Clinical Area: **FDG PET for Esophageal Cancer**
Keywords: **Cancer esophagus, FDG PET, lymph node, staging**
Reference: **Lerut T, Flamen P, Ectors N, Van Cutsem E, Peeters M, et al. Histopathologic Validation of Lymph Node Staging with FDG-PET Scan in Cancer of the Esophagus and Gastroesophageal Junction. A Prospective Study Based on Primary Surgery with Extensive Lymphadenectomy. Annals of Surgery 2000; 232(6): 743-752.**

Study Type: Comparison of diagnostic tests.
Study Aim: Assessment of the value of FGD PET for preoperative staging of patients with primary cancer of the esophagus and gastroesophageal junction (GEJ) according to the extent of nodal involvement.

Outcomes
- *Primary:* Sensitivity, specificity, and LN staging.

Design
- *Number of subjects:* N=42
- *Description of study population:* Gender: 7 women, 35 men. Mean age: 58.5. (Range: 44-76). These patients were part of a larger group in a prospective study assessing FDG PET for preoperative staging of esophageal and GEJ cancer.
- *Inclusion criteria:* Only patients who had undergone FDG PET scanning for carcinoma of the digestive system, and had the extent of nodal involvement verified by histological analysis were included in the study.
- *Exclusion criteria:* Prior treatment for carcinoma of the esophagus and GEJ, diabetes mellitus, inflammatory lung diseases, and inoperability for medical reasons.
- *Procedure*: All patients underwent the standard preoperative staging procedures including history, physical exam, lab tests, ultrasound of the neck, barium esophagram, bronchoscopy, CT of the chest and abdomen and a transesophageal EUS. In the same week a FDG PET was performed.
  Of the 42 patients included in the study, 39 had a lymphadenectomy performed with the primary curative therapy. The three others had distant nodal metastases and received neoadjuvant chemoradiation.

Validity
- *Independent blind comparison with a gold standard or follow-up of those not receiving the gold standard test?* There is no indication to whether the interpretation of PET results was blinded. The results of all tests done, including PET, were said to be reviewed, and correlated at a multidisciplinary tumor conference. The gold standard was the histology of the nodes resected during esophagectomy in operable patients (n=39) or guided biopsies of suspicious in distant nodes. (n=3)
- *Was "normal" defined?* No
- *Appropriate spectrum of disease?* Yes, only patients with esophageal and GIJ carcinoma were included.
- *Consecutive patients?* Yes.
- *Methods described in enough detail to enable you to replicate the test?* Yes.
- *Reproducible results?* Yes.

Conclusions regarding validity of methods:
Initially 74 consecutive cases diagnosed with carcinomas of the esophagus and GEJ were seen. Thirty two cases were excluded. And 42 were eligible for the study. These exclusions led to a selection bias. Cases with inflammatory lung diseases were excluded which could falsely raise the specificity of the PET. Limiting the patients included in the study, to those who had a PET scan, and histological verification of nodal involvement, was another source of selection bias. (Patients were part of a larger group in another study). It was also not clear if the study of the test results was blinded which could lead to an assessment bias.

Results:
The results of both endoscopic esophageal ultrasound (EUS) and CT scans were summed to analyze the accuracy of their combined use.

Preoperative Assessment of Lymph Node Involvement

	Combined CT& EUS*	PET	P
Sensitivity			
Locoregional	83%	22%	0.0026
Distant	46%	77%	NS
Specificity			
Locoregional	45%	91%	NS
Distant	69%	90%	0.0412

* EUS (n=39) only patients in whom complete passage of the primary tumor was possible.
-The sensitivity of combined CT&EUS for LN assessment, was significantly higher than PET in locoregional lymph nodes. (P=0.0026). There was no difference for distant nodes.
-The specificity of PET was significantly higher than the combined CT&EUS in locoregional nodes (P=0.0412).

Accuracy in Lymph Node Staging

	Correct		Over staging		Under staging	
	n	%	n	%	n	%
PET	24	57.5	4	9.5	14	33
CT	17	41	6	14	19	45
EUS	15	40.5	10	27	12	32.5

FDG-PET tended to under stage, whereas EUS did both over stage and under stage.

Authors' Conclusions:
PET scanning is not yet solving the problem of accurate clinical staging in cancer of the esophagus and GIJ. Yet, it is superior to any other available staging procedure. The high specificity and accuracy of FDG PET compared with combined CT and EUS, especially for distant metastases, provided key information and may be essential in making therapeutic plans.

Reviewer's Conclusions:
PET scan shows a statistically significant higher specificity, in lymph node assessment, than the combined CT/EUS results. We do not know if the interpretation of PET results was blinded. Moreover, excluding cases with inflammatory lung disease is a selection bias that can affect the specificity of the results.