

AbstractID: 11633 Title: Radiation Treatment Techniques and Gastrointestinal Dose in Breast Patients

Purpose: Although it has been reported that breast cancer patients have elevated risks of secondary stomach and esophagus cancers after breast radiotreatment, dosimetric information in those organs is sparse. The purpose of this study is to investigate radiation dose to specific organs at risks (OARs), specifically, stomach, esophagus and pancreas and to find factors associated with increased dose exposure.

Method and Materials:

Fifty four breast cancer patients treated with CT based 3D conformal treatment plans were selected to include variations in laterality (left side vs. right side), treatment volume (with or without supraclavicular fossa) and treatment techniques (whole vs. partial breast irradiation, supine vs. prone position). Treatment plans for these patients were recalculated after the OARs were contoured. Dose were calculated using the XiO (Version 4.40).

Results:

Patients treated to the left breast had significantly higher dose in the stomach, with average maximum dose >400 cGy when whole breast was irradiated in supine position. Prone positioning resulted in a lower stomach dose compared to supine, with an average of 200 cGy maximum. Partial breast treatment was associated with lowest dose to stomach. Similar trend is seen in the mean dose. Further regression analysis indicated that stomach dose was positively correlated with stomach volume and reversely correlated with distance to isocenter ($p < 0.05$). Elevated esophagus is seen in patients with supraclavicular treatment, regardless of laterality. Dose to pancreas is small (maximum average < 25 cGy).

Conclusion:

Radiation dose to stomach and esophagus can be substantial during breast radiotherapy treatment, depending upon laterality, target volume and treatment techniques. Prone position and PBI appear to decrease dose to stomach slightly. Dosimetric information from this work provides important base for further analyses of dose-response relationship for secondary gastrointestinal malignancies in breast cancer patients and for selection of treatment techniques to lower dose in gastrointestinal organs.