American Journal of Medical Case Reports, 2016, Vol. 4, No. 6, 221-223
Available online at http://pubs.sciepub.com/ajmcr/4/6/10

DOI:10.12691/ajmcr-4-6-10

Rapidly Metastasizing Sarcomatoid Renal Cell Carcinoma in a 76-year Old Male

Nathaniel Moulton, Joe Devasahayam*, Rohini Kannuswamy, Arul Chandran, Hunter Hofmann

Univerity of Missouri, United States
*Corresponding author: jvmd.smc@gmail.com

Abstract Renal Cell Carcinoma (RCC), the most lethal urological cancer has many variants. A relatively uncommon variant, sarcomatoid RCC (sRCC) is one of the most aggressive morphotypes of RCC. The complexity of this tumor is mainly due to the difficulty in its diagnosis as it can present with relatively subtle symptoms and quickly progress to very advanced stage with unusually rapid metastasis and could be fatal. We present a male patient with this rare tumor who initially presented with vague multi-system complaints. The patient rapidly deteriorated and expired following aggressive therapy and was subsequently found to have metastatic sRCC upon autopsy. We review the characteristic features of sRCC and analyze the clinical presentations, histology, prognosis as well as the atypical presentations of sRCC. This case therefore, highlights the difficulty of diagnosis prior to nephrectomy and reinforces the need for a high degree of suspicion for renal malignancies especially in the older patient.

Keywords: *renal cell caner, pyelonephritis, metastasis*

Cite This Article: Nathaniel Moulton, Joe Devasahayam, Rohini Kannuswamy, Arul Chandran, and Hunter Hofmann, "Rapidly Metastasizing Sarcomatoid Renal Cell Carcinoma in a 76-year Old Male." *American Journal of Medical Case Reports*, vol. 4, no. 6 (2016): 221-223. doi: 10.12691/ajmcr-4-6-10.

1. Introduction

Sarcomatoid Renal Cell Carcinoma (sRCC), a lethal and aggressive variant of RCC has complex clinical presentations. It is a very fast growing tumor and can rapidly metastasize and an early suspicion is essential in most cases to make a diagnosis.

Most patients are diagnosed at autopsy, as in our case. The symptoms can usually mimic urinary infections and hence the diagnosis can get delayed. The usual presentation is in the sixth decade and sarcomatoid differentiation can occur in any subtype of RCC with Clear cell carcinoma being the most common RCC associated with sRCC. Though there is no specific immunohistochemical pattern for sRCC, the histological pattern together with other non-specific immunological staining would aid in diagnosis. Also the radiological studies are generally not helpful in distinguishing the sarcomatoid variant. Sarcomatoid RCC has very poor prognosis, especially in the late stages.

2. Case Report

A 76 year old white male presented to his PCP with anorexia, 9 lbs. weight loss, and dull, achy, diffuse abdominal pain for 3 weeks. He also had fatigue, nausea, and a new cough. The patient's medical history included stable right renal cysts, for which he followed with an urologist. He also had abdominal aortic aneurysm with bilateral stent graft repair, hypertension, hyperlipidemia, coronary artery disease, COPD, BPH, and diverticulosis. He was afebrile and his physical exam was unremarkable. An abdominal US showed new right renal caliectasis, a previously described inferior pole renal infarct and previously described, stable renal cysts. A subsequent CT scan revealed heterogenous enhancement and peri-renal fat stranding consistent with right focal pyelonephritis (Figure 1). Due to suggestive radiologic findings and a leukocytosis of 18.5 X 10(9)/L the patient was given Levofloxacin despite a negative urinalysis and culture. The patient did not improve and he was hospitalized on the third day of antibiotic therapy for worsening symptoms. Shortly after hospitalization he developed respiratory distress and a CT chest showed new bilateral lower lobe pulmonary nodules and pleural effusions. Pleural fluid culture was negative and lung biopsies and bronchial washings showed reactive changes but no evidence of malignancy. He was started on broad-spectrum antibiotics, but 2 weeks later, a repeat CT scan showed worsening peri-nephric inflammation, numerous new pulmonary nodules, enlarging pleural effusions and new hepatic hypo-dense masses. He soon developed shock and metabolic acidosis and underwent emergent right renal embolization and nephrectomy. Following surgery on the same night, the patient required multiple blood transfusions and increasing doses of vasopressors. He subsequently developed asystole and resuscitative efforts were unsuccessful. Autopsy findings favored malignant sarcomatoid renal cell carcinoma with metastasis to the adrenal gland, left kidney, liver, bilateral lungs, diaphragm, myocardium, and omentum.

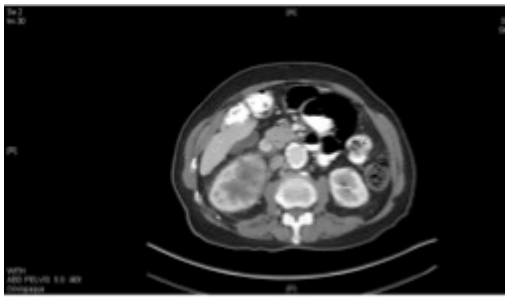

Figure 1. CT abdomen at admission, 26 days prior to death, showing perinephric fat stranding and lymphadenopathy consistent with pyelonephritis

3. Discussion

RCC is one of the most common cancers in both men and women with 61,560 predicted new cases and greater than 14, 000 deaths in 2015. It is the most lethal urologic cancer and usually occurs in the 6th decade [1,2]. About 2-3% of cases are familial through autosomal dominant syndromes, such as Von Hippel-Lindau syndrome [2]. The lifetime risk for developing RCC is 1.6%, and with the advancement in radiological technologies since 1990s the rate of new RCCs has been steadily increasing [1].

Renal cell cancers arise from tubular epithelial cells and 17 morphotypes have been now described. Each tumor type is derived from a different portion of the nephron and possesses distinct genetic, histologic, and clinical characteristics. The most common tumor type is Clear Cell disease, accounting for 70-80% of cases. Other less common types include papillary, chromophobe, collecting duct, unclassified, and medullary morphotypes [3].

Sarcomatoid differentiation is not a distinct subtype, but rather a growth pattern that can occur in any subtype and is reported to occur in 1-8% of cases. Clear cell carcinoma is associated with the majority of SRCC cases [3].

Pleomorphic spindle cells, giant cells, abundant mitoses, and large areas of necrosis suggest sarcomatoid differentiation [4]. These features of sRCC were demonstrated in the autopsy and histological evaluation of this patient. (Figure 4- Figure 6).

Diagnosis is made by tissue biopsy of the primary tumor or identifying sarcomatous differentiation in a metastatic site. The latter technique is associated with low specificity as at least one third of metastatic lesions from sRCC have only pure carcinoma elements. One study showed only 10% of sRCC patients who underwent nephrectomy had histologic demonstration of sarcomatoid features on pre-operative biopsy [4]. This supports the difficulty that was experienced in reaching a diagnosis after multiple attempts at sampling in this case

Immunohistochemical staining on the renal mass in this case was positive for AE1/AE3, which is a marker of epithelial origin, and one not usually seen in normal spindle cells (Figure 7). The mass was also negative for RCC, LCA, S100, P63, and inhibin. While there is no specific immunohistochemical pattern seen in sRCC, this pattern along with histologic findings supported the diagnosis. Both sRCC and classic RCC are positive for Cytokeratin 8, 18, and 19 as well as EMA and AE1/AE3 antibodies [5]. Vimentin-overexpression and the cytokeratin kidney-associated simple epithelial antigen are usually more prevalent in sRCC [5]. Further stains such as vimentin, CK8, 18, and 19 were not performed in this case to identify a specific RCC type as the patient expired the same day as the nephrectomy.

SRCC usually presents with flank pain, palpable mass, and hematuria, however only 10% of patients present with all components of this triad, necessitating clinical suspicion in age-susceptible patients such as ours. Although this patient was followed by a urologist for renal cysts, it is unclear if any of these cysts might have represented early primary RCC. Variations in clinical presentation can occur and case reports including patients presenting with sRCC mimicking severe kidney infections, as in this case, have been described [6].

Radiographic studies have no role in distinguishing sRCC from classic RCC as CT and MRI findings are similar in both variants [3]. Necrosis, lymphadenopathy, renal sinus invasion, and perirenal fat invasion are found in both and have similar radiological features. These features were seen in the CT scans of our patient upon original presentation (Figure 1), and as an example of the lack of specificity, the scan was read as consistent with pyelonephritis.

Metastatic disease in sRCC is seen more commonly at presentation when compared to the classic RCC, where a majority of cases present at a relatively early stage. Metastatic locations are similar in sRCC as in other renal tumors, most commonly occurring in the lung and bone as well as other organs. Case reports including metastasis to the endocardium have also been described [4,5]. Though it is unclear how early in the disease process sRCCs may metastasize, our case suggests that fatal metastasis can develop in as few as 3 weeks, as new lesions in the liver and lung developed in that time period (Figure 2 vs. Figure 3). Another case report also suggests sRCC to be very aggressive as extrarenal invasion occurred in the days between the original CT scan and radical nephrectomy [7].

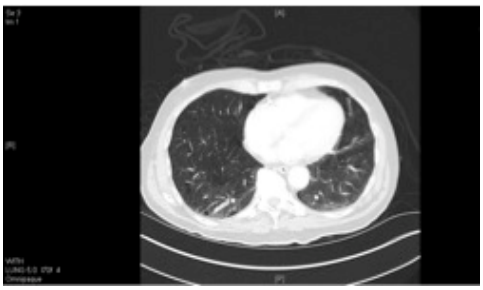

Figure 2. CT chest at the time of diagnosis of pyelonephritis showed no evidence of pulmonary nodules

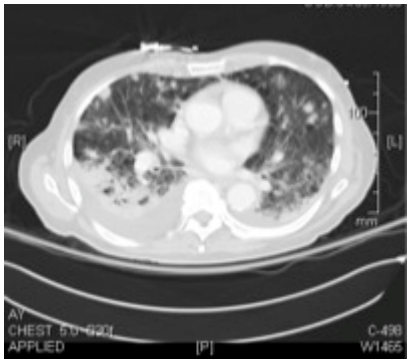

Figure 3. CT Chest 5 days prior to death, showing diffuse metastatic disease and pleural effusions

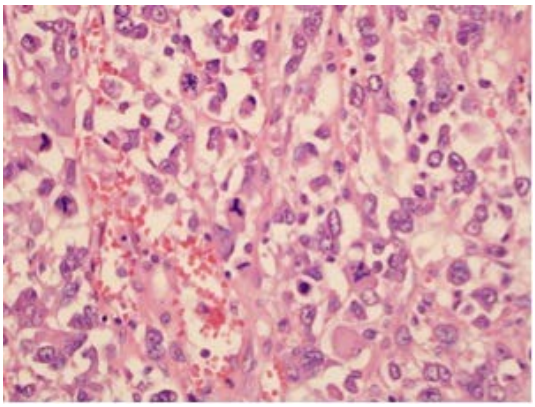

Figure 4. Poorly differentiated high grade tumor with marked nuclear atypia and many atypical mitotic figures arising from the kidney

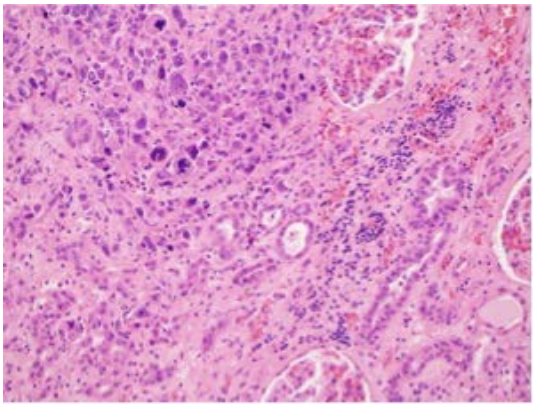

Figure 5. Focal area of the renal mass demonstrating pleomorphic spindle cells and atypical mitoses

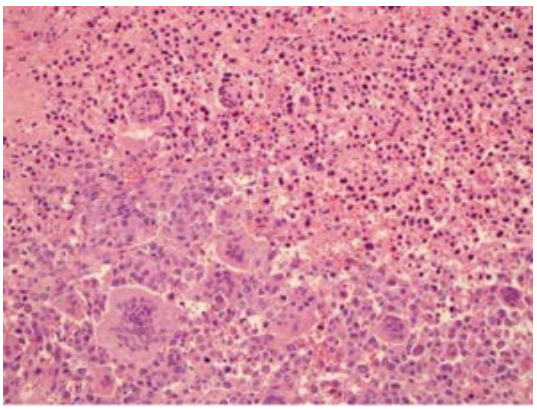

Figure 6. Renal tumor demonstrated marked necrosis and several multi-nucleated giant cells

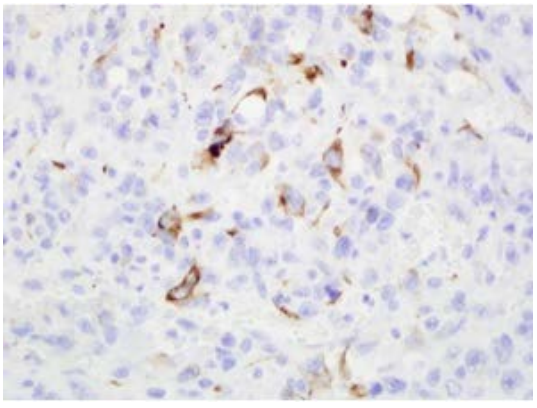

Figure 7. Renal mass cells staining positive for AE1/AE3, suggesting epithelial origin of the tumor

Nephrectomy is the standard of care for patients with localized disease. Radical nephrectomy has historically been performed in patients with advanced disease as well, despite lack of a survival benefit. Most patients with advanced disease are unable to tolerate systemic chemotherapy following nephrectomy, but due to challenges in reaching a pre-operative diagnosis, nephrectomy may be unavoidable in these cases [4,8].

Renal Cell Cancer continues to be unresponsive to systemic therapy, as multiple trials with combination systemic therapies have shown low response rates with little improvement in survival [8].

Sarcomatoid differentiation in RCC has been shown to be more aggressive with very poor prognosis. Median survival in patients with sRCC irrespective of stage is 4-9 months compared with 19 months for classic RCC. Those fortunate enough to have Stage 1 sRCC have a median survival of 50 months compared to just 4-5 months for Stage 3 and 4 disease. Poor prognostic factors include a high proportion of sarcomatous component of the tumor, lymph node involvement, lung involvement, and the involvement of 3 or more organs. Subtype of RCC, pattern of sarcomatoid growth, type of sarcomatoid cell, cellularity, degree of fibrosis, and presence of lymphocytic infiltration do not alter prognosis [4,5].

4. Conclusion

Our case perfectly demonstrates the complexity of diagnosing RCC with sarcomatoid differentiation. The clinical presentation, histology, and radiographic features were all atypical compared to classic renal cell carcinoma. It is also unclear how early metastatic disease develops in these patients. Given this, and the demonstrated poor survival outcomes, physicians must have a high degree of suspicion and low threshold for biopsy and nephrectomy in otherwise healthy elderly patients with unexplained abnormal renal findings.

References

[1] American Cancer Society. Kidney Cancer. http://www.cancer.org/cancer/kidneycancer/detailedguide/kidney-cancer-adult-what-is-kidney-cancer.

[2] Rini, B.I. Renal Cell Carcinoma. Lancet 2009.

[3] de Peralta-Venturina M, Moch H, Amin M, Tamboli P, Hailemariam S, Mihatsch M, et al.: Sarcomatoid differentiation in renal cell carcinoma: a study of 101 cases. Am J SurgPathol. 2001; 25: 275-84.

[4] Shuch B, Bratslavsky G, Linehan WM, Srinivasan R. Sarcomatoid Renal Cell Carcinoma: A comprehensive review of the biology and current treatment strategies. The Oncologist. 2012; 17:46-54.

[5] Chao D, Zisman A, Freedland SJ, Pantuck AJ, Said JW, Belldegrun AS. Sarcomatoid renal cell carcinoma: basic biology, clinical behavior, and response to therapy. Urologic Oncology. 2001; 6: 231-238

[6] Nagy V, Schneider H, Valansky L, Sokol L. Sarcomatous Dedifferentiated Renal Cell Carcinoma mimicking a severe purulent kidney infection. Urologia Internationalis. 2006; 76: 77-81.

[7] Sountoulides P, Giovis G, Metaxa L, Panagopoulos V, Kikidakis D, Filintatzi C, Paschalidis K. Sarcomatoid RCC, a Highly Aggressive Subtype of Renal Cell Carcinoma. Global Journal of Pathology and Microbiology. 2013.

[8] Mian BM, Bhadkamkar N, Slaton JW, Pisters PWT, Daliani D, Swanson DA, Pisters LL. Prognostic factors and survival of patients with sarcomatoid renal cell carcinoma. The Journal of Urology. 2002 Jan; 167: 65-70.