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Metastatic carcinoid tumor to the breast: report of two cases and review of the literature

Shimwoo Lee [a], Pascale Levine [b], Samantha L. Heller [c], Osvaldo Hernandez [b], Cecilia L. Mercado [c], Chloe M. Chhor [c,*]

[a] New York University School of Medicine
[b] Department of Pathology, New York University Langone Medical Center, New York, NY, USA
[c] Department of Radiology, New York University Langone Medical Center, New York, NY, USA

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ABSTRACT

The breast is an unusual site for carcinoid metastasis. Due to increasing survival rates for carcinoid tumors, however, awareness of their rare complications is important. Carcinoid metastasis to the breast typically presents as a palpable breast mass or a mass on screening mammogram. Because imaging findings are nonspecific, the diagnosis is established through histological findings of neuroendocrine features corresponding with the known primary carcinoid pathology. Correctly distinguishing metastatic carcinoid from primary breast carcinoma is crucial to avoid more invasive procedures required for the latter. Two cases of metastatic carcinoid to the breast are presented with review of the literature.

1. Introduction

Carcinoid tumors are rare entities derived from enterochromaffin cells, a neuroendocrine cell type. These cells contain numerous neurosecretory granules containing serotonin and various other vasoactive substances. Release of these substances into the systemic circulation can cause carcinoid syndrome, characterized by flushing, diarrhea, and wheezing. Because these cells are distributed widely throughout the body, carcinoid tumors can arise anywhere. The most common locations of origin are the gastrointestinal and the bronchopulmonary tracts. Carcinoid tumors are relatively slow growing but have a tendency to metastasize, frequently to regional lymph nodes and the liver. Distant metastasis at presentation occurs in about 22% of cases; in half of these cases, the primary source is unknown [1].

The annual incidence of carcinoid tumors is approximately 2 cases per 100,000 people [2]. The true incidence is probably higher given the indolent nature of carcinoid tumors and suggested by the incidental finding of these tumors in autopsies at a higher rate of 0.5–1% [3]. There appears to be a bimodal distribution in age at which the tumors arise, with the first peak around 15–25 years and the second around 65–75 [4]. The incidence of carcinoid tumors has grown over the past decades [5], but this is likely due to increased detection rate [4]. The prognosis for patients has improved, presumably from improvement in diagnostic modalities and from treatment options, such as octreotide, a somatostatin analog [6]. The overall 5-year survival rate is estimated to be between 70% and 80%. The best 5-year survival rate is seen in patients with localized disease (93%), whereas the poorest is seen in patients with distant metastatic disease (20%–30%), indicating that prognosis is greatly influenced by the stage of disease [5,7].

Metastasis to the breast is a very rare complication of carcinoid tumors. Often presenting as a breast mass with nonspecific characteristics on routine breast imaging, it poses a diagnostic challenge for clinicians. Yet, achieving accurate diagnosis is crucial in determining prognosis and driving treatment. In this article, we report on two cases of carcinoid metastatic to the breast in patients with a known history of carcinoid tumors and discuss the imaging findings of these and 28 other similar cases reported in the literature. Since the appearance on imaging is not specific enough to achieve accurate diagnosis, we highlight the importance of obtaining adequate tissue sample for histological examination. We thus compare fine needle aspiration (FNA) and core needle biopsy as two approaches to biopsy a breast mass identified in patients with a known history of carcinoid tumors.

Abbreviations: FNA, fine needle aspiration; MLO, mediolateral oblique; CC, craniocaudal.

* Corresponding author. Department of Radiology, New York University Langone Medical Center, New York, NY, USA. Tel.: +1 212 731 5353; fax: +1 646 754 1348.
E-mail addresses: Shimwoo.Lee@med.nyu.edu (S. Lee), Pascale.Levine@nyumc.org (P. Levine), Samantha.Heller@nyumc.org (S.L. Heller), Osvaldo.Hernandez@nyumc.org (O. Hernandez), Cecilia.Mercado@nyumc.org (C.L. Mercado), Chloe.Chhor@nyumc.org (C.M. Chhor).

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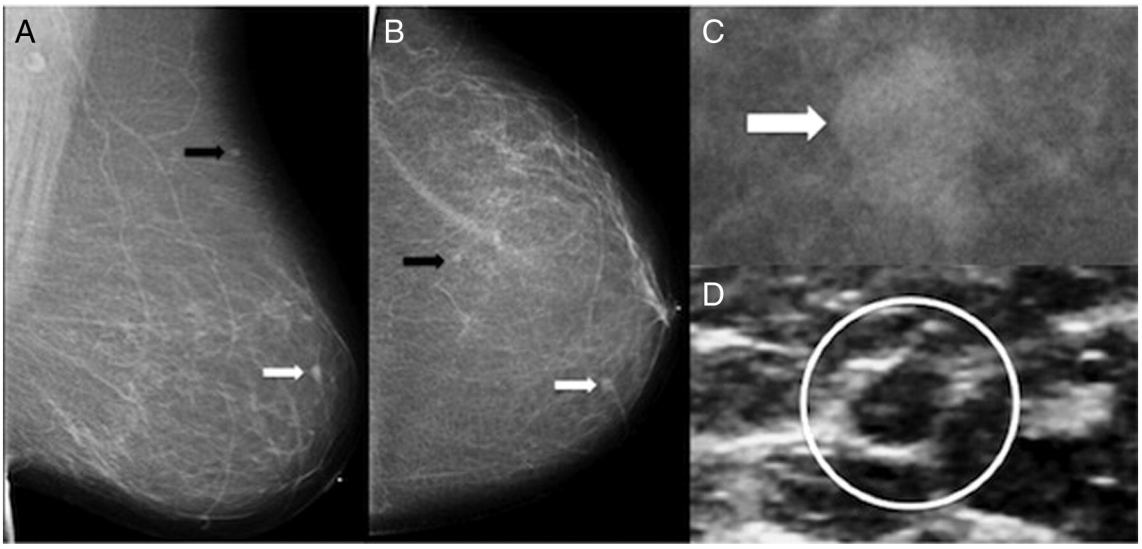

Fig. 1. Case 1: mammogram and ultrasound of the left breast. Two new small masses were seen in the left breast, 0.5 cm at 11:00 anterior depth (white arrow) and 0.4 cm at 1:00 posterior depth (black arrow) on the mediolateral–oblique (A) and craniocaudal (B) views. Craniocaudal spot compression view (C) of the 0.5-cm mass shows the mass to have microlobulated and indistinct margins. An oval hypoechoic mass (white circle) with microlobulated margins was seen on targeted ultrasound for the 0.5-cm mass (D). No sonographic correlate was seen for the smaller 0.4-cm mass.

2. Case 1

A 68-year-old female presented with a history of small bowel resection and hepatectomy for metastatic small bowel carcinoid tumor 6 years prior and with subsequent progressive hepatic disease as well as right breast lumpectomy and radiation for ductal carcinoma in situ 2 years prior. On her annual mammogram, two new masses were seen in the left breast, one measuring 0.5 cm at 11 o'clock anterior depth and the other measuring 0.4 cm at 1 o'clock posterior depth (Fig. 1). The 0.5-cm mass persisted on the spot compression views as an oval mass with indistinct margins. On targeted ultrasound of the left breast, this mass corresponded to an oval, hypoechoic mass with microlobulated margins. There was no sonographic correlate found for the smaller 0.4-cm mass. Ultrasound-guided FNA for the 0.5-cm mass was recommended and performed. The diagnosis was metastatic carcinoid to the breast expressing synaptophysin and chromogranin immunostains performed on unstained smears (Fig. 2). The patient did not undergo any breast surgery due to her metastatic disease. She continued medical treatment with octreotide.

3. Case 2

A 62-year-old female with a 10-year history of carcinoid tumor of unknown primary source metastatic to the liver presented with a palpable, painful left breast mass. Diagnostic mammogram showed multiple new small masses bilaterally (Fig. 3). A 0.8-cm irregular mass in the left breast at 1 o'clock posterior depth corresponded to the palpable area of concern and persisted on spot compression views. On targeted ultrasound, this corresponded to an irregular hypoechoic mass with associated vascular flow. Enlarged left axillary lymph nodes with loss of fatty hilum and thickened cortices were also noted. Additional smaller masses were seen in both breasts on ultrasound, including a round mass measuring 0.5 cm in the right breast at 11 o'clock middle depth (Fig. 4). Core needle biopsy of the 0.8-cm left breast mass yielded metastatic neuroendocrine carcinoma expressing synaptophysin and chromogranin (Fig. 5). The 0.5-cm right breast mass was found to be suspicious for adenocarcinoma at FNA biopsy. Upon review, this aspiration biopsy was morphologically similar to a left supraclavicular lymph node aspiration biopsy correctly diagnosed as metastatic neuroendocrine carcinoma, thus illustrating the difficulty to differentiate primary breast carcinoma from metastatic neuroendocrine tumor based on morphology alone, especially if the prior clinical history is unknown or overlooked. No excision of the right breast mass was carried out, as the potential risks of an additional invasive procedure were deemed greater than its potential benefit given the patient's already widespread carcinoid metastases. The patient continued treatment with octreotide, which kept her symptoms of carcinoid syndrome under control.

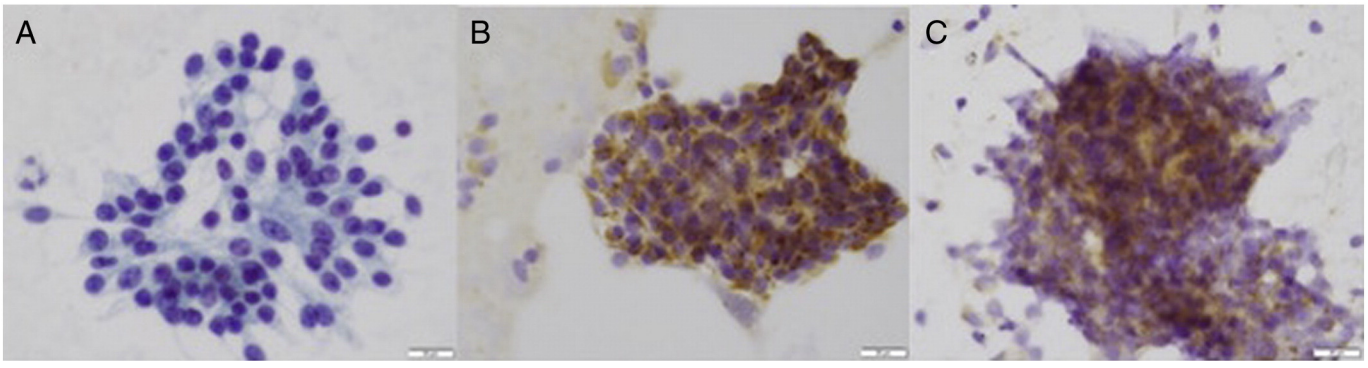

Fig. 2. Case 1: left breast FNA pathology. Histologic specimen from left 11 o'clock breast FNA with rapid Papanicolaou stain, ×600, showing (A) tumor cells in rosettes with round or oval nuclei, finely granular chromatin, small nucleoli, and rare mitotic figures. The cells stain with chromogranin (B) and synaptophysin (C), ×400, in granular cytoplasmic pattern.