International phase II trial of dose escalation to dominant intraprostatic lesion (DIL) with real-time high dose rate (HDR) brachytherapy

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Purpose. The purpose of the study is to demonstrate the feasibility of the delivery of a higher than prescription dose to the DILs as defined on diffusion contrast-enhanced MRI, while respecting tolerance doses of adjacent normal organs.
Methods and materials. If a dominant nodule is visualized on DCE MRI, it will be contoured and the images fused to the planning TRUS study. The patient's treatment will consist of the standard HDR brachytherapy boost (1 fraction of 1500 cGy) combined with external beam (3750 cGy in 15 fractions). 15 patients with a visible dominant intra prostatic nodule on MRI will be evaluated prospectively. One fraction of 1500 cGy will be delivered to the entire prostate volume escalating the dose to the visible disease to 1875 Gy while respecting tolerance doses of adjacent normal organs. No region of the prostate would be "underdosed".
Monitoring and follow-up. Follow-up with PSA and clinical evaluation will be done every 3–6 months depending on symptoms until 2 years, and then every 6–12 months. The IPSS is recorded at baseline and at each visit as is standard for all men receiving any type of prostate brachytherapy in Cruces University Hospital Descriptive statistics will be used to describe the frequency with which a DIL can be seen on DCE-MRI, the number of DIL's per patient and the isodose that can encompass the DIL without violating dose constraints. In addition to standard PSA follow-up, response will be assessed by MRI at 12 months as well as by TRUS-guided biopsy at 30 months.
Results and conclusions. This study and the Canadian study ongoing will be the first reports investigating the dose escalation to DIL with HDR brachytherapy guided by MRI/TRUS fusion.

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Prognostic factors in prostate cancer patients treated with arc radiotherapy

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Background. New technologies such as image guided radiation therapy have been shown to decrease acute toxicity for prostate cancer (PC).
Aim. We present the clinical results and the prognostic factors assessment for toxicity of arc radiation therapy (ART) for PC.
Methods. From June 2006 to May 2012, 162 cT1-T3 cN0 cM0 PC patients were treated with ART (primary diagnosis, $n = 125$; post-prostatectomy/brachytherapy biochemical recurrence, $n = 26$; and post-prostatectomy adjuvance, $n = 11$) at 2 institutions. Forty five patients were treated with RapidArc, and 117 with Helical Tomotherapy (HT). The dose prescribed to the prostate ranged between 68 and 81 Gy. Potential risk factors for grade ≥ 2 toxicity were assessed using logistic regression analysis.
Results. The median age was 69 years and the median follow-up 18 months. For all patients, the median overall survival was 23 months. Only one patient experienced acute grade 3 GI toxicity whereas 11 patients experienced acute grade 3 GU toxicity. Multivariate analysis showed that doing whole pelvic lymph node irradiation was associated with a higher grade of acute GI toxicity ($P = 0.002$). In addition, having an older age was marginally associated with a higher grade of acute GI toxicity ($P = 0.068$). Finally, HT was associated with a lower grade of acute GU toxicity compared with RapidArc ($P = 0.001$).
Conclusion. ART for PC is associated with a very low risk of severe toxicity and a low recurrence rate. HT was associated with a lower grade of acute GU toxicity compared with RapidArc. Further prospective studies using a well-defined treatment protocol are needed to confirm this finding.

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