

## X-ray Volume Imaging vs. Electronic Portal Imaging Device

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### Abstract

**Objectives:** Positioning verification is usually performed with treatment beam (MV) portal images (PI) using an EPID. A new alternative is the use of a low energy photon (KV) and an additional EPID mounted to the accelerator gantry. This system may be used for PI or--with rotating gantry as cone-beam CT. In NCCI Elekta synergy-s linear accelerator was installed in august 2009 with x-ray volume imaging (XVI) system, designed for KV imaging and EPID facility for MV imaging. Treatment is verified by both modalities but we observe that XVI is better than EPID. All the recorded mismatched coordinates were analyzed to determine the correction range then delivered the radiation with precision.

**Methods:** Twenty patients were selected and treated on LINAC (synergy-s) during 15/08/12 to 20/01/13. We have high-tech equipment EPID, on board imager CBCT, XVI software. Acquired images are stored on the XVI and EPID, Both studies are superimposed and patient positioning is analyzed and table correction is then given. The couch is moved remotely to correction the patient setup according to these coordinates. The mismatch of above two studies was recorded and treatment was executed after the correction with the help of robotic couch.

**Results:** Radiosurgery differs from conventional radiation therapy in several respects. With standard external beam radiation therapy techniques, tumors and much or all of the surrounding brain are treated to the same dose of radiation. The radiation dose is given in small increments over A total of 20 CBCT and EPID scans were retrospectively analyzed to evaluate the positioning errors obtained by automatic bone alignment in XVI and manual alignment in EPID. Before each fraction of hypo fractionated stereotactic radiation therapy a CBCT was acquired, the results of the corrections obtained by XVI software and EPID software were respectively  $3.8 \pm 0.5$  mm in vertical(X axis);  $3.8 \pm 0.7$  mm horizontal(Y axis) ;  $3 \pm 0.9$  mm longitudinal(Z axis). There was a change of coordinates even by a precise marking either due to skin flexibility, operator based or any other reason.

**Conclusions:** IGRT using cone-beam computed tomography (XVI) improves the accuracy of the treatment delivery reducing set-up uncertainty and minimizes the need of implanting the seeds. IGRT using cone-beam computed tomography (XVI) is better than EPID, friendly use and time saving.

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