

AbstractID: 10404 Title: The investigation of dosimetric reduction on organs at risk in nasopharyngeal carcinoma for static IMRT planning

Objective

There are two IMRT modes provided by some treatment planning system (TPS), one is static multi-leaf collimator (MLC) IMRT called ;°step&shoot;± and the other one is dynamic MLC IMRT called ;°sliding window;±. This work investigated the dose decline on organ at risk (OAR) for nasopharyngeal carcinoma which driven by static IMRT.

Methods

Ten patients with nasopharyngeal carcinoma were allotted. Their plans were designed in both modes with Varian Eclipse. Under the condition that beam directions and optimization parameters were all the same, the dose on tumor targets and OARs were compared between these two IMRT modes. Then the treatment setup errors were considered and the same comparisons were repeated on the planning risk volume (PRV).

Results

There were no statistical significance on the maximum point dose, minimum point dose and average dose of the targets between the two IMRT modes. The static IMRT can provide not only the better conformal index for GTV ( $p=0.036$ ) and PTV ( $p=0.047$ ), but also the lower dose distribution on parotid-average ( $p<0.01$ ), parotid-V35 ( $p<0.01$ ), brainstem-average ( $p<0.01$ ), brainstem-maximum ( $p=0.017$ ), spinal-cord-average ( $p<0.01$ ) and lens-average ( $p=0.049$ ). Even the setup errors were considered, the results on PRV of parotid-average ( $p=0.033$ ), parotid-V35 ( $p=0.012$ ) and spinal-cord-maximum ( $p=0.016$ ) were all the same.

Conclusion

In comparison with the dynamic IMRT mode, the static one can reduce the dose on some of the nasopharyngeal carcinoma OARs with no dosimetric reduction on the tumor target. This result may be partly responsible for the MLC running mode, static IMRT just deliver the dose to where ever needed, but the dynamic IMRT is beaming on all the time while the MLC sliding all over the beam field.