

Advanced right lung adenocarcinoma with ipsilateral breast metastasis

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Abstract

Breast metastases from non-small cell lung carcinoma are rarely reported. We report a case of a female patient with primary adenocarcinoma of the lower lobe of her right lung presenting with a massive right-sided malignant pleural effusion. The tumor harbored an epidermal growth factor receptor insertion mutation in exon 20 but was anaplastic lymphoma kinase translocation negative. She did not respond to treatment with erlotinib. First- and second-line cytotoxic chemotherapy resulted in stable disease as the best responses. She developed right breast metastasis 20 months after her initial presentation. The rarity of the condition and the likely mechanism of the breast metastasis are discussed.

Introduction

Metastases to the breast from extra-mammary malignancies are very rare with a reported incidence of 0.4–1.3% of all breast malignancies in the literature [1, 2]. Despite the fact that the lung cancer is the most common cancer worldwide, breast metastases from non-small cell lung carcinoma are rarely reported. We report a case of a female patient with stage IV primary right lower lobe lung adenocarcinoma who eventually developed ipsilateral breast metastasis as her disease progressed.

Case Report

A 70-year-old female who had never smoked presented with shortness of breath due to a massive right-sided pleural effusion. Two and a half liters of blood-stained pleural effusion fluid were drained. Computed tomography (CT) examination revealed a right lung lower lobe tumor in addition to the right-sided pleural effusion. A right-sided closed blind pleural biopsy and a subsequent video-assisted thoracoscopic pleural biopsy both revealed thyroid transcription factor (TTF)-1 positive adenocarcinoma which harbored an insertion mutation in exon 20 of the epider-

mal growth factor receptor (EGFR) gene but negative for anaplastic lymphoma kinase (ALK) translocation by fluorescent in-situ hybridization (FISH). Talc pleurodesis was performed at video-assisted thoracoscopic surgery. She was treated with erlotinib 150 mg once daily for a month without any symptomatic or radiological improvement. She then received four cycles of carboplatin (area under the concentration-time curve of 6) + pemetrexed (500 mg/m²) + bevacizumab (15 mg/kg) every 3 weeks with stable disease as the best response. Serial three monthly CT scan examinations revealed gradually enlarging right lower lobe tumor and right upper lobe nodules. When she developed symptomatic disease progression with the third serial CT scan (Fig. 1a), she was treated with six cycles of single agent docetaxel once every 3 weeks with stable disease as the best response. Serial three monthly chest CT scans showed stable right intrathoracic disease but multiple enlarging right axillary lymph nodes. One month after the sixth cycle of docetaxel, she developed painless erythematous skin nodules over her right breast and the lower right-sided anterior chest wall which extended across the midline to the medial aspect of the left breast with a diffuse non-tender hard right breast lump and right nipple retraction (Fig. 2). Her left breast was normal on palpation. Breast ultrasound

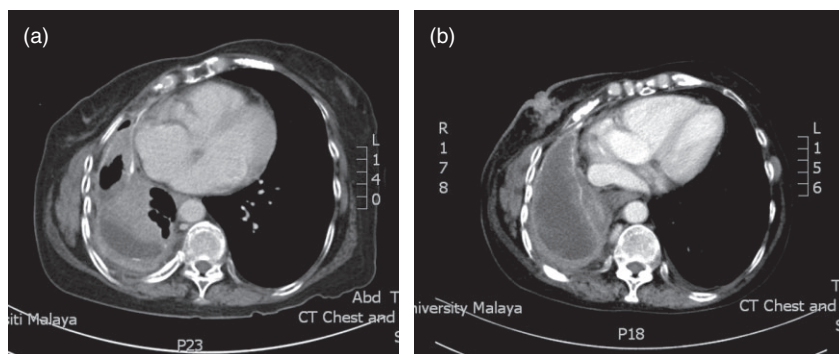


Figure 1. (a) Computed tomography (CT) scan of thorax before the commencement of docetaxel showing reduced right lung volume, tumor in the right lower lobe, right parietal pleural thickening, and a small right pleural effusion. (b) CT scan of thorax showing intact fat planes between the chest wall and breast tissue.



Figure 2. Right nipple retraction and erythematous skin nodules over the right breast as well as the lower right-sided anterior chest wall extending across the midline to the medial aspect of the left breast.

and mammogram examinations were not performed. A core needle biopsy of the breast lump showed TTF-1 positive adenocarcinoma which was negative for estrogen receptor, progesterone receptor, and human epidermal growth factor receptor type 2 and again negative for ALK translocation by FISH. She declined further palliative chemotherapy and CT scan examination then revealed stable intrathoracic disease, enlarged right axillary lymph nodes, intact fat planes between the chest wall and breast tissue (Fig. 1b) but evidence of omental metastases with ascites. Radionuclide bone scan at that time showed thoracic spine as well as multiple rib metastases. She was provided best supportive care and succumbed to the disease 2 months later.

Discussion

Metastasis to the breast occurs either by lymphatic or hematogenous spread. Our patient had metastasis to her breast on the same side as the malignant pleural effusion

in keeping with the hypothesis by Huang *et al.* [3] on a stepwise mechanism, involving parietal pleural seeding, invasion of lymphatic vessels in the chest wall which drain to the ipsilateral axillary lymph nodes, and retrograde spread to the lymphatic system of the breast. This mechanism of breast metastasis is supported by the findings of right axillary lymph node enlargement on serial chest CT scans before the appearance of breast nodules and breast lump in our patient. In addition, lymphatic metastasis to the breast usually occurs across the anterior chest wall to the opposite breast as seen in our patient. Furthermore, the right breast lump in our patient was diffuse. In hematogenous metastasis to the breast from extramammary malignancies, a solitary discrete lesion is more commonly reported than multiple or diffuse involvement [4, 5]. Direct tumor invasion of the breast from the ipsilateral pleural metastasis was unlikely because the fat planes between the chest wall and breast tissue were intact. We did not test for the presence of EGFR mutation in the metastatic breast lump because her earlier pleural biopsy that showed metastasis from lung adenocarcinoma was positive for an insertion mutation in exon 20 of the EGFR gene which was not an activating mutation. That was the reason why she did not respond to treatment with erlotinib, an EGFR tyrosine kinase inhibitor.

The nipple retraction in our patient is unusual because unlike primary breast tumors, retraction of the skin or nipple is not described in the majority of the metastases, despite their superficial location [4]. Metastatic breast lesions tend to be found in the subcutaneous fat whereas primary breast cancers develop in the glandular tissue. As opposed to primary breast cancers, metastatic tumors to the breast are more likely to be multiple or bilateral and are characteristically superficially located, poorly defined, irregular nodules or masses without calcification on mammography and ultrasonography [2]. Mammogram or ultrasound examinations of the breasts could have detected

additional lesions in the contralateral breast if it had been a hematogenous spread. The majority of breast metastases are associated with disseminated metastatic disease and an extremely poor prognosis with most patients surviving less than 1 year after diagnosis like in our patient [2, 4, 5].

Disclosure Statements

No conflict of interest declared.

Appropriate written informed consent was obtained for publication of this case report and accompanying images.

References

1. Georgiannos SN, Chin J, Goode AW, Sheaff M. 2001. Secondary neoplasms of the breast: a survey of the 20th century. *Cancer* 92:2259-2266.
2. Lee SK, Kim WW, Kim SH, Hur SM, Kim S, Choi JH, et al. 2010. Characteristics of metastasis in the breast from extramammary malignancies. *J. Surg. Oncol.* 101:137-140.
3. Huang HC, Hang JF, Wu MH, Chou TY, Chiu CH. 2013. Lung adenocarcinoma with ipsilateral breast metastasis: a simple coincidence? *J. Thorac. Oncol.* 8:974-979.
4. Yeh CN, Lin CH, Chen MF. 2004. Clinical and ultrasonographic characteristics of breast metastases from extramammary malignancies. *Am. Surg.* 70:287-290.
5. Williams SA, Ehlers RA, 2nd, Hunt KK, Yi M, Kuerer HM, Singletary SE, et al. 2007. Metastases to the breast from nonbreast solid neoplasms: presentation and determinants of survival. *Cancer* 110:731-737.