CASE REPORT

Unusual renal carcinoma with a double component: case report and review of the literature

ALINA ŞOVREA1), RENATA VASIU2), M. RAICA3), ANNE-MARIE CHINDRIŞ1)

1) Department of Histology
2) Department of Pathology
"Iuliu Hatieganu" University of Medicine and Pharmacy, Cluj-Napoca
3) Department of Histology and Cytology, "Victor Babes" University of Medicine and Pharmacy, Timisoara

Abstract
The authors report a rare case of a 60-year-old man who had in his left kidney a tumor with two distinct components: a tubulo-papillary pattern and an extensive high-grade squamous cell carcinoma. The literature concerning this subject will be also reviewed.

Keywords: kidney, collecting duct carcinoma, squamous cell carcinoma, concomitant.

Introduction
Collecting duct carcinoma (CDC), also known as Bellini duct carcinoma, is a rare tumor. Some authors report a frequency of 2% of the total of renal carcinomas [1], others say that the frequency is lower, approximating for 1% [2]. It is a very aggressive tumor, with the origin in the distal portion of the nephron, precisely in the Bellini’s duct epithelium.

Clinically, the CDC presents the same symptoms as the other forms of renal carcinomas: renal tumor mass, haematuria, local pain. An attempting clinical examination corroborated with radiological and histopathological examination can establish the correct diagnosis, especially because the CDC is localized at the limit of medulla–renal pelvis.

Macroscopically, the tumor color is gray-white, without necrosis or hemorrhage [3], and microscopically there is a tubulo-papillary architecture with desmoplasia; the ductal cells are atypical; another characteristic of the CDC is the intraductal spreading of the tumor, a threat that is not seen in other renal tumors [3].

Patient and Methods
M.T., a 60-year-old male patient, came to the Urology Department of Municipal Hospital Cluj-Napoca with symptoms of hematuria, intestinal transit disturbances, and signs of malignant impregnation. The objective physical examination of the patient revealed a tumor mass on the left side of the upper abdomen with visceral adherences and splenomegaly. A left nephrectomy with adrenalectomy, with partial colectomy and splenectomy was performed.

The surgical specimens were sent to the Pathological Department for diagnosis.

Pathology
Macroscopically, there were many specimens: (1) the nephrectomy specimen of 13×7.8×7.8 cm, without ureter or lymph nodes; the lower pole was adherent to a part of the colon (2) with a length of 13 cm; (3) a splenomegaly of 620 g; (4) a fragment of adipose tissue with some nodular lesions inside.

The kidney was opened on his convexity and presented a central nodular tumor of 8×7.3 cm on the surface, invasive on cut section; the tumor was white with yellow-tan and hemorrhagic cystic areas; the renal capsule was intact, the decollation was easily performed.

The colon specimen was intact on its whole length. The spleen was exclusively full of stases, without any other modification.

The last specimen, the adipose tissue with nodules measured 10×6×3 cm; inside the adipose tissue there was a voluminous adrenal gland (5×4×1.7 cm), with a diffuse yellow and red color.

The microscopic examination of the kidney tumor revealed a tubulopapillary pattern with a marked desmoplastic reaction (Figure 1); at a high power, the tumor cells of the ducts were pleomorphic with a high-grade ratio for the nucleus (Figure 2), and many areas of perineural invasion (Figure 3) with no vascular invasion; the capsule and the extern adipose tissue surrounding the kidney were tumor free.

The tumor also contained another component, represented by an extensive high-grade squamous cell carcinoma. This component was represented by nests of tumor cells with a polygonal pattern and a generally
round nucleus. The origin of this component is the metaplastic urothelial epithelium of the collecting ducts (Figure 4).

The nuclei were very pleomorphic, hyperchromatic, with bizarre forms (Figure 5), and with abnormal mitoses (Figure 6).

The adherent part of the tissue between the kidney and the colon was tumor free.

The spleen was fully congested and the adrenal gland presented a diffuse hyperplasia.

All these microscopical data established the final diagnosis of collecting ductal carcinoma with an extensive metaplastic component of squamous cell carcinoma.

The differential diagnosis of the main component (CDC): (1) renal medullary carcinoma is a very rare and
highly aggressive type (even more aggressive than CDC); it occurs in young Afro-Americans and is associated with a sickle anemia [3]; (2) low-grade collecting duct carcinoma, described in 1979 by Cronie et al., with a low nuclear grade, a tubular or tubulopapillary pattern, a marked desmoplastic stroma and a better prognostic [3].

Discussion

The CDC of the kidney was described for the first time in 1986 by Fleming and Lewi as a distinct entity and some specific characteristics: the onset is localized in the medulla with a secondary extension in the cortex, with a tubulo-papillary and solid pattern, and marked stromal desmoplasia [4].

The CDC is a rare type of renal carcinoma with an aggressive behavior clinically manifested by hematuria, and abdominal mass, usually without other symptoms. Its frequency among malignant renal tumors was established at 0.4 and 2.6% [1].

There are some useful examinations that can help the diagnosis, such as: immunohistochemistry, electron microscopy and chromosomal analysis. The phenotypic markers for the CDC are those of normal collecting ducts as high molecular cytokeratin (CK), Ulex europaeus-1 lectin (UEA-1) and peanut agglutinin (PNA). Ultrastructural examination shows basal laminae, intra- and extracellular lumina and tight junctions. Chromosomal analysis reveals peculiar heterogeneous chromosomal alternations as LOH (loss heterozygosity) of chromosomes 1, 6, 14, 15, and 22.

The prognosis of the metastatic CDC is very severe (one survival year) [2, 5].

Being a rare entity, little is known about the treatment of the CDC, but some studies indicate that surgery of the tumor itself (without lymph node or distant metastasis) can even cure the patient. Therapy or chemotherapy is applied (after the surgical intervention) and seems to have a better evolution if patients are treated with the schema of chemotherapy for urothelial carcinoma. It is known that metastatic CDC has a very bad outcome. The conclusion is that CDC has usually a minor response to the conventional therapies in the published literature because most collecting duct carcinomas are already metastatic at the presentation.

Clinical manifestations of the CDC are hematuria, abdominal mass and often keep lymphogenous way (para-aortical or para-caval lymph nodes), or hematogenous way metastasis (liver, lung, bones). Usually, the first clinical sign is a bone metastasis or weight loss [2, 6, 7].

Kafé H et al. [5] compared immunohistochemically 14 CDC cases with six cases of renal pelvis carcinoma extended into the medulla using UEA, PNA and AQP-3 (a membrane component of the normal collecting duct and urothelial cells). Out of 14 cases, 10 demonstrated an urothelial phenotype characterized by AQP-3+; Vim- and UEA+ and had a tubular and trabecular structure; the other four cases had an inverse phenotype as QP-3-, Vim+ UEA-.

A new hypothesis resulted from these observations: CDC with a tubular and trabecular pattern AQP-3+ Vim- belonged to the urological pathology; the papillary pattern AQP-3-, Vim+ belonged to another entity; in the mean time, AQP-3 is an useful marker in the classification of the CDC [8–10].

In the last years, two new variants of very rare CDC were described: (a) low grade CDC (Fuhrman grade 1 or 2) centrally localized, solid, composed of well-differentiated tubules lined by clear cells of low nuclear grade devoid of papillary component – the tumor cells contained hemosiderin, and between tumor cells, there is some inter cellular mucine, which is Alcian blue positive, and mucicarmine negative; there is also a very well delimitation between the tumor and the renal parenchyma with bundles of smooth muscle [2, 7]; (b) renal medullary carcinoma – a very rare subtype with the worse outcome – seen in Afro-Americans with sickle anemia [6].

Diagnosis of low-grade CDC might be well considered when the pathologist is confronted with an apparent conventional clear cell carcinoma that presents atypical features (i.e. non-cortical location, aberrant gross characteristics) [1, 6].

In our case, the collecting duct carcinoma was the major component, made by the classical gross and microscopic pattern: the tumor was centrally localized with a grey-white; there is a peculiar association between a CDC pattern and a clear squamous cell carcinoma; to our knowledge, this association within the same tumor seems to be unique.

Conclusions

The association of a classic CDC pattern (centrally localized and devoid of metastases) with a squamous cell carcinoma component is a new variant of CDC.

References

Alina Şovrea et al.


Corresponding author
Alina Şovrea, Associate Professor, MD, PhD, Department of Histology, “Iuliu Hatieganu” University of Medicine and Pharmacy, 6 Pasteur Street, 400349 Cluj-Napoca, Romania; Phone 0744–786 688, e-mail: a_sovrea@yahoo.com

Received: June 4th, 2008

Accepted: February 10th, 2009