

Daily on-line set-up correction in 3D-conformal radiotherapy: is it feasible?

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ABSTRACT

Aims and background. The aim of this report was to investigate the feasibility in terms of treatment time prolongation of an on-line no-action level correction protocol, based on daily electronic portal image verification.

Methods and study design. The occupation of a linear accelerator (LINAC) delivering 3-D conformal treatments was monitored for two weeks (from Monday to Friday, 10 working days). An electronic portal image device I-View (Elekta, UK) was used for set-up verification. Single-exposure portal images were acquired daily using the initial 8 monitor units delivered for each treatment field. Translational deviations of isocenter position larger than 5 mm or 7 mm, for radical or palliative treatments, respectively, were immediately corrected. In order to estimate the extra workload involved with the on-line protocol, the time required for isocenter check and table correction was specifically monitored.

Results. Forty-eight patients were treated. In all, 482 fractions had electronic portal images taken. Two hundred and forty-five setup corrections were made (50.8% of all fractions). The occupation of the LINAC lasted 106 h on the whole. Twelve h and 25 min (11.7% of LINAC occupation time) were spent for portal image verification and setup correction. On the average, 4.3 fractions per hour were carried out.

Conclusions. When used by trained therapists, ideally, portal imaging may be carried out before each fraction, requiring approximately 10% of LINAC occupation time.

Key words: electronic portal imaging, quality control, radiotherapy, set-up error.

Acknowledgments: The authors thank Dr Perla Avegno for reviewing the manuscript.

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Received October 10, 2011;
accepted November 18, 2011.