

Patterns of Care in Use of Stereotactic Body Radiation Therapy in Pancreatic Cancer: An Analysis of the National Cancer Database

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Abstract

Objective: Stereotactic body radiation therapy (SBRT) has been shown to be a safe method to treat pancreatic cancer and has been adopted as a treatment option by the NCCN. There are multiple ongoing studies investigating the optimal patient population and optimal dose of SBRT. The aim of this analysis is to examine the trends in SBRT utilization and to investigate predictors of SBRT usage.

Methods: Using the NCDB, we identified non-metastatic pancreatic cancer patients treated with neoadjuvant or definitive chemotherapy and radiation (conventionally fractionated radiation or SBRT) from 2004-2015. Patients were defined as receiving SBRT if they received 5 or fewer fractions with a dose of 6 Gy or more per fraction. Linear regression was used to assess patterns of care over time. Logistic regression was used to evaluate predictors of SBRT usage. The following factors were assessed in predicting increased SBRT use: age, sex, race, insurance, median income in the highest quartile (>\$63,000) and educational attainment in the lowest quartile (<29% without a high school degree) of the patient's zip code, Charlson comorbidity score, tumor size, T stage, N stage, year of diagnosis, and academic institution.

Results: A total of 23,172 patients received neoadjuvant or definitive radiation and chemotherapy between 2005 and 2015. While the number of patients who received radiation remained relatively stable over time, the use of SBRT has steadily increased from 1.7% of all neoadjuvant/definitive radiotherapy courses in 2004 to 19.2% in 2015. The overall rate of SBRT use was 8.7%. The most common SBRT regimens were 30 Gy in 5 fractions (22%), 33 Gy in 5 fractions (15%), 24 Gy in 5 fractions (14%), 36 Gy in 3 fractions (8%), and 40 Gy in 5 fractions (8%). In 2015, the most common SBRT regimen was 33 Gy in 5 fractions, which was used in 34% of cases. This regimen was rarely used (<2%) prior to 2010.

In multivariate analyses, the following tumor factors were positively associated with SBRT usage: T1 vs T2 (OR = 1.41, p = 0.026), N0 vs N1 (OR = 1.19, p = 0.013). Other factors positively associated with SBRT usage were: academic institution (OR = 3.33, p < 0.001), old age (OR = 1.04, p < 0.001), year of diagnosis (OR = 1.22, p < 0.001), lower Charlson comorbidity score (OR = 1.16, p = 0.029), white race (OR = 1.41, p = 0.001), higher median income (OR = 1.18, p = 0.014), higher educational attainment (OR = 1.56, p < 0.001), and private insurance (vs uninsured or government insurance, OR 1.19, p = 0.030).

Conclusion: The use of SBRT for pancreatic cancer has increased since 2004. Patients with smaller tumors and clinical N0 are more likely to receive SBRT. There may be disparities in the implementation of SBRT that deserve attention as SBRT becomes established as an option for localized pancreatic cancer.