Case Report

Metastatic renal cell carcinoma presenting as subcutaneous nodule

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Abstract

Renal cell carcinoma is frequently undiagnosed until it reaches an advanced metastatic stage. Renal cell cancers are also seen as incidental findings on imaging, and rarely can present as physical examination findings. We report a rare case where metastatic renal cell carcinoma presented as a solitary 2 cm subcutaneous chest wall nodule in an otherwise asymptomatic male patient. Initial ultrasound evaluation showed a solid vascular subcutaneous mass, a fine needle aspiration suggested metastatic renal cell cancer, and later, excision biopsy, and CT scan of the abdomen made the final diagnosis of stage IV renal cell carcinoma. The differential diagnosis of a 2 cm nodule can be broad and in appropriate clinical setting should include consideration of malignancy and metastasis.

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Introduction

Renal cell carcinoma (RCC) is the most common form of renal malignancy, accounting for 80%-90% of all malignant kidney tumors. It predominantly affects African American males in their 6th-8th decades of life [1,2]. There is also a 20% increased risk of RCC in smokers with a 20+ pack year tobacco-use history [2]. This cancer is known for being asymptomatic during early stages; however, some presenting symptoms of RCC are hematuria, abdominal pain, and a palpable flank mass [3]. RCC is also diagnosed by manifestations of metastases to distant sites, such as the lungs, liver, lymph nodes, and adrenal glands. A less common site of RCC metastasis is the skin, seen in 1%-3.3% of cases, and is usually a later manifestation of the disease [4,5]. We present a unique case of a 65-year-old African American male who presented with a subcutaneous 2 cm chest wall nodule in an outpatient clinic. Biopsy of the skin nodule revealed that patient has metastatic RCC. In this case report, we discuss the unique clinical presentation, diagnostic findings, and therapeutic management.

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Fig. 1 – Panel A shows patient's photograph with a left chest wall nodule (black arrow). Panel B shows the subcutaneous solid and vascular lesion which was later biopsied and then excised. An axial image from patient's CT scan of the Abdomen, using intravenous contrast, shows a large complex cystic and enhancing mass arising from the superior pole of the right kidney. Histopathology from the excision biopsy (panel D) shows solid sheets of cells with clear to vacuolated cytoplasm and macronucleoli. The delicate microvasculature is typical of clear cell renal cell carcinoma (H&E 20x).

Case report

A 65-year-old African American male with unremarkable past medical history came to the outpatient family medicine clinic for evaluation of a skin nodule in the left chest wall. The palpable nodule initially appeared about 6 months ago and was slowly growing. Patient did not have nodules on other parts of his body. Patient is a smoker and does not drink alcohol. His family history is unremarkable. On examination, a 2 cm x 2 cm subcutaneous nodule was palpated in the left chest wall. The nodule was mobile, non-tender, soft but rubbery on palpation, and non-pulsatile (Fig. 1A). His skin exam was normal on other parts of his body.

Patient had a normal complete blood count and metabolic panel. Clinically, a lipoma was suspected, and ultrasound of the nodule was obtained. This showed a 1.9 cm x 0.8 cm oval solid, well circumscribed, and vascular subcutaneous nodule (Fig. 1B). Later, an FNA was obtained, and the aspirated tissue revealed abundant malignant epithelial cells arranged in loosely cohesive groups and clusters. The cells had abundant multivacuolated cytoplasm with enlarged eccentrically placed nuclei and prominent nucleoli. The cytology features were suggestive of renal cell origin so a confirmatory immunohistochemical panel was performed. The tumor cells were positive for Ca IX, CD10 and RCC, all consistent with renal cell carcinoma. Immunohistochemical markers for melanoma (SOx10), germ cell tumors (PLAP), breast tumors (GCDFP-15, CK7) and vascular tumors (CD31) were all negative. It was decided to proceed with excisional biopsy and CT scan of his abdomen. The excisional biopsy confirmed metastatic renal cell carcinoma (Fig. 1D). The CT scan of abdomen and pelvis showed a complex cystic right renal mass of 7.8 cm x 9.0 cm (Fig. 1C), with enhancing solid peripheral nodularity, and invasion of the adjacent liver. There was evidence of metastatic retroperitoneal paraaortic lymphadenopathy and a right adrenal nodule.

It was concluded that patient had stage IV metastatic renal cell carcinoma and that the renal mass was unresectable. Patient was then referred to the oncologist for chemotherapy. After starting chemotherapy, his skin nodule became smaller, but the renal mass remained unchanged. Unfortunately, patient's disease progressed, and he developed other subcutaneous skin nodules, innumerable mesenteric nodules, peritoneal carcinomatosis, retrocrural and retroperitoneal lymphadenopathy, and lungs metastases. His treatment was
Discussion

The classic clinical triad of renal mass is flank pain, hema-
turia, and a palpable mass. However, the classic triad is very
uncommon, and may not appear until advanced stage [6]. Other
symptoms are weight loss, recurrent fever, hypertension, hy-
percalcemia, and distant metastasis [7]. On average, about 25%
RCC are metastatic, and it typically hematogenously metasta-
sizes to distant sites such as the lungs, lymph nodes, and bone
[8,9]. A very rare metastasis presentation site of RCC is the
skin, making up 1%-3.3% of cases [4,5]. Based on the literature,
the most usual locations of skin metastasis are scalp, and face.
The skin metastatic lesions grow rapidly, and some may be
pulsatile [10]. Skin metastases of RCC are often missed or over-
looked because of the low suspicion. The lesions typically im-
itate other common dermatologic disorders, such as angiomma,
basal cell carcinoma, cutaneous horn, lipoma, xanthoma, se-
baceous epithelomas and adenomas, clear cell hydro adenom-
as and other skin pathologies characterized by the presence
of clear cells [11]. For anatomic location and hematogenous
spread, RCC subcutaneous metastasis to the chest wall is even
more rare.

Renal cell carcinomas are malignant adenocarcinomas
originally derived from the renal tubular epithelium that vary
in appearance from solid homogeneous masses to heteroge-
neous with areas of cystic change, necrosis, and hemorrhage
[12]. Ultrasound can used for initial evaluation as it is cheaper
and does not expose patients to radiation. However, for tumor
staging and surgical planning, a CT scan or MRI of abdomen
and pelvis is required. RCC has a varying appearance on sono-
graph and may appear solid or partially cystic. Although most
RCCs are hypoechoic on US, they can also present as hyper-
or isoechoic. A study showed that contrast-induced ultrasound
has higher diagnostic efficacy than conventional ultrasound
for differentiating RCC and angiolipoma [13]. Immunohisto-
chemistry helps narrow the differential diagnoses of these
skin lesions: EMA, CEA, CD-10, and RCC-MA (positive in 60% of
all RCC skin lesions) are all markers that suggest skin meta-
tases of renal origin [9].

Treatments for RCC vary, based on the staging, and grading
of the disease. In most cases, metastatic RCC therapy includes
surgical (radical nephrectomy) treatment and combinations
of immune checkpoint inhibitors and/or anti-angiogenic ty-
rosine kinase inhibitors (TKIs) [14]. RCC is typically resistant
to radiation and cytotoxic chemotherapy [15]. Metastatic skin
lesions are usually surgically removed in most cases. The first
5 years after radical nephrectomy have the greatest risk of RCC
recurrence, with majority recurring in the first 3 years [16].
Within the first year of remission of RCC, 43% of cases will
recur [16].

In 80%-90% of cases, the skin lesion is not related to
the primary tumor of RCC, and presents as a cancer recur-
rence 6 months to 5 years after nephrectomy [4]. Besides skin
metastasis, renal cell cancer can also be found in calvarial
bone several years after nephrectomy [3]. Since skin metas-
tases are usually considered to be a late manifestation of this
disease, they bear a poor overall prognosis that correlates with
other visceral metastases. Life span after diagnosis of skin
metastases in this type of presentation is 6 months or less
[17]. Since our patient was diagnosed at the beginning with
skin metastasis, they were able to start chemotherapy soon
after. Our patient is still alive since his fist skin metastasis was
diagnosed, about 14 months ago.

Conclusion

The differential diagnosis of a 2 cm subcutaneous nodule is
very broad. If clinical suspicion for a neoplastic process or
metastatic disease is high, it is important to evaluate the skin
lesion further with ultrasound, and ultrasound guided FNA to
confirm the diagnosis. If renal cell skin metastasis is con-
firmed, prompt evaluation is required by multi-disciplinary
specialties, such as urology, interventional radiologist, med-
ical and surgical oncologist, to formulate the treatment plan.

Authorship

The authors declare that this is their original work and they
all approve the content of this manuscript. They confirm that
this manuscript has not been published previously, in any lan-
guage, in whole or in part, and is not currently under consid-
eration elsewhere.

Ethical clearance

This project did not involve any research and no ethical clear-
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Patient consent

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References

[1] Ljungberg B, Campbell SC, Choi HY, Jacqmin D, Lee JE,
Weikert S, et al. The epidemiology of renal cell carcinoma.
Eur Urol 2011;60(4):615–21.
[2] Pascual D, Borque A. Epidemiology of kidney cancer. Adv Urol 2008;2008:782381. doi:10.1155/2008/782381.

[3] Chan DY, Chua WJ. A rare subcutaneous manifestation of metastatic renal cell carcinoma. Case Rep Surg 2016;2016:6453975.

[4] Ferhatoglu MF, Senol K, Filiz AI. Skin metastasis of renal cell carcinoma: a case report. Cureus 2018;10(11):e3614.

[5] Onak Kandemir N, Barut F, Yilmaz K, Tokgoz H, Hosnuter M, Ozdamar SO. Renal cell carcinoma presenting with cutaneous metastasis: a case report. Case Rep Med 2010;2010:913734. doi:10.1155/2010/913734.

[6] Galia M, Albano D, Bruno A, Agrusa A, Romano G, Di Buono G, et al. Imaging features of solid renal masses. Br J Radiol. 2017;90(1077):20170077.

[7] Doshi D, Saab M, Singh N. Atypical presentation of renal cell carcinoma: a case report. J Med Case Rep 2007;1:26.

[8] Porter NA, Anderson HL, Al-Dujaily S. Renal cell carcinoma presenting as a solitary cutaneous facial metastasis: case report and review of the literature. Int Semin Surg Oncol 2006;3:27.

[9] Arrabal-Polo MA, Arias-Santiago SA, Aneiros-Fernandez J, Burkhardt-Perez P, Arrabal-Martin M, Naranjo-Sintes R. Cutaneous metastases in renal cell carcinoma: a case report. Cases J 2009;2:7948.

[10] Barbagelata Lopez A, Ruibal Moldes M, Blanco Diez A, Fernandez Rosado E, Ponce Diaz-Reixa JL, Novas Castro S, et al. Cutaneous metastasis of a renal carcinoma: case report and review. Arch Esp Urol 2005;58(3):247–50.

[11] Perdona S, Autorino R, Gallo L, DES M, Marra L, Claudio L, et al. Renal cell carcinoma with solitary toe metastasis. Int J Urol 2005;12(4):401–4.

[12] Muglia VF, Prando A. Renal cell carcinoma: histological classification and correlation with imaging findings. Radiol Bras 2015;48(3):166–74.

[13] Oh TH, Lee YH, Seo IY. Diagnostic efficacy of contrast-enhanced ultrasound for small renal masses. Korean J Urol 2014;55(9):587–92.

[14] Pilie PG, Jonasch E. Systematic review: perioperative systemic therapy for metastatic renal cell carcinoma. Kidney Cancer 2017;1(1):57–64.

[15] Yang DC, Chen CH. Potential new therapeutic approaches for renal cell carcinoma. Semin Nephrol 2020;40(1):86–97.

[16] Chin AI, Lam JS, Figlin RA, Belldegrun AS. Surveillance strategies for renal cell carcinoma patients following nephrectomy. Rev Urol 2006;8(1):1–7.

[17] Sountoulides P, Metaxa L, Cindolo L. Atypical presentations and rare metastatic sites of renal cell carcinoma: a review of case reports. J Med Case Rep 2011;5:429.