Case Report

Primary neuroendocrine carcinoma of breast with liver and bone metastasis detected with fluorine-18 fluorodeoxyglucose-positron emission tomography/computed tomography

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ABSTRACT

Cases of primary neuroendocrine carcinoma (NEC) of the breast have been reported, though rare. We report the case of a 45-year-old woman presented with jaundice and evaluated to have liver metastasis from neuroendocrine origin. She underwent whole body positron emission tomography/computed tomography, which showed left breast lesion and bone metastasis. Fine-needle aspiration (FNA) of breast revealed a NEC. A diagnosis of a primary NEC of the breast was rendered with hepatic and bone metastasis. She was treated with peptide receptor radionuclide therapy and is on follow-up.

Keywords: 18-F fluorodeoxyglucose positron emission tomography/computed tomography, hepatic metatsasis, primary neuroendocrine carcinoma of breast, skeletal metastasis

INTRODUCTION

Primary neuroendocrine carcinoma (NEC) of the breast is a rare distinct clinicopathological entity, comprising 0.5-2% of breast carcinomas world-wide.[1] In 2003, primary NEC of the breast was identified as a distinct entity by the World Health Organization (WHO) classification of tumors. The WHO classification defines primary NEC of the breast as tumors that express 50% or more of NE markers[2] There are no previous reports of F-18 fluorodeoxyglucose (FDG) positron emission tomography/computed tomography (PET/CT) in patients with primary NEC of breast with liver and bone metastasis.

CASE REPORT

Here we describe a case of a 45-year-old female patient who presented with jaundice and was evaluated to have multiple liver lesions and biopsy from liver showed metastatic neuroendocrine tumor. Her chromogranin level was 886 ng/ml (normal < 78 ng/ml). She was referred for the whole body PET/CT for detection of the primary site. PET/CT showed an intense uptake in the soft- tissue necrotic lesion in the inner quadrant of the left breast [Figure 1a and b] with the same charecteristic feature of multiple hypodense liver lesions [Figure 1c]. Furthermore uptake noted in a lytic lesion in the D4 vertebra [Figure 1d and e]. Patient underwent fine-needle aspiration of the breast lesion, which confirmed neuroendocrine origin [Figure 2a and b]. A diagnosis of primary NEC of the left breast with metastasis was made and she was treated with peptide receptor radionuclide therapy and is on follow-up now.

DISCUSSION

Primary NEC of the breast is extremely rare with the first reported case in 1983.[3] Since then, fewer than 40 cases have been reported in the literature. The most frequent reported age varies from 40 to 70 years, with a higher incidence in women greater than 60 years.[3] As metastatic neuroendocrine tumors of the breast are more common than that of primary neuroendocrine tumors of the breast, it is, therefore, important to differentiate

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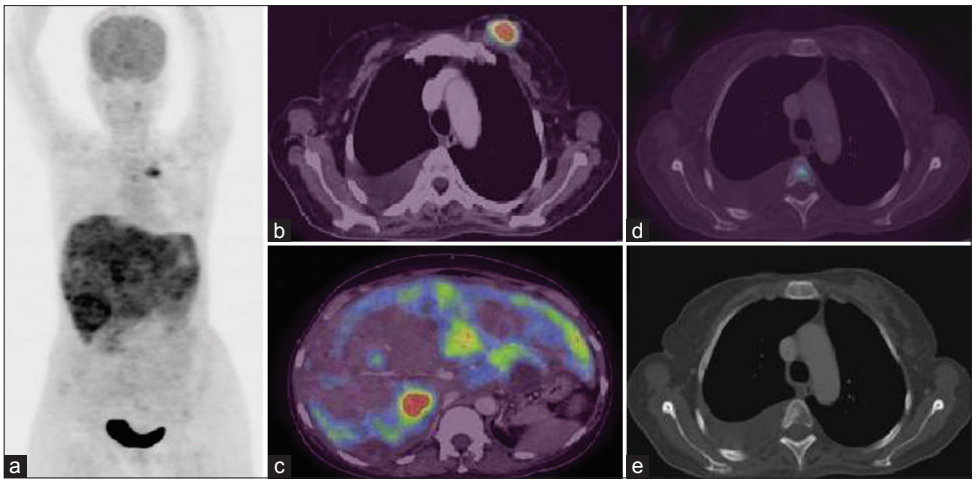

Figure 1: Whole body fluorodeoxyglucose-positron emission tomography/computed tomography (PET/CT) maximum intensity projection image (a), axial fused PET/CT showed a intense uptake in the soft-tissue lesion in the left breast (b), liver lesions (c) and bone lesion (d), axial CT showing lytic bone lesion in D4 vertebra (e)

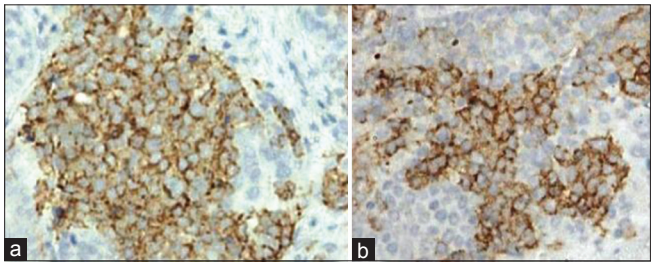

Figure 2: Immunohistochemistry staining showing positive for chromogranin (a) and synaptophysin (b)

primary breast neuroendocrine tumor from metastatic disease to the breast because of the differences in treatment focus. Primary NEC of the breast can be diagnosed if the presence of a non-mammary primary site can be clinically ruled out or if an *in situ* component is histologically detected or both.[4] NEC of the breast has no specific presenting signs or symptoms.

The radiological features are non-specific. However, findings of certain studies have revealed that NE-differentiated tumors of the breast present as dense round or irregular masses with spiculated or lobular margins on the mammogram.[5] Definitive diagnosis is made with core needle biopsy, allowing for the immunohistochemical evaluation of the specimen for the NE markers. Although the use of PET for the evaluation of NE tumors has been limited, tumors with moderate or high proliferative activity can be identified by FDG PET.[6] There are reports of FDG PET/CT in a case of Neuroendocrine Differentiated Breast Carcinoma with Pleural Metastases Using Indium-111 Octreotide.[7] There are case reports of synchronous metastases to the liver and pancreas from a primary NEC of the breast.[8] Our case is the first demonstrates that 18F-FDG PET/CT provides the most significant additional information related to the accurate detection of primary NEC of breast and bone metastasis and guiding treatment.

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