

Dear Editor,

First, we would like to thank the reviews and the Journal for considering our study for its publication. We have submitted the paper with the corrections suggested. Here you could find the first page of the papers without PMID and DOI.

Sincerely,

Diego Enrico, MD

**Breast Metastasis from Adenocarcinoma of Lung: A Case Report****Lalkota Prakash Bhanu<sup>1</sup>, BJ Srinivasa<sup>1</sup>, Diganta Hazarika<sup>2</sup>, Mohammad Nasiruddin<sup>3</sup>,  
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**ABSTRACT**

Primary breast cancer is one of the most common malignancies in adult females, in which metastases to the breast represent approximately 0.4% to 1.3% of malignant tumours in the breast. We report a female patient of NSCLC with breast metastatic and discuss clinical, radiological and pathological differential diagnosis. A 30 years old female presented with complaints of cough with haemoptysis and worsening breathing difficulty since 1 month. Lung biopsy shows adenocarcinoma of lung. Patient started chemotherapy with pemetrexated and carboplatin. Clinical examination of the breast shows palpable lump. Patient had undergone breast biopsy to rule out second primary, morphology suggestive of adenocarcinoma. ALK mutation from the breast biopsy come positive, patient started on TKI. Metastasis to the breast, although a rare diagnosis, should be kept on the differential of a patient with primary adenocarcinoma lung cancer. Clinical examination, radiological findings, and immunohistochemistry are very helpful in reaching the proper diagnosis. It has a significant impact on the patient's treatment modalities and prognosis.

**Key words:** Breast metastasis, Lung cancer, ALK, TKI, Breast biopsy

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**Case report is Original:** YES

**Whether case report publishes any where?** NO

**INTRODUCTION**

Breast cancer is the most commonly diagnosed malignancy in women [1]. Primary breast cancer is one of the most common malignancies in adult females; in which metastasis to the breast represent approximately 0.4% to 1.3% of malignant tumours in the breast [2, 3]. Secondary malignancy metastatic to the breast is uncommon with an incidence of 0.5% to 3% of patients with extra mammary malignancy [4, 5]. Other malignancies including ovary, prostate, stomach, malignant mesothelioma and rhabdomyosarcoma have been reported in several patients with breast metastasis [6, 7]. The lung is one of the most common cancer sites in terms of incidence and mortality and cases of pulmonary carcinomas metastasizing to the breast have also been

## Original Article

# Breast metastasis from lung cancer: report of two cases of adenocarcinoma with different gene mutation and one case of squamous cell carcinoma

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**Abstract:** Breast metastasis from extra-mammary malignancy is not common. According to the literature, an incidence of 0.4-1.3% has been reported. We present three cases of metastasis to the breast from two pulmonary adenocarcinoma and one lung squamous carcinoma diagnosed concomitantly or metachronous with the primary tumor. Two pulmonary adenocarcinomas (a 43-year-old female and a 45-year old female) presented with cough and a massive was found on a chest radiograph. One lung squamous carcinoma of a 75-year old male with no clinical symptom and a massive was found on a chest radiograph accidental. Additionally, on physical examination a poorly defined mass was noted in right breast of the three patients. The patient underwent bronchoscopy, excisional breast biopsy and medical thoracoscopy. By cytology, histology and immunohistochemistry primary lung cancer with metastasis to the breast was diagnosed. From our results, we speculate that lung cancer metastasis to the right side of the breast is more than the left side and the mutations should be detected of the breast adenocarcinoma from lung. Both the primary and metastatic anatomic sites demonstrated histologically extensive solid component of the two pulmonary adenocarcinoma patients.

**Keywords:** Lung cancer, breast, metastasis, ALK, ROS1, EGFR

## Introduction

Accurate differentiation of metastatic from primary carcinoma is very important because the treatment and prognosis differ significantly. Although primary breast cancer is the most common malignancy of adult females, metastatic involvement of the breast is rare with a reported incidence of 0.4-1.3% according the literature [1], in addition, the most common primary tumors are melanomas and hematological malignancies [2, 3]. Despite lung cancer is the most malignant cancer worldwide and often metastasizes to the brain, bone, liver, adrenal gland, and contralateral lung [4], breast metastases from non-small cell lung carcinoma are extremely rare. There have only been a few published cases of pulmonary carcinomas metastasizing to the breast [5-8]. We report two cases of female patient with lung adenocarci-

noma and one case of male patient with squamous-cell carcinoma metastatic to the breast were described. To our knowledge, this is the first time to report cases of breast metastasis from lung adenocarcinoma with one anaplastic lymphoma kinase (ALK)-rearrangement and another with the c-ros oncogene 1 (ROS1)-rearrangement. As far, there was no previous case reporting squamous cell carcinoma of the lung metastasis in male breast could be found in the literature. Our case reports highlight the usefulness of gene mutation detection for diagnosis and targeted treatment.

## Materials and methods

### Cases

All cases were sent in consultation to pathology specialists. Clinical and radiologic data of patients were collected from pathologic reports,

## CASE REPORT

## BILATERAL BREAST METASTASIS FROM AN ADENOCARCINOMA OF LUNG: A CASE REPORT

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### ABSTRACT

Breast metastases from extramammary neoplasms are very rare. Breast metastasis is often confused with primary breast malignancy. Accurate differentiation of metastatic breast carcinoma from primary breast carcinoma is of crucial importance because the treatment and prognosis differs significantly. The pathologist has a key role in making the diagnosis of metastasis to the breast when histological appearance is similar to primary breast tumor. The clinical history is helpful to make the diagnosis. Metastasis to the breast usually indicates disseminated metastatic disease and poor prognosis. We report a case of 42-year-old female who developed bilateral breast metastasis 18 months after the diagnosis of primary adenocarcinoma of lung.

**Key words:** Breast metastasis, Adenocarcinoma, Lung, Bilateral

### INTRODUCTION

Breast cancer is a very common malignancy in women though metastases to the breast from extramammary malignancy are rare with incidence of 0.4 - 1.3%.<sup>1-6</sup> The most common primary tumors that metastasized to breast are haematological malignancies and malignant melanoma.<sup>1,4</sup> Few cases reported on non-small cell lung cancer (NSCLC) metastasizing to the breast.<sup>5,7,8</sup> Here, we report a case of 42-year-old woman with bilateral breast metastasis from an adenocarcinoma of lung with discussion on clinical, radiological and pathological findings with differentiation from primary breast carcinoma.

### CASE REPORT

A 42-year-old woman presented with dyspnea and dry cough of 6 weeks duration. Chest examination revealed reduced breath sounds and percussion dullness at the right hemithorax. Chest roentgenogram revealed opacified shadow over the right lung field. Computed tomography of chest revealed 6.5 × 5.5 cm mass in the right lung with pleural effusion and few enlarged lymph nodes in paratracheal region (Figure 1). Transbronchial biopsy revealed high grade adenocarcinoma (Figure 2.A). On immunohistochemistry, tumor cells showed nuclear positivity for thyroid transcription factor-1 (TTF-1) (Figure 2.B). Tumor cells also positive for

cytokeratin 7 (CK7), monoclonal carcinoembryonic antigen (CEA), but negative for cytokeratin 20 (CK 20), CK5/6, estrogen receptors (ER), calcitonin and thyroglobulin. She was treated with chemotherapy and remained asymptomatic for a period of 18 months.

Then she complained heaviness in both breast. Physical examination revealed painless, ill-defined mass in both breast. Mammography showed diffuse asymmetrical density in the subareolar region and upper outer quadrant of the both breast without calcification (Figure 3). Fine-needle aspiration cytology showed highly pleomorphic cells, isolated or irregularly clustered. In view of previous malignancy, possibility of bilateral breast metastasis from an adenocarcinoma of lung was given. However, primary breast carcinoma should be excluded. Subsequent tru-cut biopsy from both breast revealed diffuse infiltration by nests of neoplastic epithelial cells around the benign mammary duct. Within the stroma, infiltrating high grade adenocarcinoma without desmoplastic stromal response was demonstrated. Lymphatic tumor embolus was evident (Figure 4). The tumor cells demonstrated immunoreactivity for TTF-1, CK 7 and monoclonal CEA. The tumor cells lacked expression of gross cystic disease fluid protein-15 (GCDFP-15), ER, progesterone receptor (PR), CK 5/6 and thyroglobulin (Figures 5). Tumor cells from breast revealed the same immunoprofile as the lung biopsy. Final diagnosis of

## Metastases to the Breast from Adenocarcinoma of Lung: Incidentally Detected with Routine Computed Tomography of Chest

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### ABSTRACT

The authors report an unusual case of breast metastases incidentally disclosed with a routine contrast-enhanced chest CT scan. A 53-year-old female patient underwent chemotherapy for lung cancer and multiple metastases, and a follow-up CT scan of chest disclosed multiple well-defined small nodules with homogeneous enhancement in her left breast. The breast nodules were non-palpable. Metastatic adenocarcinoma of pulmonary origin was subsequently confirmed at sonographically guided biopsy.

Metastases to the breast are relatively rare, which constitute 0.4-6.6% of all breast malignancies [1, 2]. This wide range depends on inclusion or exclusion of leukemia and lymphoma as primary tumors [2]. Patients with extramammary malignancies and metastases to the breast were often presented with palpable breast lumps, or breast nodules detected at mammography or sonography [1-5]. In about 40% of patients with breast metastases from extramammary carcinomas, the breast lesions were even the first manifestations of diseases [3]. Herein we report a case of breast metastases from adenocarcinoma of lung, in which breast nodules were incidentally disclosed with computed tomography (CT) of chest for the known lung cancer.

### CASE REPORT

A 53-year-old female patient presented to our institution with known adenocarcinoma of lung confirmed at an outside hospital. Initial assessment of disease disclosed a 2-cm tumor in left lung with bilateral multiple lung to lung metastases, and extensive metastases to pleura, mediastinum, brain, and liver. The laboratory test showed a

high serum carcinoembryonic antigen (CEA) of 31.13-ng/ml (normal upper limit, 5-ng/ml). She underwent chemotherapy thereafter, and serial follow-up imaging studies showed partial remission of disease in the brain and stable disease in the remaining sites during the following 9-month period.

Contrast-enhanced CT scan of chest performed 9 months after initial presentation showed stable disease with respect to lung, pleura and mediastinum; but multiple small nodules in the left breast were incidentally disclosed (Fig. 1a), which were not found in initial CT scan. A few left axillary lymph nodes were also noted. The routine contrast-enhanced CT of chest was performed with intravenous administration of 100 mL iopromide (Ultravist 300; Schering, Berlin, Germany) by using a mechanical power injector at a rate of 2.5-mL/sec. The scanning was performed 50 seconds after initiation of the contrast medium injection.

The breast nodules were not palpated at physical examination. Serum CEA was 4.1-ng/ml at that time. She underwent sonography of breast for characterization of the nodules, which showed multiple lobulated hypoechoic nodules in left breast (Fig. 1b). Most of the nodules were

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