%). EBRT+BT was associated with a significantly lower rate of distant metastasis (propensity-score-adjusted cause-specific HRs of 0.27 [95% CI, 0.17-0.43] for RP and 0.30 [95% CI, 0.19-0.47] for EBRT). Adjusted 7.5-year all-cause mortality rates were RP, 17% (95% CI, 11%-23%); EBRT, 18% (95% CI, 14%-24%); and EBRT+BT, 10% (95% CI, 7%-13%). Within the first 7.5 years of follow-up, EBRT+BT was associated with significantly lower all-cause mortality (cause-specific HRs of 0.66 [95% CI, 0.46-0.96] for RP and 0.61 [95% CI, 0.45-0.84] for EBRT). After the first 7.5 years, the corresponding HRs were 1.16 (95% CI, 0.70-1.92) and 0.87 (95% CI, 0.57-1.32). No significant differences in prostate cancer-specific mortality, distant metastasis, or all-cause mortality ( $\leq 7.5$  and  $>7.5$  years) were found between men treated with EBRT or RP (cause-specific HRs of 0.92 [95% CI, 0.67-1.26], 0.90 [95% CI, 0.70-1.14], 1.07 [95% CI, 0.80-1.44], and 1.34 [95% CI, 0.85-2.11]).

**CONCLUSIONS AND RELEVANCE** Among patients with Gleason score 9-10 prostate cancer, treatment with EBRT+BT with androgen deprivation therapy was associated with significantly better prostate cancer-specific mortality and longer time to distant metastasis compared with EBRT with androgen deprivation therapy or with RP.