

CASE REPORT

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Bilateral breast metastasis from renal cell carcinoma, do not overlook this diagnosis: case report

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Abstract

Background Renal cell carcinoma rarely metastasizes to the breast. Few cases are reported in the literature. We describe a unique case of bilateral breast metastasis from an RCC treated five years ago. To the best of our knowledge, this would be the first reported case in Egypt.

Case presentation A 65-year-old Egyptian woman who underwent a nephrectomy for a renal cell carcinoma 5-years ago, showed up complaining of bloody nipple discharge from her right breast without any palpable lumps. Mammosonography showed multiple bilateral regular breast masses and a worrisome left axillary lymph node. Needle core biopsies were obtained and a final histopathological diagnosis of bilateral metastatic deposits from clear cell renal cell carcinoma (RCC) was made.

Conclusion The differential diagnosis of bilateral breast masses should consider metastatic disease of the breast, particularly in patients with a previous history of malignancies.

Keywords Breast metastasis, Renal cell carcinoma, Case report

Background

Primary mammary carcinoma frequently presents with a breast lump, and metastatic breast disease is often an unforeseen diagnosis. Extramammary tumors rarely metastasize to the breast and secondaries from renal cell carcinoma (RCC) to the breast are extremely uncommon [1]. We describe a unique case of bilateral breast metastasis from an RCC treated five years ago. To the best of our knowledge, this would be the first reported case in Egypt.

Case presentation

An incidental finding of bloody discharge from the right breast nipple led a 65-year-old Egyptian female for medical checkup. She had a right-sided clear renal cell carcinoma (RCC) that required radical nephrectomy five years prior to this presentation. Upon clinical examination of her both breasts, no palpable lumps were clinically identified, overlying skin was intact and both nipples were normally everted. A diagnostic 2D mammography using Mammomat Select Analog mammography system, Siemens healthiness, Erlangen, Germany (cranial caudal (CC) view and the mediolateral oblique (MLO)) was performed and revealed multiple small bilateral rounded shaped masses of high density, with no associated distortion or calcifications. Left axilla showed a suspicious enlarged lymph node with increased mammographic density (Fig. 1).

Ultrasound examination was performed using Siemens ACCUSON S2000 ultrasound system (Siemens Medical Solution, Mountain View, CA, USA equipped

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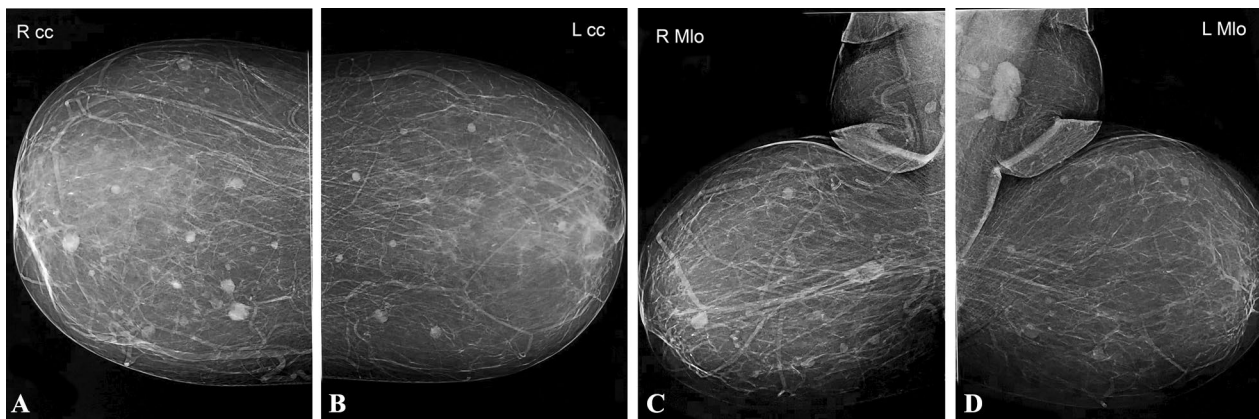


Fig. 1 Mammogram study in cranial caudal (CC) view and the mediolateral oblique (MLO) of both breasts show multiple small bilateral rounded shaped masses of high density some showed circumscribed margins, and some are with irregular margin, with no associated distortion or calcifications. A suspicious enlarged left axillary lymph node is seen with increased mammographic density, lobulated margin, and loss of hilar fat density



Fig. 2 Ultrasound image of right breast shows irregular, heterogenous hypoechoic, taller than wider mas, with no posterior features suggesting suspicious nature

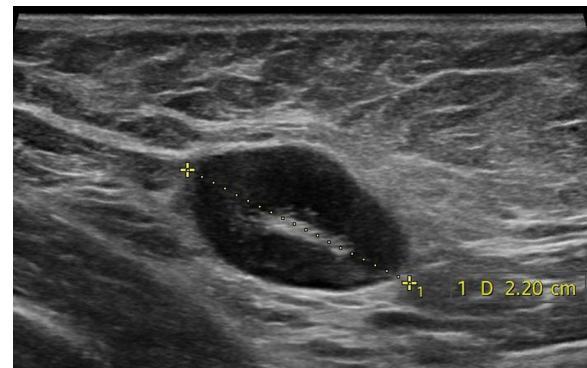


Fig. 3 Ultrasound image of the left axilla shows enlarged lymph node, with thickened cortex and preserved central hilum

with a linear transducer having a bandwidth of 9 to 12 MHz). It showed multiple bilateral small hypoechoic masses scattered in all quadrants, the largest of which measured 1 cm in diameter. One of the identified masses in the right breast was irregular, heterogenous hypoechoic, taller than wider, with no posterior features suggesting suspicious nature (Fig. 2). Examination of left axilla showed an enlarged lymph node (10 mm in short axis) globular shaped, thickened cortex with preserved eccentric fatty hilum (Fig. 3). According to the Breast Imaging Reporting and Data System (BI-RADS) [2], a BI-RADS 4b score was suggested.

After discussion with the patient, ultrasound guided core needle biopsies to get a firm diagnosis was attempted from both breasts. Informed consent was

obtained, and 4 cores were harvested using 14 -gauge semi-automatic core biopsy needle (Geotek, medical LTD; Ankara Turkey) under local anesthesia from both breast lesions and from the suspicious left axillary lymph node. Samples were preserved in 10% formalin solution and were sent for histopathological assessment.

Microscopic examination of all submitted specimens revealed a neoplastic growth composed of compact nests and sheets of cells with clear cytoplasm and distinct cell membranes, separated by a network of arborizing small and thin-walled vessels. Further ancillary immunohistochemical panel was applied. The tumor cell nuclei staining was negative for GATA3 and positive for PAX9. Final diagnosis of metastatic deposits from clear cell renal cell carcinoma to both breasts was disclosed (Figs. 4, 5).

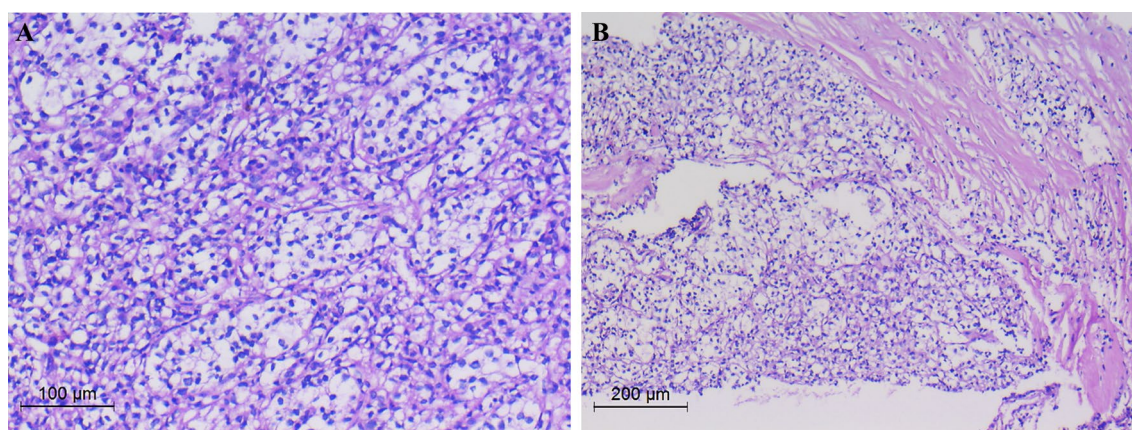


Fig. 4 Standard H & E section image shows compact nests and sheets of cells with clear cytoplasm and distinct cell membranes, separated by networks of arborizing small, thin-walled vessels. (Original magnification **A** ×100, **B** ×200.)

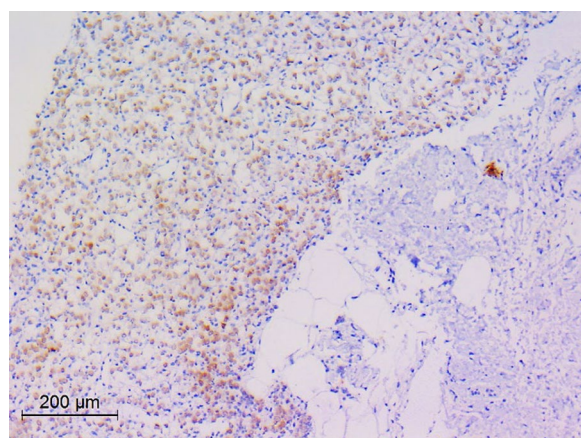


Fig. 5 The IHC study with PAX9 staining (original magnification ×100) shows positive tumor cell nuclei staining

Discussion

Breast metastatic disease is quite rare, constitutes 0.5% to 1.3% of all breast cancer cases and 0.5% to 6.6% of autopsy series [2]. The tumors that spread to the breast most frequently are contralateral breast cancer, lymphoma, leukemia, malignant melanoma, and prostate cancer (in men), which often has same radiological findings by mammogram as multiple variable-sized well-defined masses scattered all over the breast parenchyma [3].

Renal cell carcinoma (RCC) accounts for 3% of all adult malignancies and typically metastasizes in 20–30% of cases. The most prevalent type is clear cell carcinoma, and the most frequent sites of metastasis are the lung, bone, lymph nodes, liver, and brain [4]. Other metastatic sites, including the pancreas, breast, thyroid, and parotid, are extremely rare and were reported sporadically in the literature [5].

Metastatic renal cell carcinoma to the breast is relatively infrequent. In a retrospective multicentric study, only 2 cases (0.36%) out of 558 patients with metastatic clear cell RCC showed breast involvement [6]. In addition to their case study, Xu et al. [7] documented 32 cases of metastatic RCC to the breast that had been previously reported in the literature. We conducted a PubMed search and identified an additional 14 cases. To the best of our knowledge, 47 patients with breast metastatic RCC have been published to date [8–20]. The reported patients' ages ranged from 14 [21] to 90 years old [16].

Most of the reported cases were unilateral. Bilateral affection (as in our patient) is much more uncommon and has only been documented in three other cases across the literature [21–23].

It might be challenging to distinguish a primary breast tumor from a metastatic lesion. Contrary to primary breast cancers, which are always lobulated and frequently show speculations and/or microcalcifications, metastatic tumors in breasts are typically well-circumscribed and free of calcifications. Another point of distinction is that metastasis does not affect the ducts, cannot result in discharge from the nipples, and does not result in skin dimpling [24]. Metastases to the breast are usually solitary and frequently palpable because they typically lie in the subcutaneous plane [1]. Nonetheless, most benign tumors also exhibit these characteristics; hence, these features are not distinctive to metastasis [25].

Our patient had nearly all these features of metastasis but lay deeper in the breast parenchyma. Additionally, the patient had nipple discharge.

Various periods were observed between nephrectomy and the appearance of breast RCC metastases in the published literature. Five years after having a nephrectomy, our patient's breast tumors were disclosed.

Spasic et al. [20] reported RCC metastatic to the breast 11 years following nephrectomy. Recurrences after 18- and 20-years following nephrectomy had been reported by other authors [15, 17]. According to Mara et al. [26], the longest time between nephrectomy and recurrence was 23 years.

The literature lacks sufficient data on management practices in cases of RCC metastasis to the breast. For a single lesion, excision was advised; furthermore, a mastectomy or axillary nodal dissection may not be necessary, and adjuvant therapy is not recommended. On the other hand, immunotherapy may be suggested for the treatment of numerous lesions [27].

In brief, we would want to emphasize the important role of radiologists contemplating extramammary primary causes of breast lesions while determining a diagnosis of a unilateral breast lesion, particularly those with atypical radiological characteristics.

To promptly diagnose breast metastatic tumors, rule out the need for unnecessary surgery, and select the most appropriate type of therapy, a thorough clinico-radiologic examination and the use of auxiliary investigations may be helpful.

Conclusion

This case is very rare. Not all bilateral rounded masses in mammogram should be benign. History of the patient is very helpful in diagnosis. And finally, the differential diagnosis of bilateral breast masses should consider metastatic disease, particularly in patients with a previous history of malignancies.

Abbreviations

BI-RADS	Breast imaging reporting and data system
CC	Craniocaudal
GATAS3	GATA binding protein 3
H&E	Hematoxylin and eosin
IHC	Immunohistochemistry
MLO	Mediolateral oblique
PAXA9	Paired box9 (protein coding gene)

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None.

Author contributions

MK: Performed the Mammo-sonography, the guided biopsies and shared in editing of the manuscript. MA: Did the Histo-pathological assessment. AD: Shared in the clinical assessment of the patient. AA: Editing and revision of the manuscript. All authors have read and approved the manuscript.

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Availability of data and materials

The datasets used during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

This study was approved by the Research Ethics Committee of the Faculty of Medicine at Alexandria University in Egypt (IRB NO: 00012098, FWA NO: 00018699) on 14/5/2023 with serial number 0306149. The included in this study gave written informed consent to participate in this research.

Consent for publication

The included in this case report gave written informed consent to publish the data contained within this study.

Competing interests

The authors declare that they have no competing interests.

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