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Breast metastasis nine years after nephrectomy for renal cell carcinoma: A case report

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ABSTRACT

INTRODUCTION: The breast is a rare site for metastatic disease. We report a rare case of breast metastasis 9 years after nephrectomy for renal cell carcinoma (RCC) and include a review of the relevant literature. **PRESENTATION OF CASE:** An 82-year-old woman who developed an RCC underwent left nephrectomy in 2005. In October 2014, computed tomography (CT) revealed a mass of approximately 1 cm in the lateral portion of the right breast. Breast ultrasonography (US) revealed a well-circumscribed, hypoechoic mass at the same site. Fine needle aspiration (FNA) was performed, but the sample was inadequate because it did not capture breast duct epithelial cells. In June 2015, follow-up US revealed enlargement of the mass, and core needle biopsy (CNB) was performed to confirm the diagnosis. Histological examination resulted in the diagnosis of breast metastasis from an RCC. The patient underwent surgery for partial mastectomy in November 2015. The patient was asymptomatic and free of detectable disease at 18-month follow-up. **DISCUSSION:** The diagnosis of breast metastasis by imaging examination is difficult, and the results of FNA examination are often inconclusive because of the absence of breast duct epithelial cells. Only 22 cases of breast metastasis from RCC have been described in the literature. In almost all the reported cases, lumpectomy or partial mastectomy was performed.

CONCLUSION: It is important that histological diagnosis be determined by CNB and by other methods if the patient has a history of malignancy, and minimally invasive therapy should be performed in accordance with the prognosis.

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1. Introduction

The incidence of breast metastasis from extramammary primary tumors ranges from 0.5% to 2% [1]. Malignant melanoma, leukemia and lymphoma are the most common among all malignancies that have been described as metastasizing to the breast [2]. By contrast metastasis from a renal cell carcinoma (RCC) to the breast is very rare. In line with SCARE criteria, we report a rare case of breast metastasis 9 years after nephrectomy for RCC and provide a review of the relevant literature [28].

2. Presentation of case

An 82-year-old woman developed an RCC and underwent left nephrectomy for clear cell carcinoma at the Department of Urology of The Jikei University Kashiwa Hospital in 2005. She had no history of malignancy other than RCC, no breast disease and no family history of carcinoma. In October 2014, CT of the chest and abdomen performed as a regular follow-up revealed a mass of approximately 1 cm mass in the lateral portion of the right breast. The patient was referred to our department for further assessment and treatment. On clinical examination, no swelling was palpable in either breast. Mammography showed a smooth-margined, high-density mass in the upper outer quadrant of the right breast (see Fig. 1). Breast US revealed a well-circumscribed, hypoechoic mass measuring 10 mm at the same site; this was judged to be a fibrous adenoma (see Fig. 2). FNA of the right breast mass was performed, but the sample was inadequate because it did not contain breast duct epithelial cells. In June 2015, follow-up US revealed enlargement of the mass to 13 mm (see Fig. 2); FNA was conducted for the second time, but the result was undeterminable for the same

Abbreviations: RCC, renal cell carcinoma; CT, computed tomography; US, ultrasonography; FNA, fine-needle aspiration; CNB, core-needle biopsy; MRI, magnetic resonance imaging; ALND, axillary lymph node dissection.

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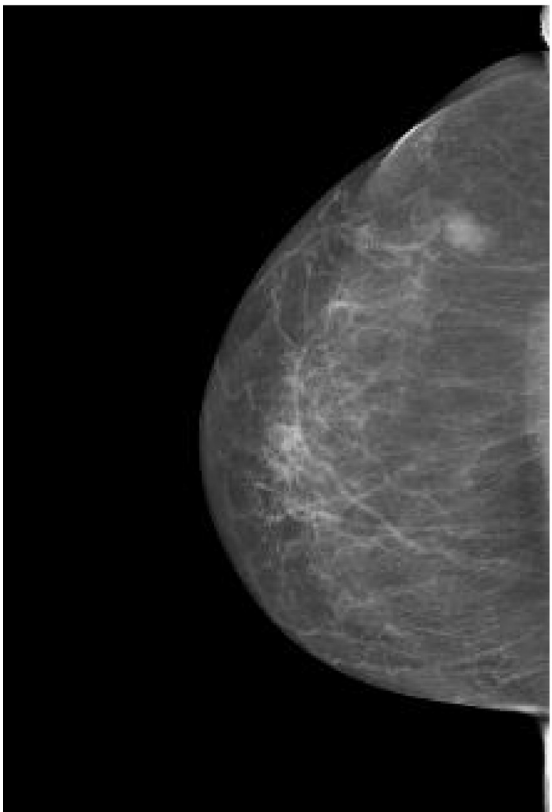
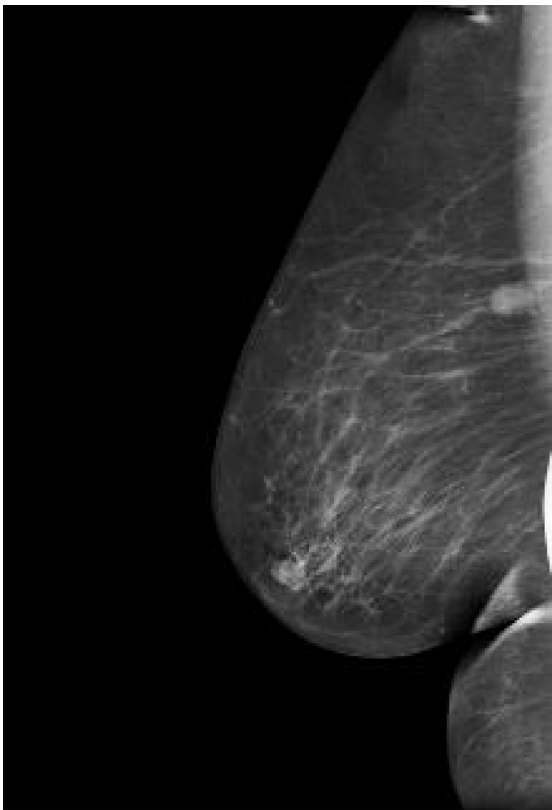


Fig. 1. The mammogram shows a smooth-margined, high-density mass in the upper outer quadrant of the right breast.

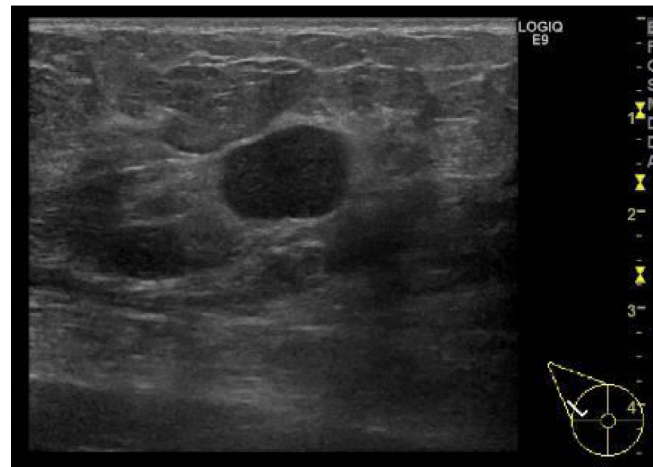
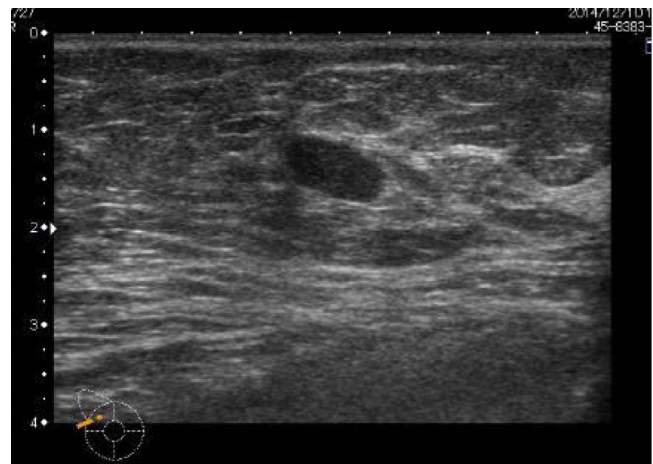


Fig. 2. US performed in October 2014 (top) shows a well-circumscribed, hypoechoic mass measuring 10 mm. US performed in June 2015 (bottom) shows enlargement of the mass to 13 mm.

reason. CNB was performed to confirm the diagnosis. Histological examination resulted in diagnosis of the lesion as breast metastasis from an RCC of the clear-cell type. Contrast-enhanced MRI and contrast-enhanced CT showed a localized, well-enhanced mass at the same site, but no extensive intraductal component and no axillary lymph node metastasis (see [Figs. 3 and 4](#)). Other imaging studies revealed no distant metastasis. Although adaptation for cryoablation was initially considered, eventually the patient underwent a partial mastectomy in November 2015. Gross pathology of the cut surface showed a yellowish-brown, well-defined tumor. Histological examination revealed solid alveolar proliferation of tumor cells with small round nuclei and abundant clear cytoplasm, compatible with clear cell type RCC metastasis (see [Fig. 5](#)). The patient was asymptomatic and free of detectable disease at 18-month follow-up without any other treatment.

3. Discussion

The breast is a rare site of metastatic disease; the incidence of clinical breast metastasis from extramammary primary neoplasms ranges from 0.5 to 2.0% of all breast malignancies [1]. Metastases from renal adenocarcinoma to the lung and lymph nodes occur most frequently, followed by metastases to the bones, liver, contralateral kidney, ipsilateral adrenal, and pancreas [3], but metastasis to the breast is very rare. It has been suggested that, as a metastatic route to the breast tumor cells transit into the right ventricle from the inferior vena cava and spread to the breast after

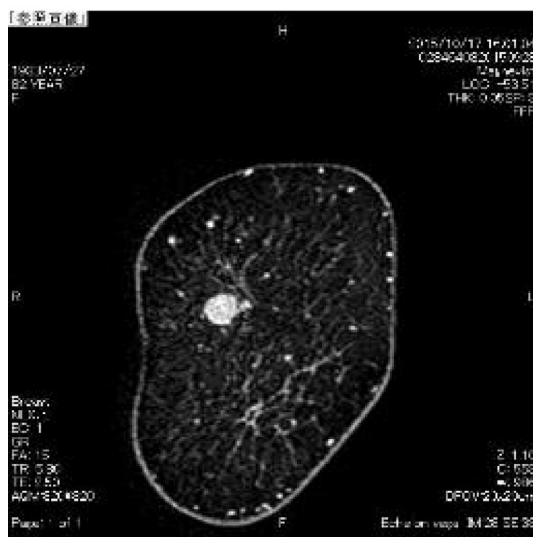


Fig. 3. Contrast-enhanced MRI shows a localized, well-enhanced mass but no extensive intraductal component.

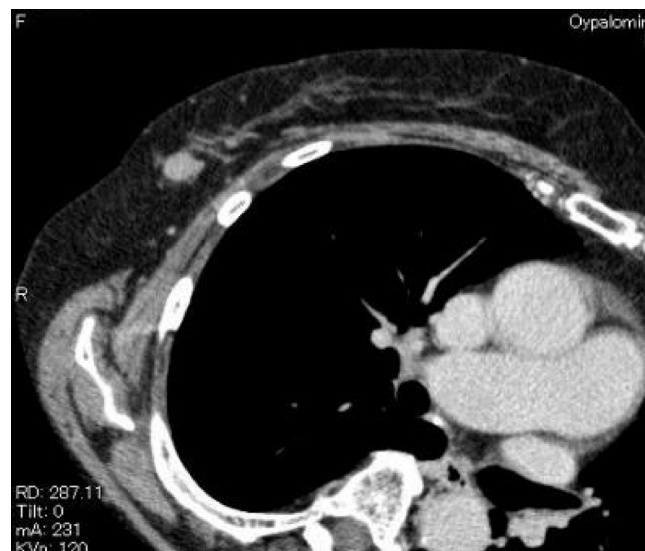


Fig. 4. Contrast-enhanced axial CT of the chest shows a corresponding enhanced homogeneous breast mass.

passing through the lungs in the arterial circulation. In addition, the paravertebral venous plexus route has been suggested [4].

Including the present case, only 23 cases of breast metastasis from RCC have been described in the literature (see Table 1). The average age at onset is 67.4 years (47–82 years), and all patients have been female. Nine of these patients were diagnosed concurrently with RCC; of these, 2 also had confirmed metastasis to the lung, bone or liver. Fourteen cases developed after nephrectomy for RCC; most were detected palpable breast masses, although some recent cases were detected by imaging studies at follow-up. The average interval from nephrectomy to discover of breast metastasis was 9.0 years (2–18 years) which supports the understanding that RCC is a very slow-growing type of cancer.

The diagnosis of breast metastasis, including cases originating from RCC, by imaging examination is difficult, and the results of FNA examination are often inconclusive because of the absence of breast duct epithelial cells. Therefore, it is important that histological diagnosis be determined by CNB and by other methods if the patient has a history of malignancy.

In almost all the reported cases of breast metastasis from RCC, lumpectomy or partial mastectomy was performed; only a few cases were treated by total mastectomy or axially lymph node dissection (ALND). ALND was performed in 4 cases, but only one of these showed lymph node metastasis. Axillary lymph node involvement is uncommon because in nearly all cases metastasis to the breast follows the hematogenous route. Generally, breast metastasis from any cancer is associated with a poor outcome; the mean survival of such patients is 10.9 months [1]. Therefore, minimally invasive surgery or nonsurgical ablation should be performed in accordance with the prognosis. On the other hand, a five-year survival rate after ablation in patients with metastasis of RCC has been reported as 53%, compared with 5% in cases in which ablation was not performed [5]. For that reason, aggressive resection should be considered in cases of solitary metastasis of RCC.

We considered that this case had appropriate therapeutic indications for cryoablation, a procedure that is often performed as clinical research in our hospital for small cancers of the breast [6], because the primary lesion in this case was RCC which the Japanese Ministry of Health admitted as an insurance adaption disease of cryoablation. However, we had to abandon cryoablation in accordance with the insurance. It is hoped that in the future insur-

Table 1
Characteristics of breast metastasis from renal cell carcinoma.

Ref.	Year	Age	Duration(year)	Opportunity	Size(mm)	Operation	LN	Postoperative treatment	Follow(mo)	Outcome
Chica [7]	1980	47	same time	mass	NS	excisional biopsy	NS	(–)	55	DOD
Brian [8]	1983	64	5	mass	NS	NS	NS	NS	NS	NS
Hardy [9]	1987	78	18	mass	60	NS	NS	NS	NS	NS
Lesho [10]	1992	74	same time	mass	20	mastectomy + ALND	(–)	NS	NS	NS
Bowditch [11]	1996	62	15	MMG	NS	excisional biopsy	NS	medroxyprogesterone acetate	NS	NS
Heggarty [12]	1998	63	same time	mass	20	lumpectomy + ALND	(–)	interferon	NS	NS
Kannan [13]	1998	65	same time	mass	10	lumpectomy	NS	NS	NS	NS
Forte [14]	1999	71	6	mass	100	radical mastectomy	(–)	NS	NS	NS
Grossklaus [15]	2000	77	same time	MMG	25	excisional biopsy	NS	NS	NS	NS
Vassalli [1]	2001	72	9	mass	35	lumpectomy	NS	(–)	12	NED
O'sullivan [16]	2003	52	same time	breast pain	NS	NS	NS	NS	NS	NS
Gacci [17]	2005	79	3	mass	NS	lumpectomy	NS	interferon	10	NED
Sarah [18]	2006	76	same time	mass	11	lumpectomy	(–)	interleukin-2 therapy	3	AWD
Alzaraa [19]	2007	81	5	mass	17	lumpectomy	(–)	(–)	NS	NS
Lee [20]	2007	71	same time	mass	40	(–)	NS	interleukin-2 therapy	5	AWD
Bortnik [21]	2008	55	2	MMG	6	lumpectomy	NS	(–)	21	NED
Daneshbod [22]	2008	65	8	mass	22	excisional biopsy	NS	NS	NS	NS
Durai [23]	2009	68	same time	mass	20	(–)	NS	chemotherapy	NS	NS
Hairulfaizi [24]	2009	67	5	mass	20	mastectomy + ALND	(+)	(–)	NS	NS
Mahrous [25]	2012	58	5	mass	40	lump excision	(–)	sunitinib	14	DOD
Botticelli [26]	2013	60	4	MMG	6	lump excision	NS	NS	NS	NS
Dhannoon [27]	2017	63	5	MMG	6	lumpectomy + SLND	(–)	(–)	3	NED
Present case	2017	82	9	CT	13	partial mastectomy	(–)	(–)	12	NED

Duration: duration until breast metastasis from nephrectomy, LN: axillary lymph node metastasis, MMG: mammography, NS: not stated, SLND: sentinel lymph node dissection, DOD: death of disease, NED: no evidence of disease, AWD: no operation for RCC and alive with disease.

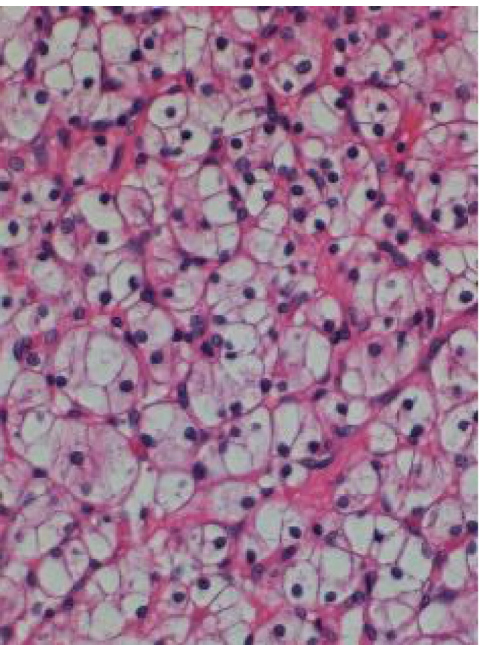
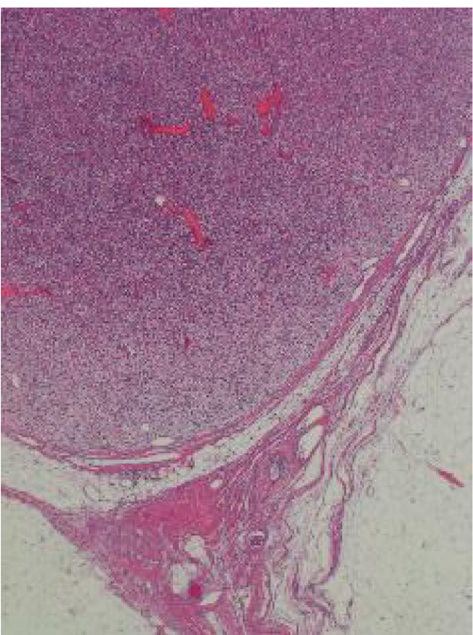


Fig. 5. Histopathological appearance of the resected specimen (hematoxylin-eosin stain). The photographs show solid alveolar proliferation of tumor cells with small round nuclei and abundant clear cytoplasm.

ance coverage will be expanded to cover therapeutic adaptation for cryoablation.

4. Conclusion

We reported an extremely rare case of breast metastasis from RCC. In such cases, it is important that the differential diagnosis

of primary breast cancer and metastatic breast cancer be determined by histological examination, and minimally invasive therapy should be performed in accordance with the prognosis.

Conflict of interests

The authors declare no conflict of interest.

Funding for your research

Nothing to declare.

Ethical approval

No ethical approval needed for the case study presented and submitted.

Consent

Our patient consented for publication of the case.

Author contribution

Takayuki Ishigaki: study concept, data collection, writing the paper.

Satoki Kinoshita: review and correct the manuscript.

Naoko Shimada: review and correct the manuscript.

Ryo Miyake: review and correct the manuscript.

Masaaki Suzuki: review and correct the manuscript.

Hiroshi Takeyama: review and correct the manuscript.

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Registration of research studies

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Guarantor

Hiroshi Takeyama is guarantor.

References

- [1] L. Vassalli, V.D. Ferrari, E. Simoncini, et al., Solitary breast metastases from a renal cell carcinoma, *Breast Cancer Res. Treat.* 68 (2001) 29–31.
- [2] B. Vergier, M. Trojani, I. de Mascarel, et al., metastases to the breast: differential diagnosis from primary breast carcinoma, *J. Surg. Oncol.* 48 (1991) 112–116.
- [3] S. Pagano, F. Franzoso, P. Ruggeri, Renal cell carcinoma metastases. Review of unusual clinical metastases: metastatic modes and patterns and comparison between clinical and autopsy metastatic series, *Scand. J. Urol. Nephrol.* 30 (1996) 165–172.
- [4] O.V. Batson, The function of the vertebral veins and their role in the spread of metastases, *Ann. Surg.* 112 (1940) 138–149.
- [5] S. Noguchi, T. Shuin, K. Takase, et al., Surgical treatment of renal cell carcinoma with metastases, *Nihongantiryougakkaiishi* 31 (1996) 5–13.
- [6] S. Kinoshita, J. Harada, Y. Kanetsuna, A. Fushimi, S. Kyoda, A. Hirano, et al., Initial experience of percutaneous cryoablation to treat small cancer of the breast, *Low Temp. Med.* 40 (1) (2014) 4–10.
- [7] G.A. Chica, D.E. Johnson, A.G. Ayala, Renal cell carcinoma presenting as a breast lump, *Urology* 15 (1980) 389–390.
- [8] I. Brian, Renal carcinoma manifesting as breast mass, *Urology* 21 (2) (1983) 166–167.
- [9] S.C. Hardy, Solitary breast metastasis from a hypernephroma, *Eur. J. Surg. Oncol.* 13 (1987) 365–366.
- [10] E.P. Lesho, Metastatic renal cell carcinoma presenting as a breast mass, *Ppstgrad. Med.* 91 (7) (1992) 145–146.
- [11] M.G. Bowditch, R. Peck, A.J. Shorthouse, Metastatic renal adenocarcinoma presenting in a breast screening programme, *Eur. J. Surg. Oncol.* (1996) 641.
- [12] P. Heggarty, et al., Bilateral breast metastases from a renal carcinoma, *IJCP* 52 (6) (1998) 443–444.
- [13] V. Kannan, Fine-needle aspiration of metastatic renal-cell carcinoma masquerading as primary breast carcinoma, *Diagn. Cytopathol.* 18 (1998) 343–345.
- [14] A. Forte, M.I. Peronace, L.S. Gallinaro, et al., Metastasis to the breast of a renal carcinoma: a clinical case, *Eur. Rev. Med. Pharmacol. Sci.* 3 (1999) 115–118.
- [15] D.J. Grossklaus, J.M. Holzbeierlein, B.J. Roth, J.A. Smith, Abnormal mammogram as the presenting sign of renal cell carcinoma, *Urology* 163 (2000) 1239–1240.
- [16] A.W. O'Sullivan, P.M. Kelly, J.M. Smith, T.F. Gorey, Renal cell carcinoma metastasis to breast, *Ir. J. Med. Sci.* 172 (2003) 48.
- [17] M. Gacci, L. Orzalesi, V. Distante, et al., Renal cell carcinoma metastatic to the breast and breast cancer metastatic to the kidney: two rare solitary metastases, *Breast J.* 11 (2005) 351–352.
- [18] S.A. McLaughlin, D.D. Thiel, S.L. Smith, M.J. Wehle, D.M. Menke, Solitary breast mass as initial presentation of clinically silent metastatic renal cell carcinoma, *Breast* 15 (2006) 427–429.
- [19] A. Alzarra, A. Vodovnik, H. Montgomery, M. Saeed, N. Sharma, Breast metastasis from a renal cell cancer, *World J. Surg. Oncol.* 5 (2007) 25.
- [20] W.K. Lee, J.N. Cawson, P.A. Hill, J. Hoang, H. Rouse, Renal cell carcinoma metastasis to the breast: mammographic, sonographic, CT, and pathologic correlation, *Breast J.* 13 (2007) 316–317.
- [21] B. Svetlana, et al., Breast metastasis from a renal cell carcinoma, *Breast J.* 14 (4) (2008) 388–390.
- [22] Y. Daneshbod, et al., Renal cell carcinoma presenting as a solitary Breast mass. a diagnostic pitfall on aspiration cytology of clear cell tumors of the Breast, *Breast J.* (2008).
- [23] R. Durai, S.N. Ruhomauly, E. Wilson, H. Hoque, Metastatic renal cell carcinoma presenting as a breast lump in a treated breast cancer patient, *Singapore Med. J.* 50 (2009) e277–e279.
- [24] H. Hairulfaizi, et al., Breast and axillary lymph nodes metastasis five years after radical nephrectomy for renal cell carcinoma a case report and review of the literature, *Ljm* (2009) 120–122.
- [25] M. Mahrous, et al., Breast metastasis from renal cell carcinoma: rare initial presentation of disease recurrence after 5 years, *J. Breast Cancer* 15 (2) (2012) 244–247.
- [26] A. Botticelli, et al., Breast metastasis from clear cell renal carcinoma, *J. Ultrasound* 16 (2013) 127–130.
- [27] S.M. Dhannoon, et al., Renal cell carcinoma with isolated breast metastasis, *BML Case Rep.* (2017), <http://dx.doi.org/10.1136/bcr-2016-219124>.
- [28] R.A. Agha, A.J. Fowler, A. Saetta, I. Barai, S. Rajmohan, D.P. Orgill, for the SCARE Group, The SCARE statement: consensus-based surgical case report guidelines, *Int. J. Surg.* (2016).

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