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Integrated Whole-Body PET/MR Imaging may improve the management of Gastroenteropancreatic Neuroendocrine Neoplasms: A Retro-Prospective Study

Abstract:

Introduction and aim:
Simultaneous positron emission tomography/magnetic resonance imaging (PET-MRI) combines the high sensitivity of PET with the high specificity of MRI. It is poorly evaluated in gastroenteropancreatic neuroendocrine neoplasms (G-NENs). Thus, we evaluated the impact of PET-MRI in G-NEN patients at the time of diagnosis and during the surveillance.

Methods:
From June 2017 to December 2021, a monocenter controlled study including 71 G-NEN patients was conducted: patients underwent whole-body PET-MRI for staging and/or follow-up purposes. A whole-body emission scan with ^{18}F-6-fluoro-L-dihydroxyphenylalanine (^{18}FDOPA, n = 30), ^{18}F-fluoro-2-deoxy-D-glucose (^{18}FDG, n = 21), or ^{68}Ga-(DOTA(0)-Phe(1)-Tyr(3))-octreotide (^{68}Ga-DOTATOC, n = 20) with the simultaneous acquisition of a T1-Dixon sequence and diffusion-weighed imaging (DWI), followed by a dedicated step of MRI sequences with a Gadolinium contrast. They underwent PET-MRI every 6-12 months during the follow-up period until death. Over this period, 50 patients with two or more PET-MRI were evaluated.

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Results:

The mean age was 61 [extremes, 31-92] years. At the baseline, PET-MRI provided new information in 12 cases (17%) as compared to conventional imaging: there were more metastases in eight, an undescribed location (myocardia) in two, and an unknown primary location in two cases. G grading at the baseline influenced overall survival. During the follow-up (7-381 months, mean 194), clinical and therapy managements were influenced by PET-MRI in three (6%) patients due to new metastases findings when neither overall, nor disease-free survivals in these two subgroups (n = 12 vs. n = 59), were different.

Conclusion:

Our study suggests that using PET/MRI with the appropriate radiotracer improves the diagnostic performance (staging and distribution of tumors) with no significant impact on survival.

Keywords: G-NET; MRI; PET; PET-MRI; endocrine; gastrointestinal; pancreas