

Thyroid Cartilage Metastases on F-18 Fluorodeoxyglucose Positron Emission Tomography-Computed Tomography: A Tale of Two Cases with a Brief Review of Literature

Abstract

Metastases to thyroid cartilage are rare entities and can often easily be missed on computed tomography (CT) scan alone. Positron emission tomography (PET)-CT imaging has overcome this diagnostic dilemma due to its ability to provide for both anatomical and functional imaging. We report two rare cases of thyroid cartilage metastases on F-18 fluorodeoxyglucose PET-CT from breast and papillary thyroid malignancies as primaries.

Keywords: Breast, fluorodeoxyglucose positron emission tomography-computed tomography, metastasis, thyroid cartilage, thyroid

Introduction

The thyroid cartilage is rare sites of metastases, and its involvement is associated with grave prognosis as it signifies of disseminated metastatic disease. Clinically, the patients present with hoarseness of voice, laryngeal pain, or dyspnea if there is extensive involvement. Metastases to thyroid, cricoids, and arytenoids cartilage have been reported in the literature with majority of the primaries being breast, lung, and prostate. We report a case of a 40-year-old female with metastatic breast cancer with the involvement of the right lamina of the thyroid cartilage apart from metastases to multiple skeletal sites. Another case is a 62-year-old male with papillary thyroid carcinoma with metastases to regional lymph nodes and bilateral lungs apart from the involvement of the right lamina of thyroid cartilage reaching up to the angle crossing the midline.

Case Report

Case 1

A 40-year-old female, known case of metastatic breast cancer came to the nuclear medicine department for F-18 fluorodeoxyglucose positron emission tomography-computed tomography (¹⁸F FDG PET-CT) scan for the

evaluation of response to chemotherapy. She underwent right modified radical mastectomy after being diagnosed with malignancy of the right breast 8 years back. She remained symptom-free for 7 years after that, until 1 day she complained of severe crippling back pain. On suspicion of recurrence, she was referred for a PET-CT scan which showed lytic lesions with FDG uptake in multiple cervico-dorso-lumbar vertebrae, left parietal skull bone, bony clivus, right mandible, bilateral pelvic bones, and sacrum. Subsequently, she was started on 1 mg anastrozole and referred for a PET-CT scan which revealed the same lesions along with a new lesion showing FDG uptake involving the right lamina of thyroid cartilage [Figure 1a-e].

Case 2

A 62-year-old male, known case of papillary thyroid cancer, posttotal thyroidectomy, and bilateral neck dissection and 50 mCi radioactive ¹³¹I-NaI therapy for remnant ablation presented with an elevated thyroglobulin level of 3690 ng/ml. On ¹³¹I whole-body scan, faint amount of tracer uptake was seen in the neck region, and diffuse tracer uptake was seen in the bilateral lung fields which was confirmed as metastatic central compartment lymph node on single PECT/CT. Subsequently, he was given 150 mCi ¹³¹I-NaI therapy

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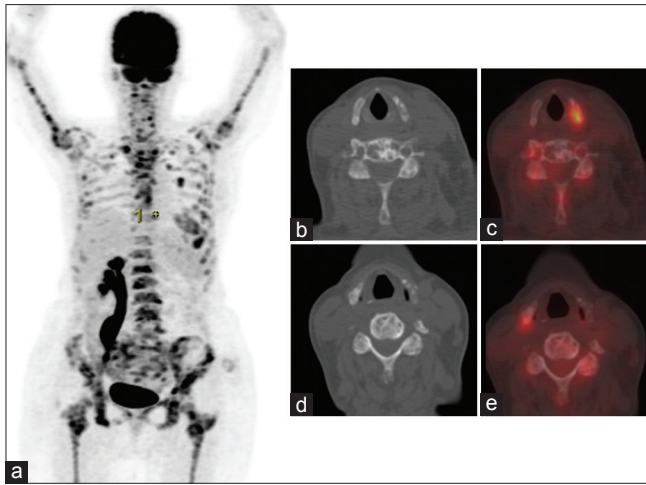


Figure 1: (a) Maximum intensity projection image of F-18 fluorodeoxyglucose positron emission tomography-computed tomography showing diffuse increased fluorodeoxyglucose uptake in the axial and appendicular skeleton, (b) Focal lytic lesion with mild sclerosis on computed tomography image showing increased fluorodeoxyglucose uptake on fused positron emission tomography-computed tomography image (c). (d) Represents axial computed tomography image showing focal lytic lesion in the right lamina of thyroid cartilage showing increased fluorodeoxyglucose uptake on fused positron emission tomography-computed tomography image (e)

for the treatment of nodal and pulmonary metastases, and a posttherapy scan was done which revealed no additional lesions. However, in view of such a high level of thyroglobulin levels, it was suspected there must be some additional sites of metastases, preferably skeletal lesions. Hence, he was advised for a ¹⁸F FDG PET-CT scan to rule out any additional sites of metastases. PET-CT scan revealed hypermetabolic lytic lesion involving the right lamina of thyroid cartilage reaching up to the angle and crossing the midline [Figure 2a-g]. Additional lesions seen were FDG avid left level VB, VI, and bilateral supraclavicular lymph nodes and multiple pleural-and parenchymal-based nodules with no significant FDG uptake.

Discussion

Metastases to cartilaginous tissues are extremely rare events as these tissues are deprived of any vasculature. Extensive review of literature reveals that malignancies metastasizing to thyroid cartilage include that of prostate, lung, breast, and gall bladder.^[1,2] Ehrlich published the first case report of thyroid cartilage metastases in a 72-year-old male of carcinoma lung with additional sites of metastases to bone, liver, and diaphragm in 1954.^[1] Till now, there have been at least 20 cases of thyroid cartilage metastases reported in the literature. However, incidental detection of metastases to thyroid cartilage without any significant chief complaints associated with it was only more feasible after the advent of fusion imaging. Wiesenthal and Nguyen first reported about the utility of FDG PET-CT in the detection of thyroid cartilage metastases in multiple myeloma patient.^[3] There was no biopsy done in our case to prove that the lesions of thyroid cartilage were metastatic as both the cases being

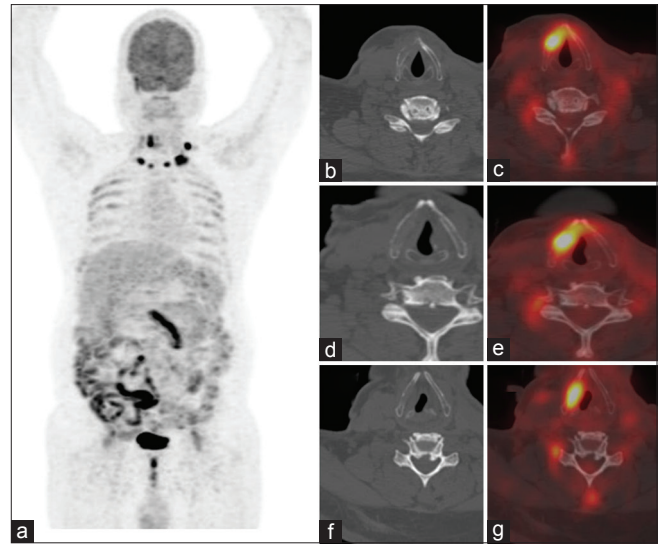


Figure 2: (a) Maximum intensity projection image of F-18 fluorodeoxyglucose positron emission tomography-computed tomography showing multiple focal increased areas of fluorodeoxyglucose uptake in the neck region. (b, d and f) Represents axial computed tomography image showing lytic lesions in the right lamina of thyroid cartilage showing increased fluorodeoxyglucose uptake in the respective corresponding fused positron emission tomography-computed tomography images (c, e and g)

disseminated malignancies it would have been proved to be an invasive procedure. Other malignancies where FDG PET-CT was able to detect thyroid cartilage metastases were lung and prostate.^[4,5] One solitary case report described cricoid cartilage metastasis from prostate carcinoma on ¹⁸F Fluorocholine PET-CT.^[6] Through this case, the authors reiterate the fact that ¹⁸F FDG PET-CT can be helpful in determining the rare sites of metastasis with ease.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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