

AbstractID: 7193 Title: HDR Brachytherapy of Prostate Patient in the Presence of Bi-lateral Hip Prostheses Using Megavoltage Cone-Beam CT

Only a rare concern a few years ago, an increasing number of patients with hip replacements are presenting for prostate radiotherapy. Image artifacts caused by the presence of hip replacements render CT images useless for prostate delineation and catheter definition. We report on the use of a Mega-Voltage Cone-Beam CT (MVCBCT) system to identify the catheters and to complement the regular CT for target definition of High Dose Rate Brachytherapy of prostate cancer patients with hip replacements.

Following a routine trans-rectal ultrasound guided catheter implant and recovery, MVCBCT and regular CT acquisitions were performed within few minutes. Metallic wires were inserted in the catheters during the MVCBCT image acquisition. A series of filters were applied on the MVCBCT image to maximise spatial resolution and image quality. The MVCBCT and CT images were registered with the Anatomy Modelling module of the planning system using the catheters as landmarks. The fused images were used to delineate the target and organs at risk. Then, the MVCBCT and the volumes of interest were transferred to the brachytherapy planning system where catheters were identified solely from the MVCBCT image. The dose distribution was optimized by following our standard technique using the inverse planning IPSA.

Fused MVCBCT-CT images greatly facilitated target delineation. The registration precision was better than 1.5 mm in the prostate and catheter areas. Catheters were easily visible and accurately defined on MVCBCT. The same dosimetric criteria used for regular HDR prostate planning were and achieved on this patient.

HDR treatment based only on CT is not possible for patients with bi-lateral hip replacements. The use of MVCBCT for planning purpose allows to offer prostate and other pelvic patients with hip prosthesis the most advanced form of HDR brachytherapy.

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