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Gallium-68 DOTATOC PET-CT for Localization of Primary Tumor in Patients with Metastatic Neuroendocrine Tumors

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Background: Surgical resection of the primary tumor may improve survival in patients with neuroendocrine tumors (NET) even in the presence of metastatic disease.

Objective: To evaluate the utility of Gallium-68 DOTA-D-Phe[1]-Try[3]–Octreotide (Ga-68 DOTATOC), an investigational PET radiopharmaceutical targeting somatostatin receptors, for localization of primary tumors in patients (pts) with metastatic NET.

Methods: Patients with known or suspected NET underwent whole-body ^{68}Ga-DOTATOC PET-CT in a prospective study. Ga-68 DOTATOC was produced at the University of Iowa under a physician-sponsored investigational new drug (IND) approval using an automated 68Ge/68Ga generator coupled with a ModularLab PharmTracer fluid handling system (Eckert-Ziegler). PET-CT scans were obtained 60 min after the IV administration of 148 MBq of Ga-68 DOTATOC with a low-dose non-contrast CT. Images were interpreted qualitatively with focal uptake above normal background considered positive for NET.

Results: 20 pts with histologically proven NET metastases underwent Ga-68 DOTATOC PET-CT for localization of the primary tumor and evaluation of disease extent. Metastases were mostly in the liver (n=17) and lymph nodes (n=6). All pts had previous CT or MRI and 8 patients had In-111 Octreotide scan within 1 year of Ga-68 DOTATOC. Ga-68 DOTATOC PET-CT was positive in potential primary tumor sites in 14 pts (70%) and was negative for a primary lesion in 6 pts (30%). 9 primary tumor sites demonstrated with Ga-68 DOTATOC were confirmed (45% true positive), 7 with histology and 2 on follow-up imaging, including 3 ileal lesions and 6 lesions in the pancreas. There were 2 false positive Ga-68 DOTATOC PET-CT scans and 3 lesions are unconfirmed.

Conclusion: Our findings suggest a promising role for Ga-68 DOTATOC PET-CT in localization of the primary tumor in patients with metastatic neuroendocrine tumors.