Sporadic breast metastasis derived from renal cell carcinoma: A case report

Daiki Ikarashia,⁎, Kazuyuki Ishidab, Masahiro Kashiwabac, Yoichiro Katoa, Ei Shiomia, Misato Takayamaa, Hideaki Komatsuc, Ryo Takataa, So Ohmori a, Tamotsu Sugib, Wataru Obara a

a Department of Urology, Iwate Medical University School of Medicine, Uchimaru, 020-8505, Morioka, Iwate, Japan
b Department of Pathology, Iwate Medical University, Morioka, Iwate, Japan
c Department of Surgery, Iwate Medical University, Morioka, Iwate, Japan

Article history:
Received 24 November 2017
Accepted 30 November 2017
Available online 5 December 2017

Keywords:
Breast metastasis
Clear cell carcinoma
Hematogenous metastasis

1. Introduction

Breast metastases from extramammary tumors are much less common than primary breast tumors and are usually due to melanoma, lymphoma, or leukemia. Metastases to the breast from renal cell carcinoma (RCC) are very rare. Here we report on a case of solitary breast metastasis from RCC, which occurred 2 years after nephrectomy.

2. Case presentation

A 57-year-old woman was found to have an impalpable breast mass on enhanced computerized tomography (CT) at a follow-up visit. Two years ago, she underwent a right radical nephrectomy for RCC, and shortly thereafter, she underwent total pancreatectomy. The pathological findings revealed renal clear cell carcinoma, pT1bN0M0, and a pancreatic neuroendocrine tumor (NET). There was no further treatment, and the patient was followed up with annual CT and routine blood tests. Laboratory findings, including the tumor markers carcinoembryonic antigen (CEA) and carbohydrate-associated (CA) 19-9 antigen, were almost within normal limits. Two years after surgery, CT revealed an enhanced, solitary, 0.8-cm mass, which was located in the internal part of the left breast with no physical finding. It was not associated with the enlargement of the ipsilateral axillary lymph nodes (Fig. 1). The differential diagnosis included primary breast cancer or breast

Fig. 1. Preoperative computed tomography shows an enhancing left breast mass, 0.8 cm in diameter (red arrow).

Abbreviations: CA, carbohydrate-associated antigen; CEA, carinoembryonic antigen; CT, computerized tomography; H&E, hematoxylin and eosin; IHC, immunohistochemistry; MEN, multiple endocrine neoplasia; NET, neuroendocrine tumor; RCC, renal cell carcinoma; VHL, Von Hippel-Lindau.
metastasis from RCC or the pancreas, prompting a breast surgery consultation. Breast ultrasound (US) revealed a hypoechoic homogeneous mass, and color Doppler US demonstrated abundant peripheral vascularity. Core needle biopsy revealed that the tumor was composed of cells with clear cytoplasm. As a result, breast metastasis from RCC was considered. The patient underwent metastasectomy without dissection of axillary lymph nodes. The metastasectomized specimen contained a whitish, well-defined, solid mass measuring 0.7 × 0.6 cm (Fig. 2). A histological examination revealed that the tumor was composed of cells with clear cytoplasm and a prominent but delicate vascular network. These findings did not support the diagnosis of NET but rather RCC as the primary site (Fig. 3A, B and C). Immunohistochemistry (IHC) was performed to investigate the breast metastatic site, i.e., primary RCC or pancreatic NET. IHC of each tissue was positive for CD-10 in the metastatic site and RCC but was negative in the pancreas (Fig. 3D, E, and F). This pattern was consistent with clear RCC and was the same in the primary and metastatic sites. The specific marker for NET, i.e., chromogranin A, was negative in the metastatic site. For the lymphatic spread, D2-40 immunostaining of the lymphatic endothelium for cancer invasion into the renal sinus of the primary site was negative in the RCC and metastatic site. These findings supported a diagnosis of breast metastasis from RCC. The postoperative course was uneventful, and no further adjuvant treatment was received. There was no local recurrence or metastasis 1 year after metastasectomy.

3. Discussion

Metastases to the breast from extramammary primary malignancies are rare. In various clinical autopsy studies, the incidence of metastasis to the breast ranges from 5% to 6.6%.1 The most frequent metastases to the breast are from malignant melanoma, lymphoma, lung cancer, and, in men, prostatic cancer.2 Approximately 25%–30% of patients with RCC will present with metastatic disease at the time of diagnosis. The most common sites of metastatic RCC are the lung, bone, regional lymph nodes, liver, and brain. Metastases to the breast from RCC are rare. First reported RCC metastasis to the breast in 1942, and only 25 cases have been reported in the literature.3 Eleven of these cases presented with metastasis as the initial sign.

Fig. 2. Macroscopic findings of the breast segmental resection.

Fig. 3. Histological findings (H&E, ×200) and immunohistochemical staining of the surgical specimen. On H&E staining, A: the specimen was composed of cells with the clear cytoplasm of primary renal clear cell carcinoma. B: the breast metastatic site was composed of clear cells. C: the pancreatic tumor was composed of well-differentiated neuroendocrine tumor. On immunohistochemical staining, CD10 (×100) was positive in D: the primary renal cell carcinoma and E: the breast metastatic site, but was negative in F: the pancreatic tumor.
of the disease and 14, among which two were bilateral, occurred as metachronous lesions after a former nephrectomy. Metastasis of RCC occurs through hematogenous and lymphatic spread of tumor cells to distant sites, often in an unpredictable manner due to the varying lymphatic drainage of the kidney. In general, the pathway of RCC metastasis to the breast is considered to be hematogenous. In order to confirm the primary site of metastasis, IHC, e.g., CD-10, for the RCC primary, pancreas, and the metastatic site, supported the diagnosis of RCC. The results were negative for the pancreas, and therefore, the primary was considered to be RCC. The primary and metastatic sites were negative for D2-40 IHC examination. Based on these results, we confirmed that the metastatic pathway to the breast from RCC was hematogenous.

In this case, it was difficult to identify the primary site of metastasis because of the concurrence of RCC and pancreatic NET. “Clear” cell change is a well-described phenomenon in pancreatic NET, especially in multiple endocrine neoplasia type 1 (MEN1). Moreover, both RCC and pancreatic NET are clinical findings of Von Hippel-Lindau (VHL) disease, which results from a mutation of the VHL suppressor gene. In this case, the diagnostic criteria of VHL were excluded; however, we were unable to investigate mutation of the VHL gene. Mutation of the VHL gene influences carcinogenesis. Based on the patient’s background, we not only had to investigate whether the pathway of metastatic spread was hematogenous or lymphatic but also whether the primary site was RCC or pancreatic NET. Finally, hematoxylin and eosin (HE) staining and IHC examination revealed that the pathway of breast metastasis was hematogenous metastasis from RCC.

4. Conclusions

In conclusion, isolated breast metastasis from RCC is very rare. Primary and secondary breast cancer may be clinically and radiologically similar. Breast metastasis from RCC might be considered as being hematogenous rather than lymphatic metastasis.

Conflicts of interest

None.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Acknowledgments

The authors thank the patient for allowing us to publish this case report. The authors would like to thank Enago (www.enago.jp) for the English language review.

Appendix A. Supplementary data

Supplementary video related to this article can be found at https://doi.org/10.1016/j.eucr.2017.11.032

References

1. Kannan V. Fine-needle aspiration of metastatic renal-cell carcinoma masquerading as primary breast carcinoma. Diagn Cytopathol. 1998;18:343–345.
2. Forte A, Peronace ML, Gallinaro LS, et al. Metastasis to the breast of a renal carcinoma: a clinical case. Eur Rev Med Pharmacol Sci. 1999;3(3):115–118.
3. Falco G, Buggi F, Sanna PA, Dubini A, Folli S. Breast metastases from a Renal Cell Carcinoma. A case report and review of the literature. Int J Surg Case Rep. 2014;5:193–195.
4. Holland R, Veling SH, Mravunac M, Hendriks JH. Histologic multifocality of Tis, T1-2 breast carcinomas. Implications for clinical trials of breast-conserving surgery. Cancer. 1985;56:979–990.
5. Fryer E, Serra S, Chetty R. Lipid-rich (“Clear cell”) neuroendocrine tumors of the pancreas in men I patients. Endocr Pathol. 2012;23:243–246.