FDG PET imaging of locally advanced gastric carcinomas: correlation with endoscopic and histopathological findings.

Abstract:
Gastric cancer carries a poor prognosis and is the second most frequent cause of cancer-related death worldwide. In spite of the clinical importance of this tumour entity, only a few fluorine-18 fluorodeoxyglucose positron emission tomography (FDG PET) studies have been published on gastric carcinomas. The aim of this study was to characterise the FDG uptake of gastric carcinomas by relating it to the histopathological properties of the tumours. Within this context, we focussed particularly on the microscopic growth type according to Lauren since our preliminary observations indicated low FDG accumulation in the non-intestinal growth type compared with the intestinal type. Forty patients with locally advanced gastric carcinomas and ten control subjects were studied by FDG PET (300 MBq i.v., emission scan: 40 min p.i., one bed position, measured transmission, filtered back-projection). Detectability of the tumours was qualitatively assessed by two independent observers. For quantitative analysis the regional tumour uptake was measured by standardised uptake values (SUV normalised to the body surface area) using a region of interest technique. Qualitative and quantitative analyses were performed with respect to the microscopic growth type according to Lauren (intestinal type vs non-intestinal type). Other histopathological characteristics were
also assessed: mucus content, grading, tumour extension and tumour location. In 36 patients the survival rates were compared for detectable vs non-detectable tumours and for tumour FDG uptake above and below the median. Only 24 of the 40 locally advanced gastric carcinomas (60%) were detected by FDG PET. The detection rate for tumours of the intestinal type was significantly higher than that for tumours of the non-intestinal type (83% vs 41%, \(P=0.01\)). Only 2/18 intestinal type tumours contained extracellular or intracellular mucus whereas 17/22 non-intestinal tumours did so (\(P<0.01\)). The mean SUV was significantly different between the intestinal type and the non-intestinal type (6.7+/−3.4 vs 4.8+/−2.8, \(P=0.03\)), between non-mucus-containing tumours and mucus-containing tumours (7.2+/−3.2 vs 3.9+/−2.1, \(P<0.01\)) and between grade 2 tumours and grade 3 tumours (7.4+/−2.3 vs 5.2+/−3.3, \(P=0.02\)). The survival rate was not significantly different in patients with detectable tumours on FDG PET and patients with non-detectable tumours (\(P=0.85\)). It is concluded that advanced malignant tumours with a poor prognosis may show low FDG uptake due to special histopathological characteristics. The overall low detection rate of gastric carcinomas is attributable to the frequent occurrence of diffusely growing and mucus-containing tumour types. This may limit the value of FDG PET for diagnosis and therapy monitoring in patients with gastric carcinomas. Furthermore, the intensity of tumour FDG uptake is not predictive of survival in gastric carcinomas.