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Somatostatin receptor expression on ⁶⁸Ga-Dotatate imaging among patients with poorly differentiated extra-pulmonary neuroendocrine carcinomas: a prospective study

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BACKGROUND

Limited data are available regarding somatostatin receptor (SSTR) expression in poorly-differentiated neuroendocrine carcinoma (NEC). Some retrospective series report strong SSTR expression in as high as 40% of patients with NEC. However, these figures may be influenced by selection bias, such as imaging of patients with lower ki-67 index or uncertainty about pathologic tumor differentiation.

METHODS

In this prospective study, ⁶⁸Ga-Dotatate PET was compared with FDG PET in patients with metastatic extrapulmonary NEC and at least one measurable site of metastasis. The primary endpoint was proportion of patients with tumors showing uniform dotatate-avidity (uptake > normal liver) tumors. Secondary endpoint was the proportion of patients with completely negative SSTR expression or a heterogeneous pattern of expression.

RESULTS

The study enrolled 30 patients, who underwent ⁶⁸Ga-Dotatate PET imaging; 28 patients also had FDG PET imaging within a prespecified 2 month-interval from ⁶⁸Ga-Dotatate PET. Primary tumor sites included pancreatic (7), colorectal (6), uterine (2) and unknown (9). Histologic subtype included small cell (15), large cell (6), and mixed or unspecified (9). All patients had anatomically measurable metastases at time of scanning, although metabolic uptake on FDG PET may have been attenuated, in some cases, by prior chemotherapy administration. Only 3 patients (10%) had evidence of avid (Krenning grade 3 or 4) uniform dotatate avidity indicating strong SSTR expression with corresponding uptake on FDG/PET and/or anatomic imaging. Nine patients had disease characterized as completely negative on Dotatate PET, another 9 had mostly dotatate PET negative disease with a few weakly avid lesions, eight had heterogeneous avidity patterns, and 1 patient had weakly avid lesions on dotatate PET.

CONCLUSIONS

A small proportion, approximately 10%, of patients with metastatic poorly-differentiated extrapulmonary NEC exhibit strong and uniform somatostatin receptors expression, indicating their suitability for peptide receptor radionuclide therapy.