The Clinical Use of PET/CT in Upper Gastrointestinal Oncology

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The upper gastrointestinal tract includes mouth, pharynx, oesophagus and stomach but mouth and pharynx are usually included in head and neck anatomical district.

In recent years 18F-FDG PET/CT has gained a prominent role in the evaluation of tumors of the upper gastrointestinal tract mainly because of its ability to detect distant metastasis; the point is pivotal because is closely correlated with prognosis an clinical management.

Esophageal cancer is the ninth most common cancer in the world, with significant differences of incidence in different countries, the prognosis is poor with an estimated 5 years survival rate of 17-34%. The two major histological types of esophageal cancer are squamous cell carcinoma (ESCC) and adenocarcinoma (EAD), which have different biological behavior and therapy outcomes. Esophageal squamous cell carcinoma is more sensitive to chemioradiation and has higher complete response rate than adenocarcinoma. 18F-FDG uptake is higher in well differentiated ESCC and in poorly differentiated EAD.

Endoscopy ultrasoundgraphy (EUS) is nowadays considered the most accurate diagnostic tool for determining tumor invasion and evaluation of local lymph nodes (T and N status), although the evaluation of distant nodes is not possibl; for this reason 18F-FDG-PET has gained an important role in the staging of esophageal cancer to detect both nodal and distant metastasis.

In the evaluation at the end of chemioradiation therapy 18F-FDG-PET scans are gaining an import role and some studies suggest that metabolic parameters before and after therapy could be important prognostic factors and even guide therapeutical behavior.

About 60% of the patients have a recurrence of the disease one year after treatment; 18F-FDG-PET has proven to be useful in follow-up because of its sensitivity in identifying both local and distant recurrence.

Gastric cancer is the fourth most common cancer worldwide, its prognosis is poor with an estimated overall 5 years survival rate of 35%. Most common histological types are intestinal, non-intestinal type (diffuse type, mixed typer, signet ring cell), non Hodgkin lymphomas (NHL) and gastrointestinal stroll tumors (GIST), which have different biological behavior and outcomes. Only 60% of all gastric solid tumors can be identified with 18F-FDG-PET because some histological types are not 18F-FDG avid.

EUS is nowadays considered the most accurate diagnostic tool for determining tumor invasion and evaluation of local lymph nodes, although the evaluation of distant nodes is not possible. 18F-FDG PET shows high specificity and sensibilities in identifying distant metastasis both nodal and hematological. FDG PET also provides important metabolic information on the primary tumor and even prognostic data. Moreover metabolic response has been proven to be correlated with survival after surgical resection.

About 40 to 60% of patients with advanced gastric cancer develop recurrence after surgery (74% of the patients within 2 years and 98% within 3 years), and their prognosis is poor. 18F-FDG PET is highly effective in discriminating true recurrence with sensitivity of 85% and specificity of 78% respectively.

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Gastric LNH represent about 20-30% of all lymphomas and usually is an aggressive tumor. As in others NHL 18F-FDG PET is useful in diagnosis, staging, evaluation of therapy response and follow-up. A rare form of gastric NHL is mucosa-associated lymphoid tissue (MALT), in this hystotype the detection rate of 18F-FDG PET is about 50% and is correlated with gross morphological characteristics, tumor stage and Ki-67 index.

Gastrointesitnal stromal tumors (GIST) are the most common non-epithelial mesenchymal tumors of the gastrointestinal tract (60% occurs in stomach, 20-30% in bowel) with uncertain biological behaviors. 18F-FDG PET has shown good accuracy in diagnosis and treatment response evaluation and has demonstred to be a predicotor of cinical outcome.

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