

AbstractID: 7504 Title: Extensive patient specific IMRT QA for a Head & neck patient with pacemaker.

Purpose: We have used Intensity Modulated radiation therapy (IMRT) technique to reduce the dose to the pace maker, while providing adequate coverage to the target. However there is a greater uncertainty in the delivered dose due to many factors. In this study we have attempted to verify the dose delivered to the pace maker by performing extensive patient specific quality assurance (QA) and as well with in-vivo dosimetry.

Methods: The physical location of the pacemaker made it impossible to eliminate the pacemaker outside of the jaw setting from the field, however we were able to shield the pace maker with MLC. We have used Eclipse treatment planning system inverse planning to optimize the dose delivery. The option of using a "hard" constrain to the pacemaker during the plan optimization was engaged. The QA carried included ion-chamber measurement; EPIDose based on Electronic Portal Imager [1]. Mont Carlo simulations were carried out.

Results and Discussion: The Monte Carlo calculated maximum and mean dose of 342.3cGy and 140.7cGy to the pace maker agreed well with Eclipse planning system data of 348cGy and 117.1cGy. The ion-chamber measured dose at the location of the pacemaker was 11.4% higher then the planned dose. The EPIDose showed about 9.7% higher then the calculated dose. The patient QA plan was created using Radon phantom and the MOSFET measurement is carried out.

The results indicated that the planning system underestimated the dose to the pace maker by 20%. The dose to the pacemaker reported included all the uncertainties. In consultation with the manufacturer of the pace maker, we have determined that it is safe to proceed with the treatment, with the advice to have more frequent cardiology appointment to determine the proper functionality of the pacemaker.

*1. Medical Physics* 33 (2006) 3369-3382 W.Ansbacher.