

Plan Quality and Treatment Time of Patients Receiving Pancreatic SBRT with Volumetric Modulated Arc Therapy

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Abstract

Objective(s): Pancreatic SBRT is an increasingly utilized component of neoadjuvant management of locally advanced pancreatic cancer. There exists large variability among institutions utilizing pancreatic SBRT in treatment planning approaches, prescription doses, and application or normalization of prescription doses. Due to this large variability, consistent reporting of prescription practices with treatment outcomes is important for proper interpretation of results. The purpose of our work was to catalogue and report the treatment planning and delivery characteristics of patients treated at our institution on and off protocol whose clinical outcomes have been previously described.

Methods: We reviewed the treatment planning and dosimetry of 29 patients treated according to our institutional protocol assessing the efficacy of pancreatic SBRT following neoadjuvant modified FOLFIRINOX. We reviewed the target characteristics, use of dose-painted PTV (dpPTV), prescription doses, GTV and PTV coverage at prescription dose, GTV and PTV mean dose, Paddick CI, and organ at risk exposure. Planning characteristics were compared among patients treated on protocol and those treated who were not eligible for protocol.

Results: Of the 29 patients, 13 patients received treatment on protocol and 16 received treatment off protocol. Prescription dose ranged from 33Gy/5fx to 40Gy/5fx. All patients received treatment with VMAT with two arcs on TrueBeam STx or Edge linear accelerator. A dpPTV was used for all but one case. Mean GTV coverage at prescription dose was 82.9% (63.8 – 100%) and 88.6% (67.8 – 100%) for patients treated off and on protocol ($p = 0.122$). 100% coverage of GTV by prescription isodose was achieved only in 6 patients (3 each on and off protocol). Mean PTV coverage at prescription isodose was 92.6% (65.6 – 100%) and 92.9% (79.1 – 99.5%) off and on protocol ($p = 0.465$). Paddick CI for PTV was 0.84 and 0.85 off and on protocol ($p = 0.338$). Average treatment fraction time was 19:14; average total treatment time was 1:33:24.

Conclusion(s): There were no significant differences in measured Plan quality and delivery parameters between protocol and non-protocol patients treated with pancreatic SBRT at our institution. However there were considerable variations in dose coverage of GTV and PTV by prescription isodose due to use of dpPTV for sparing critical organs at risk (OAR). Uniform

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Abstract

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isodose coverage requirements should be established to optimize individual treatment plans and for inter-institutional comparisons of outcomes. Reporting of plan quality and prescription coverage will become increasingly important as centers attempt to further dose escalate pancreatic SBRT treatments and replicate high quality treatments.