Focal Low Dose Rate Brachytherapy for Unifocal Low Intermediate Prostate Cancer – Preliminary Experience

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Introduction

Definitive treatment for localized prostate cancer is associated with significant morbidity. Focal therapy for patients with low-intermediate risk features is an emerging modality aimed at reducing treatment-related toxicity. With the development of accurate diagnostic imaging using MRI, focal treatment with low dose rate (LDR) brachytherapy has become a viable ablation option.

Aims

This pilot study aimed to evaluate the feasibility and the early toxicity of focal brachytherapy in highly selected localized prostate cancer patients.

Methodology

Between August 2015-February 2020, a prospective database of eligible patients was maintained. Only patients with unifocal MRI-visible low-intermediate grade tumours on targeted plus template transperineal biopsy were included. Men received LDR via a single monotherapy implant using Iodine 125 seeds to deliver a prescribed dose of 145Gy. All patients underwent a post implant dosimetry scan at day 30 to assess seed position. Follow up at 3 and 6 months included clinical exam, PSA test and toxicity review using RTOG scoring criteria. Patients underwent a repeat mpMRI and targeted and template TP prostate biopsy at 12 months post-therapy.

Results

A total of 28 patients completed assigned treatment with the mean operating time of 36min (23-47min). Baseline characteristics included mean: age 69 (52-82), prostate volume 40ml (15-90) and PSA 7.2 (3.5-15.3). Most patients, 26 (92%) had Gleason score (GS) 3+4, while 2 (7%) had GS 3+3. The mean total implanted activity (mCi) was 16.75 (8.2-32.25) with 25% of the prostate irradiated on average. Excellent or good post implant dosimetry outcomes were achieved in 24/28 (85%) patients with minimal radiation to at risk organs (urethraV200+0.00cc=0%, RectumV100>4.0cc=0%). Serum PSA measurements decreased after treatment and stabilized at 6 months. No RTOG grade ≥3 toxicity was observed. To date, 8 (28%) patients have completed their post-treatment biopsy date. Sampling of the index lesion post treatment found 4 men with no cancer and 4 men with cancer of indeterminate grade due to treatment effect. No patient had cancer detected in the remainder of the gland. One patient (3.5%) proceeded to radical treatment following biochemical failure at 36m. He was re-biopsied, finding a small foci of GS 4+3 at the treatment zone and underwent an uncomplicated radical prostatectomy.

Conclusions

Our initial experience with focal LDR brachytherapy highlights its ease of implementation in the hands of an experienced brachytherapist, lack of toxicity and a high rate of successful ablation of significant prostate cancer. These results have formed the basis of the prospective LIBERATE registry for focal brachytherapy.