

# Non-small Cell Carcinoma of the Lung with Isolated Bilateral Adrenal Metastasis: Imaging and Review of Literature

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## Abstract

Adrenal metastases are common in patients suffering from non-small cell lung cancer (NSCLC) accounting up to 40% in advance cases, in contrast to 20-45% of all cancer patients. Unilateral adrenal metastases is frequent while bilateral adrenal metastases especially isolated cases are exceedingly rare and diagnosed incidentally during staging of patients with lung cancer. Bilateral adrenal involvement only accounts 3% at the time of diagnosis. Here we present a case of isolated large bilateral adrenal metastases from NSCLC patient who was symptomatic at presentation, treated with common anticancer drugs without any complications and along with we also describing relevant imaging findings and literature review.

**Keywords:** Anticancer drugs, Isolated bilateral adrenal metastasis, Non-small cell lung cancer

## INTRODUCTION

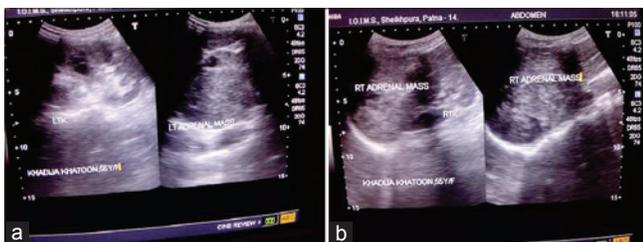
Lung cancer is leading the cause of cancer-related death in both male and female<sup>1</sup> and 70-80% is constituted by non-small cell lung cancer (NSCLC). Long-term survival of the patients are limited when there is systemic dissemination of cancer even after surgical or medical treatment.<sup>1,2</sup> The adrenal glands are a common site for systemic spread for NSCLC, others include breast cancer, renal cancer, bowel cancer, melanoma, and lymphoma.<sup>1</sup> The adrenal metastases seen around 10% of NSCLC at the time of initial diagnosis. Unilateral adrenal metastases is frequent, but bilateral adrenal involvement in the case of lung cancer is not common and is usually associated with diffuse systemic spread of the primary.<sup>3</sup> In contrast to this, we discuss the case of locally advanced NSCLC presenting with symptomatic isolated large bilateral adrenal metastasis without other organs involvement. This isolated spread is due to lymphatic dissemination by retroperitoneal channels or early veno-occlusive entrapment of tumor emboli by adrenal glands. Such a large adrenal mass poses serious complication, although rare, like spontaneous hemorrhage,

rupture and adrenal insufficiency, thus early surgical treatment is advocated to prolong disease-free interval. However, if surgery is not possible, suitable chemotherapy and/or radiotherapy is given.

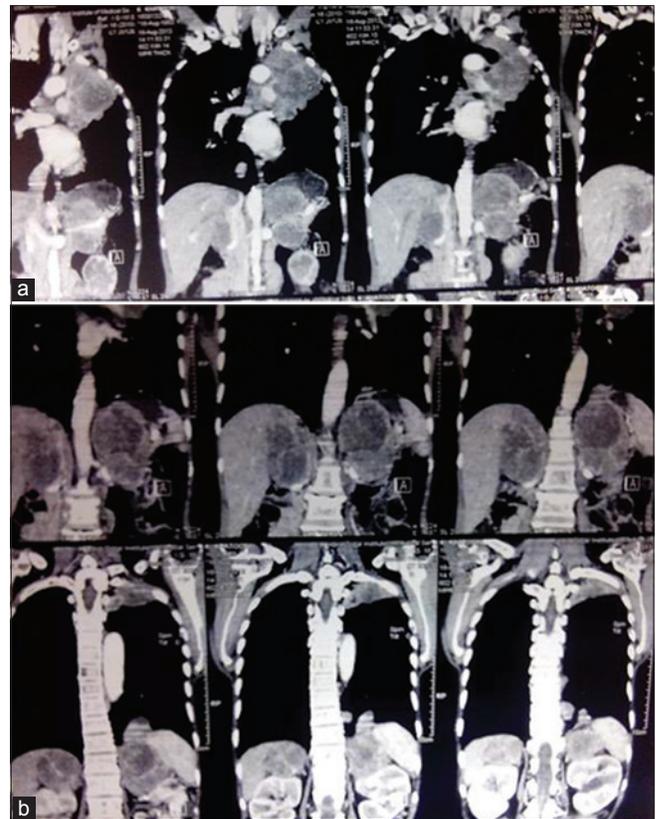
## CASE REPORT

A 56-year-old woman presented with recent onset of diffuse low-grade abdominal pain, heaviness and dragging sensation mainly around both hypochondrium and lumbar regions, and also noticed abdominal discomfort on compression over lumbar regions. She had a chronic history of dry cough become productive on winter season and was bidi smoker for last 20 years with a frequency of 15-20 bidis/week. On clinical examination, all vital signs are normal and unremarkable with visible mild fullness of lumbar regions marked in the left side. Reduced resonance on percussion and breath sound on auscultation noted in the left upper lobe region of the thorax and mild tenderness over both lumbar region, but no palpable lump felt on abdominal examination.

Her laboratory examination was unremarkable except anemia hemoglobin (Hb = 8.1 g/dl). Patient was referred to the radiology department for further imaging evaluation like chest X-ray and abdominal sonography. Chest X-ray revealed a homogeneous opacity in left upper lobe from hilum to lateral thoracic wall. Ultrasonography of the abdomen showed (Figure 1) well encapsulated heterogeneous bulky mass in relation to the upper pole of the kidney on both sides. The mass lesion having areas of cystic changes. In view of opacity in the left lung, these mass reported as bilateral moderate to large adrenal metastasis from lung mass. A complimentary computed tomography (CT) scan of thorax and abdomen was done on 16 slice multidetector scanner without contrast and with contrast. CT scan showed moderate size enhancing soft tissue mass in the upper lobe of left lung (Figure 2a and b), encasing the neck vessels at the root of neck, infiltrating the fat plane of arch of aorta, main pulmonary trunk, left pulmonary branch insinuating into aorto-pulmonary window and left hilum associated with chest wall infiltration. Few enlarged pre-carinal lymphnodes also seen. While abdominal scans (Figure 3a-c) revealed bulky bilateral adrenal masses. The left one measuring 80 mm × 62 mm and the right one 61 mm × 40 mm with central cystic changes. The adrenal masses are compressing the renal capsule and encasing the renal vascular pedicles. No evidence of any recent hemorrhage into the adrenal tumoral mass. Fine-needle aspiration cytology was done from lung mass and adrenal mass as well which confirmed the adenocarcinoma of the lung mass and similar cellularity of the adrenal mass. Whole body bone scan showed no abnormal tracer uptake. Final diagnosis was NSCLC with isolated large bilateral adrenal metastases (T3N1M1). The treatment plan was advised as an early surgical adrenalectomy and palliative chemotherapy for lung mass. However, because of bilaterality of the adrenal lesion, the poor Hb status and lack of such surgical facility, she was finally kept on chemotherapy. Patient was given 6 cycles of chemotherapy containing folic acid based pemetrexed and platinum based carboplatin. She was followed-up regularly and found that she tolerated the drugs well having only complaint of mild nausea, vomiting, and occasional diarrhea. No worsening of her symptoms or



**Figure 1: (a) Upper and (b) lower. Ultrasonography images of the abdomen showing large bilateral adrenal masses (metastases) mainly solid with few cystic spaces**

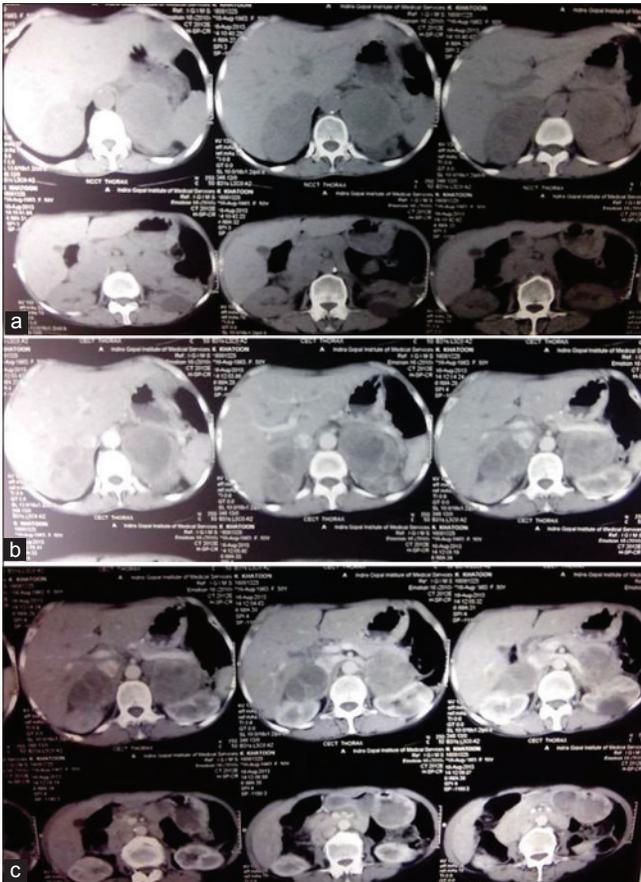


**Figure 2: Coronal reconstructed contrast computed tomography scan of the thorax including the upper abdomen (a and b) showing a large left upper lobe mass that has infiltrated the fat planes of arch of the aorta, pulmonary trunk, left pulmonary artery branch, thoracic wall and insinuated the left hilum and associated with pre-carinal nodes. Large isolated bilateral adrenal masses also visualized**

any evidence of symptoms/signs correlate with acute hemorrhage, adrenal insufficiency or rupture of mass during chemotherapy. After 12 months of follow-up, she was reevaluated by abdominal sonography and CT scan of thorax and abdomen. There was evidence of the increase in size of the lung mass and few more appearance of para-tracheal lymphnodes, but no change in adrenal mass size or its any complications like hemorrhage or rupture noted. Thus labeled as progressive lung lesion and treated for another 4 cycles of chemotherapy with changing the drugs, i.e. gemcitabine and docetaxel and advised coming after 1 month. However unfortunately she was lost to follow-up thereafter probably she became symptom-free or treatment is costly for her.

## DISCUSSION

Although adrenal glands are a common site of metastasis for NSCLC, others also include breast, kidney, gastrointestinal tract, melanoma, and lymphoma.<sup>4</sup> Adrenal metastasis constitute <10% (1.6-3.5%) in a patient



**Figure 3: Axile noncontrast (a) computed tomography (CT) scan showing large bilateral adrenal masses with no evidence of calcification, fat or intratumoral hemorrhage, while contrast images (b) showing heterogeneous enhancement of adrenal masses with displacement of adjacent vessels and indentation over renal capsule. (c) Axile contrast CT scan showing large bilateral adrenal masses with multiple cystic necrotic areas and compression of the renal capsule with encasement of renal vascular pedicle on respective sides**

presenting with NSCLC. Isolated metastatic involvement alone is very rare and bilateral is even more rare.<sup>5</sup> Metastases means wide spread systemic dissemination and carries poor prognosis leading to patient loss even after treatment.

Most adrenal metastasis are incidentally diagnosed by abdominal imaging either patient was symptomatic by abdominal discomfort or during the staging evaluation.<sup>5</sup>

The sensitivity of CT scan in the evaluation was low, but its specificity was high, in a study involving 53 adrenal glands with a proven metastasis from lung cancer.<sup>5</sup> Magnetic resonance imaging (MRI) is best to differentiate between adrenal metastases and adrenal adenoma, where adenoma appears hypointense (due to fat) and metastases is hyperintense (due to cystic change).<sup>3</sup> Any isolated adrenal mass >3 cm should be investigated thoroughly in diagnosed NSCLC and CT guided biopsy is advised.<sup>6</sup>

In metastatic NSCLC, palliative chemotherapy is generally the common method of treatment. Most studies and reports demonstrated that patient survival can be prolonged by surgical resection of isolated metastasis such as brain, and it is also useful and safe for adrenal in a selected patient where primary lung cancer is in early stage.<sup>7</sup>

According to the hypothesis, the cause of isolated adrenal metastasis in lung cancer is direct lymphatic spread from the primary tumor via retroperitoneal channels representing a loco-regional spread in contrast to systemic spread. An isolated adrenal metastasis is defined as synchronous if it is diagnosed within 6 months of initial diagnosis of primary lung cancer and metachronous metastasis when diagnosed after 6 months. The surgical approach for synchronous adrenal metastasis in a patient with operable NSCLC was safe and increases patient survival.<sup>7</sup> Adrenalectomy for solitary metachronous adrenal metastasis also lead to long survival of the patient in completely resected primary mass.<sup>8</sup> Where adrenalectomy is not feasible palliative chemotherapy and/or radiation therapy is used as like other metastatic disease.<sup>3,9</sup> The independent predictor of poor survival in a patient with adrenalectomy is loco-regional lymphnode metastasis noted at surgery for primary NSCLC.<sup>10</sup>

Laparoscopic adrenalectomy is also a safe procedure in a patient for resected primary lung mass, but not implicated if the size of metastasis is >5 cm as it increases the risk of dissemination and tumor recurrence.<sup>3,11</sup>

Adrenal hemorrhage and insufficiency are rare but serious complication, and the risk is high when metastatic mass is large. In such cases, the early adrenal resection is strongly suggested.<sup>3</sup>

According to Porte *et al.* the median survival of patients underwent adrenalectomy was 11 months in a multicentric study and no significant difference noted in survival between synchronous and metachronous presentation.<sup>12</sup> However, according to Tanvetyanon retrospective study on survival of adrenalectomy in NSCLC patients, median survival was shorter for synchronous adrenal metastasis than metachronous adrenal metastasis. The cause for this is intrinsic biology of tumor where synchronous lesion grows faster or more aggressive in nature. According to Soffen *et al.* median survival was 6 months for palliative radiotherapy for isolated adrenal metastasis done on nine patient with lung cancer.

All patients must be thoroughly investigated with a positron emission tomography scan, MRI brain, whole body bone scan and mediastinoscopy to rule out any possibility of more advanced stage of disease, if they presented with early stage of NSCLC with isolated adrenal metastasis.

## CONCLUSION

Solitary adrenal metastases is very common in NSCLC but isolated large bilateral adrenal metastases is exceedingly rare. The possible cause for isolated metastases is lymphatic spread through retroperitoneal lymphatic channels. Although rare, large adrenal metastasis has risk of complication like hemorrhage thus early surgical measures are recommended. If surgery is not possible palliative chemotherapy and/or radiotherapy can be given to improve the patient survival.

## REFERENCES

1. Jett JR, Miller YE. Update in lung cancer 2005. *Am J Respir Crit Care Med* 2006;173:695-7.
2. Micke P, Faldum A, Metz T, Beeh KM, Bittinger F, Hengstler JG, *et al.* Staging small cell lung cancer: Veterans Administration Lung Study Group versus International Association for the Study of Lung Cancer – What limits limited disease? *Lung Cancer* 2002;37:271-6.
3. Karanikiotis C, Tentes AA, Markakidis S, Vafiadis K. Large bilateral adrenal metastases in non-small cell lung cancer. *World J Surg Oncol* 2004;2:37.
4. Brunt LM, Moley JF. Adrenal incidentaloma. *World J Surg* 2001;25:905-13.
5. San Miguel Fraile P, Tardáguila Montero F, Ortiz Rey JA, Antón Badiola I, Zungri Telo E, De La Fuente Buceta A. Bilateral adrenal metastasis as first clinical manifestation of pulmonary carcinoma: Report of a case and review of the literature. *Actas Urol Esp* 2002;26:124-8.
6. Beitler AL, Urschel JD, Velagapudi SR, Takita H. Surgical management of adrenal metastases from lung cancer. *J Surg Oncol* 1998;69:54-7.
7. Pfannschmidt J, Schlolaut B, Muley T, Hoffmann H, Dienemann H. Adrenalectomy for solitary adrenal metastases from non-small cell lung cancer. *Lung Cancer* 2005;49:203-7.
8. Mercier O, Fadel E, Mussot S, Fabre D, Chataigner O, Chapelier A, *et al.* Is surgery required for patients with isolated adrenal metastasis of non-small cell lung carcinoma? *Presse Med* 2007;36:1743-52.
9. Short S, Chaturvedi A, Leslie MD. Palliation of symptomatic adrenal gland metastases by radiotherapy. *Clin Oncol (R Coll Radiol)* 1996;8:387-9.
10. Itou S, Imai T, Usami N, Uchiyama M, Yasuda A, Kawaguchi K, *et al.* Surgical treatment for adrenal metastasis from lung cancer. *Kyobu Geka* 2006;59:47-52.
11. Lam KY, Lo CY. Metastatic tumours of the adrenal glands: A 30-year experience in a teaching hospital. *Clin Endocrinol (Oxf)* 2002;56:95-101.
12. Porte HL, Massouille DG, Lebuffe GR, Wurtz AJ. A unique congenital mediastinal malformation. *Ann Thorac Surg* 2001;71:1703-4.

**How to cite this article:** Kumar A, Suman SK, Kumar B, Kumar S. Non-small Cell Carcinoma of the Lung with Isolated Bilateral Adrenal Metastasis: Imaging and Review of Literature. *Int J Sci Stud* 2014;2(6):142-145.

**Source of Support:** Nil, **Conflict of Interest:** None declared.