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Case Report

Intramammary Metastasis in a Patient with a History of Renal Cell Carcinoma: A Case Report

Miyuki Kitahara[a] Yasuo Hozumi[a] Rio Asada[a] Aya Sawa[a]
Hitoaki Saito[b] Tatsuo Iijima[b]

[a]Department of Breast Surgery, Ibaraki Prefectural Central Hospital and Cancer Center, Kasama, Japan; [b]Department of Pathology, Ibaraki Prefectural Central Hospital and Cancer Center, Kasama, Japan

Keywords
Breast cancer · Intramammary metastasis · Renal cell carcinoma · Renal cancer

Abstract
Intramammary metastasis of renal cell carcinoma (RCC) is extremely rare, accounting for only 1.5% of all intramammary metastases. Distinguishing intramammary metastases from benign tumors and breast cancer is clinically problematic. Some patients undergo excessive surgery after a misdiagnosis of breast cancer instead of a mammary tumor. We performed a core needle biopsy (CNB) of a breast mass that developed in a 71-year-old woman after surgeries for bilateral RCC and breast cancer, leading to a diagnosis of intramammary metastasis of RCC. In this case, the CNB and immunohistochemical examination were critical for reaching a definitive diagnosis. We conclude that, when examining patients with mammary tumors, establishing their history of malignant tumors may help diagnose intramammary metastasis and select the best treatment strategy.

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Miyuki Kitahara
Department of Breast Surgery
Ibaraki Prefectural Central Hospital and Cancer Center
6528 Koibuchi, Kasama, Ibaraki 390-1793 (Japan)
E-Mail m-kitahara@chubyoin.pref.ibaraki.jp

Introduction

Intramammary metastasis of malignant tumors of other organs is rare; it accounts for 0.3–2.7% of all breast malignancies [1]. Intramammary metastasis of renal cell carcinoma (RCC), specifically, is also extremely rare, accounting for only 1.5% of all intramammary metastases [2]. In general, the prognosis following the development of intramammary metastasis is poor, with a mean survival of 1 year [2].

To date, reports have indicated that intramammary metastases in general are often round, firm, and not accompanied by pain. Distinguishing intramammary metastases from benign tumors (e.g., fibroadenoma, hamartoma, and phyllodes tumors) and breast cancer (e.g., medullary cancer, mucinous carcinoma, and solid tubular carcinoma) is clinically problematic because of similar form and properties [3].

In the present study, we performed a core needle biopsy (CNB) of a mass that developed in the breast of a 71-year-old woman after surgeries for bilateral RCC and breast cancer, leading to a diagnosis of intramammary metastasis of RCC.

Case Report

A 71-year-old woman visited our Department for a routine checkup. She complained of lumps in her left breast that she had noticed 4 months before.

Eight years earlier, the patient had undergone a partial mastectomy of the left breast with a sentinel lymph node biopsy for left-sided breast cancer (scirrhous carcinoma, pT1N0M0). She had then received radiotherapy (50 Gy/25 fractions) to the residual breast, concurrent with endocrine therapy (letrozole). Her medical history also included a right nephrectomy for right-sided renal cancer (clear-cell RCC) and the surgical removal of a tumor thrombus from the inferior vena cava (pT3bN0M0) 9 years earlier. Two years after the right nephrectomy, she had undergone a partial left nephrectomy for left-sided renal cancer (clear cell RCC pT1N0M0), followed by interferon therapy for 1 year. A computed tomography (CT) examination conducted 3 years prior to her visit had revealed multiple nodular shadows in both lungs, leading to a suspicion of pulmonary metastasis of RCC. A thoracoscopic lung biopsy for a diagnosis, followed by systemic pharmacotherapy was recommended, but the patient did not wish to undergo this treatment. The decision to provide best supportive care was therefore made. The patient's family history revealed nothing of note.

Upon presentation, physiological findings included a palpable, painless, elastic, soft mass with redness located at the B and D boundary zones of the left breast. Furthermore, postoperative scarring was observed in zone C of the left breast and left axilla. Breast ultrasonography showed a polygonal, internally homogenous hypoechoic mass measuring 6 × 7 × 4 mm in the middle portion at the 6 o'clock position of the left breast; it was smooth with a distinct border and abundant blood flow (Fig. 1). Fine needle aspiration cytology (FNAC) of the same site was performed; however, since only blood components and vascular stroma were observed, no determination could be made. Positron emission tomography-CT revealed a mass with a diameter of 7 mm in the lower left breast, exhibiting contrast enhancement, and an 18-mm-diameter lymph node with strong fluorodeoxyglucose uptake at level 1 of the right axilla (Fig. 2). It was noted that the multiple nodular shadows in both lungs had subsided or reduced in size.

Differential diagnoses of postoperative recurrence of breast cancer, metachronous multiple breast cancer, and intramammary metastasis of RCC were considered, and a CNB of the

left breast mass and right axillary lymph nodes was performed. All tumor cells had formed dense, solid nests, or glandular structures of small cells with deeply stained small-to-medium sized nuclei exhibiting mild irregularity and reticula with clear, distinct borders (Fig. 3a). As the patient had a history of bilateral clear cell RCC, we suspected intramammary metastasis of renal cancer. To confirm this suspicion, an additional immunohistochemical examination was performed, which showed positive results for CD10 and RCC and negative results for cytokeratin 7, cytokeratin 20, GCDFP-15, estrogen receptor (ER), and progesterone receptor (Fig. 3b, c). The histocytological and immunohistochemical findings led to a diagnosis of clear cell RCC, with left breast and right axillary lymph node metastasis. The patient did not wish to receive systemic pharmacotherapy; thus, tumorectomy of the left breast and right axillary lymph node dissection were performed for localized control.

At present, 12 months after diagnosis, there have been no subjective or objective findings suggestive of new metastasis, and the patient is receiving follow-up observation on an outpatient basis.

Discussion

Malignant tumors showing common intramammary metastasis include melanoma, lung cancer, gynecological cancers (e.g., ovarian cancer), and hematologic malignancies (e.g., leukemia and lymphoma). In contrast, intramammary metastasis of renal cancer accounts for only 1.5% of all intramammary metastases, making it extremely rare [2].

While the characteristic clinical and laboratory findings of intramammary metastasis remain unclear, in many instances, they include tumors with good mobility and relatively distinct borders [1]. According to a report about intramammary metastases, solitary or multiple round-to-oval masses with distinct borders are delineated on mammography; of these, 10% exhibit microcalcification within the tumor [4]. On breast ultrasonography, most intramammary metastases are described as round-to-oval hypoechoic masses with posterior acoustic enhancement and clearly delineated or smooth and distinct borders [5].

It has been found that 84% of patients with intramammary metastasis have a history of malignant tumors [2]. There has been a report of a case in which the diagnosis of breast cancer by CNB was subsequently revised to intramammary metastasis of renal cancer as the physician became aware that the patient had a history of renal cancer and subsequently performed a repeat microscopic examination with additional immunostaining of the tissue specimen [6]. Furthermore, a case of breast cancer, as diagnosed by FNAC, that was then revised to metastasis of renal cancer after a partial mastectomy and sentinel lymph node biopsy has been reported [7]. Due to the limited number of reports on intramammary metastasis, some patients undergo excessive surgery, including axillary operations, after a misdiagnosis of breast cancer instead of a mammary tumor, which places these patients at increased risk for postoperative lymphedema and skin damage caused by radiotherapy [1].

Histopathologically, images of tumors with a distinct border and no calcification around normal mammary glands or characteristics of intraductal carcinoma are findings that strongly suggest intramammary metastasis of malignant tumors of other organs [8]. Moreover, immunohistochemical examination is an important diagnostic method that can be used to identify the primary organ of malignant tumors [7]. Renal cancer is most commonly positive for RCC and CD10, whereas ER, GCDFP-15, and cytokeratin 7 are rarely expressed [8]. This case had similar findings, and the CNB and immunohistochemical examination were extremely useful in reaching a definitive diagnosis of intramammary metastasis of renal cancer.

In conclusion, when evaluating the clinicopathological findings of mammary tumors, oncologists should verify the patient's history of malignant tumors and conduct a thorough examination of the presence or absence of features of malignant tumors of other organs, including immunohistochemical analyses. This may lead to a diagnosis of intramammary metastasis and help in the selection of the best treatment strategy.

Statement of Ethics

Institutional review board approval was obtained before writing the case report. Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Disclosure Statement

The authors declare that they have no conflicts of interest.

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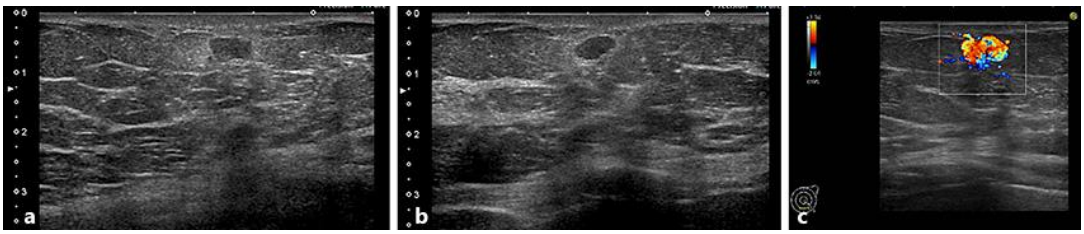

Fig. 1. Breast ultrasonography findings. **a**, **b** A hypoechoic mass measuring 6 × 7 × 4 mm was noted in the left mammary gland. **c** Blood flow was extremely abundant.

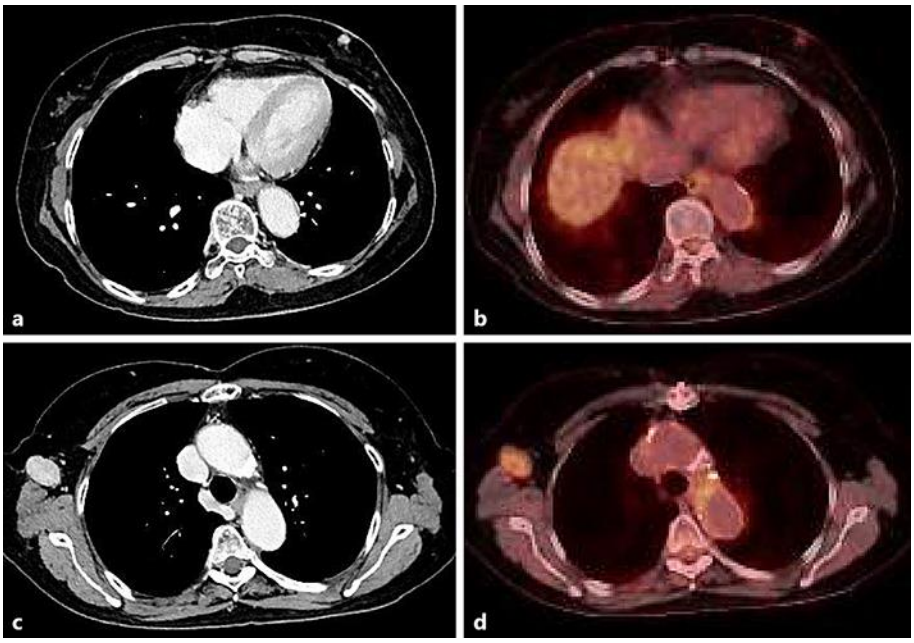

Fig. 2. Positron emission tomography-computed tomography findings. **a**, **b** A mass with a diameter of 7 mm, exhibiting strong contrast enhancement, was observed in the lower left breast. **c**, **d** Swollen lymph nodes with diameters of 18 mm with strong fluorodeoxyglucose uptake were observed at level 1 of the right axilla.

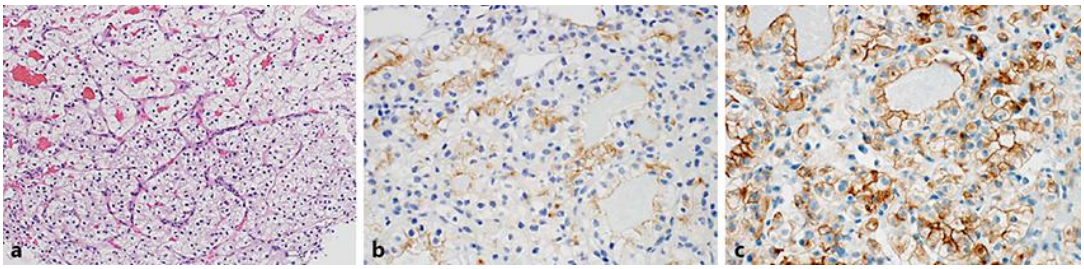

Fig. 3. Histopathological findings of the mass in the left mammary gland. **a** Cells with clearly delineated reticula had formed solid nests. **b** Positive staining for CD10. **c** Positive staining for RCC.