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Original article

Utility of 18 Fludeoxyglucose in Preoperative Positon-Emission Tomography-Computed Tomography (PET-CT) in the Early Diagnosis of Exocrine Pancreatic Cancer: A Study of 139 Resected Cases☆

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ABSTRACT

Introduction: In pancreatic ductal adenocarcinoma (PDA), surgical resection is the only curative treatment, but due to its late clinical presentation only 15–25% patients are candidates for curative resection. The aim of this prospective, single-center study is to determine the diagnostic utility of preoperative PET-CT for early detection of PDA and early panIN lesions.

Methods: We studied the histopathological features of PDA and different panIN lesions in 139 surgical samples from patients undergoing pancreatic resection (from 2010 to 2014), comparing these results with preoperative PET-CT and MDCT study. For tumor diagnosis in PET-CT maximum standard SUV 2.5 was used. Pancreatic baseline SUVmax is the maximum uptake of the radiotracer 18-2FDG on the ROI curve determined for the area of the normal pancreas after pathological reassessment with areas not affected by tumors or preneoplastic lesions. Tumor Uptake Index is the ratio between the tumor SUVmax and pancreatic baseline SUVmax.

Results: Using an standard maximum SUV value of 2.5, PET-CT sensitivity was 77.7% (108 of the 139 cases) against 75.5% (105 of the 139 cases) of MDCT. But when we combined this value with maximum SUV of normal pancreatic tissue from each patient, PET-CT sensitivity improved its value to 94.9%.

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Conclusion: A combination of studies of PET-CT in tumor and non-tumor tissue of each patient might be a very useful diagnostic tool not only for preoperative diagnosis of PDA, but also for early panIN lesions.

Utilidad de la 18-fluorodeoxiglucosa en la tomografía por emisión de positrones-tomografía computarizada (PET-TC) preoperatoria en el diagnóstico precoz del cáncer de páncreas exocrino: estudio en 139 casos resecados

Palabras clave:
Adenocarcinoma ductal de páncreas
Tomografía por emisión de positrones-tomografía computarizada (PET-TC)
Cirugía pancreática
Neoplasia intraepitelial pancreática

R E S U M E N

Introducción: El único tratamiento curativo del cáncer de páncreas (CP) es la exéresis quirúrgica, pero debido a su presentación clínica tardía solo el 15-25% de los pacientes son candidatos a resección curativa. El objetivo de este trabajo, prospectivo y unicéntrico, es determinar la utilidad de la PET-TC preoperatoria en el diagnóstico precoz del CP, en su estadificación y en la detección de estadios precursores de la enfermedad en una serie de 139 pacientes sometidos a intervención quirúrgica con «intención curativa» y con el diagnóstico histológico de adenocarcinoma ductal.

Métodos: Hemos estudiado las características histopatológicas del CP y de las diferentes lesiones panIN en las piezas quirúrgicas de 139 pacientes sometidos a resección pancreática durante el periodo 2010-2014, comparando estos resultados con los datos preoperatorios de una tomografía computarizada multidetector con contraste trifásico (TCMD) y una PET-TC en la que la captación de glucosa fue determinada por el SUV, considerando malignidad por encima de 2,5.

Resultados: En nuestra serie, la sensibilidad de la PET-TC para el diagnóstico tumoral fue del 77,7% (108 de los 139 casos) versus el 75,5% (105 de los 139 casos) para la TCMD. Cuando combinamos este valor máximo del SUV tumoral con el SUV máximo de tejido pancreático normal de cada paciente, la sensibilidad diagnóstica de la PET-TC para el CP asciende al 94,9% (132 de los 139 casos).

Conclusión: Una combinación de los estudios del PET-TC en el tejido tumoral y no tumoral de cada paciente puede ser una herramienta diagnóstica muy útil no solo para el diagnóstico preoperatorio del CP, sino también para las lesiones panIN.

Introduction

The only curative treatment for pancreatic cancer (PC) is surgical removal.[1–7] The 5-year survival rate is less than 5%, although it reaches 30% in patients who undergo surgery with curative intent associated with adjuvant radiotherapy and chemotherapy.[8–10]

Today, PC survival rates may be able to be improved if early diagnosis is reached with precise tumor staging, in addition to the detection of precursor lesions of PC, known as pancreatic intraepithelial neoplasms (panIN).[11–15] Some authors[16–22] suggest that 18-fluorodeoxyglucose in positron emission tomography-computed tomography (PET-CT) could provide benefits in this area. Furthermore, in experimental models it has been observed that PET may be useful for the detection of precursor lesions of PC, although its utility has never been evaluated in humans.[23]

The objective of our study is to determine the utility of preoperative PET-CT in the early diagnosis of PC, its staging and the detection of precursor stages of the disease in a series of 139 patients who underwent surgery with curative intent and had a histological diagnosis of ductal adenocarcinoma.

Methods

Patients

At our hospital, 139 prospective patients diagnosed with PC underwent pancreatic resection with curative intent in the study period from 2010 to 2014. Mean age was 60.6±12.9 years (range: 37–79 years); 88 patients (63.3%) were male and the remaining 51 (36.7%) were female. The variables studied included: tumor location and tumor size, histologic grade, TNM stage, lymphovascular invasion, perineural invasion, lymph node metastases, presence of panIN lesions, maximum tumor SUV, maximum SUV for panIN and maximum baseline SUV of the pancreas.