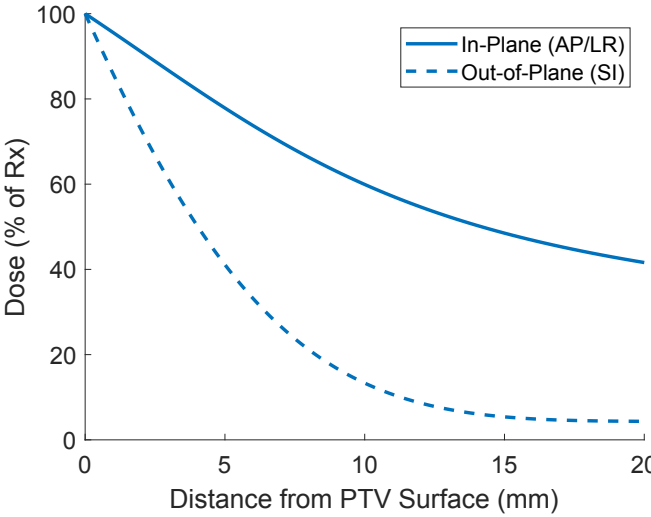

FIG. S1. Dosimetric model of SBRT falloff from the PTV. These data were derived using an artificial neural network dosimetric model of 20 pancreatic SBRT plans.

VIII. SUPPLEMENTAL MATERIAL

We implemented a dosimetric model to evaluate the impact of real-time imaging treatment shifts. In a prior study, we developed an artificial neural network-based framework for modeling pancreatic SBRT dose distributions (33). We used this framework to build models that predict dose falloff within 2 cm of the PTV in the in-plane (LR/AP) and SI directions. The model was built using 20 physician-approved patient plans for training.

We used a simplified formalism of the method presented in our earlier work (33) containing four geometric parameters. These geometric parameters were r_{ptv3D} (shortest 3D distance to PTV), r_{ptv2D} (axial component of rptv3D), z_{out} (SI position, out of slice), and V_{ptv} (target volume). This simplified model was used in order to capture the effect of dose falloff in areas very close to the PTV. Similar to our previous work, we derived feed-forward networks composed of a single hidden layer containing 25 nodes. Models were trained using L2 regularization. We divided the 20 input plans into two groups, half for training and half for validation.

Figure S1 shows the average dose falloff as a function of distance to the PTV as predicted by the artificial neural network dose model. These values were modeled in both the in-plane (LR/AP) and SI directions. Dose falloff was steep in the SI direction, owing to the need to spare dose to the duodenum (which often wraps around tumors located in the head of the pancreas).