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Evaluation of ⁶⁸Ga-DOTATATE PET After Two Cycles of Peptide Receptor Radionuclide Therapy (PRRT) in Neuroendocrine Tumors (NET)

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BACKGROUND

We aimed to evaluate the added information provided by ⁶⁸Ga-DOTATATE PET after two cycles of peptide receptor radionuclide therapy (PRRT) in patients with somatostatin receptor (SSTR)-expressing neuroendocrine tumors (NET).

METHODS

In this retrospective study, 105 patients (54 women and 51 men, 62.5±10.5-year-old) with progressive NET treated with at least two cycles of ¹⁷⁷Lu-DOTATATE were included. All patients had ⁶⁸Ga-DOTATATE PET (PET/CT or PET/MRI) at baseline, after two cycles, and upon completion of PRRT. RECIST and change in SSTR-density were used to evaluate the scans and assess treatment response. Change in tumor marker chromogranin A was recorded. Patients were surveyed regarding their stance on the additional scan midway through the treatment.

RESULTS

All patients considered the additional ⁶⁸Ga-DOTATATE PET contributing to their quality of life as it provided important peace of mind. After two PRRT cycles, 0/105 (0%) patients showed complete response (CR), 54/105 (51%) partial response (PR), and 40/105 (38%) had stable disease (SD) with agreement between RECIST and SSTR-density. In 11/105 (11%) patients RECIST and SSTR-density were discordant: progressive disease (PD) according to RECIST was seen in 11/11 patients, while evaluation of SSTR-density showed true progression in 4/11 and pseudo-progression in 7/11 patients. Follow-up imaging after completion of PRRT verified results from interim imaging: 4/11 had true progression while the other 7/11 patients showed PR. The pattern of pseudo-progression consisted in an up to 2 mm increase in size of known NET lesions, with or without central necrosis or new stranding, but no new lesions. The SSTR-density in these patients was stable or decreased when related to the liver.

Chromogranin A was available in 37/105 patients. The change in chromogranin A did not positively correlate with response to treatment.

CONCLUSIONS

Our data show that a ^{68}Ga -DOTATATE PET after two cycles of PRRT provides important reassurance for the patient about the status of the disease and response to treatment. No patient showed CR after two cycles of PRRT, clearing concerns about possible overtreatment. ^{68}Ga -DOTATATE PET is more accurate in assessing treatment response after two cycles than RECIST, allowing continuation of treatment in patients with pseudo-progression. Change in tumor marker did not correlate well with response to treatment after two treatment cycles.

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