

AbstractID: 9256 Title: Patient based
IMRT QA using fluence map
measurements

Purpose:

Traditionally IMRT QA involves measuring dose maps and comparing to the planning system using a gamma analysis. This methodology has been successful, but removes the link between the measured dose maps and DVHs relating to the patient used to define a clinically acceptable plan. A system containing a feedback loop for the treatment planning system and evaluating the dose distribution based on measured dose maps has been developed for H&N IMRT.

Method and Materials:

After an IMRT plan has been created, dose maps measured by film at Dmax and 0° Gantry are measured for each IMRT beam. The dose maps are converted to fluence maps by deconvolving the dose map with a Gaussian point spread function approximating phantom scatter present in the measurement geometry. The derived fluence maps are then re-introduced into the Philips Pinnacle treatment planning system and the dose re-calculated to provide a dose distribution based on the patient anatomy and the deliverable fluence from each beam. Once re-calculated, DVH comparisons and dose statistics can be used to assess the deliverable plan.

Results:

The methodology is currently in the testing phase for H&N IMRT plans. The feedback system has provided a comparison of the planned and deliverable dose distributions for 5 IMRT plans so far. The methodology has shown some differences in doses delivered to the nodal regions, and small differences to organs-at-risk such as the spinal cord and contra-lateral parotid. To date, no clinically significant differences in dose have been found by the system providing confidence in our H&N IMRT programme.

Conclusion:

The introduction of an IMRT QA system based on delivered fluence maps to establish the delivered dose distribution to the patient has been developed. The system allows the IMRT QA to be assessed based on clinical tolerances to the individual patient.