

## AbstractID: 13742 Title: Feasibility of an online adaptive replanning scheme for pancreatic cancer radiotherapy

**Purpose:** To demonstrate the feasibility of using an online adaptive replanning scheme to address interfractional variations in pancreatic cancer radiotherapy (RT).

**Method and Materials:** We have previously developed an online adaptive replanning scheme which has been implemented in a planning system (RealART, Prowess Inc.). Using this system, we analyzed daily pre-treatment CTs acquired for representative pancreatic cancer patients treated with gated RT with the guidance of a gated CT-on-Rails (CTVision, Siemens) for repositioning. Acquisitions of all daily CTs and the planning CT were synchronized at the end of exhale to minimize respiration motion. Contours of the targets and critical structures were generated on daily CTs by populating planning contours based on deformable registration with manual editing if necessary. For each daily CT set, two plans were created: adaptive plan generated with RealART and repositioning plan by copying the original plan with the repositioning shifts considered. PTV margins of 5 and 10 mm were used for the adaptive and repositioning plans, respectively. The repositioning plans represent those for the current IGRT practice. Two plans were compared.

**Results:** The adaptive plans are in general superior than the repositioning plans in terms of both target coverage and critical structure sparing. For example, while target coverage are similar in both plans, the mean dose for left and right kidneys are 11.3Gy and 13.9Gy for adaptive plan, and 12.6Gy and 19.1Gy for the repositioning plan. Liver mean dose is reduced from 15.2Gy for the repositioning plan to 11.0Gy for the adaptive plan.

**Conclusion:** The online adaptive replanning scheme is effective to account for interfractional variations in pancreatic cancer radiotherapy. Further developments includes tools capable of rapidly delineating targets and critical structures and algorithms to account for multi organ independent dislocation and deformation.