AbstractID: 6480 Title: Dosimetry in an IMRT phantom designed for a remote auditing program

Purpose: Accurate delivery of the most-up-to-date treatment techniques, such as intensity-modulated radiation therapy (IMRT), is essential. An anthropomorphic phantom was designed and constructed for a remote-audit program that allows evaluation of an institution's accuracy for delivering IMRT. The dosimetric characteristics in the phantom were investigated. **Method and Materials**: The phantom has the shape of a cylinder with one target and three organ-at-risks (OARs) inside. The target and OARs were shaped analogous to those of nasopharynx cancer patients. TLD holders were inserted inside the target and the OARs for absolute dose measurements. The phantom allows measurements with ion chamber (IC) at the TLD locations, so that inter-comparison between two dosimeters was possible. For the measurement of relative dose distribution, two film slots were orthogonally placed near the center of the phantom, which also enables inserting inhomogeneities near the target. Measurements with TLDs and ICs were done for four cases. The first was an anterior one-port 6MV X-ray (Primus, Siemens, USA) delivery; the second used the same beam geometrically, but with inhomogeneities inserted, and in the third case three ports of beams were distributed in equi-gantry angle, and the fourth was an IMRT without inhomogeneities. For case 1-3, theoretical predictions were computed by using Monte Carlo code. **Results**: For anterior one port X-ray delivery to a homogeneous/ inhomogeneous phantom, the deviation between the IC and TLD measurements, ranged from 1.7% to 2.3%. For three-port beam delivery, the range was also similar. For IMRT delivery, the differences were 0.1-2.8%. The differences between the TLD measurements and MC predictions ranged from –0.14-1.8%.**Conclusion:** The TLD measurements in the developed phantom agreed with IC and MC results within acceptable differences. The developed phantom with TLD dosimeters are feasible to be used for remote monitoring of IMRT. Supported by KFDA Grant No 05102eui BangPum and 06112eui BangAn300.