The Role of Neoadjuvant Stereotactic Body Radiation Therapy in Pancreatic Cancer

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Selected patients who are initially deemed unresectable may now undergo resection after receiving neoadjuvant induction chemotherapy and SBRT. Furthermore, improved surgical outcomes are observed with neoadjuvant SBRT in comparison with neoadjuvant chemotherapy alone. Longer follow-up is needed to validate its impact on survival.

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BACKGROUND: Recent prospective data demonstrate that stereotactic body radiation therapy (SBRT) is safe and effective in locally advanced pancreatic cancer (LAPC); however, little is known regarding the role of SBRT in the neoadjuvant setting. This study compared the role of neoadjuvant chemotherapy with and without SBRT in patients with borderline resectable pancreatic cancer (BRPC) or LAPC.

METHODS: All patients who underwent surgical resection following chemotherapy alone or induction chemotherapy followed by SBRT (SBRT group) were retrospectively reviewed. Disease stage was determined by multidisciplinary review. Chemotherapy regimens were heterogeneous; the cumulative SBRT dose range was 25–33 Gy in five fractions. Pathologic complete response (pCR) was defined as no residual tumor, and near pCR (npCR) was defined as microscopic foci of single cells of adenocarcinoma scattered among an area of dense fibrosis.

RESULTS: Among 76 resected patients with BRPC or LAPC, 37 received chemotherapy alone and 39 received SBRT. Median age was 60.4 years (range: 44.2–83.6 yr) and 64.4 years (range: 39.2–83.2 yr) in the SBRT group and chemotherapy-alone group, respectively. Fluorouracil, leucovorin, irinotecan, and oxaliplatin (FOLFIRINOX)-based chemotherapy was administered to 61.5% and 45.9% of SBRT and chemotherapy-alone patients, respectively. The majority (61.5%) of SBRT patients were deemed unresectable, while only 29.7% in the chemotherapy-alone group had LAPC. Pancreatodudodenectomy was performed in 66.7% of SBRT patients compared with 75.7% of chemotherapy-alone patients. Median time to surgery was 2.0 months (range: 0.1–10.5 mo) from the end of SBRT.

The overall rate of margin-negative resection in patients who received SBRT was 87.2%, with 86.7% in BRPC and 87.5% in LAPC. In comparison, the overall margin-negative resection rate in chemotherapy-alone patients was 48.6% (34.3% in BRPC, 54.5% in LAPC). Node-negative resections were achieved in 71.7% of patients who received SBRT (60.0% in BRPC, 79.2% in LAPC) and in 45.9% of patients who received chemotherapy alone (50.0% in BRPC, 36.4% in LAPC). The pCR rate was 10.3% in the SBRT group (6.7% in BRPC, 12.5% in LAPC) and 2.7% in the chemotherapy-alone group (0% in BRPC, 9.1% in LAPC). The npCR rate was 23.1% in the SBRT group (20.0% in BRPC, 25.0% in LAPC) and 5.4% in the chemotherapy-alone group (7.7% in BRPC, 0% in LAPC).

CONCLUSIONS: Selected patients who are initially deemed unresectable may now undergo resection after receiving neoadjuvant induction chemotherapy and SBRT. Furthermore, improved surgical outcomes are observed with neoadjuvant SBRT in comparison with neoadjuvant chemotherapy alone. Longer follow-up is needed to validate its impact on survival.

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