

Dose Tolerance Limits and DVH Evaluation for SBRT

Purpose:

To determine stereotactic body radiation therapy (SBRT) dose tolerance limits and to develop a way to conveniently ensure the limits are being met for each patient.

Methods and Materials:

An extensive literature review was conducted to determine emerging dose tolerance limits to critical structures for SBRT treatments of various cranial and extracranial targets. We developed a program called the DVH Evaluator to overlay the appropriate tolerance limits onto dose volume histogram (DVH) results, and to highlight any instances where the tolerance limit goals are not met. This can be used interactively to improve the treatment plan by periodically exporting the dose distribution to the DVH Evaluator to quickly and quantitatively see which parts of the plan need improvement. If dose tolerance limits are not met the chance of adverse events to the patient may increase.

Results:

The literature review uncovered 375 dose tolerance limits for critical anatomical structures throughout the body, for one to five fractions of SBRT.

Conclusion:

This work represents significant progress towards cumulating a comprehensive collection of dose tolerance limits for SBRT, but 375 limits is too many to be practical for daily clinical use. The DVHEvaluator provides a convenient and effective tool to help manage the variety of dose tolerance limits and help assess individual plans. Still, we recommend formation of AAPM and ASTRO task groups to thoroughly address this issue from both physics and physician perspectives.

Conflict of Interest:

None