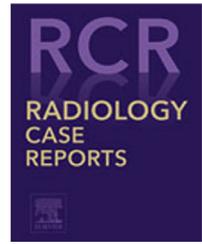


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Case Report

Ultrasound findings of subcutaneous soft tissue metastasis of renal cell carcinoma: A case report[☆]

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ABSTRACT

In renal cell carcinoma (RCC), metastasis to subcutaneous soft tissues is rare, with only a small number of cases reported to date, especially those based on ultrasound findings. This case report presents the ultrasound findings of an 81-year-old Chinese man who developed RCC presenting as subcutaneous soft-tissue metastasis 15 years after curative nephrectomy. We suggest that ultrasound-guided puncture biopsy should be considered when such suspicious lesions are found.

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Introduction

Renal cell carcinoma (RCC) is the most common malignant tumor of the kidney and can metastasize to any part of the body [1]. However, metastasis of RCC to subcutaneous soft tissue is extremely rare and is usually detected in a few case reports [2–4]. We report a case of metastatic RCC in the subcutaneous soft tissue of the right arm that developed 15 years after curative nephrectomy.

Case report

An 81-year-old Chinese man was admitted to our department for a nodule in his right arm, without accompanying

symptoms that had persisted for 3 months. He was diagnosed with renal clear cell carcinoma 15 years prior and underwent surgical resection of the right kidney. A positron emission tomography-computed tomography (PET-CT) scan showed a right-arm lesion and multiple lung lesions due to abnormal 18F-FDG uptake (Fig. 1). Superficial ultrasonography of the right arm revealed a solid hypo-echoic nodule approximately 17 mm × 9 mm in size with an oval shape, smooth edges, and a well-defined boundary in the subcutaneous fat (Fig. 2A). Color Doppler flow imaging revealed rich blood flow in the nodule (Fig. 2B). The patient underwent ultrasound-guided puncture biopsy of the solid masses in the right arm. Pathological results, morphology, immunohistochemical results, and clinical history supported the metastasis of renal clear cell carcinoma (Fig. 3). Biopsy results of the lung lesions suggested lung adenocarcinoma. The patient subsequently received targeted therapy with icotinib.

[☆] Competing Interests: There is no conflict of interest to declare.

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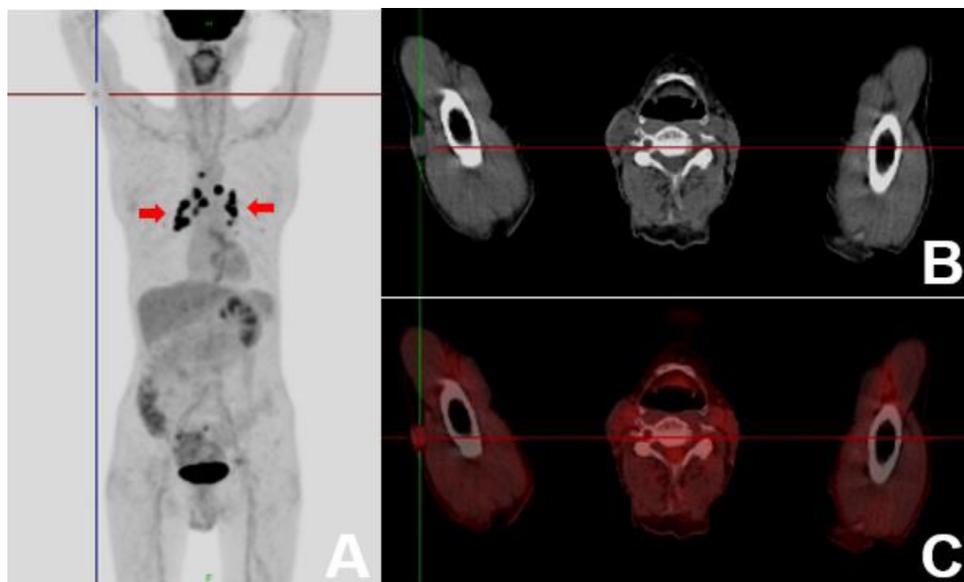


Fig. 1 – (A). The maximum intensity projection (MIP) image of the patient who had undergone post-right nephrectomy shows abnormal sites of uptake in a right arm lesion (target spot) and multiple lung nodules (red arrowheads). **(B)** The lesion in the subcutaneous soft tissue of right arm is noted as a low-density nodule on CT **(C)** with abnormal uptake on 18F-FDG PET-CT.

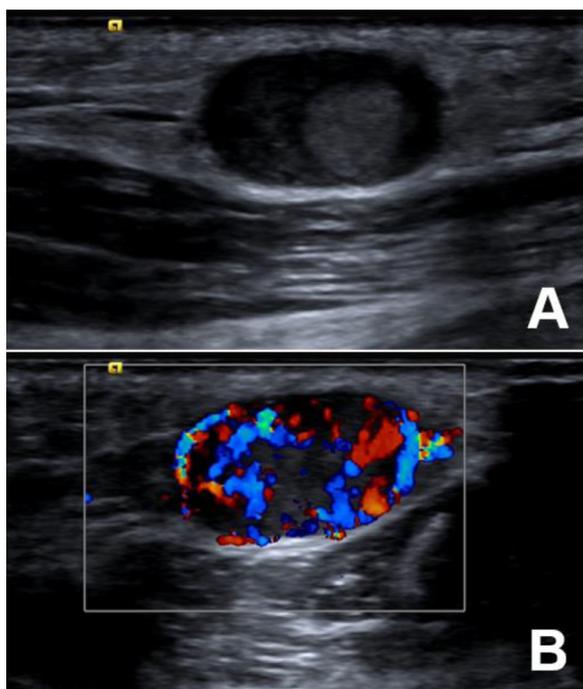


Fig. 2 – (A) Superficial ultrasound of the right arm shows an oval, hypo-echoic nodule with well-defined margins and no shadowing in the subcutaneous fat. **(B)** Extensive vascularity is noted.

Discussion

RCC is prone to early metastasis with approximately 33% of patients having metastatic lesions [5,6]. RCC usually metastasizes to the lungs, bones, liver, and brain [7,8]. However, RCC can also metastasize to some atypical sites, such as the skeletal muscle [9], skin [10], and pancreas [11].

Herein, we presented a rare case of RCC that had metastasized to the subcutaneous soft tissue of the right arm with no clinical signs. On gray-scale ultrasonography, the lesion presented as a hypoechoic nodule with well-defined margins. It presented abundant blood flow signals on color Doppler ultrasound. These findings are consistent with previous reports [9,12,13].

A hypoechoic mass with well-defined margins is a manifestation of most benign tumors on grayscale ultrasonography. Thus, the above findings were not specific to metastatic RCC lesions. This makes it challenging to differentiate this uncommon metastasis from primary soft tissue tumors. Most clear cell carcinomas are inherently hypervascular, and clear cell RCC has a high mean microvessel density of 653.6 mm² [14]. Therefore, the abundant blood flow signals in RCC metastases are worthy of attention.

RCC can recur at any time after nephrectomy. The time interval from the diagnosis of the primary tumor to the detection of RCC metastasis varies from several months to decades [15]. When evaluating these lesions, the patient's history should be combined with the ultrasound findings, which is very important to diagnose metastatic RCC lesions.

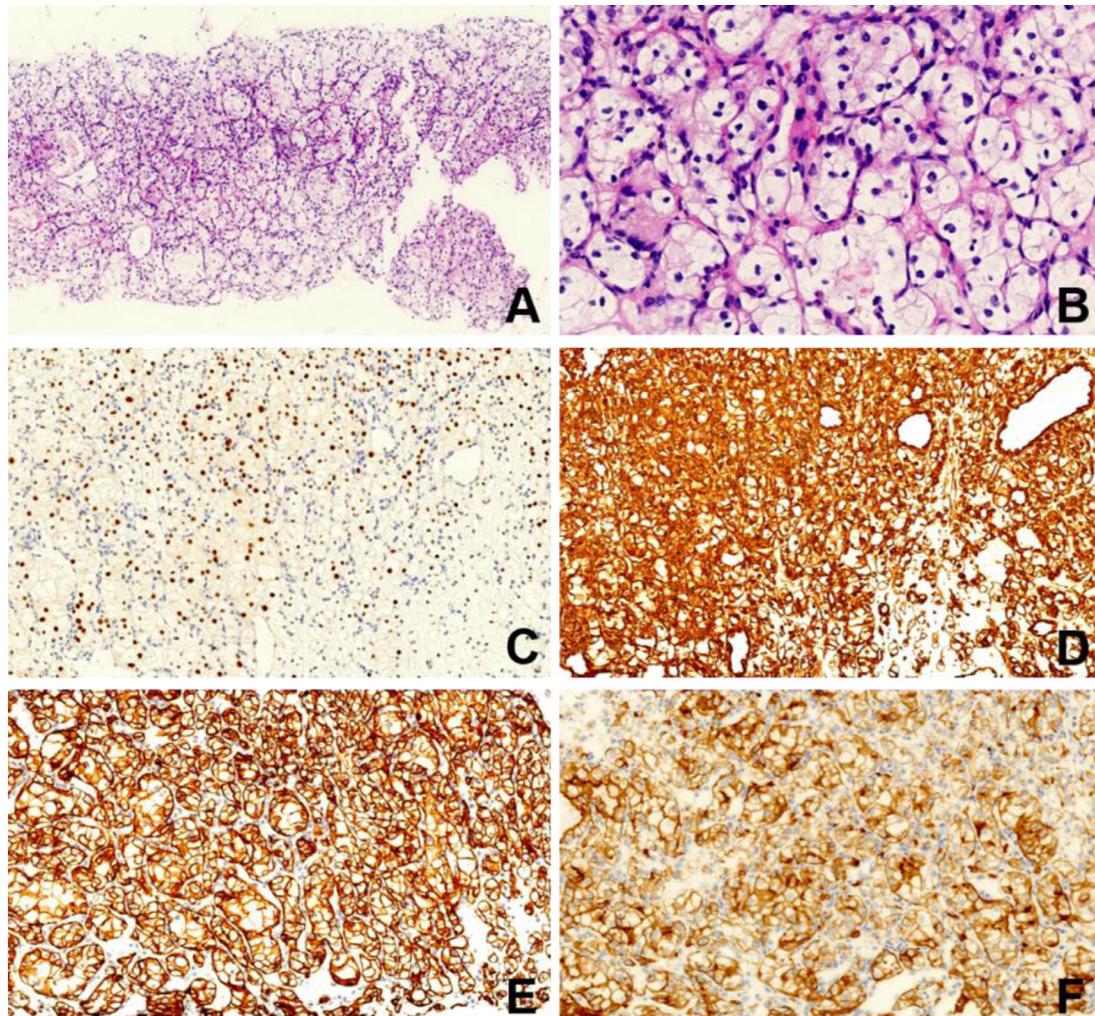


Fig. 3 – Renal clear cell carcinoma metastasis to the right arm. (A, B) Metastatic clear cell RCC (hematoxylin-eosin, original magnification 10× & 40×). (C) The neoplastic cells show strong nuclear staining with PAX-8 (immunohistochemistry, original magnification 40×). (D) Diffuse and strong cell cytoplasm staining for vimentin is observed in the neoplastic cells. Positive cells display brownish yellow granules on the surface, cytoplasm, and intercalated disks (immunohistochemistry, original magnification 40×). (E, F) The neoplastic cells show strong membranous staining with CA-IX and CD10 (immunohistochemistry, original magnification 40×).

Conclusion

High-resolution ultrasound has significant advantages for the diagnosis of superficial lesions. Ultrasound-guided biopsy can help make a definite diagnosis. We suggest that newly discovered subcutaneous soft tissue lesions should be closely followed-up by ultrasound for patients with a history of malignant tumors, and ultrasound-guided puncture biopsy should be performed in a timely manner.

Patient consent

Consent has been obtained to publish the details, information and imaging of the case detailed in the article “Ultrasound

findings of subcutaneous soft tissue metastasis of renal cell carcinoma: A case report.”

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.radcr.2022.09.055](https://doi.org/10.1016/j.radcr.2022.09.055).

REFERENCES

- [1] Gray RE, Harris GT. Renal cell carcinoma: diagnosis and management. *Am Fam Physician* 2019;99(3):179–84.
- [2] Wayne M, Wang W, Bratcher J, Cumani B, Kasmin F, Cooperman A. Renal cell cancer without a renal primary.

- World J Surg Oncol 2010;8:18. doi:[10.1186/1477-7819-8-18](https://doi.org/10.1186/1477-7819-8-18).
- [3] Chin W, Cao L, Liu X, et al. Metastatic renal cell carcinoma to the pancreas and subcutaneous tissue 10 years after radical nephrectomy: a case report. *J Med Case Rep* 2020;14:36. doi:[10.1186/s13256-020-2355-6](https://doi.org/10.1186/s13256-020-2355-6).
- [4] Tatoglu MT, Özüiker T, Sayilgan AT. Subcutaneous fatty tissue metastasis from renal cell carcinoma detected with fluorine-18 fluorodeoxyglucose positron emission tomography/computed tomography and magnetic resonance imaging. *Indian J Nucl Med* 2011;26:27–30. doi:[10.4103/0972-3919.84608](https://doi.org/10.4103/0972-3919.84608).
- [5] Chowdhury N, Drake C. Kidney cancer: an overview of current therapeutic approaches. *Urol Clin North Am* 2020;47(4):419–31. doi:[10.1016/j.ucl.2020.07.009](https://doi.org/10.1016/j.ucl.2020.07.009).
- [6] Padala SA, Barsouk A, Thandra KC, Saginala K, Mohammed A, Vakiti A, et al. Epidemiology of renal cell carcinoma. *World J Oncol* 2020;11(3):79–87. doi:[10.14740/wjon1279](https://doi.org/10.14740/wjon1279).
- [7] Wei H, Miao J, Cui J, Zheng W, Chen X, Zhang Q, et al. The prognosis and clinicopathological features of different distant metastases patterns in renal cell carcinoma: analysis based on the seer database. *Sci Rep* 2021;11(1):17822. doi:[10.1038/s41598-021-97365-6](https://doi.org/10.1038/s41598-021-97365-6).
- [8] Bianchi M, Sun M, Jeldres C, Shariat SF, Trinh QD, Briganti A, et al. Distribution of metastatic sites in renal cell carcinoma: a population-based analysis. *Ann Oncol* 2012;23(4):973–80. doi:[10.1093/annonc/mdr362](https://doi.org/10.1093/annonc/mdr362).
- [9] Salman R, Sebaaly MG, Asmar K, Nasserline M, Bannoura S, Khoury NJ, et al. Rare skeletal muscle metastasis from renal cell carcinoma: case report and review of the literature. *Gen Case Rep* 2018;7:316–19. doi:[10.1007/s13730-018-0350-1](https://doi.org/10.1007/s13730-018-0350-1).
- [10] Silver E, Roudakova K, Bial N, Daniel D. Cutaneous metastasis of renal cell carcinoma to the cheek: a case report and literature review. *Am J Case Rep* 2021;22:e928999. doi:[10.12659/AJCR.928999](https://doi.org/10.12659/AJCR.928999).
- [11] Cao H, Sun Z, Wu J, Hao C, Wang W. Metastatic clear cell renal cell carcinoma to pancreas and distant organs 24 years after radical nephrectomy: a case report and literature review. *Front Surg* 2022;9:894272. doi:[10.3389/fsurg.2022.894272](https://doi.org/10.3389/fsurg.2022.894272).
- [12] Pickhardt PJ, Pickard RH. Sonography of delayed thyroid metastasis from renal cell carcinoma with jugular vein extension. *AJR Am J Roentgenol* 2003;181(1):272–4. doi:[10.2214/ajr.181.1.1810272](https://doi.org/10.2214/ajr.181.1.1810272).
- [13] Xu Y, Hou R, Lu Q, Deng Y, Hu B. Renal clear cell carcinoma metastasis to the breast ten years after nephrectomy: a case report and literature review. *Diagn Pathol* 2017;12(1):76–82. doi:[10.1186/s13000-017-0666-8](https://doi.org/10.1186/s13000-017-0666-8).
- [14] Jinzaki M, Tanimoto A, Mukai M, Ikeda E, Kobayashi S, Yuasa Y, et al. Double-phase helical CT of small renal parenchymal neoplasms: correlation with pathologic findings and tumor angiogenesis. *Comput Assist Tomogr* 2000;24(6):835–42. doi:[10.1097/00004728-200011000-00002](https://doi.org/10.1097/00004728-200011000-00002).
- [15] Costantini M, Tuderti G, Minisola F, Pompeo V, Sentinelli S, Amoreo CA, et al. Metachronous isolated splenic metastasis in a young patient with renal cell carcinoma: case report and literature review. *Urology* 2019;127:13–18. doi:[10.1016/j.urology.2019.01.007](https://doi.org/10.1016/j.urology.2019.01.007).