

Verification of IMRT in clinical routine can be performed by comparing a calculated portal dose image (PDI) with a PDI measured by an electronic portal imaging device (EPID). In this work, two methods of calculating PDIs are investigated and compared to measurements obtained with the amorphous Silicon detector PortalVisionTM aS500 (Varian Medical Systems) and film dosimetry. One way to calculate a PDI is provided by Monte Carlo (MC) simulations. A multiple source model of a Varian Clinac 2300 has recently been developed and extended to allow simulations of a dynamic MLC. Intensity modulated fields are discretized and the portal dose is scored within a polystyrene phantom modelling the EPID. Another method for predicting portal dose is now available for the CadPlan treatment planning system (Varian Medical Systems). For this purpose, the patient's CT data set is converted to an equivalent homogeneous phantom. In this study, two realistic cases were investigated: a 6 MV (Head and Neck carcinoma) as well as a 15 MV (Bronchus carcinoma) intensity modulated field. For IMRT verification, these two fields were delivered dynamically on a phantom consisting of bone and air inhomogeneities. Comparisons between relative dose profiles and the use of a special metric (γ -concept) provide quantitative evaluations. The dose profiles as well as the γ values show good agreement (about 5%) between the PDIs calculated by the MC and the measured ones of the PortalVisionTM aS500 and film. However, at and outside the field boundaries, the CadPlan tool shows appreciable deviations (up to 15%).