

## **SU-D-BRA-06: Duodenal Interfraction Motion with Abdominal Compression.**

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## **Abstract**

### **PURPOSE:**

To quantify the effect of abdominal compression on duodenal motion during pancreatic radiotherapy.

### **METHODS:**

Seven patients treated for pancreatic cancer were selected for analysis. Four patients were treated with abdominal compression and three without. The duodenum was contoured by the same physician on each CBCT (five CBCTs for patients with compression, four for non-compression patients). CBCTs were rigidly registered using a soft tissue match and contours were copied to the delivered plans which were all radical (BED > 50 Gy). The distance between the duodenum on the planning CT and each CBCT was quantified by calculating the root mean square (RMS) distance. The DVHs of each abdominal compression patient was converted to an EQD2 DVH (alpha/beta = 10) using an in-house tool and volumes receiving at least 25, 35, 45, and 50 Gy were recorded.

### **RESULTS:**

The maximum variation in duodenal volumes on the CBCTs for the four abdominal compression patients were 19.1 cm<sup>3</sup> (32.8%), 19.1 cm<sup>3</sup> (20.6%), 19.9 cm<sup>3</sup> (14.3%), and 12.9 cm<sup>3</sup> (27.3%) compared to 15.2 cm<sup>3</sup> (17.6%), 34.7 cm<sup>3</sup> (83.4%), and 56 cm<sup>3</sup> (60.2%) for non-compression patients. The average RMS distance between the duodenum on the planning CT and each CBCT for all abdominal compression patients was 0.3 cm compared to 0.7 cm for non-compressed patients. The largest (and average) difference between the planning CT and CBCTs in volume of duodenum receiving more than 25, 35, 45 and 50 Gy for abdominal compression patients was 11% (5%), 9% (3%), 9% (2%), and 6% (1%).

### **CONCLUSION:**

Abdominal compression reduces variation in volume and absolute position of the duodenum throughout treatment. This is seen as an improvement but does not eliminate the need to consider dosimetric effects of motion. Abdominal compression is particularly useful in SBRT when only a few fractions are delivered. Alon Witztum is supported by an MRC/Gray Institute DPhil Studentship. Daniel Holyoake is supported by a CRUK/Nuffield Clinical Research Fellowship. Sam Warren and Mike Partridge are supported by CRUK grant C5255/A15935. Maria Hawkins received an MRC Fellowship MC\_PC\_12001/2.