

## **Abstract**

The purpose of my doctoral thesis was to compare two different styles of prostate image-guided radiotherapy: bony landmark (BL) setup vs. fiducial markers (FM) setup. Twenty-nine prostate patients were treated with daily BL setup and 30 patients with daily FM setup. Delivered dose distribution was reconstructed on cone-beam CT (CBCT) acquired once a week immediately after the alignment. Target dose coverage was evaluated by the proportion of the CTV encompassed by the 95% isodose. Original plans employed 1 cm safety margin. Alternative plans assuming smaller 7 mm margin between CTV and PTV were evaluated in the same way. Rectal and bladder volumes were compared with initial ones. While the margin reduction in case of BL setup makes the prostate coverage significantly worse ( $p = 0.0003$ , McNemar's test), in case of FM setup with the reduced 7 mm margin, the prostate coverage is even better compared to BL setup with 10 mm margin ( $p = 0.049$ , Fisher's exact test). Moreover, partial volumes of organs at risk irradiated with a specific dose can be significantly lowered ( $p < 0.0001$ , unpaired t-test). Reducing of safety margin is not acceptable in case of BL setup, while the margin can be lowered from 10 mm to 7 mm in case of FM setup.