

AbstractID: 1707 Title: Dose Allocation Function as a Tool for Evaluation of SBRT Treatments

Dose shaping in stereotactic body radiotherapy (SBRT) is critical for evaluation of this treatment technique. The assessment of stereotactic therapy should provide information about the PTV coverage but also the information about uniformity of the dose decrease away from the target. Traditional measures verifying quality of dose distributions include radiation conformity index, organ volume exposed below given value of the dose (e.g. V_{20}) and dose volume histograms (DVH). Conformality index, V_{20} or DVH can estimate how big portion of tumor is exposed to a given dose and can indicate how large volume of the organ is protected. However, these parameters are not capable to distinguish if tissue exposed to large dose is close to the tumor (where cancerous cells may persist and where dose delivery may be advantageous) or if it is located far from the tumor. As the most important from SBRT point of view is the relation between PTV surface (S_{PTV}) and the surface (S_D) of tissue volume exposed below dose D the new measure for adequate evaluation of SBRT is defined as follows. (i) A large number of points is distributed uniformly on the surface of the sphere with the center O located at center of PTV volume. (ii) Distances along all rays between surfaces S_{PTV} and S_D are calculated. (iv) Histogram is produced assigning *number of distances* calculated in (ii) to *any given interval* on a real line. This presentation is devoted to investigation of the properties of the above function.