

^{111}In -DTPA-Octrotide SPECT (OctreoScan[®]) Uptake in Metastatic Renal Cell

Carcinoma to Pancreas

Abstract

We report a case of late presentation of metastatic renal cell carcinoma demonstrating intense ^{111}In -DTPA-Octrotide uptake in pancreas without recurrence at the primary site. Immunohistochemistry study revealed somatostatin receptor (SSTR) subtype 2 of metastatic RCC preferentially express on tumour endothelial cells. The typical hypervascular features of RCC with intense homogeneous contrast enhancement in the arterial phase on computed tomography should raise the possibility of metastatic RCC. This case illustrate that RCC can demonstrate high octreotide uptake in abdominal metastases.

Key words: renal cell carcinoma, somatostatin receptor, renal cell carcinoma, pancreatic neuroendocrine neoplasm, ^{111}In -DTPA-Octrotide SPECT

Figure 1. A 62-year-old man presented with generalised weakness and long standing diarrhoea but otherwise fit with no weight loss. Two-year ago he underwent left radical nephrectomy for T3a renal cell carcinoma (RCC) with microscopic invasion to renal vein and no lymph-node involvement demonstrated. Regular follow up post-operatively had been uneventful. However, surveillance computed tomography (CT) scan showed an arterially enhancing hypervascular 28mm lesion on the anterior aspect of pancreatic head just right of the superior mesenteric artery. **(A)** There was no evidence of RCC recurrence at the nephrectomy site. ^{111}In -DTPA-Octrotide SPECT (OctreoScan®, St Louis, Missouri, USA) demonstrated avid uptake at the head of pancreas, indicating that the mass was somatostatin receptor (SSTR) positive. **(B)** ^{111}In -DTPA-Octreotide SPECT (OctreoScan®) is recommended in current European Association of Nuclear Medicine (EANM) guideline for diagnosing neuroendocrine tumours (NETs) if image appearances are suspicious for NET.¹ Somatostatin receptor imaging enables molecular imaging of SSTRs where well differentiated NETs strongly express SSTRs on their surface especially subtype 2. Other tumours with high expression of SSTR include sympathoadrenal tumours, medullary thyroid carcinoma, Merkel cell carcinoma and small cell lung cancer.¹ Metastatic RCC in abdomen usually demonstrate low level uptake on OctreoScan®¹,². Isolated cases of ^{68}Ga -DOTATATE uptake by metastatic RCC in pancreas has been reported.³⁻⁵ This case highlighted that it is possible for metastatic RCC to demonstrate intense uptake on somatostatin receptor scintigraphy, which initially has led to a suspicion of neuroendocrine tumours.

Figure 2. Pancreaticoduodenectomy was performed. Macroscopically there was a yellow, well-circumscribed, solid, nodular pancreatic mass. Microscopically the lesion was composed of nests of cells with clear cytoplasm, distinct cell boundaries, uniform round nuclei and inconspicuous nucleoli, arranged in alveolar growth pattern and set within a prominent, but delicate vasculature (**A**). Immunohistochemical study demonstrated that the tumour cells were positive for CAM5.2, RCC and PAX8, and negative for chromogranin, synaptophysin, insulin, glucagon, somatostatin and gastrin. The morphologic features and immunoprofile were those of a metastatic clear cell renal cell carcinoma. Interestingly immunostaining for somatostatin receptors subtype 2 (SSTR2) was positive in the endothelial cells and completely negative in tumour cells (**B**). Post-operative follow up CT scan at 3 months showed no intra-abdominal recurrence of RCC or further metastases. The patient remained well post operatively. Of the five subtypes of SSTR, RCC predominately express subtype 2, and almost completely no subtype 3 which is distinct from breast carcinoma and carcinoid tumour.⁶ This diffuse endothelial staining may explain the intense uptake of the RCC on somatostatin receptor scintigraphy. Metastases to retroperitoneum including pancreas occur in about 7% of the cases.⁷ Due to angiogenesis activated by overproduction of vascular endothelial growth factor (VEGF), radiologically RCC metastases have the typical hypervascular features with intense homogeneous contrast enhancement in the arterial phase, which could sometimes clinically manifest as intra-abdominal bleeding.⁸ The typical arterial enhancement could help to differentiate RCC from other malignancies. Early surgical intervention in the current case was performed, as this was an isolated site of disease and the management of metastatic RCC and pancreatic NET would have been the same.

References

1. Bombardieri E, Ambrosini V, Aktolun C, et al. ¹¹¹In-pentetreotide scintigraphy: procedure guidelines for tumour imaging. *European journal of nuclear medicine and molecular imaging*. 2010;37:1441-1448.
2. Edgren M, Westlin JE, Kalkner KM, et al. [¹¹¹In-DPTA-D-Phe1]-octreotide scintigraphy in the management of patients with advanced renal cell carcinoma. *Cancer biotherapy & radiopharmaceuticals*. 1999;14:59-64.
3. Papadakis GZ, Millo C, Sadowski SM, et al. Kidney Tumor in a von Hippel-Lindau (VHL) Patient With Intensely Increased Activity on ⁶⁸Ga-DOTA-TATE PET/CT. *Clinical nuclear medicine*. 2016;41:970-971.
4. Vamadevan S, Le K, Shen L, et al. ⁶⁸Ga-DOTATATE Uptake in Solitary Pancreatic Metastasis From Clear Cell Renal Cancer. *Clinical nuclear medicine*. 2017;42:700-701.
5. Peter L, Sanger J, Hommann M, et al. Molecular imaging of late somatostatin receptor-positive metastases of renal cell carcinoma in the pancreas by ⁶⁸Ga DOTATOC PET/CT: a rare differential diagnosis to multiple primary pancreatic neuroendocrine tumors. *Clinical nuclear medicine*. 2014;39:713-716.
6. Adams RL, Adams IP, Lindow SW, et al. Somatostatin receptors 2 and 5 are preferentially expressed in proliferating endothelium. *British journal of cancer*. 2005;92:1493-1498.
7. Bianchi M, Sun M, Jeldres C, et al. Distribution of metastatic sites in renal cell carcinoma: a population-based analysis. *Annals of oncology : official journal of the European Society for Medical Oncology / ESMO*. 2012;23:973-980.
8. Gajendra S, Sachdev R, Mohapatra I, et al. Metastatic Renal Cell Carcinoma: An Unusual Cause of Bleeding Pancreatic Mass. *Journal of clinical and diagnostic research : JCDR*. 2015;9:ED15-17.