Carcinoma of oesophagus is relatively rare malignancy and constitutes about 10% of all gastrointestinal malignancies. The 5-year survival ranges between 14 - 20%.\textsuperscript{1,2} Squamous cell carcinoma (SCC) is the most common pathological variant (50-70%) and tends to involve the middle and distal 1/3\textsuperscript{rd} of oesophagus.\textsuperscript{3} Smoking and alcohol consumption are considered important risk factors. While 30-50\% cases are adenocarcinoma (AC), which involves distal oesophagus associated with Barrett’s transformation.\textsuperscript{4} However, in the United States, AC has become the most common esophageal cancer (about 80\%).\textsuperscript{5} Only 15\% of oesophageal cancers involve proximal 1/3\textsuperscript{rd} of the oesophagus.\textsuperscript{3}

Oesophageal cancer has notorious behaviour with dismal outcome in most of the patients. As oesophagus does not have serosa, it has the tendency to involve neighbouring structures. Since oesophagus has a rich vascular and lymphatic supply, therefore, it has the tendency for an early nodal and distant metastasis. About 20-30\% of patients with carcinoma of oesophagus present with nodal and (or) distant metastasis at the time of presentation.\textsuperscript{6} Early-stage disease is usually asymptomatic; but in the late stage, dysphagia is the most common presenting complaint. The severity of dysphagia correlates with a degree of luminal obstruction by primary tumor itself and/or perilesional nodal metastasis. TNM (tumor, node, metastasis) staging is commonly performed by the American Joint Committee on Cancer (AJCC - 8th Edition) staging system.\textsuperscript{7}

Fifty-four to sixty-nine percent (54-69\%) of patients with carcinoma of oesophagus are eligible for surgery; however, median survival after surgery is only 13-19\%.\textsuperscript{8} Neoadjuvant chemotherapy and external beam radiation therapy are gaining acceptance in recent years due to promising results. Conventional diagnostic workup including fluoroscopy, tomography (CT), MRI and endoscopy ultrasound (EUS) play a pivotal role in diagnosis and staging of the disease.\textsuperscript{9}

In the hybrid imaging era, PET/CT using 18-fluorodeoxyglucose (\textsuperscript{18}FDG) is gaining acceptance in staging, restaging, response evaluation and prognostication in carcinoma of oesophagus.

\textsuperscript{18}FDG PET/CT Imaging in Carcinoma Oesophagus
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\textsuperscript{18}FDG PET/CT being a part of diagnostic paradigm in carcinoma oesophagus has significantly improved detection of distant hypermetabolic metastasis and also specificity of nodal staging. Combining \textsuperscript{18}FDG PET/CT with EUS-guided nodal biopsy has significantly improved diagnostic yield of nodal metastasis prior to surgery.\textsuperscript{10} \textsuperscript{18}FDG PET/CT has a sensitivity and specificity of 51\% and 94\% for locoregional and 67\% and 84\% for distant staging, respectively.\textsuperscript{11} For primary tumor, \textsuperscript{18}FDG PET/CT has an overall sensitivity of 80\% which reaches up to 100\% for T3 and T4 tumors. However, sensitivity declines to 43\% for T1 tumors and fails to detect tumors \textit{in situ} and T1a tumors.\textsuperscript{12} Therefore, \textsuperscript{18}FDG PET/CT has significantly weaker role in determining T-staging than morphological imaging like CT, MRI and EUS. For nodal staging, CT/EUS has a sensitivity of 83\% but specificity of 45\%. On the other hand, \textsuperscript{18}FDG PET/CT has a sensitivity of 22\%, but specificity of 91\% for nodal staging. Therefore, combining CT/EUS (having good sensitivity) with \textsuperscript{18}FDG PET/CT (having good specificity) would ensure high diagnostic accuracy for nodal staging. For distant metastasis, \textsuperscript{18}FDG PET/CT outperforms CT/EUS for being more sensitive (69\% vs. 46\%) and specific (93\% vs. 74\%).\textsuperscript{13} In clinical practice, \textsuperscript{18}FDG PET/CT has been found to change staging in 14\% of the patients and can detect distant hypermetabolic metastasis in additional 5-8\% patients, which were not evident on CT/EUS. However, in patients with recurrence, \textsuperscript{18}FDG PET/CT has sensitivity and specificity similar to morphological imaging (CT/EUS).\textsuperscript{11} However, use of \textsuperscript{18}FDG PET/CT in staging of early esophageal cancers has been questioned by some researchers, as well.\textsuperscript{12}

\textsuperscript{18}FDG PET/CT is also found to have good predictive value for response to chemotherapy or chemoradiation.\textsuperscript{11,15} \textsuperscript{18}FDG PET/CT performed two weeks after chemotherapy or chemoradiation can be used to categorise patients as responder and non-responder, based on metabolic changes (change in SUVmax pre- and post-therapy scans). Using PET emission response criteria in solid tumor (PERCIST), significant decline in...
SUVmax (30 - 80%) is considered to have better survival. However, due to limited special resolution of PET images, minimal residual disease cannot be excluded as there is higher incidence of recurrence within 1-2 years despite significantly reduced SUVmax.

It is important to be cognizant of pitfalls of FDG PET/CT imaging. FDG is a sensitive but non-specific substrate having variable uptake in malignant and non-malignant (inflammatory and infection) lesions. Mild diffuse FDG uptake may be seen in patients with oesophagitis or lower oesophageal sphincter motility. Similarly, false-positive FDG uptake may be seen over hiatus hernia, benign strictures after dilatation, post-biopsy sites, and oesophageal leiomyomas. Small intra-capsular nodal metastases have a higher possibility of false negative results. Intense FDG uptake in primary tumor may obscure perilesional nodal metastatic nodes. Detection of synchronous tumors is not significantly reduced SUVmax.

Oesophageal cancer is a biologically aggressive and metabolically active tumor with higher mortality. FDG PET/CT is useful for staging, restaging, prognostication, and assessing treatment response. FDG PET/CT has good specificity for loco-regional nodal metastases; and being whole-body technique, has good response for staging, restaging, prognostication, and assessing treatment for clinically active tumor with higher mortality.

Oesophageal cancer is a biologically aggressive and metabolically active tumor with higher mortality. FDG PET/CT is useful for staging, restaging, prognostication, and assessing treatment response. FDG PET/CT has good specificity for loco-regional nodal metastases; and being whole-body technique, has good diagnostic accuracy for distant metastatic disease in patients with oesophageal cancers. However, FDG being a non-specific substrate may pose diagnostic challenge due to variable uptake in malignant and non-malignant (inflammatory and infection) lesions.

REFERENCES