Abstract ID: 15476 Title: On-line Target localization with stereotactic body frame and Cone Beam CT for accelerated Partial Breast Irradiation

Purpose:
On-line target localization with Cone Beam CT (CBCT) alone has the limitation that the detected offsets of patient tilt and spin cannot be corrected. This causes not only the geometric but also dosimetric quality compromise to the accelerated Partial Breast Irradiation. In this work, the stereotactic body frame was used for tuning the patient tilt and spin by means of its equipped air bags. The resultant geometric and dosimetric improvements were presented.

Methods:
On each treatment fraction, patient setup for accelerated Partial Breast Irradiation was initially performed based on the stereotactic body frame. CBCT images were acquired and registered with planning CT images to match the breast and the cavity. Offsets of patient position in the anterior-posterior, lateral, longitudinal as well as the couch rotation
were corrected by controlling the linear accelerator. Patient tilt and spin were corrected by justifying the air cushion of the stereotactic body frame. Geometric and dosimetric improvements were evaluated by calculating the physic depths and the depth doses of all treatment fields based on the CBCT images with and without patient tilt and spin justification.

Results:
The average magnitude of corrections to patient tilt and spin are 2.4 ±1.2 degree and 3.6 ±2.3 degree (2 patients, 20 fractions). Without tilt and spin justification, the average physic depths of all treatment fields were off by 12±7.5mm which causes depth doses off by 6.5±2.1%.

Conclusions:
Combining the stereotactic body frame with the Cone Beam CT for accelerated Partial Breast Irradiation demonstrated the ability to improve the quality of dose delivery. It can be implemented as routine procedure in clinic.