AbstractID: 10283 Title: 3D Dose Volume Histogram with position index ---3D DVHp

Purpose:

To correlate the dose grid and anatomic position from a treatment plan, and to determine spatial information including volume, location and inter-distance of hot spot clusters in any given structure.

Method and Materials:

A test phantom into which different anatomic structures can be inserted was constructed, and a treatment plan was designed with Pinnacle to provide necessary data. The dose grid, anatomic position indices and related information were extracted and were used in functions compiled in Matlab. The dose grid and anatomic position were correlated. Color wash of hot spots and Dose Volume Histograms were reproduced for verification purposes. Functions to search for hot spot clusters and their spatial information were compiled in Matlab.

Results:

Color wash of hot spots and Dose Volume Histograms were compared to those in the treatment plan from Pinnacle, and they matched well, demonstrating that the correlation was correct. Interpolation for dose grid was performed, so the dose at any point in any structure could be determined. Spatial information of hot spot clusters, such as location, volume, and distances between each cluster were successfully calculated.

Conclusion:

This work indicates the potential of creating a new tool in treatment plan evaluation. The development of a new Dose Volume Histogram with "position-specific" indices is possible. Most current bio-models do not include detailed spatial information such as the distance between multiple hot spot (or cold spot) clusters. With the dose and position correlation capability, it may be possible to extend or add to these models to better refine their predictive power and improve clinical input to physicians for planning.