RETROSPECTIVE EXAMINATION OF THE EFFICACY OF THE RTOG PROTOCOL PTV DEFINITION FOR PROSTATE TREATMENT

The RTOG protocol for 3D conformal radiation therapy of prostate cancer provides guidelines for margin selection in forming a planning target volume (PTV) to compensate for expected patient setup error and internal organ motion. Specifically, treatment margins from 0.5 to 1cm are recommended. The concern of rectal toxicity in late-phase dose escalation has commonly led clinicians to select the minimal margin allowed in the protocol, without clear knowledge of the resulting dose loss suffered by the clinical target volume (CTV). The goal of this study was to analyze the relationship between margin selection and dose loss, so as to provide clinicians with more complete information in their application of the RTOG PTV definition.

Measurements of internal organ motion and patient setup error, obtained from multiple daily CT datasets and portal images of 35 prostate patients at our clinic, were obtained. These daily measurements were used to mimic the actual treatment of the individuals assuming the RTOG PTV definition was applied. The maximum dose reduction in the CTV was then evaluated for a range of treatment margins. The study was first performed assuming conventional conformal delivery, then repeated assuming intensity modulated beam delivery.

Our study indicates that tremendous dose reduction occurs when the minimal margin is applied. Furthermore, even the maximum RTOG margin is inadequate for the IMRT treatment technique, due to its steep dose profile outside the target boundary.

Supported in part by NCI-CA71785