

## Bilateral parotid involvement as the solitary metastatic site from squamous cell lung cancer

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### CASE STUDY

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### ABSTRACT

The detection of metastatic disease has major therapeutic and prognostic implications on the management of cancer patients. We report an asymptomatic metastasis from the lung cancer to the intra-parotid lymph node which was detected by the FDG PET scan and subsequently confirmed by fine needle aspiration cytology. The case is unique as solitary metastatic involvement of the parotid from non-head and neck tumors are extremely rare and thus, may be missed during staging evaluation.

#### Key Words

Parotid metastasis, squamous cell lung carcinoma, PET-CT

#### Implications for Practice:

##### 1. What is known about this subject?

Lung cancer commonly metastasises to the liver, adrenal gland, brain and bones.

##### 2. What new information is offered in this case study?

We report a case where lung cancer had metastasized to a rare site - the intra-parotid lymph node and PET-CT was instrumental in detecting it.

##### 3. What are the implications for research, policy, or practice?

Rare metastatic sites must be meticulously looked for and confirmed, since this has important implications on subsequent management and prognosis.

### Background

A careful staging workup is essential to avoid missing small and rare sites of metastasis from lung cancer. It is desirable to obtain pathological confirmation from such uncommon sites before final staging is done, especially if these sites are the solitary areas of suspected metastasis. We present the case of Non-small cell lung cancer with bilateral parotid gland metastases which was successfully diagnosed and treated with chemotherapy.

### Case details

A 64-year-old Indian male, a chronic smoker, presented with complaints of vague left sided chest pain without any fever, cough, hemoptysis or change in voice. His past medical history was unremarkable. He was initially evaluated and treated for pneumonia; however, persistence of radiographic lesions prompted a computed tomogram (CT) of the chest that revealed a large ill-defined enhancing mass lesion in the left lingular lobe extending up to the lateral chest wall. A CT guided biopsy from this lesion showed features of a squamous cell carcinoma with large areas of necrosis (Figure 1).

He subsequently underwent a PET-CT scan (Scanner: GE Discovery STE PET-CT (BGO crystal); Radioisotope FDG 8.0 mCi/60 minutes uptake period) which showed a lobulated

heterogeneously enhancing hyper metabolic mass lesion in the left lingular segment (6.0×5.3×5.3cm with SUV max 14.31) and increased FDG uptake in multiple mediastinal and bilateral hilar lymph nodes (largest along the left lower paratracheal node measuring 1.7×1.3 cm with SUV max 5.26). In addition, increased FDG uptake was also noted in bilateral intra-parotid glands larger on the right side, measuring 1.3×1.1cm (SUV max 10.56), suggesting metastasis (Figure 2). A fine needle aspiration cytology (FNAC) from the right intra-parotid gland showed extensive necrosis with features of metastatic squamous cell carcinoma (Figure 3). Consequently, the patient was staged as a squamous cell carcinoma lung, T3N3M1b - Stage IV (American Joint Committee on Cancer-AJCC 7th edition) and the case was discussed with the pulmonologist, radiation oncologist and the surgical team. He was started on doublet chemotherapy with Carboplatin and Paclitaxel at three weekly intervals.

After two cycles of chemotherapy, he developed a cystic swelling on the right cervical area. An FNAC of this lesion demonstrated only necrotic and inflammatory material; the lesion subsequently subsided with a course of antibiotics. A PET-CT scan (Figure 4) showed resolution of the intraparotid metastasis on both sides and decrease in the size of the primary lung lesion, suggesting partial response. Chemotherapy was continued and PET-CT done after 6 cycles (Figure 5) showed stable disease with no new metastatic lesion. He continues to receive maintenance chemotherapy.

## Discussion

### Metastasis from Squamous cell carcinoma/NSCLC: SITES

Lung cancer is a common lethal malignancy with more than 50 per cent of patients with non-small cell lung cancer (NSCLC) having disseminated disease at the time of diagnosis.<sup>1</sup> Distant metastases of NSCLC commonly involve the liver (33 per cent–40 per cent), adrenal glands (18 per cent–38 per cent), brain (15 per cent–43 per cent), bone (19 per cent–33 per cent), kidney (16 per cent–23 per cent), and abdominal lymph nodes (29 per cent).<sup>2</sup> Rarely, metastasis to pancreas<sup>3</sup>, duodenum and small intestine,<sup>4</sup> orbit,<sup>5</sup> skeletal muscle,<sup>6</sup> knee bursa,<sup>7</sup> spermatic cord,<sup>8</sup> skin,<sup>9</sup> breast,<sup>10,11</sup> placenta,<sup>12</sup> vagina<sup>13</sup> and thyroid<sup>14</sup> have also been reported. However, metastasis to parotid gland is extremely rare. Although reports of parotid metastasis from Adenocarcinoma,<sup>15</sup> small cell carcinoma lung<sup>16,17</sup> and squamous cell carcinoma<sup>18</sup> are available, most of them are unilateral in presentation and to the best of our knowledge, this is possibly the first case of solitary bilateral parotid metastasis from squamous cell carcinoma of the lung.

### Intraparotid metastasis: Pathophysiology and Causes

Metastatic tumors of the salivary glands are rare and mostly located in the parotid gland because the parotid gland contains a dense network of lymphatic vessels, lymphatic follicles and lymph nodes. The parotid gland can be divided into paraglandular lymph nodes, intraglandular lymphatics, and parenchyma. The paraglandular and intraglandular lymphatics are common sites for metastasis via the lymphatic drainage. Metastatic lesions involving the parotid usually represent spread from adjacent regions to the lymph structures of the parenchyma of the gland or to the paraglandular lymph nodes, and also by direct invasion of the gland by the adjacent tumor.<sup>19</sup> On the other hand, parenchymal metastasis is considered to occur via haematogenous rather than lymphatic spread.<sup>20</sup> The involvement of the intraparotid lymph node in our case suggests lymphatic dissemination of the primary tumour though no enlarged cervical LN were identified.

Metastatic involvement comprises only 8 per cent of all parotid gland malignancies.<sup>21</sup> In a retrospective analysis of 108 cases of metastatic tumors to the salivary gland by Siefert et al,<sup>22</sup> it was seen that only 21 out of these originated from primary tumors outside the head and neck region. In another retrospective study by Nuyens et al,<sup>23</sup> only 34 cases of metastatic disease could be identified among 520 cases of parotid mass. Notably, among these, none was a metastasis from the lung.

In a retrospective analysis of 244 patients with parotid cancer, 66 (29 per cent) had squamous cell histology.<sup>24</sup> Squamous cell carcinoma of the parotid was metastatic from a known primary in more than half of the patients. The most common site of the primary tumor was a cutaneous malignancy of the head and neck. No case of metastasis from the lung was reported in this analysis.

In a recent review of the metastatic cancer to the parotid, it was observed that the cutaneous squamous cell carcinoma and melanoma were the most common pathologies that metastasize to the parotid gland and metastasis from other sites are unusual.<sup>25</sup>

Only few cases of metastasis to bilateral parotid gland have been reported. The primary has been the renal cell carcinomas,<sup>26,27</sup> small cell carcinoma of the lung,<sup>28-30</sup> melanoma<sup>31</sup> and carcinoid tumors.<sup>32</sup>

In the above mentioned case reports that we reviewed, the parotid gland metastasis was clinically manifesting as swelling or pain in the parotid region. However, in our case,

the parotid metastasis was asymptomatic and was picked up by the PET-CT done for staging. Detection of unsuspected distant metastasis is a well-known advantage of PET scan and has been reported in 6 per cent to 17 per cent of patients with primary lung carcinoma otherwise considered resectable.<sup>33,34</sup>

## Conclusion

- Detecting distant metastasis has important implications for staging and consequently on the management and prognosis in lung cancer. Small or rare sites of metastasis may be missed, or ignored as infective/inflammatory, thereby affecting accurate staging and treatment.
- Attempts must be made to obtain a pathological diagnosis from solitary metastatic sites to exclude benign etiology.
- Detection of unsuspected distant metastasis is a well-known advantage of PET scan.

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### PEER REVIEW

Not commissioned. Externally peer reviewed.

### CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

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None

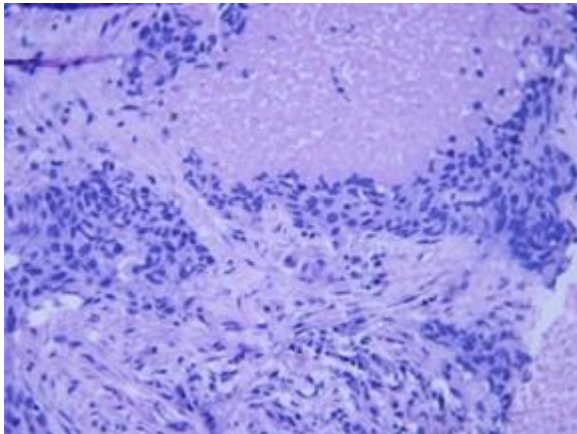
### PATIENT CONSENT

The authors, Kumar R, Mohan A, Arava SK, Madan K, Hadda V, Guleria R, Agarwal KK, declare that:

1. They have obtained written, informed consent for the publication of the details relating to the patient(s) in this report.
2. All possible steps have been taken to safeguard the identity of the patient(s).
3. This submission is compliant with the requirements of local research ethics committees.

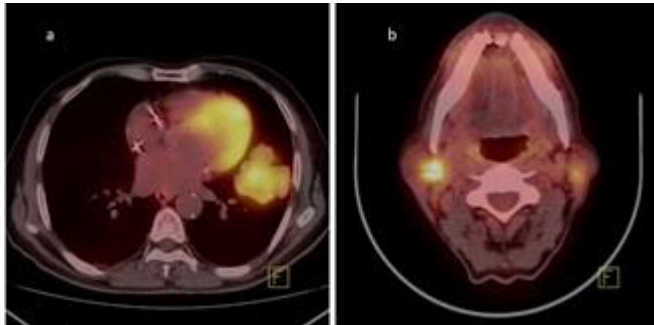


**Figure 1: CT guided biopsy of the lung lesion showing features of Squamous cell carcinoma**

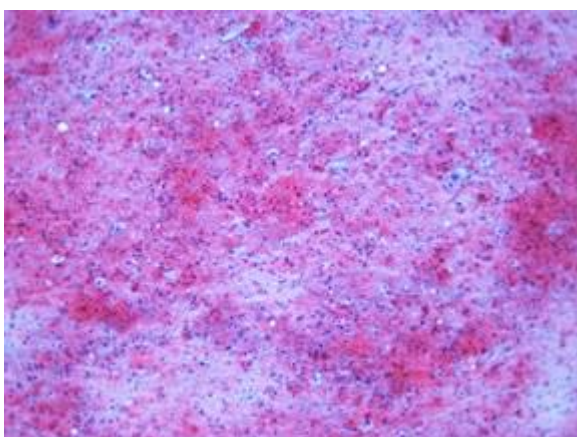


**Figure 2: PET CT for pre-treatment staging:**

**Figure 2a:** PET-CT showing an FDG avid mass lesion (6.0 X 5.3 X 5.3cm with SUV max 14.31) in the lingular lobe of left lung extending upto the lateral chest wall. **Figure 2b:** PET-CT showing increased FDG uptake in bilateral intra-parotid glands largest on the right side measuring 1.3 X 1.1cm (SUV max 10.56). The gland on the left side showed an SUV max 6.12

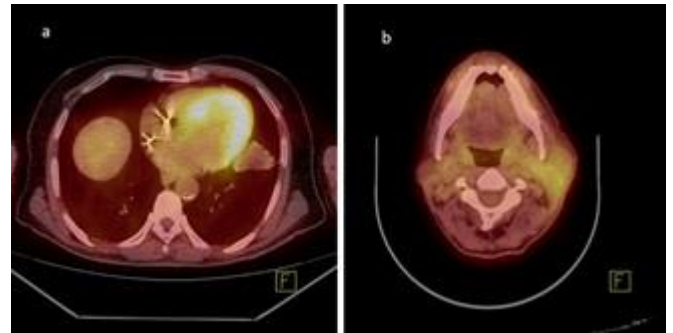


**Figure 3: FNAC done from the right intra-parotid lymph node showing extensive necrosis along with features of metastatic squamous cell carcinoma**



**Figure 4: PET CT after 2 cycles of chemotherapy**

**Figure 4a:** PET CT done after 2 cycles of chemotherapy showed a reduction in the primary lung lesion (3.0x4.1x2.9 cm; SUV max 4.69) and an inflammatory lesion in the neck (which later improved with antibiotics) measuring 3.5x3.2cm and SUV max of 2.1] (Figure 4b)



**Figure 5: PET CT after 6 cycles of Chemotherapy**

**Figure 5a:** PET CT done after 6 cycles of chemotherapy showed a stable primary disease (3.0 X 2.9 X 2.6 cm with SUV max 3.12) and a normal neck region (metastasis no longer seen) (Figure 5b)

