Health Innovation Reports 2025,1(1):7-10

Case Insight

Metachronous Unilateral Ovarian Metastasis from Renal Cell Carcinoma with Chemotherapy Response: A Case Report

Yadgar Abduljabbar Shwani [1]

Received: 5 March 2025 Revised: 29 March 2025 Accepted: 30 March 2025 Published: 15 April 2025

Abstract

Renal cell carcinoma (RCC) rarely metastasizes to the ovary, with only a few dozen cases reported in the literature. We report a rare case of a 23-year-old woman who initially presented with a large left renal mass and underwent radical nephrectomy. Histopathological and immunohistochemical analysis confirmed unclassified clear renal adenocarcinoma. After completing six cycles of chemotherapy and three years of regular follow-up, a left adnexal mass was detected. Imaging and core biopsy confirmed metastatic ovarian involvement with histologic features identical to the primary renal tumor. The patient responded favorably to a second chemotherapy course, and laparoscopic oophorectomy revealed no residual malignancy. This case emphasizes the importance of long-term surveillance in RCC patients and highlights the diagnostic challenge posed by rare metastatic presentations mimicking primary ovarian tumors. Awareness of such rare pathways is essential for timely diagnosis, proper therapeutic decisions, and improved patient outcomes through multidisciplinary collaboration.

Keywords Renal Cell Carcinoma · Ovarian Metastasis · Metachronous Tumor · Chemotherapy · Chemotherapy Response · Immunohistochemistry

✉ Yadgar Abduljabbar Shwani
yadgar23305@gmail.com

[1] Erbil Teaching Hospital, Erbil, Iraq

Introduction

Renal cell carcinoma (RCC) accounts for approximately 2–3% of all adult malignancies and is known for its unpredictable behavior and potential to metastasize to various distant organs (Hsieh et al., 2017). The most common metastatic sites include the lungs, bones, liver, adrenal glands, and brain (Aggarwal et al., 2025). However, metastasis to the ovary is extremely rare, with reported incidences ranging from 0.2% to 0.5% (Singh et al., 2021). In a literature review by Thomakos et al. (2019), only 41 cases of RCC metastasizing to the ovary were identified across databases, underscoring the rarity of this presentation. The clinical and morphological resemblance of ovarian metastasis from RCC to primary ovarian tumors further complicates diagnosis. This rarity is compounded by the metachronous nature of such metastases, where the secondary lesion appears months or years after nephrectomy. Recognizing such cases is crucial as they require different treatment plans and have varied prognoses.

Accurate differentiation between primary ovarian tumors and secondary RCC metastases relies heavily on immunohistochemistry. A panel including CK7, CK20, vimentin, PAX8, and EMA is often used to establish diagnosis (HORNICK and DABBS, 2021). The presence of a renal–ovarian vascular axis, particularly on the left side, may facilitate hematogenous spread. Although rare, clinicians should be aware of this metastatic pathway, especially during long-term surveillance. Therefore, this study aims to present a rare case of metachronous unilateral ovarian metastasis from RCC and to highlight the importance of accurate diagnosis and tailored treatment.

Case Presentation

A 23-year-old thin virgin female presented to our surgical clinic in August 2021 with non-specific lower abdominal pain persisting for several weeks. Clinical examination revealed pallor and a palpable mass on the left side of her abdomen. Laboratory investigations showed a hemoglobin level of 9.5 g/dL, while renal and liver function tests were within normal limits. Abdominal ultrasound revealed a large mass in the left kidney. Further evaluation with contrast-enhanced CT urography demonstrated a 16 × 12.5 × 9 cm heterogeneously enhancing soft tissue mass replacing nearly the entire left renal parenchyma. The mass extended medially across the midline, partially surrounding the left side of the aorta, and completely encased the left renal artery without involving the renal vein or inferior vena cava. Mild lymphadenopathy was noted medial to the mass, and the chest X-ray was unremarkable. (Figure 1)

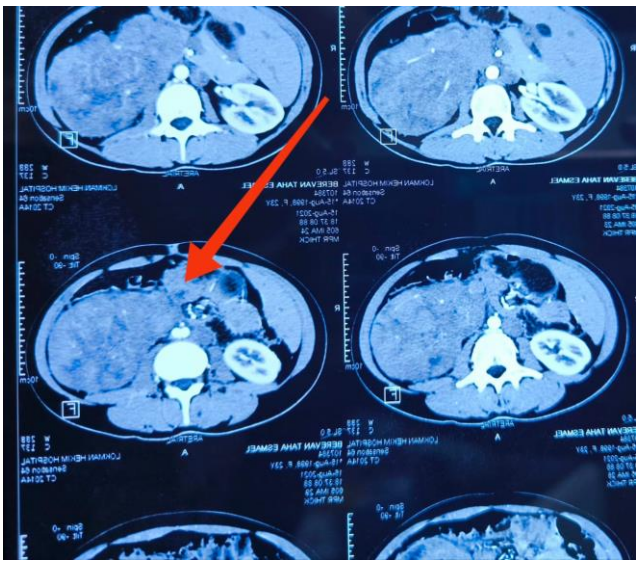

Figure 1: Axial CT image demonstrating a large, heterogeneously enhancing mass involving the left kidney (red arrow), replacing much of the renal parenchyma and encasing adjacent structures.

Following correction of anemia, the patient underwent an open radical nephrectomy through a left anterior subcostal incision. The nephrectomy specimen was submitted for histopathological examination. The sample was reviewed by two independent laboratories. Histopathology and immunohistochemical staining revealed positivity for AE1/AE3 pancytokeratin, CD56, and focal positivity for EMA and PAX8. Other markers were negative. The final diagnosis was determined as unclassified clear cell renal adenocarcinoma. Postoperatively, the patient was referred to the oncology department and completed six cycles of chemotherapy with carboplatin and docetaxel. She was placed on a surveillance program involving imaging and PET-CT scans every six months.

In 2024, three years after nephrectomy, a routine follow-up revealed a newly developed left adnexal mass. Dynamic pelvic MRI showed a 7 cm ovarian mass with central hemorrhagic features. Ultrasound-guided core biopsy confirmed histopathologic features identical to the primary renal tumor. A second chemotherapy regimen of carboplatin and docetaxel was initiated, resulting in reduction of the mass to 3 cm. Laparoscopic left oophorectomy was then performed, and final histopathology showed no residual tumor. For more details refer to figure 2.

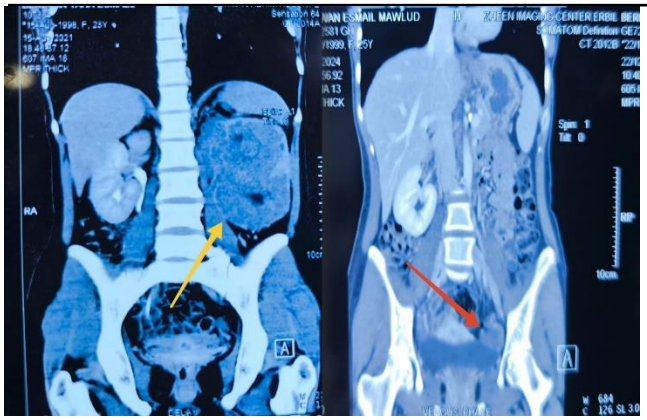

Figure 2: Left panel: Coronal CT image showing the left renal mass (yellow arrow). Right panel: CT image showing a left adnexal mass suggestive of ovarian metastasis (red arrow), detected three years post-nephrectomy.

Discussion

This case report aimed to present a rare instance of metachronous unilateral ovarian metastasis originating from RCC, emphasizing the diagnostic complexity, treatment response, and the need for long-term oncologic surveillance. Given the extreme rarity of RCC metastasis to the ovary, especially occurring years after nephrectomy, this report contributes to the limited literature and highlights the clinical importance of recognizing atypical metastatic patterns in young patients.

Overall, the results demonstrate that RCC can metastasize to the ovary via hematogenous spread even after an extended disease-free. In my patient, the ovarian mass was detected three years following radical nephrectomy and was pathologically confirmed to share identical immunohistochemical characteristics with the primary renal tumor, including PAX8, EMA, and AE1/AE3 positivity. The ovarian lesion responded significantly to systemic chemotherapy, regressing from 7 cm to 3 cm, and was subsequently removed through laparoscopic oophorectomy with no residual malignancy detected. This response reinforces the therapeutic value of systemic treatment in selected cases and illustrates the importance of individualized, multidisciplinary management.

The significance of this case lies in its deviation from common metastatic behavior of RCC, which typically involves the lungs, bones, or liver. Compared to existing literature, our findings align with previous reports suggesting a higher likelihood of ovarian involvement when the primary tumor is on the left side, likely due to the renal–ovarian venous connection (Karaosmanoglu et al., 2019, Shaaban and Rezvani, 2010). However, the rarity of such cases limits the ability to generalize outcomes. A key limitation of this study is the absence of molecular profiling and long-term survival data. Future research should focus on collecting multicenter data to better understand the pathophysiology, genetic markers, and optimal management strategies for RCC with atypical metastasis, particularly in young women with preserved reproductive anatomy.

Conclusion

This case demonstrated that a metachronous unilateral ovarian metastasis from renal cell carcinoma responded well to systemic chemotherapy followed by surgical removal, with no residual tumor found. Based on this outcome, it is recommended that policymakers and healthcare providers develop protocols for long-term surveillance in RCC patients, especially young women, to ensure early detection of rare metastatic patterns.

Statements and Declarations

Funding information None.

Conflict of Interest Statement The authors declare no conflict of interest.

Ethics Statement Ethical approval was not required for this case report, as it involved a retrospective review of a single patient with no identifiable personal data disclosed.

Patient consent statement Informed verbal consent was obtained from the patient for publication of this case and any accompanying images.

Clinical trial registration This study did not constitute a clinical trial and therefore did not require registration.

Acknowledgements Thanks to all the peer reviewers and editors for their opinions and suggestions and for their support of this research.

Author Contributions Yadgar Abduljabbar Shwani: Conceptualization; data curation; methodology; writing—original draft; Visualization; writing—review & editing; Supervision.

References

AGGARWAL, N., BARGUNAM, P., PRASAD, R., KHANNA, G. & SINGH, D. K. 2025. Exploring unconventional sites of bone metastasis: a comprehensive exploration of common and uncommon tumors in the Lesser-Known realms. Surgical and Experimental Pathology, 8, 8. https://doi.org/10.1186/s42047-025-00179-3

HORNICK, J. L. & DABBS, D. J. 2021. Immunohistology of carcinoma of unknown primary site. Diagnostic Immunohistochemistry E-Book: Diagnostic Immunohistochemistry E-Book, 213.

HSIEH, J. J., PURDUE, M. P., SIGNORETTI, S., SWANTON, C., ALBIGES, L., SCHMIDINGER, M., HENG, D. Y., LARKIN, J. & FICARRA, V. 2017. Renal cell carcinoma. Nature reviews Disease primers, 3, 1-19. https://doi.org/10.1038/nrdp.2017.9

KARAOSMANOGLU, A. D., ONUR, M. R., SALMAN, M. C., USUBUTUN, A., KARCAALTINCABA, M., OZMEN, M. N.

& AKATA, D. 2019. Imaging in secondary tumors of the ovary. Abdominal Radiology, 44, 1493-1505. https://doi.org/10.1007/s00261-018-1809-4

SHAABAN, A. & REZVANI, M. 2010. Ovarian cancer: detection and radiologic staging. Topics in Magnetic Resonance Imaging, 21, 247-259. https://doi.org/10.1097/RMR.0b013e31823d8063

SINGH, S., SANJAY, B., KUMAR, P., LAKHERA, K. & SWAIN, P. 2021. Breast Metastases from Ovar-ian Primary: A Rare Entity and Review of Literature. Int J Oncol Res, 4, 030. https://doi.org/10.23937/2643-4563/1710030

THOMAKOS, N., DIAKOSAVVAS, M., MACHAIRIOTIS, N., FASOULAKIS, Z., ZAROGOULIDIS, P. & RODOLAKIS, A. 2019. Rare distant metastatic disease of ovarian and peritoneal carcinomatosis: a review of the literature. Cancers, 11, 1044. https://doi.org/10.3390/cancers11081044