

CASE REPORT



Sarcomatoid renal cell carcinoma with clear cells and eosinophilia: a case report and short review of the literature

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Abstract

Sarcomatoid renal cell carcinoma (SRCC) is an aggressive form of de-differentiated renal cell carcinoma. We report a case of a 79-year-old male who presented himself to the Department of Emergency complaining of macroscopic hematuria for the last two days and a back pain located in the lumbar region persisting for around a month; there were no major changes in the initial laboratory tests. Abdominal ultrasonography identified a renal mass located in the lower pole of the left kidney. The computed tomography (CT) scan with iodine-based contrast revealed the left kidney had a complete deletion of corticomedullary differentiation and a large renal mass located in the lower pole with inhomogeneous iodophilia, which measured around about 15 cm in transversal diameter and 13.6 cm in craniocaudal diameter. Nephrectomy of the left kidney was performed. Histopathological and immunochemistry tests diagnosed a SRCC with clear cells and eosinophilia. We present these findings along with a short review of the literature.

Keywords: renal cell carcinoma, cancer, immunohistochemistry.

Introduction

Kidney cancer is currently the 13th most common cancer worldwide. The incidence of kidney cancer varies across countries. Kidney cancer is most common diagnosed in people over 75 years old with the highest rates of diagnosis between 85 to 89 years old for both males and females [1, 2]. Renal cell carcinoma (RCC), also known as hypernephroma, is currently the most common type of renal tumor found in adults aged between 50 to 70 years old [3]. One of the most aggressive forms is RCC that presents sarcomatoid features (SRCC). SRCC mostly affects patients aged between 54 and 63 years old and the male to female ratio ranges from 1.3:1 to 2:1. The mechanism behind this gender difference currently remains unclear [4]. Histopathologically, SRCC occurs with a loss of characteristic epithelial components and adds new features, such as cellular atypia, increased cellularity, and spindle cells (also called fibroblasts) [5]. These described features were found in 5–8% of the reported cases of clear cell RCC (ccRCC), 2–3% of cases in papillary RCC and 8–9% of cases in chromophobe RCC [6–9]. SRCC carries a poor prognosis,

most studies report a mean overall survival from five to 12 months and up to 75% of the patients with SRCC associate metastatic disease [10].

Aim

The goal of this case report was to illustrate a rare type of renal neoplasia, as well as to underline the importance of early diagnosis in RCCs due to the risks of being highly aggressive. Swift surgical treatment followed by histopathological (HP) examinations of the extracted tumor provides a quick diagnosis, which should lead to a personalized treatment, therefore extending the patients lifespan.

Case presentation

A 79-year-old smoker male patient (around a pack a day for the last 40–45 years), with a medical history of type 2 diabetes, benign prostatic hyperplasia, hypertension, coronary heart disease and hyperuricemia presented himself to the Department of Emergency complaining of macroscopic hematuria for the last two days and a back

pain located in the lumbar region persisting for around a month. The patient further described a reduction in appetite and a 4–5 kg loss in weight over a period of two months. An emergency abdominal ultrasonography (US) and blood tests were promptly ordered. The abdominal US identified a left renal mass located in the lower renal pole of approximately 12×9.6 cm. The complete blood count (CBC) pointed out a mild microcytic anemia with a hemoglobin (Hb) value of 10.3 g% (normal values range between 13.5 to 17.5 g%) a mean corpuscular volume (MCV) of 73.7 fL (80 and 96 fL) and a hematocrit of 32.2% (38.3 to 48.6%), the other parameters were within normal range. Coagulation tests showed a decreased prothrombin time 66.9% (= 100% Quick) and an elevated international normalized ratio (INR) of 1.34 (0.8–1.2). Biochemical tests were normal except for a low serum creatinine value of 0.66 mg/dL (0.84 to 1.21 mg/dL), a high conjugated bilirubin value of 0.41 mg/dL (0–0.3 mg/dL) and an increased glycemia value of 182 mg/dL (70 and 99 mg/dL). An emergency computed tomography (CT) scan of his abdomen and pelvis followed.

The CT scan with iodine-based contrast revealed the left kidney had a complete deletion of corticomedullary differentiation and a large renal mass located in the lower pole with inhomogeneous iodophilia, which measured around about 15 cm in transversal diameter and 13.6 cm in cranio-caudal diameter. The described mass invaded the renal lodge and widely infiltrated the large left psoas muscle.

Cystic formations of 7 mm in diameter were observed in the VIIIth hepatic segment. There was no pathological adenopathy observed in the left lateral aortic, inter-aortic cave or ilio-obturator space. Abdominal or pelvic ascites, secondary lesions in the lumbar spine, pelvic bones or lungs were all absent.

A swift decision was made to carry out a left radical nephrectomy and the operation proceeded. A giant renal mass with a size of about 22/14/15 cm was found in the lower pole of the left kidney.

The solid 22/14/15 cm tumor removed from the lower pole of the left kidney presented a red-yellowish color and multiple hemorrhagic areas. When this tumor was sectioned, it presented cystic degenerations, different grades of hemorrhagic zones, as well as internal necrosis.

This renal mass was further examined by the Department of Histopathology.

HP examination consisted of two parts: Hematoxylin–Eosin (HE) staining and immunohistochemical (IHC) analysis of the tissue. HE staining revealed renal tumor with the appearance of a renal carcinosarcoma, with predominance of areas with high malignancy fibrosarcoma, associated with small outbreaks of ccRCC, *International Society of Urological Pathology* (ISUP) grade 3, with extensive areas of ischemic and suppurative intratumorally necrosis, with interstitial hyalinization and foci of stromal calcifications (Figure 1, A–D), as well as eosinophilia.

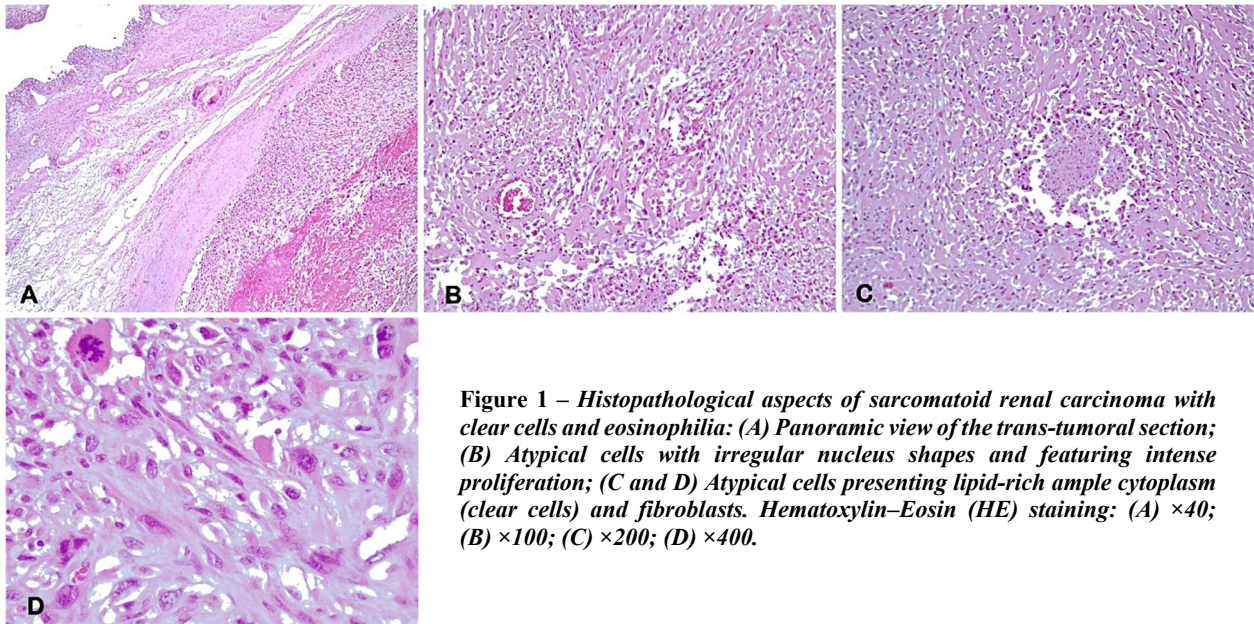


Figure 1 – Histopathological aspects of sarcomatoid renal carcinoma with clear cells and eosinophilia: (A) Panoramic view of the trans-tumoral section; (B) Atypical cells with irregular nucleus shapes and featuring intense proliferation; (C and D) Atypical cells presenting lipid-rich ample cytoplasm (clear cells) and fibroblasts. Hematoxylin–Eosin (HE) staining: (A) ×40; (B) ×100; (C) ×200; (D) ×400.

The tissue from the sectioned tumor was fixed in 10% neutral buffered formalin and embedded in paraffin. IHC analysis was done using the following immunomarkers: cluster of differentiation 68 (CD68), pan-cytokeratin (pan-CK), epithelial membrane antigen (EMA), vimentin, CK8/18, CK34/βE12, S100 protein, CK7, CK20 and human melanoma black 45 (HMB45). All the immunomarkers showed intense immunoreactivity on the internal controls.

IHC staining for CD68, pan-CK, and EMA showed slight immunoreactivity (Figure 2, A–C). Immunoreactivity for vimentin was intense positive (Figure 2D).

Slight immunoreactivity was also seen for CK8/18 (Figure 3A) and no immunoreactivity was seen for CK34/βE12 (Figure 3B), S100 (Figure 3C), CK7 (Figure 3D), CK20 (Figure 3E), and HMB45 (Figure 3F).

Postoperatively, the patient refused the indication to perform chemoradiotherapy and was discharged from the hospital 10 days after the admission without any obvious symptoms. The patient did not appear to the postoperative consultation with a specialist and according to the family, the patient succumbed to the illness eight months after the surgery.

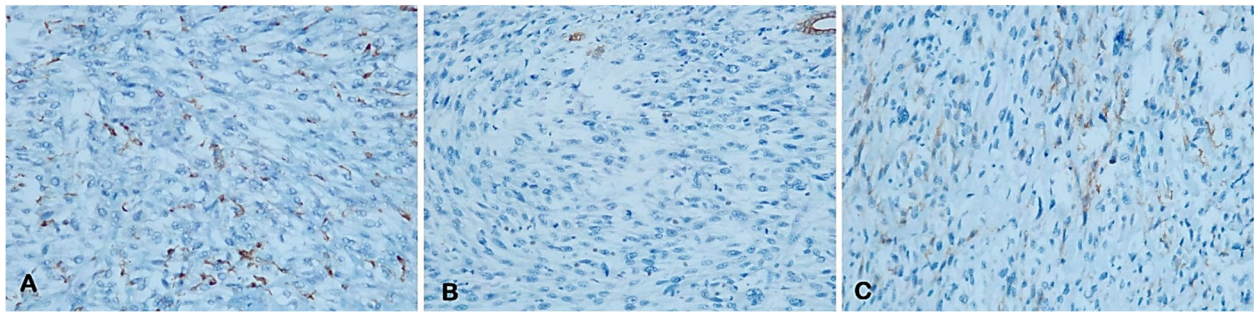


Figure 2 – IHC staining for CD68, pan-CK, EMA, and vimentin ($\times 200$): slight positive IHC staining for CD68 (A), pan-CK (B), and EMA (C); intense positive IHC staining for vimentin (D). CD68: Cluster of differentiation 68; CK: Cytokeratin; EMA: Epithelial membrane antigen; IHC: Immunohistochemical.

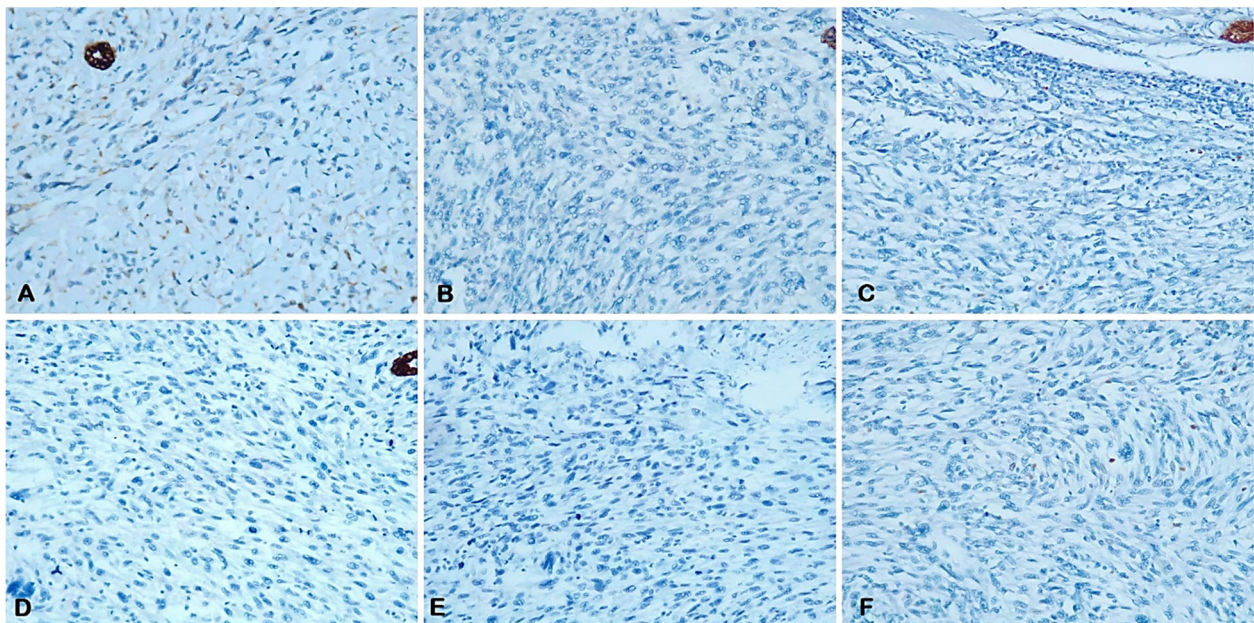
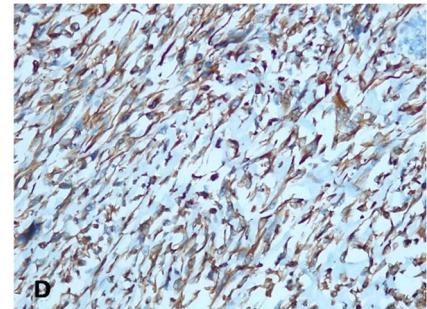


Figure 3 – IHC staining for CK8/18, CK34 β E12, S100, CK7, CK20, and HMB45 ($\times 200$): slight positive IHC staining for CK8/18 (A); negative IHC staining for CK34 β E12 (B), S100 (C), CK7 (D), CK20 (E), and HMB45 (F). CK: Cytokeratin; HMB45: Human melanoma black 45; IHC: Immunohistochemical.

Discussions

The most common type of renal cancer is clear cell carcinoma, followed by papillary and chromophobe carcinoma [11]. Tobacco smoking appears to be one of the main risk factors for this type of cancer, its effects on the tumor pathobiology currently being unknown [12].

Sarcomatoid variant of ccRCC represents a spindle cell phenotype that can occur in any subtype of cancer (clear cell, chromophobe or unclassified) [13]. Several studies on SRCC point towards a reserved prognosis [13–15]. Recent reports consider less than 20 patients and follow different courses of treatment leading to different outcomes with the reported median survival rate after diagnosis being between nine and 19 months [8, 16]. Response rates to both cytokines and chemotherapy are low. To optimize survival rate of these patients, individual

treatments that consider the factors that impact the biological behavior of SRCC and are essential to disrupt the course of the disease [16]. Chemotherapy and cytokines induce adverse effects in majority of patients; therefore, strict selection criteria should be used to determine if patients will benefit from the treatments [17].

This cancer originates from the renal cortex, in the epithelium of the proximal tubes, presenting an expansive growth model invading the surrounding tissue. Macroscopically, it presents as a yellowish, solid lesion with variable degrees of internal cystic degeneration, necrosis, and hemorrhagic areas. These findings are associated with a high-rate malignancy [18].

Histopathologically, lesions such as necrosis, hemorrhagic areas, and cystic degenerations present malignant clear cells due to their lipid and glycogen-rich cytoplasm content [19].

CD68 is a surface marker that plays a role in phagocytic activities of tissue macrophage [20–22]. This marker binds to tissue and organ-specific lectins or selectins, allowing homing of macrophage subsets to particular sites. In RCC, it may be used as a prognostic immunomarker that points towards an unfavorable prognosis. Anti-CD68 antibodies were useful in the characterization of several neoplasms, such as renal cell adenocarcinoma [23].

SRCC, considering its epithelial derivation, presents immunoreactivity for epithelial markers, such as EMA and vimentin. EMA appears to be positive in around 50–55% of the cases and vimentin in 56–100% [24, 25]. SRCC tend to show stronger immunoreactivity in a higher proportion for vimentin and a reduced positivity for EMA when compared to conventional RCCs [24]. SRCC is negative for CK7 [26]. In a recent study conducted by Yu *et al.*, where they determined 19 IHC markers in 42 cases, all the cases showed immunopositivity for vimentin and 80% of the cases were positive to at least one epithelial marker, such as pan-CK, EMA, CK7 and CK18 [27]. CK34βE12 is a high molecular weight keratin, which is relatively specific for prostate basal cells [28]. It is usually negative for ccRCC [29]. ccRCC usually shows typically a restricted immunoreexpression pattern of CK8/18 [30]. S100 protein was shown to have an extensive distribution in different human tissues, including renal tubules but the potential utility of S100 protein in RCCs was not extensively investigated [31].

☒ Conclusions

SRCC remains to this day a challenge both to diagnose and especially to treat. Considering the rarity of this cancer, many details such as careful history taking or different IHC markers may provide additional clues that lead to a better understanding of this disease. More case studies and pathological studies are needed to further understand the physiological mechanisms and the risk factors for SRCC. Proper imaging and HP tests play a crucial role in ruling out metastases of this disease. Currently, no standard guideline for the treatment exists. Radical nephrectomy with lymph node dissection appears to remain the standard treatment, even in metastatic SRCC.

Conflict of interests

The authors report that they have no conflict of interests. The authors alone are responsible for the content and writing of the paper.

Ethics Statement

The Ethics Committee of Vasile Goldiș Western University of Arad, Romania, approved this paper (No. 91 from 19.07.2019) and written consent was obtained from the patient after carefully explaining the implications of this manuscript.

Authors' contribution

Alexandru Neşiu and Carmen Neamțu equally contributed to this article.

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