Rectal reduction dose in prostate cancer with inflatable spacer system
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Introduction. Prostate cancer is the most common cancer in men. Radiotherapy is one of the treatments of choice for prostate cancer, but rectal bleeding toxicity is one of its major complications.

Purpose. To assess the safety of a biodegradable rectal balloon spacer and its effectiveness in decreasing rectal dose in prostate cancer patients treated with radiotherapy.

Methods. Three patients with localized prostate cancer treated with radiotherapy. Prior to treatment with radiation, is implanted a rectal balloon spacer (BioProtect®). The balloon is made of a co-polymer of poly-lactide acid and epsilon-caprolactone. It degrades after 6 months of placement. The implant is performed in the operating room, under spinal anesthesia, with the patient in lithotomy position. The device is implanted transperineally under transrectal ultrasound (TRUS) guidance. The biodegradable balloon is placed between the prostate and the anterior rectal wall. Once positioned is inflated with saline solution, increasing the distance prostate–rectum, 16 mm on average. Planning CT was performed before implantation and after it. The treatment plan is calculated in both CT scans, prescription dose 76 Gy.

Results. No complications were observed with the implant. Comparing the dose volume histograms, rectal volume achieving 20, 50, and 70 Gy (V20, V50 and V70) was, without and with spacer: V20: mean: 86.5% (70–95), 69% (54–84); V50: 51.5% (48–58), 35% (26–41); V70: 20% (19–21), 11% (9–16), respectively. These data represent a decrease in the dose received by the rectum V20, V50 and V70 of 20.5%, 32.6% and 42.6% respectively. Average dose in rectum with and without implant was: 51.3 Gy (48.7–53.9) and 36.5 Gy (26.5–43.5) respectively, representing a decrease of 29%. During treatment, rectal toxicity was not observed.

Conclusion. The inflatable balloon placement is a safe and effective procedure, which increases the distance prostate–rectum, allowing decrease radiation dose in the rectum.

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Rectal volume variations during hypofractionated tomostherapy prostate cancer treatment
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Introduction. Rectal volume (RV) can change daily due to the state of filling despite dietary instructions and emptying procedures with an influence to the absorbed dose. It has also been suggested a significant decrease in RV during Intensity-Modulated Radiation Therapy (IMRT) for prostate cancer. Tomotherapy would avoid these kinds of situations through daily verification with megavoltage CT (MVCT) and correction if necessary.

Objective. To evaluate RV variations during hypofractionated Image-Guided Radiation Therapy (IGRT) to prostate cancer treatment using MVCT in the TomoTherapy Hi Art System.

Materials and methods. We have performed a retrospective study of the RV in 30 patients with prostate cancer incorporating anatomical information provided by daily MVCT scans. The rectum was contoured days 1, 15 and 27 of the treatment, and reviewed by one of the investigators. We utilized a TomoTherapy treatment planning workstation and the Planned Adaptive software. The absolute RV was examined to identify deviation between the planned and mean RV. All patients followed dietary instructions and were treated in a hypofractionated regimen to deliver 70.2 Gy in 27 fractions.

Results. A total of 90 scans were contoured. The mean RV in the planning CT scan was 72.02 cc (r: 29.03–128.25). The combined average deviation of the actual RV from the planned volume was 14.46 cc (range 0.39–87.12). Mean Individual volume for day 1 was 21.77 cc (r: 0.15–142.76), day 15 was 17.68 cc (r: 1.33–79.48), and day 27 was 20.27 cc (r: 1.42–71.12).

Conclusions. We have observed that there is a large rectal motion during hypofractionation in prostate cancer patients even with rectum emptying procedures. However plans can be adapted based on the image feedback from daily MVCT scans to allow the actual delivered doses to closely track the original planned doses, no significant decrease in RV during helical IGRT was observed.

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Reducing the number of segments
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Introduction. In the radiotherapy service of hospital, we started to plan IMRT treatments in March 2010. But we wanted to introduce some variations in our planning with the aim of improving them, shortening the time of treatment and the waiting of the patient, but the most important of all, without losing the quality of the treatment.