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Response Rates in Metastatic Neuroendocrine Tumors Receiving Peptide Receptor Radionuclide Therapy and Implications for Future Treatment Strategies

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BACKGROUND: Peptide receptor radionuclide therapy (PRRT) is a targeted therapy used to treat unresectable or metastatic somatostatin receptor-positive neuroendocrine tumors. The objective of this study was to evaluate treatment response rates among metastatic neuroendocrine tumors of different primary origins with largely liver-dominant disease, and identify factors that may be useful for future treatment strategies using PRRT.

METHODS: We retrospectively reviewed patients who received PRRT for unresectable or metastatic neuroendocrine tumors from 2018 to 2019 at a single institution. Patients were assessed with computed tomography and/or magnetic resonance imaging and 68Ga-DOTATATE-positron emission tomography before and after 2 or 4 cycles of PRRT. The primary endpoint of this study was tumor response according to RECIST 1.1. Secondary endpoints included response rates after two cycles and assessment of treatment toxicities. Statistical analyses included multinomial logistic regression models and Fisher exact test.

RESULTS: Twenty-seven patients underwent 92 cycles of peptide receptor radionuclide therapy: pancreas (n = 11), small bowel (n = 7), and other (n = 9) neuroendocrine tumors. Overall, 30% (8 of 27) of patients had partial response, 59% (16 of 27) stable disease, and 11% (3 of 27) progressed. Pancreatic neuroendocrine tumors responded differently from small bowel neuroendocrine tumors regardless of cycle number (P = 0.01). The majority of pancreatic neuroendocrine tumors (6 of 11) had partial response to peptide receptor radionuclide therapy, while all small bowel neuroendocrine tumors had stable disease. Pancreatic neuroendocrine tumors which were stable after 2 cycles were more likely to respond to additional cycles compared to other neuroendocrine tumor types (probability: 60% vs 11%). There were no treatment related hepatic or renal toxicities.

CONCLUSION: Patients with unresectable advanced or metastatic pancreatic neuroendocrine tumors may benefit from a full course of peptide receptor radionuclide therapy, whereas other neuroendocrine tumors appear less likely to respond. Large prospective studies are needed to confirm these findings.

ABSTRACT ID: 13