NATURE REVIEWS ENDOCRINOLOGY **| REVIEW**

Neuroendocrine tumours: the role of imaging for diagnosis and therapy

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Abstract

In patients with neuroendocrine tumours (NETs), a combination of morphological imaging and nuclear medicine techniques is mandatory for primary tumour visualization, staging and evaluation of somatostatin receptor status. CT and MRI are well-suited for discerning small lesions that might escape detection by single photon emission tomography (SPECT) or PET, as well as for assessing the local invasiveness of the tumour or the response to therapy. Somatostatin receptor imaging, by ^{111}In-pentetreotide scintigraphy or PET with ^{68}Ga-labelled somatostatin analogues, frequently identifies additional lesions that are not visible on CT or MRI scans. Currently, somatostatin receptor scintigraphy with ^{111}In-pentetreotide is the more frequently available of the two techniques to determine somatostatin receptor expression and is needed to select patients for peptide receptor radionuclide therapy. In the future, because of its higher sensitivity, PET with ^{68}Ga-labelled somatostatin analogues is expected to replace somatostatin receptor scintigraphy. Whereas ^{18}F-FDG-PET is only used in high-grade neuroendocrine cancers, PET–CT with ^{18}F-dihydroxy-L-phenylalanine or ^{11}C-5-hydroxy-L-tryptophan is a useful problem-solving tool and could be considered for the evaluation of therapy response in the future. This article reviews the role of imaging for the diagnosis and management of intestinal and pancreatic NETs. Response evaluation and controversies in NET imaging will also be discussed.

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Competing interests statement

E.P. Krenning and D.J. Kwekkeboom are stockholders in Advanced Accelerator Applications (AAA). The other authors declare no competing interests.

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