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Diagnosis of pancreatic cancer using fluorine-18 fluorodeoxyglucose positron emission tomography (FDG PET) —Usefulness and limitations in "clinical reality"—

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The present review will provide an overview of the literature concerning the FDG PET diagnosis of pancreatic cancer and a summary from our experience of 231 cases of pancreatic lesions. FDG PET can effectively differentiate pancreatic cancer from benign lesion with high accuracy. Newly-developed PET scanners can detect small pancreatic cancers, up to 7 mm in diameter, by their high resolution, which could make a great contribution to the early detection of resectable and potentially curable pancreatic cancers. FDG PET is useful and cost-beneficial in the pre-operative staging of pancreatic cancer because an unexpected distant metastasis can be detected by whole-body PET in about 40% of the cases, which results in avoidance of unnecessary surgical procedures. FDG PET is also useful in evaluation of the treatment effect, monitoring after the operation and detection of recurrent pancreatic cancers. However, there are some drawbacks in PET diagnosis. A relatively wide overlap has been reported between semiquantitative uptake values obtained in cancers and those in inflammatory lesions. As for false-positive cases, active and chronic pancreatitis and autoimmune pancreatitis sometimes show high FDG accumulation and mimic pancreatic cancer with a shape of focal uptake. There were 8 false negative cases in the detection of pancreatic cancer by FDG PET, up to 33 mm in diameter, mainly because of their poor cellularity in cancer tissues. In addition, there are 19% of cancer cases with a decline in FDG uptake from 1 hr to 2 hr scan. FDG PET was recently applied to and was shown to be feasible in the differential diagnosis of cystic pancreatic lesions, such as intraductal papillary mucinous tumor of the pancreas. Further investigations are required to clarify the clinical value of FDG PET in predicting prognosis of the pancreatic patients.

Key words: positron emission tomography, tumor diagnosis, pancreatic cancer, ^{18}F-fluorodeoxyglucose, glucose transporter, hexokinase, therapy monitoring, prognosis