Abstract

Background The Scandinavian Prostate Cancer Group Study Number 4 (SPCG-4) trial showed that radical prostatectomy (RP) reduced prostate cancer deaths with an absolute mortality difference (AMD) between the RP and watchful waiting arms of 6.1% (95% confidence interval [CI] = 0.2% to 12.0%) after 15 years. In the United States, the Prostate Cancer Intervention Versus Observation Trial (PIVOT) produced an AMD of 3% (95% CI = -1.1% to 6.5%) after 12 years. It is not known whether a higher frequency of screen detection in PIVOT explains the lower AMD. Methods We assumed the SPCG-4 trial represents RP efficacy and prostate cancer survival in an unscreened population. Given the fraction of screen-detected prostate cancers in PIVOT, we adjusted prostate cancer survival using published estimates of overdiagnosis and lead time to project the effect of screen detection on disease-specific deaths. Results On the basis of published estimates, we assumed that 32% of screen-detected cancers were overdiagnosed and a mean lead time among non-overdiagnosed cancers of 7.7 years. When we adjusted prostate cancer survival for the 76% of case patients in PIVOT who were screen detected, we projected that the AMD after 12 years would be 2.0% (95% CI = -1.6% to 5.6%) based on variation in published estimates of overdiagnosis and mean lead time in the United States. Conclusions If RP efficacy and prostate cancer survival in the absence of screening are similar to that in the SPCG-4 trial, then overdiagnosis and lead time largely explain the lower AMD in PIVOT. If these artifacts of screening are the correct explanation, then there is a subset of case subjects that should not be treated with RP, and identifying this subset should lead to a clearer understanding of the benefit of RP in the remaining cases.

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