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Metastasis of primary lung carcinoma to the breast: a systematic review of the literature

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ABSTRACT

Background: The purpose of this systematic review was to summarize previously published case reports of primary lung carcinoma metastasis to the breast to assess common clinical and pathologic features and management strategies.

Materials and methods: Case reports describing breast metastasis of primary lung carcinoma were systematically evaluated in MEDLINE and EMBASE.

Results: Thirty-one reported cases of non-small-cell lung carcinoma (NSCLC) metastasized to the breast were identified, along with eight cases of small-cell lung carcinoma. Sixty-seven percent of reported NSCLC metastases to the breast were detected metachronously with the primary lung abnormality, whereas 80% of small-cell lung carcinoma breast metastases appeared synchronously. Thyroid transcription factor 1 was found to be expressed in 58% of total NSCLC breast metastases, including 83% of those of adenocarcinoma origin. Therapeutic strategies among NSCLC cases varied widely, and only 36% of NSCLC breast metastasis patients were administered chemotherapy. Additional sites of metastasis in these cases are summarized as well.

Conclusions: It is recommended to include metastatic lung cancer in the differential diagnosis of patients presenting with a breast abnormality in the context of a suspected lung cancer. Thyroid transcription factor 1 expression should be examined in these cases. The metachronous versus synchronous nature of lung carcinoma metastasis to the breast has consequences for both detection of the primary and secondary lesions and patient outlook. Clinical correlation is vital to effective management of the care of patients harboring these atypical secondary lesions.

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1. Introduction

Breast cancer is one of the most notable public health issues of the 21st century, garnering significant interest for its screening, prevention, and treatment. Herein, we describe two patients with “typical” presentations for a breast abnormality that were on further investigation discovered to be a rare breast lesion: metastasis from primary lung malignancy. We present the clinical and pathological features of these metastatic deposits and provide a systematic review of the literature on the breast as a metastatic site of primary lung carcinoma.

2. Case reports

2.1. Case 1

A 67-y-old woman with no prior history of malignancy was referred for evaluation of a suspicious left breast mass discovered on screening mammography. The patient did not report new breast lumps, skin changes, or nipple discharge on breast self-exam. Her family history was significant for a paternal aunt with breast cancer, and a mother with colon cancer. She had a 50-pack-y smoking history. On review of systems, she reported chronic dyspnea on exertion, occasional productive cough with clear phlegm, and chronic back pain.

On physical examination, there was a subtle contour abnormality in the left breast with a 2-cm firm, round, mobile mass at the 2-o’clock position. Neither breast had skin changes nor suspicious supraclavicular or axillary lymphadenopathy. A diagnostic mammogram demonstrated a 17-mm irregular mass with an indistinct margin in the left breast that was a BI-RADS 4C lesion (Fig. 1A). Ultrasound guided core biopsy of the lesion contained only carcinoma, without any normal adjacent breast tissue. The carcinoma had an unexpected appearance (Fig. 1B) and was ultimately diagnosed as large cell undifferentiated carcinoma with neuroendocrine features metastatic from the lung, confirmed with positive immunolabeling for

chomogranin, synaptophysin, and thyroid transcription factor 1(TTF-1). The chest x-ray was negative for abnormality. A chest computed tomography (CT) followed and showed a large sub-carinal mass. A staging whole body CT or positron emission tomography scan demonstrated several large metastatic necrotic masses in the right hepatic lobe and additional metastatic deposits involving the right adrenal gland. A hypermetabolic 1.4-cm right gluteal mass with associated soft tissue defect was also noted. The patient was referred to medical oncology who recommended a course of chemotherapy with carboplatin and pemetrexed, but felt Hospice was also a reasonable option given the patient’s significant tumor burden with a relatively chemoresistant subtype of non–small cell lung cancer (NSCLC). The patient chose Hospice care and died 2 mo from the time of her breast biopsy.

2.2. Case 2

A 58-y-old woman with a prior history of stage IIIA T2N2 lung adenocarcinoma diagnosed 3 y prior, presented with a self-detected left breast mass. Her lung tumor was positive for an EGFR mutation in exon 19 and had been treated with a left pneumonectomy and mediastinal lymph node dissection followed by postoperative radiotherapy and cisplatin/navelbine chemotherapy. She denied any trauma, skin changes, or nipple discharge associated with the breast lesion. She was a cigarette smoker for 12 y but quit 15 y before. Her family history was significant for a sister diagnosed with breast cancer in her forties and her mother’s diagnosis of breast cancer in her sixties. Her mammogram 2 y prior was normal. On review of systems, she noted a weight loss of 20 lb in the last year and shortness of breath.

Before her referral to our multidisciplinary clinic for a second opinion, a mammogram and ultrasound performed at the referring facility (Fig. 2A and B) revealed a 1.3-cm medial left breast mass. A core needle biopsy was performed and was reported by the pathologists, at both the referring facility and our institution, as infiltrating ductal carcinoma with receptors for estrogen weakly positive (20%), progesterone negative, and

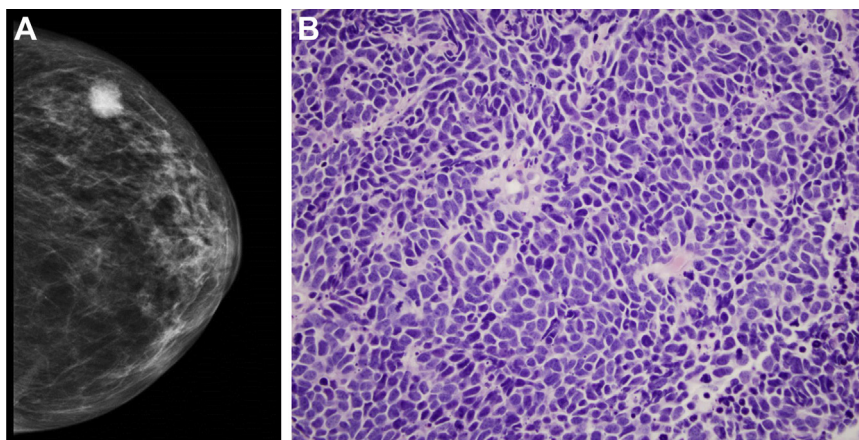


Fig. 1 – Case 1. (A) Mammogram. Breast mass, 17 mm in diameter, at the 2-o’clock position in the left breast. (B) Large cell lung carcinoma evident in the left breast (H and E). (Color version of figure is available online.)

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