CASE REPORT

Lung cancer masquerading as breast cancer with carcinoma en cuirasse

Emma Harrett,¹ Rhian Sian Davies,² Richard Attanoos,³ Jason Francis Lester¹¹Department of Clinical Oncology, Velindre Cancer Centre, Cardiff, UK²Department of Clinical Oncology, ABM University Health Board, Swansea, UK³Department of Histopathology, Cardiff and Vale UHB, Cardiff, UK**Correspondence to**Dr Rhian Sian Davies,
rhian.s.davies@wales.nhs.uk

Accepted 26 October 2014

SUMMARY

Metastases to the breast from lung cancer are rare. Carcinoma en cuirasse is an unusual form of metastatic cutaneous carcinoma, almost exclusively described as deposits secondary to breast carcinoma. A 63-year-old woman presented with dyspnoea. A CT scan demonstrated a pleural effusion, large pericardial effusion, mediastinal lymphadenopathy and right basal consolidation. Pleural fluid cytology and immunohistochemistry were consistent with a diagnosis of primary lung adenocarcinoma. The patient was treated with pemetrexed and carboplatin, resulting in stable disease. A year later, she developed bilateral breast masses and multiple painful erythematous subcutaneous nodules over her torso, clinically indistinguishable from carcinoma en cuirasse. A biopsy demonstrated these were deposits from metastatic adenocarcinoma of the lung. The patient received docetaxel and carboplatin with initial good response. The painful lesions were subsequently treated with radiotherapy, which provided symptomatic relief. To the best of our knowledge, this is the only case of metastatic lung adenocarcinoma mimicking carcinoma en cuirasse.

BACKGROUND

Breast metastases are a rare clinical entity when compared to primary breast carcinomas. The incidence of metastases to the breast from extra-mammary malignancy is reported to be 0.5–6.6%.^{1–7} This wide difference in incidence can be accounted for by the inclusion or exclusion of haemopoietic malignancies.¹ Melanoma, genital tract and gastrointestinal tract malignancies have been reported to metastasise to the breast.^{1–6} Lung cancer is a relatively rare cause of breast metastases and is reported as the primary source in 0.5% of cases.⁴ There are case reports published of solid breast metastases from squamous carcinoma, adenocarcinoma and small cell carcinoma of the lung, adenocarcinoma being the most common.^{1–4, 8}

All of these publications describe solid breast metastases from extra-mammary primary cancers. Carcinoma en cuirasse is a separate and distinct clinical entity. Velpeau first described ‘cancer en cuirasse’ in 1838; a description chosen because of the resemblance of this type of metastatic cancer to the metal breastplate of a cuirassier.^{9–10} It is a rare form of metastatic cutaneous skin carcinoma, most often described as cutaneous metastases from breast carcinoma affecting the thoracic wall.¹¹ It is described as small, shot-sized, flattish papules or nodules, which enlarge to the size of a pea. They may be seated on a

red or bluish-red surface, which may be traversed by dilated blood vessels. The nodules may coalesce to form a leathery sheet encasing the thorax, interfering with deep respiration.⁹ Histologically, carcinoma en cuirasse mainly consists of fibrosis with an ‘Indian file’ pattern where tumour cells form small lines between collagen bundles.^{10–11}

CASE PRESENTATION

A 63-year-old woman presented in April 2011 with a productive cough, exertional dyspnoea and fever. She was an ex-smoker, with a 45 pack-year history. She had no significant medical history, and no family history of malignancy.

A CT scan showed a large pericardial effusion, a right pleural effusion, enlarged mediastinal nodes and right basal consolidation. Transthoracic echocardiogram showed pericardial tamponade, which required drainage. A chest drain was also inserted. The patient was treated for pneumonia with intravenous antibiotics and non-invasive ventilation on a high dependency unit.

Pleural fluid was sent for cytological analysis. This reported an adenocarcinoma and immunocytochemistry favoured lung cancer. The cells were thyroid transcription factor-1 (TTF-1) positive, cytokeratin-7 (CK7) positive, cytokeratin-20 (CK20) negative, carcinoembryonic antigen (CEA) negative, MOC31 positive, WT-1 negative, calretinin negative and cytokeratins 5/6 negative. Molecular testing of the biopsy sample did not show any mutations in the epidermal growth factor receptor (EGFR).

The patient was diagnosed with stage Tx N2 M1b adenocarcinoma of the right lung based on the results of the CT scan and pleural fluid analysis. A bronchoscopy was not carried out in view of the definitive immunohistochemical results and corroborative radiology.

Following a period of treatment in the high dependency unit, the patient’s condition improved. A decision was made to start treatment with systemic chemotherapy. A baseline CT scan showed a persistent right pleural effusion, right lower lobe collapse and enlarged mediastinal nodes. The patient was treated with four cycles of 3-weekly AUC five carboplatin and pemetrexed 500 mg/m² starting in July 2011. A 20% dose reduction was applied to cycle 1 due to the patient’s WHO performance status of 2. Her WHO performance status improved to one after the first cycle and the dose was increased to 100%. A CT scan in September 2011 after three cycles of chemotherapy showed persistent collapse of the right lower lobe, but resolution of the effusions and reduction in the

CrossMark

To cite: Harrett E, Davies RS, Attanoos R, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2014-206596

Figure 1 Needle core showing invasive islands of carcinoma morphologically mimicking breast ductal carcinoma (H&E x200).

Figure 3 Thyroid transcription factor-1 showing nuclear expression in tumour cells (x200).

size of the mediastinal lymphadenopathy, indicating a partial response to chemotherapy.

In April 2012 the patient returned to clinic reporting of pain in her left breast. On examination she had a red swollen left breast with a mass underneath the nipple and a left pleural effusion. There was no nipple discharge or inversion and no palpable lymphadenopathy. Serum Ca 15-3 was 700 U/mL (normal range <32), CEA <1 U/mL (<5) and Ca125 24 U/mL (<35). She was reviewed by the oncology team and underwent an ultrasound-guided biopsy of the left breast mass in May 2012. Pathology initially reported a grade 2 invasive ductal carcinoma, which was estrogen receptor (ER), progesterone receptor (PR) and HER-2 negative. In addition, the left pleural fluid was aspirated and cytological examination reported scanty small groups and single vacuolated cells with prominent nucleoli. The cells were positive on immunohistochemistry for BerEP4, MOC31, CK7 and TTF-1, and negative for calretinin compatible with metastatic primary lung adenocarcinoma (figures 1–3).

At her next clinic review, there had been a rapid increase in size of the left breast mass and a new 6 cm mass behind the right nipple was found. In addition, the patient reported a bloody discharge from the right nipple and worsening dyspnoea. Clinically her disease was behaving more like breast cancer than lung cancer, and given the conflicting pathology reports, the pleural fluid and breast biopsy were reviewed.

Figure 2 High power showing irregular islands of moderately differentiated adenocarcinoma with focal rudimentary acinar formation (H&E x400).

Additional immunostaining of the breast biopsy showed the breast tumour to be positive for CK7 and TTF-1, and negative for CK20, identical to the pleural fluid from both lungs. The breast biopsy and pleural fluid were both reported as consistent with metastatic primary lung adenocarcinoma rather than breast cancer. Gene profiling of the breast biopsy sample did not reveal any mutations in the EGFR receptor or the presence of anaplastic lymphoma kinase translocation.

The patient was treated with 3-weekly docetaxel 60 mg/m² and carboplatin (AUC 5) chemotherapy to a total of four cycles starting in July 2012. The size of the breast masses dramatically reduced and her breathing improved.

OUTCOME AND FOLLOW-UP

Clinically and radiologically, the disease remained stable until January 2013 when she presented with new bilateral multiple tender subcutaneous breast masses, with skin tethering and crusting around the nipples. She was treated with radiotherapy to both breasts—30 Gy in five fractions using 6 MV photons once weekly to good effect with regression of the skin changes.

In May 2013, the patient developed extensive multiple erythematous subcutaneous painful nodules over her lower thoracic wall beneath the left breast outside the previous radiotherapy fields, clinically indistinguishable from carcinoma en cuirasse (figure 4).

Figure 4 Picture of multiple erythematous subcutaneous nodules in May 2013.

Further chemotherapy was discussed but the patient declined further systemic treatment. The patient's condition deteriorated, and by June 2013 she was symptomatic with dyspnoea and had a WHO performance status of 2. She was treated with radiotherapy (8 Gy single fraction using 6 MeV electrons) to the painful area of carcinoma en cuirasse, which provided symptomatic relief. She died in October 2013 and the cause of death was recorded as metastatic lung cancer. The patient did not have a postmortem.

DISCUSSION

We report an unusual case of breast metastasis from lung cancer. What makes this case unique is the development of carcinoma en cuirasse. To the best of our knowledge, this has not previously been reported in the medical literature in relation to primary lung cancer.

Lung cancer can metastasise extensively throughout the body. If a patient with a previous diagnosis of lung cancer presents with the clinicopathological features of a new primary cancer, lung cancer metastases should always be considered in the differential

diagnosis. In this situation, obtaining a biopsy of the new lesion and reviewing this in the context of the original lung pathology is essential if the patient is to receive optimum treatment.

This case emphasises the need for expert histological and immunohistochemical analysis of tissue and fluid in unusual cancer cases.

Acknowledgements Dr Annabel Borley was involved in the clinical care of this patient and provided specialist Breast Oncology input in the writing of this manuscript (Consultant Clinical Oncologist, Velindre Cancer Centre, Cardiff).

Contributors All the authors have read and approved the final version of this manuscript. EH wrote the manuscript. RSD and JFL revised the manuscript critically and were contributors in preparing the final manuscript. RA provided the histopathological input for the case and prepared the images. JFL and EH were involved in the clinical care of the patient.

Competing interests None.

Patient consent None.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Luh S, Kuo C, Tsao T. Breast metastasis from small cell lung carcinoma. *J Zhejiang Univ Sci B* 2008;9:39–43.
- 2 Babu K, Roberts F, Bryden F, *et al.* Metastases to breast from primary lung cancer. *J Thorac Oncol* 2009;4:540–2.
- 3 Hsu W, Sheen-Chen S, Wang J, *et al.* Squamous cell lung carcinoma metastatic to the breast. *Anticancer Res* 2008;28:1299–302.
- 4 Ramar K, Pervez H, Potti A, *et al.* Breast Metastasis from non-small cell lung carcinoma. *Med Oncol* 2003;20:181–4.
- 5 Vizcaino I, Torregrosa A, Higuera V, *et al.* Metastasis to the breast from extra mammary malignancies: a report of four cases and a review of the literature. *Eur Radiol* 2001;11:1659–65.
- 6 Gupta D, Merino M, Farhood A, *et al.* Metastases to the breast simulating ductal carcinoma in situ: report of two cases and review of the literature. *Ann Diagn Pathol* 2001;5:15–20.
- 7 Chattopadhyay S, Aich RK, Sengupta A, *et al.* Squamous cell carcinoma of lung metastasizing in breast. *J Cancer Res Ther* 2012;8:630–2.
- 8 Liu W, Palma-Diaz F, Alasio T. Primary small cell carcinoma of the lung initially presenting as a breast mass: a fine needle aspiration diagnosis. *Diagn Cytopathol* 2009;37:208–12.
- 9 Stavata L. Cancer en cuirasse. *Br J Dermatol* 1943;55:31–9.
- 10 Hyde JN. Disseminated lenticular cancer of the skin: "cancer en cuirasse". *Am J Med Sci* 1892;103:235–45.
- 11 Carlesimo M, Rossi A, DeMarco G, *et al.* Carcinoma en cuirasse of the breast. *Eur J Dermatol* 2009;19:289–90.

Learning points

- Breast metastases are a rare clinical entity when compared to primary breast carcinomas.
- Carcinoma en cuirasse is an unusual form of metastatic cutaneous carcinoma, almost exclusively described as deposits secondary to breast carcinoma. It is described as small red or bluish-red, shot-sized, flattish papules or nodules, which enlarge to the size of a pea. These may coalesce to form a leathery sheet encasing the thorax, interfering with deep respiration.
- In unusual cases, there is a need for expert histological and immunohistochemical analysis of tissue and fluid if patients are to receive optimum treatment.

Copyright 2014 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- Submit as many cases as you like
- Enjoy fast sympathetic peer review and rapid publication of accepted articles
- Access all the published articles
- Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow