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Abstract

Published 04/02/2023

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Patterns of Failure Following Preoperative Chemotherapy and Stereotactic Body Radiation Therapy for Patients with Borderline Resectable or Locally Advanced Pancreatic Cancer

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Corresponding author: Abdul Rashid, neh31@georgetown.edu**Categories:** Radiation Oncology**Keywords:** borderline resectable pancreatic cancer, pancreatic cancer, stereotactic ablative body radiotherapy**How to cite this abstract**

Hodgins N E, Unger K, Pang D, et al. (April 02, 2023) Patterns of Failure Following Preoperative Chemotherapy and Stereotactic Body Radiation Therapy for Patients with Borderline Resectable or Locally Advanced Pancreatic Cancer. Cureus 15(4): a907

Abstract

Objectives:

The role of neoadjuvant stereotactic body radiation therapy (SBRT) in the treatment of pancreatic cancer is controversial and the optimal target volumes and dose-fractionation is unclear. The aim of this study is to report on treatment outcomes of patients with borderline resectable (BL) or locally advanced (LA) pancreatic cancer following preoperative chemotherapy and SBRT and to characterize patterns of failure at a single institution. Between 2011-2022, 22 patients treated with neoadjuvant chemotherapy and SBRT for LA (n=4) or BL (n=18) pancreatic cancer followed by resection were eligible for inclusion.

Methods:

Patients received a median of 4 months (range 2-11 months) of neoadjuvant chemotherapy (FOLFIRINOX (n=9), FOLFOX (n=2), gemcitabine-abraxane (n=3), and other combination (n=8)). SBRT was prescribed to 30 Gy over 5 fractions to the pancreas planning tumor volume (PTV) and a simultaneous integrated boost was included in 10 patients to 35-45 Gy to the high risk vascular PTV. Elective nodal irradiation (ENI) was utilized in 13 patients (59%), and the median planning target volumes was 22.1 cc (6.5 – 92.9). Surgery consisted of a Whipple procedure (n=15), distal or subtotal pancreatectomy (n=2), and total pancreatectomy (n=5). Vascular reconstruction was required in 9 patients. Resectability and local recurrence rate (LRR) were defined as per the Alliance A021501 trial. Overall survival (OS), progression-free survival (PFS), and locoregional control (LRC) estimates were obtained using Kaplan-Meier analysis.

Results:

Following neoadjuvant treatment, 5 patients (23%) had a pathologic complete response (pCR) or < 5% viable cells on pathology. Surgical specimen tumor size ranged from microscopic disease to 7 cm. 8 patients (36%) had node positive disease. 16 patients (73%) had a margin negative pancreatic resection (75% for BL vs 50% for LA).

At a median follow up of 24 months (range 8-98 months), no patients had an isolated LRR. 5 patients (23%) had concomitant LRR and distal recurrence, and 11 patients (50%) had a distant recurrence only. There were no local failures in patients treated with ENI; LRR for patients without ENI was 43%. For all patients with LR, 3 had an infield recurrence, 1 had an in and out of field recurrence, and 1 patient had a recurrence outside of the PTV. There are no local failures in the patients who had a CR or near CR.

For the entire cohort, 2-year LRC, PFS, and OS were 82%, 32%, and 59% respectively. For BL and LA cancers, 2-year LRC was 78% vs 75% respectively, 2-year PFS was 39% vs 0% respectively, and 2-year OS was 61% vs. 50% respectively.

Conclusion(s):

Preoperative chemotherapy and SBRT with selective use of SIB and ENI techniques for borderline resectable and locally advanced pancreatic cancers offers encouraging R0 resection rates and outcomes, which compare favorably to published studies incorporating conventionally fractionated chemoradiation.

