

AbstractID: 5685 Title: An Evaluation of User Variability for Image-Guided Radiation Therapy (IGRT) Shift Determination

Purpose:

To evaluate the Image-Guided (IGRT) shift variability calculated by different users using the same patient data and same IGRT process.

Method and Materials:

IGRT was performed using the Siemens Primatom. This system consists of a Siemens Primus Linear Accelerator and a Siemens Emotion diagnostic CT on rails. Patients have a daily, pre-treatment CT scan taken that is transferred to the Siemens Coherence Workstation where the daily CT is fused with the original treatment planning CT. The fusion is performed so that the daily internal organ or critical structure position can be determined and the organ/structure can be aligned to give the same position relative to the isocenter that was determined from the treatment plan. A shift in the x, y and z directions are made to facilitate this alignment.

Four users retrospectively calculated the shifts required for an IGRT patient using the same CT data set and the same IGRT process. The treatment area for the patient was the prostate gland and a total of 39 daily shifts were performed.

Results:

The maximum variation on any one day was 0.90cm in the right/left direction, 1.10cm in the superior/inferior direction and 0.93cm in the anterior/posterior direction. The averages of the maximum daily variations were 0.39cm, 0.54cm and 0.55cm respectively.

Conclusion:

There are multiple systems that will perform IGRT but the advantage to using CT-on-rails systems is the high soft tissue resolution you get from the diagnostic CT sets. The higher resolution allows the user much more information that can be included in the shift evaluation. Our results show the user variability to be acceptable but when implementing this type of IGRT, user variability must be considered.

Conflict of Interest (only if applicable):