Lung cancer Detected as a Metachronous Second Primary Malignancy in a patient with Pyriform Sinus Carcinoma during ^{18}F FDG PET-CT scan

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ABSTRACT

Pyriform sinus squamous cell carcinoma is the most prevalent type of hypopharyngeal carcinoma. The presence of a second primary malignancy in pyriform sinus carcinoma is uncommon. We present a case of metachronous second primary lung cancer detected by whole-body ^{18}F-FDG PET-CT imaging during the follow-up evaluation in a treated case of well-differentiated squamous cell carcinoma of the left pyriform fossa.

Keywords: **^{18}F FDG PET-CT scan, Positron emission tomography, Pyriform sinus carcinoma.**

Bangladesh J. Nucl. Med. Vol. 24 No. 1 & 2 year 2021

Doi: https://doi.org/10.3329/bjnm.v24i1-2.59339

INTRODUCTION

Hypopharyngeal carcinomas are relatively rare among head neck cancers (1). The incidence rate is 0.8 per 100,000 people. The commonest hypopharyngeal cancer is pyriform sinus squamous cell carcinoma. The risk of synchronus or metachronus second primary malignancy is extremely high in hypopharyngeal carcinoma with a poor prognosis (2). The esophagus is the most common location of involvement (27%) and pulmonary involvement is less common; only 6.34% (3). Reported case was a diagnosed and treated patient of pyriform sinus carcinoma having second primary malignancy in lung that was detected by whole body ^{18}F FDG PET-CT scan during his follow up evaluation.

CASE REPORT

A 68 years old male presented with dysphagia for two months without any palpable neck node or enlarged thyroid gland. Patient had long history of smoking. Direct laryngoscopy showed an ulcerating proliferative growth involving left supraglottis, left arytenoid, left aryepiglottic fold and medial surface of left pyriform fossa. Vocal cords were normal and mobile. Biopsy specimen from the medial wall of left pyriform fossa showed histopathological features of well differentiated squamous cell carcinoma, grade I. Patient did not have any baseline PET-CT scan or CT scan, however no abnormal mass lesion was detected in chest X-ray.

The patient was treated with adjuvant concurrent chemo-radiotherapy. Follow up after six months showed significant weight loss of the patient with persistent dysphagia. Physical examination revealed no palpable neck nodes. Edematous swellings in the epiglottic and arytenoid regions were detected by indirect laryngoscopy. Patient was referred to PET-CT division of National Institute of Nuclear Medicine and Allied Sciences for whole body ^{18}F FDG PET-CT scan to see disease recurrence and metastases.

Whole body ^{18}F FDG PET-CT scan showed no metabolic evidence of local recurrence at left pyriform fossa and no cervical lymphadenopathy. There was a hypermetabolic soft tissue density mass with irregular margin at upper lobe of left lung, measuring about 23 X 15 mm with SUVmax: 4.5, likely to be a second primary malignancy. In addition, few FDG avid mediastinal lymph nodes involving AP window (SUVmax: 3.4) and sub-carinal (SUVmax: 3.5) regions suggested as metastases.

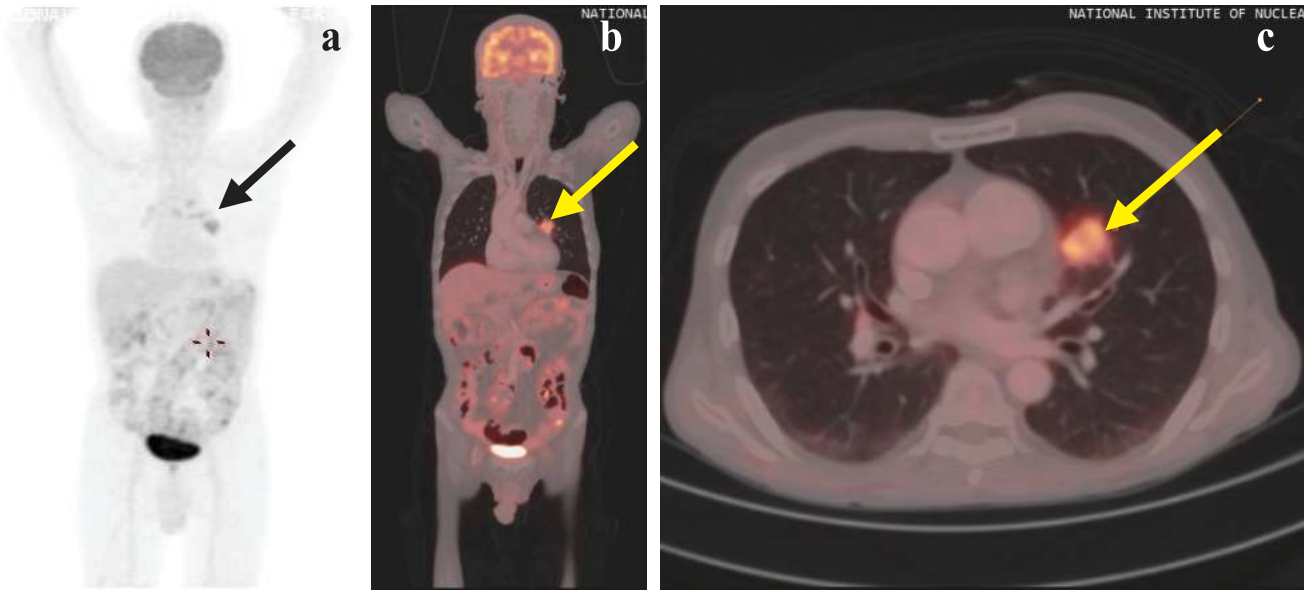

Figure 1: a. ^{18}F-FDG PET MIP image showing hypermetabolic lesion in the mediastinum. The neck region appears normal, b. whole body coronal and c. transaxial fusion PET-CT images show hypermetabolic lesion in the upper lobe of left lung.

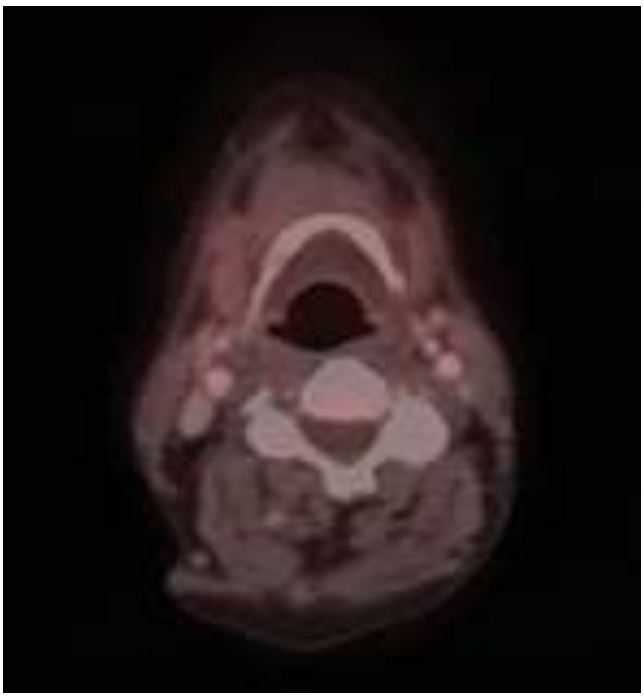

Figure 2: Transaxial fusion PET-CT image of neck shows no abnormal FDG uptake in pyriform sinus.

As patient had no obvious pulmonary symptoms the physician prescribed antibiotic for 14 days; however, he developed cough during this treatment. Considering his long history of smoking for about 45 years another CT scan was performed showing that the lung lesion had not altered. CT guided FNAC from the pulmonary lesion revealed squamous cell carcinoma. Immunohistochemistry expressed cytokeratin and TTF1 negative with positive P63 which confirmed primary moderately differentiated squamous cell carcinoma. The patient has been scheduled for concurrent chemo-radiotherapy.

DISCUSSION

Patients with pyriform sinus squamous cell carcinoma are at a significant risk of acquiring synchronous or metachronous second primary malignancies. One study found an 8.9% chance of having a new primary malignancy (4). Majority of these second primaries develop within one year of diagnosis of hypopharyngeal cancer with esophagus and lung being commonest sites of origin (3). Another study showed that the total incidence of second primary tumors in patients with head and neck squamous cell carcinomas is only 5-10%, with the oesophagus being the most common site and the lung being the least common (5).

This reported case highlights detection of a second malignant tumor in the lung by ^{18}F FDG whole body PET-CT scan without any definite pulmonary symptoms during post treatment evaluation of carcinoma of the left pyriform fossa and shows the importance of this imaging tool to detect a second primary lesion.

Yi Huang et al described the cause of second primary malignancy to lung or esophagus as the "field cancerization" phenomenon (3). Field cancerization of the mucous membranes of aerodigestive tract occurs frequently in response to tobacco and alcohol abuse which is characterized by a variety of premalignant and frankly malignant epithelial alteration that can lead to the development of multiple primary cancers of the aerodigestive tract. The similar mucosa of aerodigestive tract that is of both hypopharyngeal and pulmonary squamous epithelium exposed to similar risk factors during the process of carcinogenesis cause multiple cancers. (9, 10). Considering the long history of tobacco smoking in this patient, made the lesion in lung to be suspicious of another primary malignancy. Yi Huang et al and few other studies suggested that the early detection of second primary tumor is crucial for better prognosis and subsequent management and pyriform sinus or hypopharyngeal carcinoma is suggested to have regular surveillance endoscopy and chest CT scan to detect second primary. ^{18}F FDG PET-CT scan is widely accepted imaging tool for evaluating squamous cell carcinomas of head and neck regions like the reported case and is used in almost all settings including baseline staging, treatment planning, assessment of therapy response, detection of second primaries and follow-up after completion of therapy (2, 3). Two squamous cell carcinomas were observed in this patient; one in the pyriform sinus and other in the lung; the lung lesion being detected by ^{18}F-FDG PET-CT scan.

^{18}F-FDG PET-CT scan can identify both metastases and synchronous or metachronous primary tumors. Diagnosis of a second primary cancer is not so easy with previous history of cancer and anticancer therapy. The newly developed tumor might have arisen from the first malignancy or might be the part of second malignancy (6). Multiple lung nodules of varying sizes are usually classified as metastases. Suspicion for second primary tumor arose as we found single pulmonary lesion, however, distinguishing a lung metastasis from a second primary lung carcinoma is much more difficult when single pulmonary lesion is detected. Lesions with different histological character can be easily recognized as separate primary tumor; but when the histologic features are common, as in this instance, it is difficult to classify as metastasis or another primary tumor. According to World Health Organization (WHO), immunohistochemistry must be used in small biopsy or cytological specimen to diagnose lung carcinoma (7). A solid carcinoma with no keratinization or intercellular bridges but immunohistochemical positivity for "squamous cell carcinoma markers" such as p40, CK5/6, and TP63 (p63) is diagnosed as squamous cell carcinoma of lung. TTF1 is used to differentiate between adenocarcinoma and squamous cell carcinoma as its presence is most sensitive for adenocarcinoma (8). Accordingly, positive p63 and TTF1 negativity favors our case as primary lung carcinoma. It is difficult to label our case as metachronous because our patient did not have a baseline PET-CT scan or a chest CT scan before starting treatment for pyriform sinus cancer. These data in favor of metachronous cancers include the fact that the patient had no respiratory symptoms from the time of diagnosis of pyriform sinus cancer until the end of treatment, and no definite mass lesion was found in the baseline chest X-ray. The pulmonary lesion was detected by 18F FDG PET-CT scan on his follow up visit after six months which supports the diagnosis of lung lesion as metachronous second malignant tumor.

CONCLUSION

As Bangladesh has the highest incidence of hypopharyngeal cancer with 4.8 per 100,000 populations (3) with tobacco consumption as a well-established risk factor, our recommendation is whole body ^{18}F-FDG PET-CT scan is an effective modality for early detection of presence of second primary malignancy in lung irrespective of having symptoms for better prognosis and therapeutic decision making which can contribute further management and overall survival.

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