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Dosimetric Verification and Commissioning of a PrecisePLAN in Pusan Paik Hospital

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A commercial aperture based three-dimensional inverse treatment planning system, PrecisePLAN was recently made available. This paper reports our preliminary results and experience with commissioning this system for clinical implementation. In Nov., 2005, a new TPS, ELEKTA PrecisePLAN V2.10 was introduced in our department together with a new accelerator, ELEKTA SynergyTM platform. To commissioning, we measured central axis percent depth dose curves, profiles, dose rate as field size, off-axis beam for open field and wedge field in water and intensity distribution of photon fluence at penumbra region, air correction factor, off center ratio along diagonal for maximum field using brass build up cap considering small field and more precision in air. Also we measured in water transmission for narrow photon beam. In case of Electron, we measured central axis percent depth curves, dose rate of nominal Dmax depth, profiles at Rp+1cm in water and off center ratio along BEV diagonal, air sigma, virtual source distance in air. Then, we put in the measured beam data to RTP and accomplished optimization and commissioned the beam data. To test the dose calculation a algorithm used by PrecisePLAN, the dose distribution for single rectangular shaped field(10×10 cm2, Dmax, 5 cm, 10 cm) and multiple fields using apertured based IMRT planning were compared with water phantom measuring data and H&N phantom. In case of single rectangular shaped field, the measured and predicted doses were found that 6 MV and 10 MV has a deviation 0.2 %, 0.1% at all measurement points, and 6 MeV and 9 MeV has a deviation 0.5 % and 0.2% at Dmax. In case of multiple fields, 6 MV and 10 MV, in both cases the average difference was less than 1 %. We have shown that the doses calculated by the TPS are reliable and in the expected accuracy range. These results are sufficient for the implementation of the IMRT technique. Measurements and calculations are currently being performed for very small beam apertures and inhomogeneity corrections as well.

Keywords : PrecisePLAN, Commissioning, Dosimetric Verification