Long-term erectile function (EF) and factors influencing EF preservation in men treated with permanent seed brachytherapy for localized prostate cancer

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Purpose

Of all the main treatment modalities for localized prostate cancer, none has been proven to be superior to the others in terms of cancer control (1). This made the understanding of the health related quality of life (HRQOL) outcomes associated with each treatment modality all the more important. The aim of this study is to evaluate one of the long term HRQOL domains i.e. erectile function (EF) following permanent seed brachytherapy treatment for localized prostate cancer. The secondary aim is to determine patient-, tumour- and treatment-related factors influencing EF preservation following BT.

Methods and Materials

822 patients with biopsy-confirmed localized prostate cancer were treated with permanent seed brachytherapy (BT) at the William Buckland Radiotherapy Centre (WBRC) between 1998 and 2011. All patients completed the International Index for Erectile Function five-item survey (IIEF-5), a validated patient-administered diagnostic tool for erectile function (2,3), prior to treatment and at regular follow-up post-treatment. Normal EF is defined as IIEF-5 score of 22-25, mild erectile dysfunction (ED) 17-21, mild-moderate ED 12-16, moderate ED 8-11 and severe ED 0-7. Patients who completed the IIEF-5 questionnaires pre-treatment and reported no or mild ED were included in this study (n=389)

The primary outcome of interest in this study is the EF preservation. An event is defined as development of worse than mild ED (i.e. IIEF-5<17) at last follow-up. Time to event is defined as the time from the date of BT seed implantation to last follow-up.

Information on baseline patient characteristics (i.e.diabetes, hypertension, ischemic heart disease, smoking histories) and clinicopathological characteristics of prostate cancer (i.e. serum PSA level pre-treatment, Gleason score, clinical staging, prostate volume) was collected. Treatment-related factors of interest are use of PDE5-1, androgen deprivation therapy, and the radiation dose to the prostate, assessed using CT scan at 4-week post-BT seed implant. Radiation dose was quantified using D90. In order to include patients treated with combination of BT and EBRT, the D90 was converted to biologically effective dose (BED).

The probability of EF preservation post-BT was estimated using the Kaplan-Meier method. The difference in EF perservation between strata for each factor of interest was assessed using the log-rank test, with Bonferroni correction for multiple testing (threshold for significance $P<0.005$). Multivariate Cox proportional hazard regression was
used to estimate the effect of each factor on EF preservation, and a two-sided $P<0.05$ was considered to indicate statistical significance. The proportional hazard assumption was assessed and no evidence of violation was observed. All statistical analyses were performed using STATA/IC 11.

Results

Of the 389 patients, 292 (75%) reported no ED and 97 (25%) reported mild ED pre-treatment. All patients were followed-up for a median of 42 months (range: 3-132 months). The 5-year acturial rate for EF preservation was 60% among patients with no or mild ED pre-treatment. The 5 year acturial rate of EF preservation was worse for patients of older age ($\geq$60 vs <60), with medical comorbidities (diabetes, hypertension or ischemic heart disease), higher Gleason score (7 vs. <7), and higher BED ($\geq$150 Gy vs. <150 Gy) ($P<0.005$).

In multivariate Cox regression, higher Gleason score (7 vs. <7) is most strongly associated with poorer EF preservation, with a hazard ratio (HR) of 2.8 (95%CI=1.9-4.0). Other factors associated with EF preservation post-BT are: age at BT seed implant (HR=1.04; 95CI=1.01-1.06), presence of medical comorbidities (HR=1.42; 95%CI=1.02-1.98) and BED (HR=1.60; 95%CI=1.13-2.27).

Conclusion

The EF preservation at 5-year follow-up post-BT treatment was 60% in our cohort of prostate cancer patients, with mild or no ED pre-treatment. We observed that age at BT seed implant, presence of medical comorbidities, Gleason score and BED are associated with long-term EF preservation post-BT treatment. Understanding of these EF preservation predictors will be useful for patient counselling and guiding the clinician-patient discussion in terms of treatment decision.

Personal Information

References
