# C-21

## Characterizing Bone Metastases in Patients with Well-Differentiated Neuroendocrine Neoplasms Utilizing Ga68-DOTATATE PET

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### BACKGROUND

Tumors of neuroendocrine origin are a rare, heterogenous group of neoplasms. Neuroendocrine neoplasms (NENs) are categorized by site of origin, differentiation status, and by grade (Ki-67 expression and/or mitotic rate), with significant prognostic variability accordingly. These tumors frequently metastasize to bone, with reported incidence between 6-12% by older SSTR imaging. Our study evaluates patients with well-differentiated tumors of neuroendocrine origin to determine the incidence of osseous metastases when evaluated with higher-sensitivity Ga68 DOTATATE PET scans. The study characterizes the clinical features therein.

### METHODS

This study was performed at a single tertiary-care institution with 3 sites in the US. IRB approval was obtained. An automated data extraction tool was used to mine the electronic medical record by searching all performed positron emission tomography (PET) studies for keywords. Identified scans had to include a combination of the following keywords: “Dotatate” AND “met*” or “lesion” AND “bone” or “osse*” or “skel*”. The individual medical records identified from the generated report were then reviewed to include only patients with 1) well-differentiated NETs of GI and pancreatic origin, lung carcinoid, paraganglioma/pheochromocytoma, or other/unknown primary site, and 2) patients with confirmed osseous metastatic disease. Patient data was then entered into a database and evaluated in aggregate.

## RESULTS

1,948 PET scans of 1,473 patients were extracted from the EMR, from which 424 patients were identified for inclusion; scans were performed between 5/2018 and 5/2021. Calculated incidence of bone metastasis by Ga68 DOTATATE PET was 28.8%. Median age of included population was 61 years (range 14-92), 49.5% being male. Site of origin was 47.2% bowel NET, 18.9% pancreatic NET, 10.8% lung carcinoid, 10.6% paraganglioma/pheochromocytoma, 2.1% other site, and 10.4% unknown primary. Majority of patients were asymptomatic (64.0%), had sclerotic appearance (76.7%), Krenning 4 (71.4%), and >3 sites (68.3%) of osseous disease. 94.6% of the population had disease of the axial skeleton; 65.6% of appendicular. Only 57 patients with osseous disease (13.4%) suffered a fracture, despite high proportions of patients having metastasis at high-risk sites. Fracture occurred at disproportionately low rates in NETs originating in bowel (22.8% of fractures), with proportionately higher rates among pancreatic NETS and paragangliomas/pheochromocytomas (31.6% and 22.8%, respectively).

## CONCLUSIONS

Osseous metastatic disease in well-differentiated NENs are evident at much higher rates when imaging with Ga68 DOTATATE PET compared with previously reported data. Nevertheless, fracture occurred at a low rate, suggesting that these patients are at a relatively low risk for skeletal-related events.

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