Knowledge-based planning and evaluation

A pilot DVH registry for paediatric cranio-spinal irradiation

Kildea J, Freeman CR, Joseph, A, and Parker W

Departments of Medical Physics and Radiation Oncology, McGill University Health Centre, Montreal, Canada

OBJECTIVES

To demonstrate the use and usefulness of a DVH registry for treatment planning and evaluation through application to paediatric intensity-modulated cranio-spinal irradiation (IMRT-CSI).

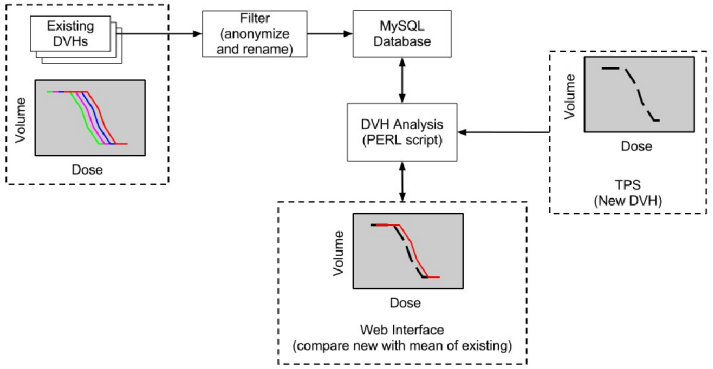
METHODS

Owing to the low frequency of the cranio-spinal irradiation technique, planners and physicians often refer to previously-treated plans for guidance.

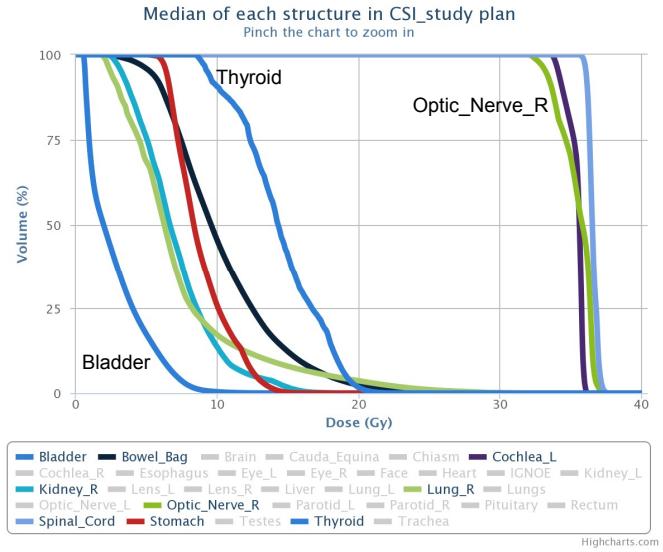
We hypothesized that this crude form of “knowledge-based” planning could be greatly facilitated by a DVH registry.

Our registry allows us to generate *ab initio* a “standard” plan with standard (mean or median) dose-volume constraints derived from a cohort of previously-treated plans.

The registry allows for addition of future plans as they are produced, such that the data set is always current.



Schematic of the DVH registry instrastructure.



Screenshot showing median DVHs for a number of structures used in our IMRT-CSI technique.

RESULTS

Organ	V5	V10	V20
Bladder	17	0	0
Heart	92	23	0
Left Lung	52	11	1
Right Lung	68	17	4
Left Kidney	62	15	0
Right Kidney	75	13	0
Esophagus	100	100	35
Liver	63	21	0
Stomach	100	26	0
Trachea	100	100	22
Thyroid	100	91	2

We have used our DVH registry to produce standard (median of the cohort) DVHs for an initial demonstrative cohort of ten recently-treated paediatric IMRT-CSI patients treated to 36 Gy.

CONCLUSIONS

Initial results have demonstrated the usefulness of our DVH registry for CSI treatment planning.

In particular, we have been able to produce standard (median of a cohort) dose-volume constraints for our IMRT-CSI that serve as useful starting points for inverse planning and useful comparison data for plan evaluation.