

AbstractID: 11001 Title: Treatment Margins for Pancreatic Cancer Based on Daily IGRT with Cone Beam CT (CBCT)

**PURPOSE:** To evaluate interfraction pancreatic motion as evidence by daily image guided radiotherapy (IGRT) using daily CBCT.

**MATERIALS AND METHODS:** Daily kilovoltage CBCT was used during the definitive treatment of seven patients. Daily CBCT images were registered to planning CT with automatic software tools that put higher importance on bony anatomy as proxy for pancreatic motion. Validation scans were employed when preset constraints were not met. A single treating physician reviewed and approved each fusion. Data regarding interfraction deviation from these daily shifts are analyzed for translation and rotation in the anterior-posterior (AP), right-left (RL), and superior-inferior (SI) directions.

**RESULTS:** One hundred and eighty registration scans were utilized and revealed average shifts of 0.24, 0.15, and .01 cm in the SI, AP, and RL directions, respectively with standard deviations of 0.42, 0.27, and 0.45 cm. Using this data in the Van-Herk model suggests treatment (PTV) margins of 0.39 cm in RL, 0.91 cm in SI, and 0.58 cm in AP direction to ensure that 90% of all of the clinical target volumes (CTV) receive 95% of the prescribed dose. The average vector displacement was 0.61 cm with a standard deviation of 0.41 cm. The maximum observed vector shift was 1.95 cm in the SI direction. The registration yielded an average rotation of  $0.97^\circ$ ,  $-.06^\circ$ , and  $-.20^\circ$  in the coronal, sagittal, and axial planes respectively with standard deviations of  $0.8^\circ$ ,  $1.25^\circ$ , and  $1.1^\circ$ . The maximum rotation noted in any direction was  $4.6^\circ$ .

**CONCLUSIONS:** CBCT is an important tool to monitor interfraction pancreatic motion. Bony fusion as proxy provides some confidence and may translate into smaller margins. However, further assessment with soft tissue fusion and the use of internal fiducials are needed to help provide further confidence.