AbstractID: 10693 Title: In vivo dose reconstruction using a 2D array dosimeter via transit dosimetry

Purpose: To determine if a commercially available 2D array dosimeter can be used for the application of *in vivo* dose reconstruction. **Method and Materials:** An empirical-based back-projection dose reconstruction algorithm was developed for the purpose of *in vivo* dose reconstruction. The algorithm reconstructed a 2D dose distribution by raytracing the transit fluence to a desired depth in a phantom/patient. The algorithm was evaluated using homogeneous and heterogeneous phantoms. For the homogeneous phantom, 20 cm thick solid water was used to evaluate six conformal fields and five IMRT fields. A planar dose from Pinnacle^3 treatment planning system was used as the reference (3 % / 3 mm gamma index criteria). For the heterogeneous phantoms, there were three rectangular shaped solid water phantoms with air cavities that were varying in shapes and sizes. Two anthropomorphic head and neck and pelvis phantoms were also considered. A combination of radiochromic films and planar dose from Pinnacle^3 treatment planning system was used as the reference (5 % / 3 mm gamma index criteria). **Results:** For conformal fields, the algorithm showed passing rates of better than 99%. Similar passing rates were observed for the five IMRT fields. For the three rectangular shaped solid water phantoms, the dose distributions not in the air cavities had a passing rate ranging from 89.9% to 100%. The passing rates for the dose distribution in the air cavity ranged from 87.4% to 94.9%. For the head and neck and pelvis phantoms, the passing rates were 93.3% and 99.9%, respectively. **Conclusions:** A 2D array dosimeter can be used for high precision back-projection dose reconstruction for in vivo dosimetry for homogeneous phantoms. For the heterogeneous phantoms, it has proven to have an acceptable agreement.