

AbstractID: 11266 Title: Impact of Stomach Size and Position on Out-of-Field Organ Dose

Purpose: Accurate dosimetry calculations are an important component of epidemiological studies of radiation induced late effects. It is impossible to perform individual dosimetry calculations for thousands of patients. Thus, patients are grouped using several criteria, and dose is calculated for a representative individual from each group. Within groups, the organs are assumed to be in the same location; however, this is complicated when the position of the organ of interest is known to vary between patients, as is the case for the stomach. The purpose of this work was to determine the impact of the size and position of the stomach on the mean organ dose when the stomach is completely outside of the treatment field. This work focused on the dose received from a typical mantle field for Hodgkin lymphoma.

Method and Materials: A treatment plan was created for an anthropomorphic male dosimetry phantom. Contouring tools in the treatment planning system were used to create five additional stomachs by modifying the size and position of the original stomach contour. The phantom was loaded with 550 thermoluminescent dosimeters (TLD) to encompass the six different stomachs. The phantom was irradiated with the treatment plan and the dosimeters were read using an established laboratory protocol. The mean dose to each of the six stomachs was determined using the appropriate TLD data points. An Analysis of Variance (ANOVA) was performed to determine whether the mean doses to each of the six samples were statistically different.

Results: The mean out-of-field dose was determined for six common variations of the stomach. The ANOVA indicated that the means of the six stomachs were not statistically different.

Conclusion: This study indicates that variations in organ position and size do not statistically change the mean organ dose for out-of-field organs.

Conflict of Interest (only if applicable): n/a