

Assessment of Lymph Node Metastases Using 18F-FDG PET in Patients with Advanced Gastric Cancer

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Background and Purpose: Gastric cancer is the most common cancer and constitutes the leading cause of cancer deaths in Korea. The pre-operative accurate diagnosis is important for optimal treatment plan and overall prognosis. Lymph node involvement is one of the most important prognostic factors. 18F-fluoro- 2-deoxyglucose (FDG) positron emission tomography (PET) is a well-established method for detection and staging of a variety of malignancies. We conducted a prospective study in order to determine the accuracy of FDG PET with regard to Lymph node (LN) staging in patients with advanced gastric cancer, and to ascertain the factors that affect the accuracy of this method.

Patients and Methods: Seventy-three patients with advanced gastric cancer were enrolled in this prospective study from October 2002 to June 2004. Eligibility criteria for this study were as follows: 1) advanced gastric cancer confirmed via gastroendoscopic biopsy; 2) advanced gastric cancer with stage of T3 or higher according to preoperative spiral CT; 3) curative-intent operation planned; and 4) no history of radiation treatment or chemotherapy. Before entry into the study during eligibility assessment, we performed standard preoperative procedures, including a complete history, physical examination, laboratory tests, gastroendoscopy, and spiral abdominal CT, and obtained written informed consent. Patients underwent either gastrectomy and D2 lymphadenectomy (n=67) or exploratory laparotomy. Japanese Research Society for Gastric Cancer (JRS GC) classification was used for LN assessment.

Results: FDG PET was able to detect primary lesions in 70 of the 73 cases. The sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of FDG PET for LN metastasis were 40%, 95%, 91%, and 56%, respectively. Signet-ring cell carcinoma was associated with the lowest degree of sensitivity (15%), whereas other cell types could be detected with modest sensitivity (30~71%) and high specificity (93~100%). According to multiple logistic regression, the standard uptake value for primary tumors exhibited significant positive regression to sensitivity ($p=0.02$, odd ratio=1.14) for LN metastasis. CT was superior to PET in sensitivity ($p<0.0001$), and PET was superior to CT in specificity ($p<0.0001$) and PPV ($p=0.05$).

Conclusions: FDG PET exhibited good specificity with regard to LN staging of gastric cancer, and FDG accumulation in the primary tumor was the only independent variable for the accuracy of FDG PET. In spite of its clear limitations, FDG PET was useful in the LN staging of FDG-avid gastric cancer.