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Mucinous tubular and spindle cell carcinoma of the kidney: case report with literature review

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Abstract

Mucinous tubular and spindle cell carcinoma (MTSCC) of the kidney is a rare renal cancer type, recently recognized by the World Health Organization (WHO) in 2004, with indolent behavior. We present a case of a 50-year-old female that revealed a renal mass on an abdominal echography, incidentally discovered during a hepatic hemangioma follow-up, which was removed by partial nephrectomy. Pathological evaluation showed a tumor composed by tubules mixed with spindle cells in a background of mucin (highlighted by periodic acid-Schiff and Alcian blue). The tumor was positive for vimentin, CK7 and AMACR and negative for CD10, providing the final diagnosis of MTSCC. MSTCC is a special renal cancer type, with low degree of malignancy. Surgical resection is the treatment of choice. It's important to be aware of this entity in order to differentiate MTSCC with renal cancers of higher degree of malignancy like papillary renal cell carcinoma.

Keywords: Spindle cell carcinoma; kidney cancer; papillary renal cell carcinoma; incidence; immunohistochemistry

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Introduction

Kidney cancer is the 13th most common cancer in the world and the 7th in Europe, where it had an incidence of more than 115,000 in 2012 [1]. It is a cancer with several morphological subtypes and molecular variants, including a mucinous tubular and spindle cell carcinoma (MTSCC) type [2].

MTSCC is a rare variant of renal cancer, first described in 1997 by MacLennan et al., under the designation of low grade collecting duct carcinoma [3]. Later it was included in the category of unclassified renal cell carcinoma (RCC) [4], and finally, in 2004, it was incorporated by the World Health Organization (WHO) classification of renal tumors as a new and distinct entity: a variant of RCC [5].

Only few reports of MTSCC can be found in the medical literature, and because of their spindle cell component. Many of them were misdiagnosed in the past as sarcomatoid papillary renal cell carcinoma [6].

MTSCC is a low grade carcinoma, with good prognostic [7]. Regarding its origin, which has been subject of intense debate, some pathologists believe that it is originated from the epithelial cells of the loop of Henle, while others propose the cells of the collecting ducts as its start point [8].

Grossly MTSCC is usually a well circumscribed mass, with a homogeneous gray-tan cut surface [2].

Histologically MTSCC has a wide spectrum, but the classic form is characterized by a mixture of low grade tubular cuboidal cells with spindle cells on a mucinous background. Some variants such as presence of focal papillae or mucin poor are reported [9].

Partial nephrectomy, when technically feasible, is the treatment of choice, with good results [2].

In this report we describe a case of a MTSCC diagnosed at our institution and its histopathological characteristics.

Case Report

Clinical data

An asymptomatic 50-year-old female with a medical history of hepatic hemangioma performs an abdominal ecography that detects a nodular, regular and well defined lesion with heterogeneous texture. To better characterization of the lesion, imaging examination by computed tomography (CT) (Fig.1) was made and revealed an exophytic well defined solid mass of regular contours with 35mm on the lower pole of the left kidney. The lesion had clear enhancement during arterial phase in a heterogeneous manner, suggesting a primitive tumor lesion. Its surgical complexity, evaluated by the RENAL Score, was low (Score 4X). No metastases were identified.

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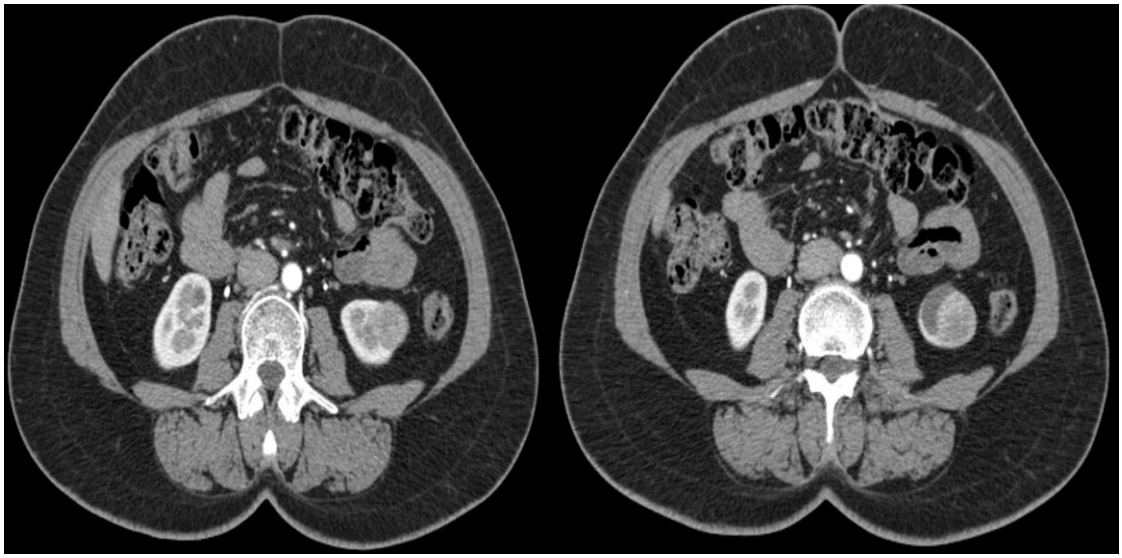

Fig.1 *Computed tomography (CT) showing an exophytic, well defined solid mass of regular contours on the lower pole of the left kidney, with arterial phase enhancement.*

Treatment

The patient underwent a laparoscopic partial nephrectomy. The surgery was performed without complications. It was necessary to perform arterial selective clamping for 22 minutes. The post-operative course displayed was without complications, and the patient was discharged at the 4th day after the surgery.

Macroscopy

On gross examination we analyzed a partial nephrectomy with 27g and 3.5x3x2.5cm with a brownish capsular surface. Cut section showed a tumor lesion with 3cm maximum length diameter and 0.6cm minimum length between the surgical resection margins. The tumor was well defined and composed of yellowish tissue.

Microscopy

Examination was performed on Haematoxylin and Eosin stained slides, which were viewed using a light microscope – Nikon Eclipse 50i. Digital images were acquired by a Nikon-Digital Sight DS-Fi1 camera.

The lesion corresponded to an expansive malignant epithelial tumor, morphologically composed of tubules, partly elongated and compressed, intermingled with spindle cells, sometimes in a background of extracellular mucin. The tubules were formed by polygonal cells with well-defined boundaries. Cells displayed with an eosinophilic cytoplasm; nuclei with open chromatin, and occasionally with prominent nucleoli (Fuhrman Grade 2). The spindle cells had elongated nucleus. Herein, no atypia or

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mitotic activity were noted. Necrosis or capsular invasion were not reported either (Fig. 2A – 2D).

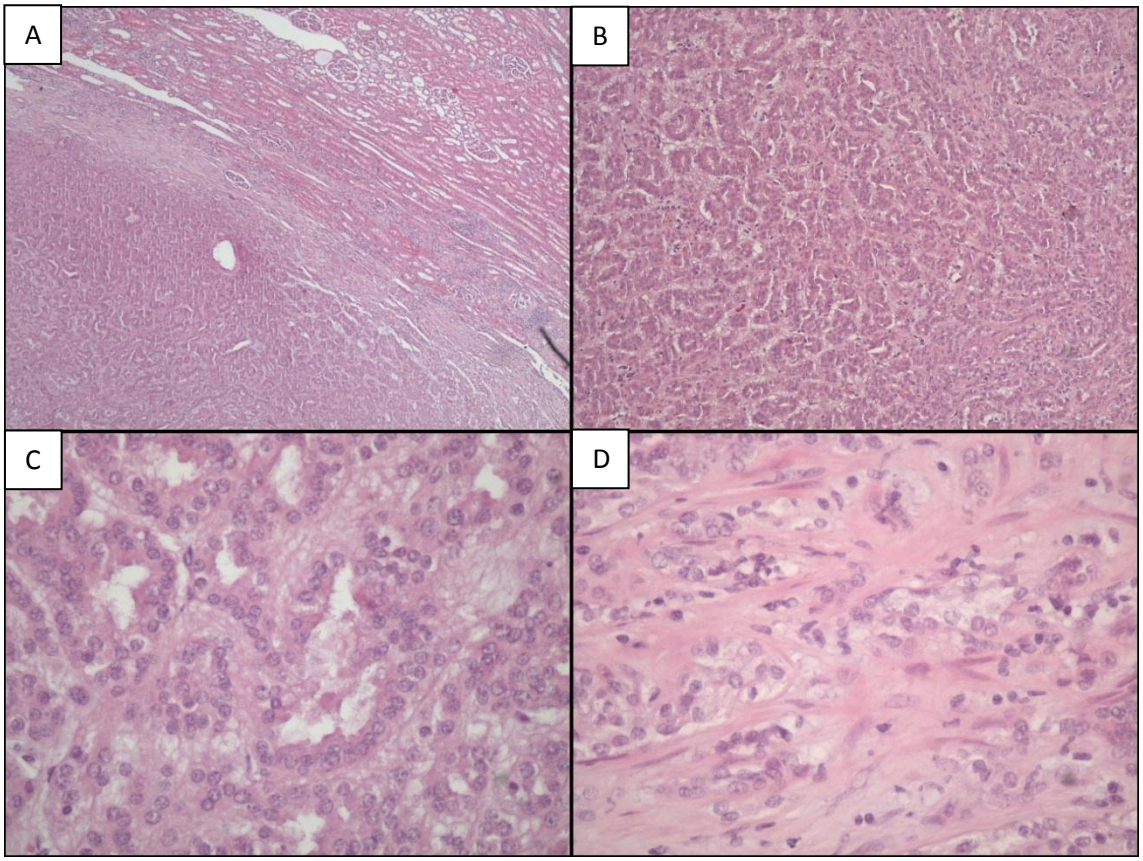

Fig.2. *Mucinous tubular and spindle cell carcinoma (MTSCC) morphologic aspects.* ***A*** *– expansive behavior, compressing the tumor free renal tissue, H&E stain 40x;* ***B*** *– Note the formation of partly compressed tubular structures, H&E stain 100x;* ***C*** *– The tubules are composed of cells displaying with well-defined boundaries, eosinophilic cytoplasm, and nuclei displaying with open chromatin and visible nucleoli, H&E stain 400x;* ***D*** *– Between the tubules a population of spindle cell, with elongated nuclei was noted. No atypia, necrosis or mitotic activity; thus simulating a smooth muscle cell neoplasm, H&E stain, 200x*

Supplementary Techniques/Immunohistochemistry

The characteristics of the used probes are summarized in table 1. Studies were performed on one representative block of the lesion, resorting to the avidin-biotin-peroxidase complex detection system and performed on a Ventana Marker Platform Bench Mark ULTRA IHC/ISH.

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TABLE 1 – Characteristics of the antigens used on immunohistochemistry

Antigen	Clone	Dilution	Antigen Retrival	Source	Detection System
Vimentin	V9	1:200	Ultra CC1	Ventana	ultraView DAB Ventana
CK7	OV-TL 12/30	1:100	Ultra CC1	Dako	ultraView DAB Ventana
AMACR	SPM314	1:100	Ultra CC1	Dako	ultraView DAB Ventana
CD10	SP67	Ready to use	Ultra CC1	Ventana	ultraView DAB Ventana

Alcian blue and periodic acid-Schiff – PAS (with and without diastase clearing) stains confirmed and highlighted the presence of extracellular mucus (Fig. 3A – 3D).

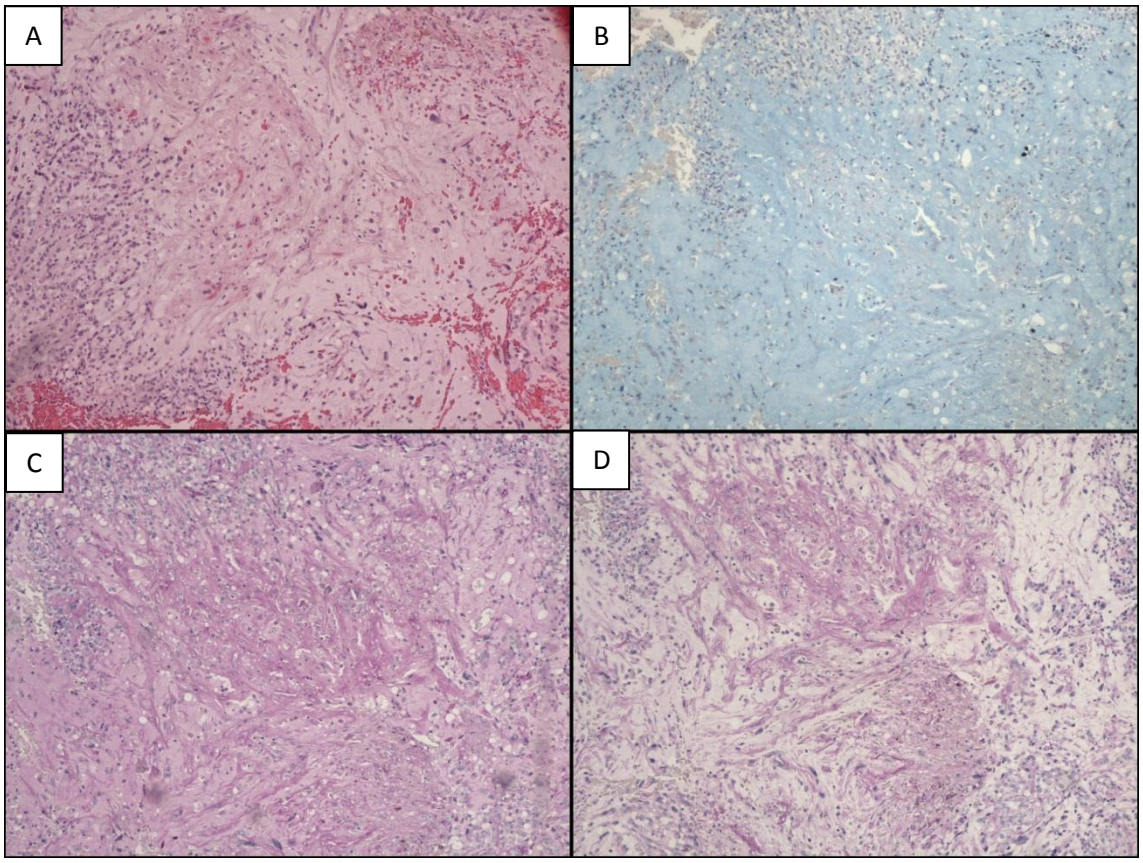

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Fig.3. *Presence of extracellular mucin. The tumor had areas with evidence of mucin (A), which stained with Alcian Blue (B), with PAS (C) e PAS-D (D). All images were acquired at a 100x magnification.*

Immunohistochemically showed the tumor strong and diffuse positivity for vimentin (cytoplasm), CK7 (membrane and cytoplasm) and racemase (cytoplasm). CD10 stain was negative (Fig. 4A – 4D).

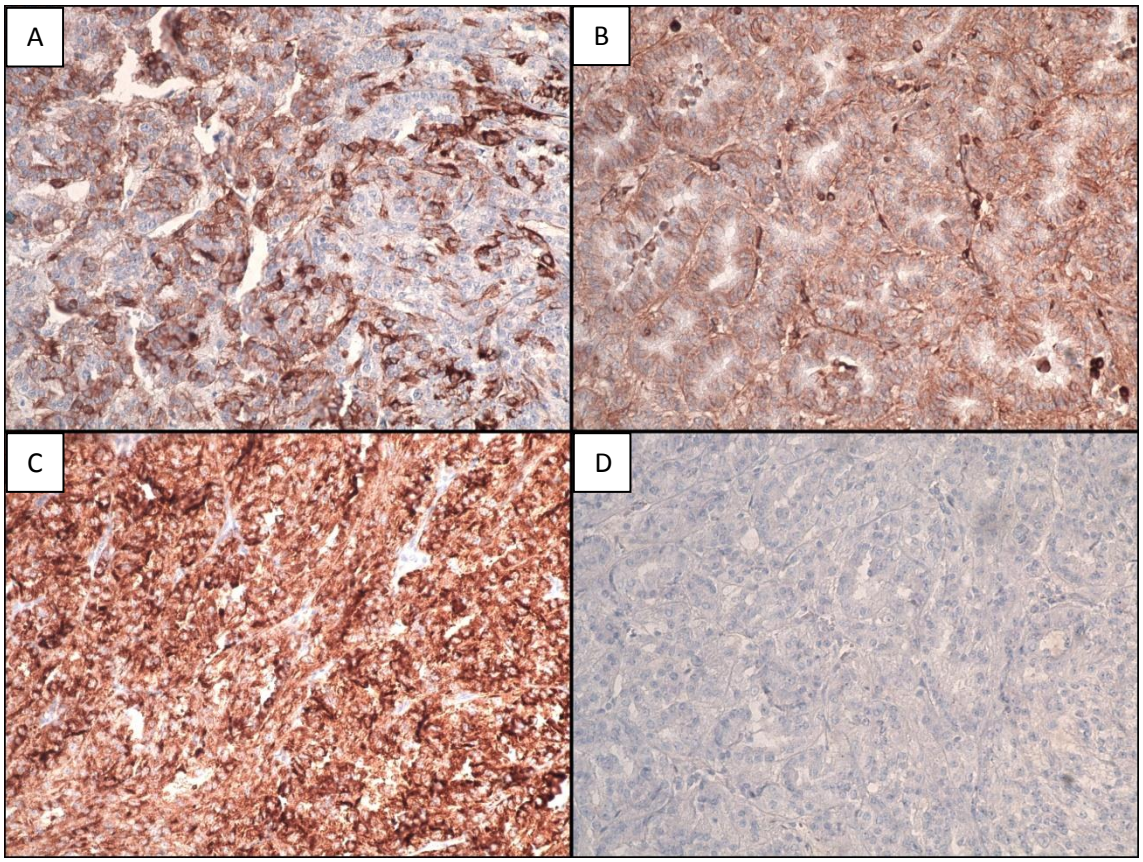

Fig.4. *Immunostain profiles of MTSCC. A – Strong and diffuse membrane and cytoplasm expression of CK7; B – strong and diffuse cytoplasm expression of vimentin; C – strong and diffuse cytoplasm expression of AMACR; D – negative staining for CD10. All images were acquired at a 200x magnification.*

Post operative Staging

The tumor was staged as pT1aNxMx (7th edition); AJCC/UCII – Stage 1 (N0); Fuhrman Grade 2; ISUP grade 2.

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Discussion

MTSCC is a rare and recently described renal tumor, with low grade malignancy. It occurs predominantly in females, with a female/male ratio of 4:1 and at an age range from 17 to 82 years old (mean age – 53) [2, 7]. Most of the time it is accidentally detected by live imaging studies or due to non - seismic shifts such as flank pain, anemia [2, 5, 7], occult blood loss in urine [10], during pregnancy/puerperium [11] or during routine liver examinations as in this case. Some authors have evoked an association with nephrolithiasis [12].

Microscopically, the classic tumor entity is composed of elongated tubules formed by cuboid cells which display with low grade cellular characteristics. They are separated by various amounts of mucinous stroma. Quite often, arrays of parallel tubules express spindle cell configuration, mimicking a mesenchymal tumor. Solid areas, necrosis, foam cells and inflammation might also be present. Variations such as mucin poor, papillary changes, ectopic bone formation, neuroendocrine differentiation, and sarcomatoid changes have also been reported. In such cases, the diagnosis can be challenging. Immunohistochemistry and additional techniques such as cytogenetics are essential [5, 9, 13].

The major differential diagnosis of MTSCC, specially of non-classic entities, include other renal tumors with dominant characteristic growth patterns, namely papillary RCC – second most common RCC type. Clear cell papillary RCC and Xp11.2 translocation carcinoma are also entities that have to be considered [13 – 16].

Immunohistochemically, MTSCC demonstrate a complex staining pattern, with positive expression of vimentin, epithelial markers (CK7, AE1/AE3, EMA) and distal convoluted tubule markers (E-cadherin) [2, 5, 13]. At cytogenetic level, monosomies on chromosomes 1, 4, 6, 8 and 13 and trisomies on 7, 11 16 and 17 are genetic abnormalities found on tumor cells [9], lacking the typical gains of chromosome 7 and 17, and detectable losses of the Y gene in papillary RCC [17]. Recent studies did not find mutations of VHL and 3p loss. They described abnormalities of chromosomes 15 and 22. These studies suggested MTSCC, even in case of high grade tumors [18].

Surgical resection is recommended for treatment. A post operative course without complications can be expected [2, 5].

It is important for urologists to become familiar with the MTSCC entity, and to be aware of its non-classic variants. The entity should be included in differential diagnoses of morphologically similar kidney cancer, even of higher malignancy cases such as papillary renal cell carcinoma. In typical cases the combination of morphologic and immunohistochemistry findings should permit a correct diagnosis, atypical presentations might require cytogenetic analysis.

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