Prostate Cancer Disease Progression and Mortality after Radical Prostatectomy or External Beam Radiotherapy: Results from the ERSPC, Section Rotterdam

Introduction and Objective: Radical prostatectomy (RP) and external beam radiotherapy (RT) are the two major curative therapeutic options for treating (clinically localized) prostate cancer (PC). No randomized studies are available that compare outcomes such as disease progression (PCProg) and/or disease specific mortality (PCmort). We aimed to compare the long term outcomes of RP and RT using observational data with adjustment for potential confounders by propensity scores.
Materials and Methods: A total of 2,173 men, all participants (screening and control arm) in the European screening trial (ERSPC, section Rotterdam) and diagnosed with PC were initially treated with RP (n= 1,248 (57.4%)) or RT (n=925 (42.6%)). PCProg and PCmort were ascertained through semiannual chart review and a cause of death committee.vCox proportional hazard analysis and competing risk analysis was used to evaluate the association of PCProg (local progression and distant metastasis) and PCmort with type of treatment. We determined the propensity to receive either RT or RP for each patient, using age at diagnosis, PSA, clinical T stage, biopsy Gleason grade, Charlson co morbidity score, year of diagnosis and study arm as covariates in a multivariable logistic regression model. The propensity score was used as a covariate of the treatment effect of RP vs RT.
Results: After a median follow-up of 8 years, 208 men suffered from PCProg and 91 died of PC. Undergoing RP resulted in less PCProg and less PCmort than RT, with hazard ratios of 0.58 (95% confidence interval 0.41-0.82) and 0.46 (0.25-0.85) respectively. Similar results were found for 1785 men with T1/T2 disease at time of diagnosis, where PCmort was less frequent (14 and 29 deaths among RP and RT men respectively).
Conclusions: Although the results point towards better outcomes with RP than RT, the observation nature of this study necessitates a careful interpretation. We adjusted for differences in observed confounders, but various other characteristics may bias the comparison, such as an inventory of subsequent treatment.

	Radical prostatectomy (RP)	**Radiotherapy (RT)**
Number of PC (N of T1/T2 PC in brackets)		
Total	925 (862)	1248 (1007)
Disease progression	57 (46)	151 (80)
Death	17 (14)	74 (29)
Death other causes	338 (249)	136 (127)
Cox regression for disease progression		**Hazard Ratio RP versus RT (95%CI)**
Cox regression with propensity scores for adjustment (all PC cases)		0.58 (0.41-0.82)
Cox regression with propensity scores for adjustment (T1/T2 PC cases)		0.63 (0.41-0.96)
Cox regression for disease specific mortality		**Hazard Ratio RP versus RT (95% CI)**
Cox regression with propensity scores for adjustment (all PC cases)		0.46 (0.25-0.85)
Cox regression with propensity scores for adjustment (T1/T2 PC cases)		0.56 (0.26-1.21)