

## Rare thyroid Cartilage Metastases Detected on <sup>18</sup>F-Fluorodeoxyglucose Positron Emission Tomography/Computed Tomography Scan

### Abstract

Metastatic lesions to thyroid cartilage are very rare and can be often missed on conventional imaging. Anatomical and functional fused positron emission tomography/computed tomography (PET/CT) imaging has higher sensitivity as compared to conventional CT imaging and can thus identify such atypical sites of metastasis. Here, we present four cases of thyroid cartilage metastases detected on <sup>18</sup>fluorodeoxyglucose PET/CT scan from carcinoma lung, breast, stomach and urinary bladder.

**Keywords:** <sup>18</sup>fluorodeoxyglucose positron emission tomography/computed tomography scan, breast, lung, stomach, thyroid cartilage, urinary bladder

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### Introduction

The thyroid cartilage metastases are very rare, and their involvement signifies extensive metastatic lesions and poor prognosis. Initially, laryngeal cartilage metastases remain asymptomatic, and in later stages, they can present with neck pain or hoarseness of voice. Laryngeal metastases have been previously reported from renal, breast, or lung tumors. Our 4 cases with primary each from the stomach, urinary bladder, and lung with fluorodeoxyglucose (FDG) avid metastatic lesion involving thyroid cartilage were detected during staging scan and in follow-up scan of carcinoma left breast.

### Case Reports

#### Case 1

A 58-year-old male presented with chest pain and shortness of breath. CT scan was suggestive of the left hilar lesion. In view of suspicion of carcinoma lung, the patient was referred for whole-body FDG positron emission tomography/computed tomography (PET/CT) scan which revealed FDG avid lesion in the left hilar region and multiple FDG avid metastatic lesions along with FDG avid lesion also involving left lamina of thyroid cartilage with associated soft component [Figure 1a-g]. The biopsy from the left hilar mass confirmed left lung carcinoma.

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#### Case 2

A 63-year-old female, known case of metastatic carcinoma left breast, postleft modified radical mastectomy (10 years back), postchemotherapy, and radiotherapy, now presented with jaundice and generalized body pain. MIP image [Figure 2a] revealed multiple FDG avid metastatic lesions. Axial CT and fused PET/CT images [Figure 2b and c] revealed a left mastectomy status. Axial CT and fused PET/CT images suggestive of FDG avid lesion involving thyroid cartilage [Figure 2d-g].

#### Case 3

A 42-year-old male, recently diagnosed case of adenocarcinoma stomach, was referred for staging whole-body FDG PET/CT scan. MIP image [Figure 3a] revealed multiple FDG avid metastatic lesions. Axial CT and fused PET/CT image [Figure 3b and c] revealed FDG avid mural thickening along Antero-pyloric region of the stomach and axial CT and fused PET/CT images suggestive of FDG avid lesion involving thyroid cartilage [Figure 3d-g].

#### Case 4

A 56-year-old male, recently diagnosed case of carcinoma urinary bladder, was referred for staging whole-body FDG PET/CT scan. MIP image [Figure 4a] revealed multiple FDG avid metastatic lesions. Whole-body PET/CT scan reveals FDG avid mural thickening involving the posterior and

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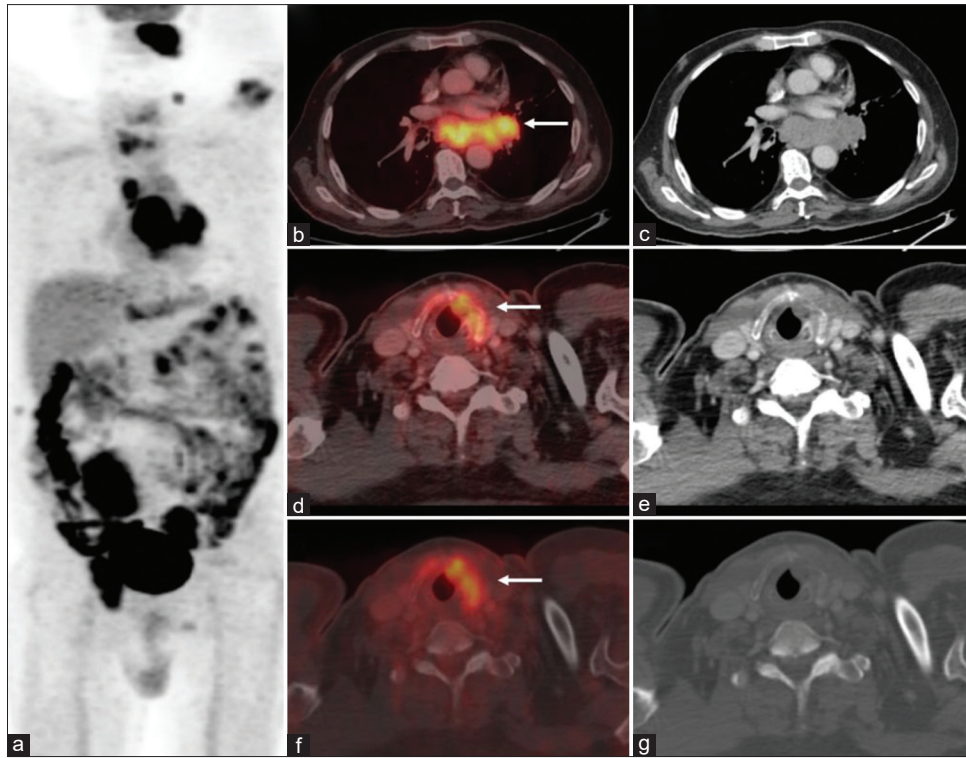


Figure 1: (a) Maximum intensity projection image of F-18 fluorodeoxyglucose positron emission tomography-computed tomography. Axial computed tomography and fused positron emission tomography/computed tomography (b-c) images showing fluorodeoxyglucose avid lesion in left hilar region. Axial computed tomography and fused positron emission tomography/computed tomography (d-g) images showing fluorodeoxyglucose avid lytic lesion with associated soft tissue component involving left lamina of the thyroid cartilage

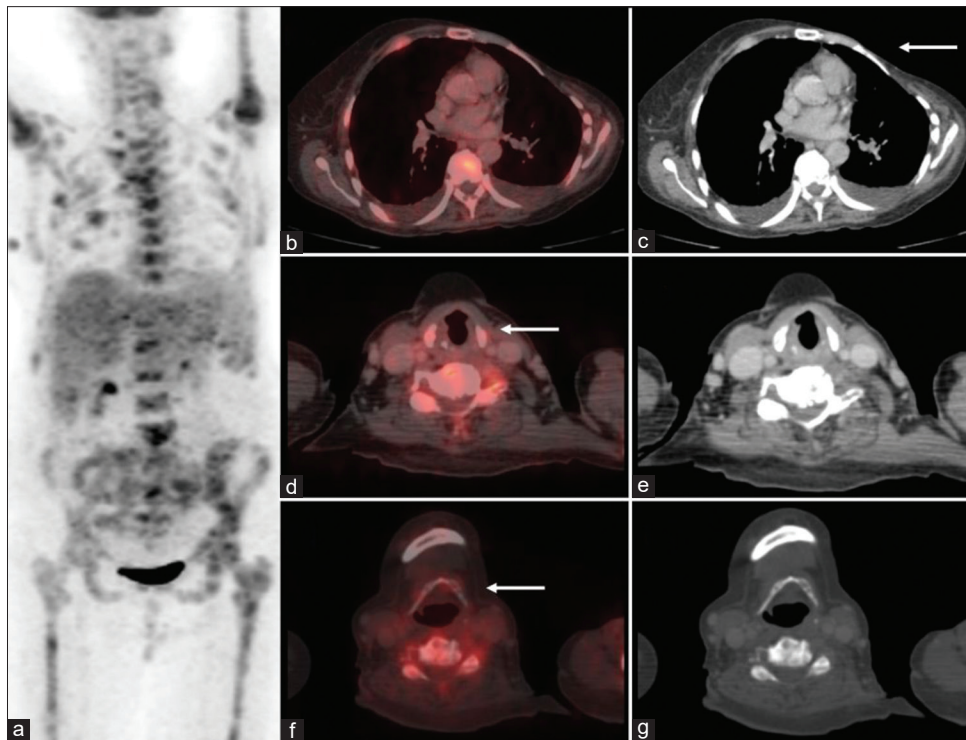


Figure 2: (a) Maximum intensity projection image of F-18 fluorodeoxyglucose positron emission tomography-computed tomography. Axial computed tomography and fused positron emission tomography/computed tomography (b and c) images are showing left mastectomy status. Axial computed tomography and fused positron emission tomography/computed tomography images (d-g) showing fluorodeoxyglucose avid lytic lesion involving the thyroid cartilage

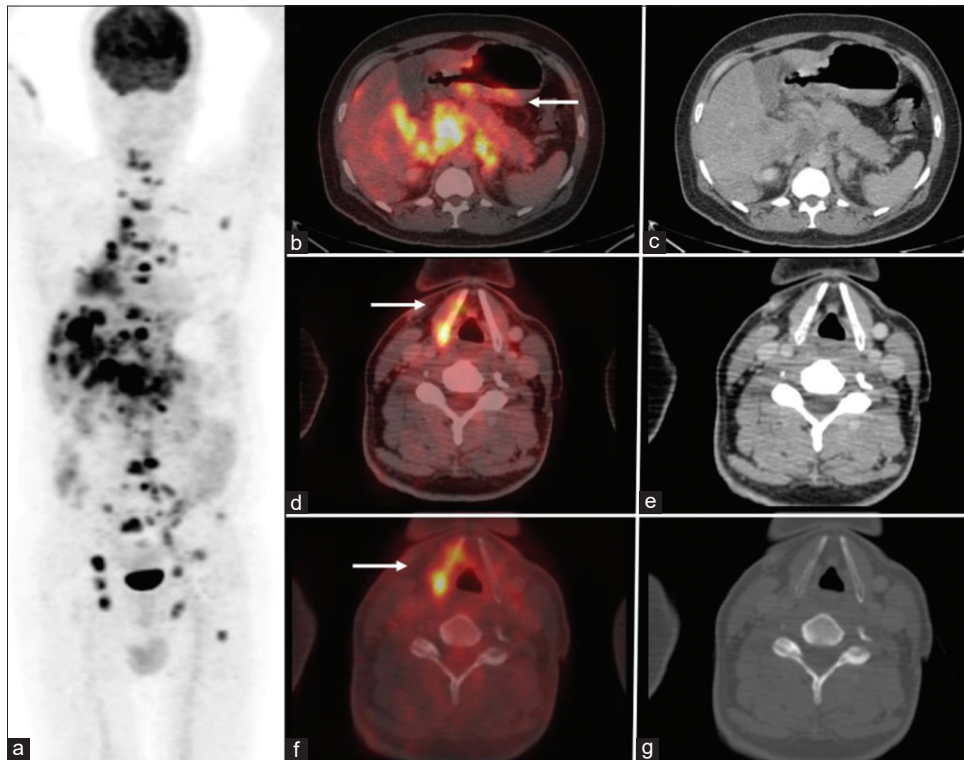


Figure 3: (a) Maximum intensity projection image of F-18 fluorodeoxyglucose positron emission tomography-computed tomography. Axial computed tomography and fused positron emission tomography/computed tomography (b-c) images showing fluorodeoxyglucose avid mural thickening involving the antero-pyloric region of the stomach. Axial computed tomography and fused positron emission tomography/computed tomography (d-g) images showing fluorodeoxyglucose avid lytic lesion involving the thyroid cartilage

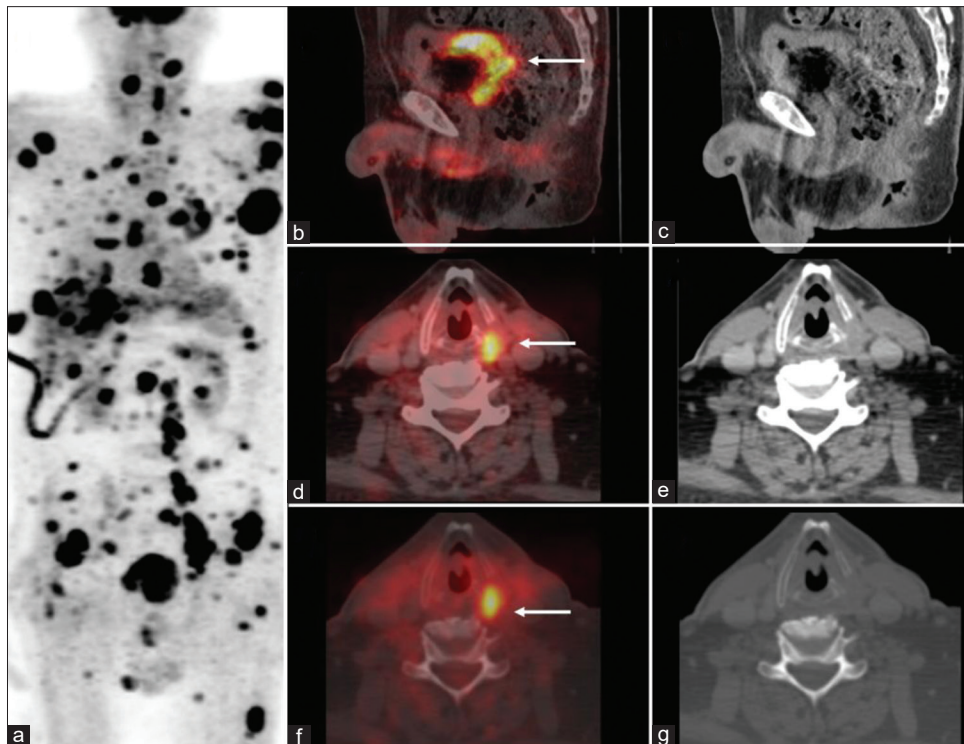


Figure 4: (a) Maximum intensity projection image of <sup>18</sup>F-fluorodeoxyglucose/computed tomography scan. Sagittal computed tomography and fused positron emission tomography/computed tomography (b and c) images showing fluorodeoxyglucose avid mural thickening involving the urinary bladder, the primary site. Axial computed tomography and fused positron emission tomography/computed tomography (d-g) images showing fluorodeoxyglucose avid lytic lesion involving the left lamina of the thyroid cartilage

bilateral walls of the urinary bladder, corresponding to the known primary site and multiple FDG avid metastatic lesions and FDG avid lesion involving the left lamina of thyroid cartilage [Figure 4b-g].

## Discussion

Secondary tumors of the thyroid cartilage are extremely rare. Primary malignancies that commonly metastasize to the thyroid cartilage arise from the adjacent tissues, for example, the larynx, the vallecula, and pyriform sinus.<sup>[1]</sup> Metastatic involvement of the larynx is rare due to the absence of vessels within the cartilaginous tissue. The probability of metastatic spread increases with aging as a result of larynx ossification. Metastasis to laryngeal cartilages is relatively rare and mainly arises from renal cell carcinoma,<sup>[2]</sup> melanoma,<sup>[3]</sup> and rarely from the lung.<sup>[4]</sup> Till now, very few case reports have been published describing metastatic lesions to the thyroid cartilage.<sup>[5,6]</sup>

These lesions might be missed on conventional imaging; however, with present PET/CT fusion imaging combining anatomical and functional information, and it becomes easier to detect these subtle lesions. Since these lesions are associated with multiple metastases, thus biopsy of the thyroid cartilage lesion is not usually performed. As seen in our cases, these thyroid cartilage lesions are associated with multiple other metastatic lesions and thus carry a poor prognosis. Early metastases, when confined to the thyroid cartilage, are often asymptomatic. As a result, they are seldom diagnosed early and usually present at a late stage when there is a presence of more advanced disease, thus implicating poor prognosis.

Laryngeal cartilage metastasis starts by micrometastases within the hematopoietic tissue of the ossified laryngeal parts. Then they merge to form visible focal tumor nodules, and further growth causes destruction of the laminae, and subsequently, the tumor extension is seen into perilaryngeal soft tissue. Different PET/CT scan tracers like FDG PET/CT scan, PSMA PET/CT scan,<sup>[7]</sup> <sup>18</sup>F-fluorocholine PET/CT scans<sup>[8]</sup> and <sup>18</sup>F-Choline and <sup>64</sup>Cu-PSMA PET/CT<sup>[9]</sup> scans have been reported to be useful to detect thyroid cartilage metastases. Thus, a review of the literature and our case series describes that fused imaging PET/CT scans can detect these rare sites of metastases.

## 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.

## References

1. Timon CI, Gullane PJ, Brown D, Van Nostrand AW. Hyoid bone involvement by squamous cell carcinoma: Clinical and pathological features. *Laryngoscope* 1992;102:515-20.
2. Ferlito A, Pesvento G, Meli S, Recher G, Visona A. Metastasis to the larynx revealing a renal cell carcinoma. *J Laryngol Otol* 1987;101:843-50.
3. Zenga J, Mehrad M, Bradley JP. Metastatic cancer to the larynx: A case report and update. *J Voice* 2016;30:774.e9-774.e12
4. Ogata H, Ebihara S, Mukai K, Mashima K, Saikawa M, Asai M, *et al.* Laryngeal metastasis from a pulmonary papillary adenocarcinoma: A case report. *Jpn J Clin Oncol* 1993;23:199-203.
5. Tripathy S, Parida GK, Singhal A, Shamim SA, Kumar R. Thyroid cartilage metastases on F-18 Fluorodeoxyglucose positron emission tomography-computed tomography: A tale of two cases with a brief review of literature. *Indian J Nucl Med* 2019;34:220-2.
6. Bracanovic D, Vukovic V, Janovic A, Radosavljevic D, Rakocevic Z. Hyoid bone and thyroid cartilage metastases from sigmoid colon adenocarcinoma: A case report. *Balkan Med J* 2017;34:278-80.
7. Tupalli A, Damle NA, Thankarajan AS, Mangu BS, Kumar A, Khan D, *et al.* An Unusual Case of Simultaneous Cricoid and Thyroid Cartilage Metastases from Prostatic Adenocarcinoma on <sup>68</sup>Ga-PSMA PET/CT. *Nucl Med Mol Imaging*. 2020;54:61-62.
8. Ng SJ, Sinha AK, Loi HY, Khor LK. Asymptomatic metastasis to cricoid from prostate carcinoma: An incidental finding detected on <sup>18</sup>F-choline PET/CT. *Jpn J Radiol* 2015;33:298-301.
9. Annovazzi A, Faiella A, Pescarmona E, Sanguineti G, Sciuto R. Asymptomatic metastasis to thyroid cartilage detected by <sup>18</sup>F-choline and <sup>64</sup>Cu-PSMA PET/CT as a single site of disease relapse in a patient with castration-resistant prostate carcinoma. *Clin Nucl Med* 2020;45:214-6.