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CASE REPORT PEER REVIEWED | OPEN ACCESS

A rare case of lung adenocarcinoma with metastases to the breasts bilaterally

Saurabh Dubey, Maysoon T Hussain, Mohamad Akil, Nasir Gondal

ABSTRACT

We present a case of a 65-year-old female with a history of stage IV adenocarcinoma of the lung that metastasized to the bilateral breasts. The breasts are a rare metastatic site for lung adenocarcinoma, with metastases to the breasts bilaterally being further unique. Our patient was diagnosed with stage IV adenocarcinoma of the lung with EGFR exon 20 insertion with metastases to the bone and skin four years prior to presentation, and she underwent a left lower lobotomy and multiple failed therapies. Biopsy of her breast masses revealed TTF (lung marker) positive GATA binding protein 3, GCDFP15, and mammaglobin (breast markers) negative metastatic moderately differentiated adenocarcinoma. Next-generation sequencing studies revealed exon 20 mutation, for which there are few effective targeted therapies. She was considered for therapy with amivantamab but ultimately never received therapy due to multiple hospitalizations, and passed away due to septic shock, likely from empyema versus ESBL *E. coli* urinary tract infection.

Keywords: Breast metastases, EGFR exon 20 insertion, Lung adenocarcinoma, Non-small cell lung cancer

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INTRODUCTION

Breast metastases from extra-mammary malignancies are rare (accounting for only 0.4–1.3% of malignant breast masses), with primary breast malignancy being much more common [1]. The main metastatic sites for non-small cell lung cancers (NSCLC) are the brain (47%), bone (36%), liver (22%), adrenal glands (15%), thoracic cavity (11%), and distant lymph nodes (10%). About 50% of cases of NSCLC are metastatic at diagnosis. Metastases to the breast are considered uncommon metastases, accounting for only 0.03% of metastatic sites. However, they are clinically important because uncommon metastatic sites have been associated with a poorer prognosis [2].

Objective

We present a case of a 65-year-old female with a history of stage IV adenocarcinoma of the lung that metastasized to the bilateral breasts. The breasts are a rare metastatic site for lung adenocarcinoma, as the breasts have relatively minimal blood supply. Additionally, this case is unique because this patient had metastases to the breasts bilaterally, which is also a rare finding.

CASE REPORT

A 65-year-old female with a history of stage IV adenocarcinoma of the lung status post left lower

lobotomy and radiation therapy presented to our emergency department due to respiratory distress.

History was obtained from the patient. She was diagnosed with stage IV adenocarcinoma of the lung with EGFR exon 20 insertion with metastases to the bone and skin four years prior. She underwent a left lower lobotomy and multiple failed treatment lines including gefitinib, osermitinib, pemetrexed, bevacizumab, furmonertinib, and anlotinib. The patient was told that her lung cancer has spread to the breast, and reported that she had a breast biopsy around six months prior to presentation.

On exam, she had diffuse thickening of the skin and induration of the left breast, right breast exam was unremarkable. Breast imaging revealed a 9 mm mildly irregular mass in the upper outer right breast, right axillary lymph node prominence with borderline cortical thickening and significant decrease of fatty hilum [pictured in Figure 1 on ultrasonography (US)]. The left breast could not be evaluated by ultrasound due to diffuse thickening of the skin and left axilla. Computed tomography (CT) images (Figures 2 and 3) showing the left breast mass with overlying skin thickening are included. To rule out primary breast malignancy, she underwent ultrasound guided bilateral breast biopsies at that time, which showed TTF (lung marker) positive GATA binding protein 3, GCDFP15 and mammaglobin (breast markers) negative metastatic moderately differentiated adenocarcinoma (Figure 1).

Outpatient positron emission tomography (PET) scan was done. This revealed the following findings: linear, sand like nodular opacity with air bronchograms in the left upper lobe with low-grade metabolic activity, which may represent post-radiation fibrosis, large lobulated left breast metastasis, with associated striatal edema and metabolically active skin thickening. She had a brain magnetic resonance imaging (MRI) that ruled out brain metastases. Next-generation sequencing studies revealed exon 20 mutation; she was being considered for therapy through a clinical trial of CLN-081 but was found to not be eligible due to prior treatment with EGFR tyrosine kinase inhibitors. In the meantime, therapy with amivantamab was planned, but delayed given multiple hospital admissions over the next few months for cancer-related pain and hydronephrosis.

Our medical ICU (MICU) and palliative care services were consulted, and in agreement with the patient's family members, felt that the patient would best benefit from pain control without escalation of care. The patient's family reaffirmed her wishes as do not resuscitate (DNR)/ do not intubate (DNI). She passed away due to septic shock, likely from empyema versus ESBL *E. coli* urinary tract infection.

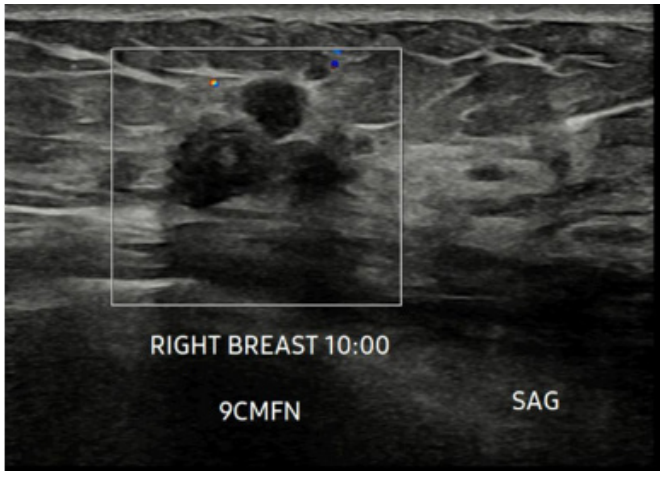

Figure 1: Ultrasonography of the right breast showing 9 mm mildly irregular mass in the upper outer right breast consistent with metastatic lesion in this patient.

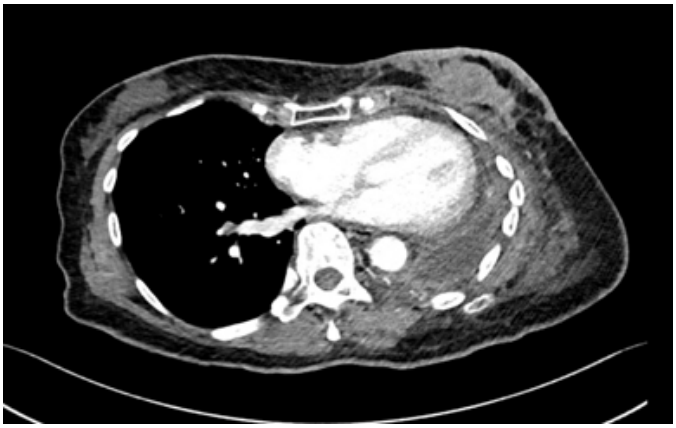

Figure 2: Axial CT scan showing left breast mass with overlying skin thickening. Right breast lesion can also be visualized.

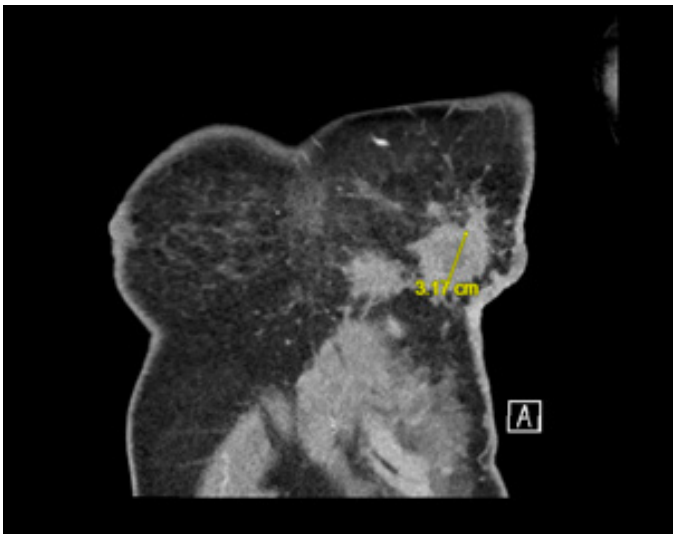

Figure 3: Coronal CT scan showing 3.17 cm left breast mass

DISCUSSION

The presence of ipsilateral lung cancer, breast lesion, and axillary lymphadenopathy should prompt consideration of metastatic disease versus a second primary malignancy [3]. As in this case, this can be confirmed by pathologic, histologic, and immunohistochemical analyses. This is important to guide treatment and prognostic assessment. It is worth

noting that our patient had exon 20 insertion, for which amivantamab and mobocertinib have been found to be effective targeted therapies [4]. However, there remains a significant unmet need for first-line treatment strategies. Our case is atypical not only in the fact that there is breast metastasis from NSLC, but that it was also to the bilateral breasts with few such cases reported in the literature [5, 6].

CONCLUSION

In a case of extra-mammary malignancy presenting with suspected breast malignancy, it is important to differentiate between primary breast malignancy and metastases to the breast, in order to guide appropriate treatment strategies.

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Author Contributions

Saurabh Dubey – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Maysoon T Hussain – Conception of the work, Interpretation of data, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Mohamad Akil – Conception of the work, Interpretation of data, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Nasir Gondal – Conception of the work, Interpretation of data, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Guarantor of Submission

The corresponding author is the guarantor of submission.

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Consent Statement

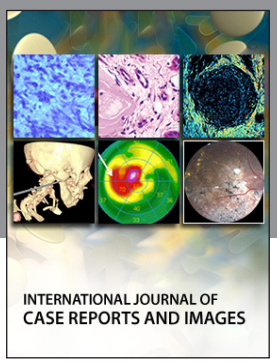
Written informed consent was obtained from the patient for publication of this article.

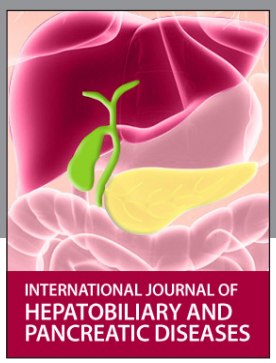
Conflict of Interest

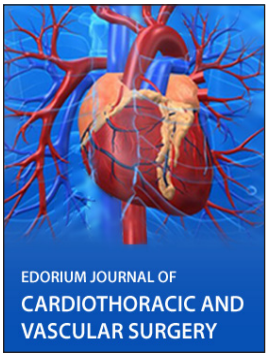
Authors declare no conflict of interest.

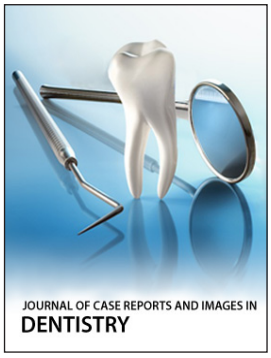
Data Availability

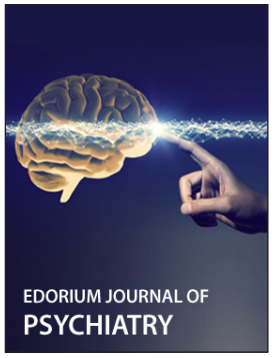
All relevant data are within the paper and its Supporting Information files.

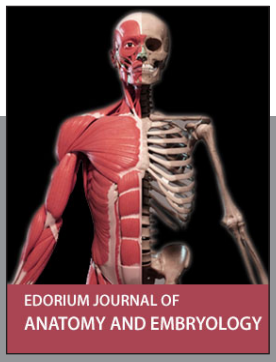


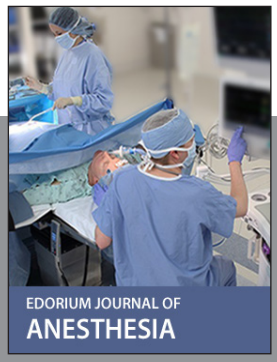












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