RELATO DE CASO

DOI: 10.55825.RECET.SBU.0266

MUCINOUS, TUBULAR AND SPINDLE CELL CARCINOMA OF THE KIDNEY: A CASE REPORT AND LITERATURE REVIEW

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ABSTRACT

INTRODUCTION: Mucinous, tubular and spindle cell renal carcinoma is an epithelial neoplasm which makes up less than 1% of all renal neoplasms. It is most common in the renal cortex and is characterized by tubules which merge with soft spindle cells in a myxoid stroma. Usually, it is an asymptomatic tumor diagnosed incidentally in imaging exams. **CASE DESCRIPTION:** A 67-year-old male patient was attended at a university hospital with diffuse abdominal pain. A computed tomography scan showed a renal mass of approximately 9 cm in its largest dimension. He underwent a nephrectomy, and the histopathological analysis was compatible with mucinous, tubular and spindle cell renal carcinoma. **CONCLUSION:** Mucinous tubular and spindle cell carcinoma is a rare neoplasm, with nonspecific findings and, therefore, of a difficult diagnosis. The absence of a spindle component and genetic analysis may help in differential diagnosis, essential to determining the correct prognosis and patient follow-up.

Palavras-chave: Kidney Neoplasms, Renal Cell Carcinoma, Urologic Neoplasms

INTRODUCTION

Mucinous tubular and spindle cell carcinoma (MTSCC) is an uncommon type of kidney tumor characterized by three main components: spindle cells, tubular structures, and extracellular mucoid material (1). There are approximately 200 cases reported in medical literature (2), accounting for less than 1% of all renal tumors. It is most common in adults with an average age of 58 years, and more prevalent in females, with a female-to-male ratio of 3:1. Most cases are incidentally diagnosed during imaging for unrelated conditions, but few patients experience symptoms like hematuria, flank pain, and palpable abdominal mass (3).

Due to its unusual epidemiology and distinct histopathological type, our objective is to report a case of mucinous tubular and spindle cell carcinoma of the kidney in an older, symptomatic male patient requested for right radical nephrectomy.

PATIENT INFORMATION

A 67-year-old male patient was attended to at the emergency department of a University Hospital in February 2022 with complaints of anuria and diffuse abdominal pain. He also reported progressive symptoms of polyuria, nocturia, hesitancy, and dysuria, accompanied by right flank pain that began two months ago. The patient has a medical history of systemic hypertension, type 2 diabetes mellitus, and benign prostatic hyperplasia, and he is currently on continuous medication. He stated that he never smoked and denied alcohol consumption.

CLINICAL FINDINGS

Upon physical examination, he presented in good overall condition, with no visceromegaly or palpable masses.

TIMELINE

(Table 1)

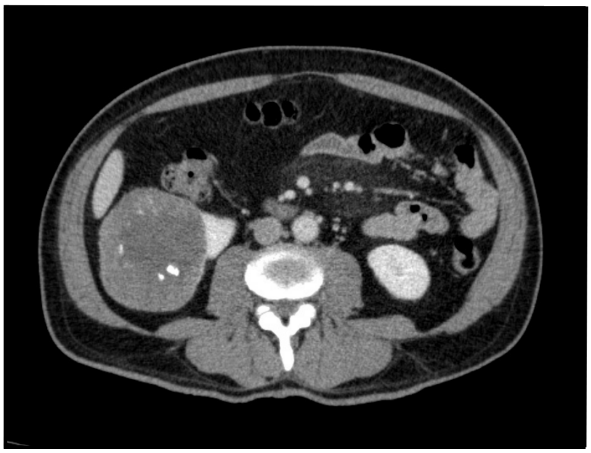
DIAGNOSTIC ASSESMENT

Laboratory and imaging tests were ordered for a more comprehensive evaluation and to rule out a possible urinary tract infection. A pelvic ultrasound was requested, which estimated a prostate of 23 grams with no significant findings. Subsequently, a total abdominal and pelvic computed tomography (CT-scan) revealed a hypodense, contrast--hypocaptating, expansive lesion in the lower third of the right kidney (Figure 1), measuring approximately 9 cm in its largest dimension in the coronal plane and featuring a calcification focus. This lesion was classified as Bosniak IV, with a RENAL Nephrometry score of 9x (3 + 1 + 3 + x + 2).

Table 1: Timeline

February, 2022	Patient attended at the Emergency Department
March, 2022	Right laparoscopic nephrectomy
September, 2022	First follow-up CT-scan and Anatomopathology Results
March, 2023	Second follow-up CT-scan
September, 2023	Loss of follow-up

FIGURE 1: Contrasted CT-scan. Hypodense and hypocaptating expansive lesion in the lower third of the right kidney, measuring 96 mm in its largest dimension, with focal areas of calcification inside. Source: The authors (2023).



THERAPEUTIC INTERVENTION

The case was discussed in a multidisciplinary team. Due to tumor size and radiological characteristics, surgical approach with a partial nephrectomy was discarded. A right laparoscopic radical nephrectomy was the surgery of choice, driven also by the fact that the patient's left kidney was healthy. The surgery was carried out uneventfully, and the patient was discharged on the first postoperative day. The specimen was then sent to the Pathology Department for further examination.

The Pathology Department observed that macroscopically the right kidney measured 18.1 cm in length. Upon sectioning, a solid-cystic tumor with dimensions of 9.6 x 8.8 x 8.0 cm was identified. The tumor had a pearly appearance and exhibited varying consistency, ranging from friable to elastic. It was located in the lower pole and centered at the corticomedullary interface, with no reported invasions. At the center of the lesion, there were areas of necrosis, which accounted for approximately 60% of the tumor's area. Microscopically, the examination revealed a low-grade, polymorphic renal epithelial neoplasm characterized by tubular formations merging with spindle cells in a myxoid stroma (Figure 2). There were variable components of tubular architecture, basophilic extracellular mucinous material, and spindle areas. The stroma exhibited myxoid features with abundant extracellular mucin and the potential presence of focal clusters of foamy macrophages (Figure 3). Therefore, the morphological presentation is consistent with a Mucinous Tubular and Spindle Cell Carcinoma.

FIGURE 2: Histopathological features. A Component of spindle cells (Optical microscopy, Hematoxylin-eosin, x100). B Anastomosing tubules (Optical microscopy, Hematoxylin-eosin, x100). Source: The authors (2023).

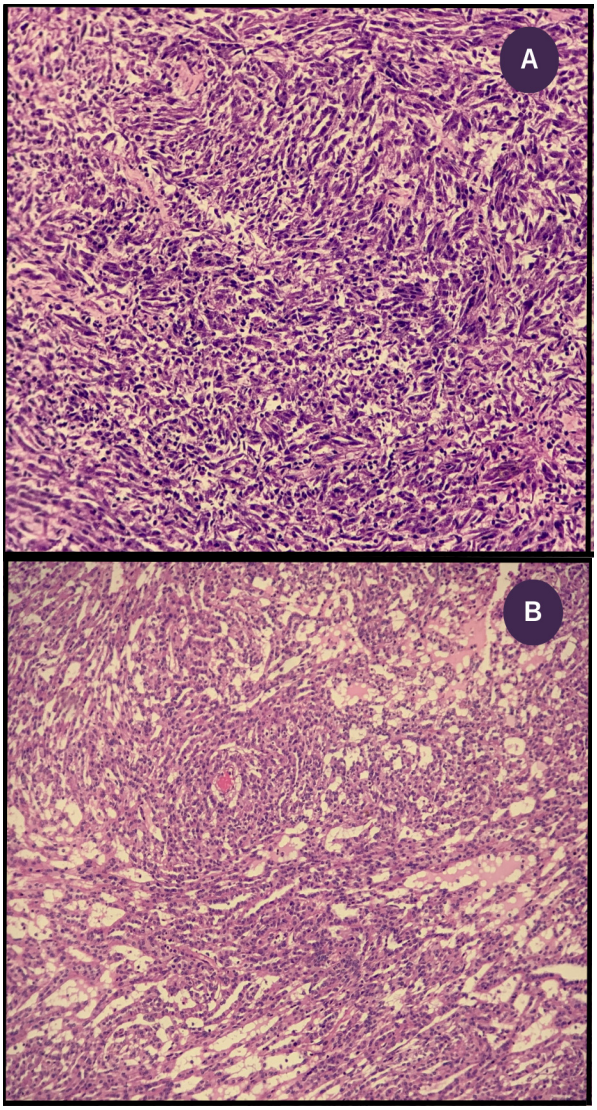
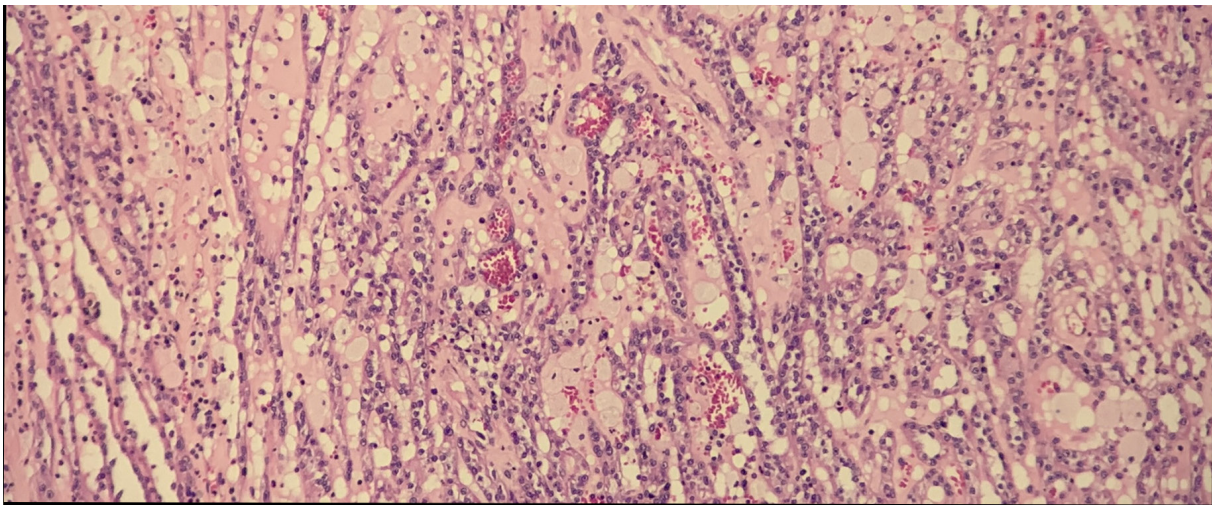


FIGURE 3: Histopathological features. Tubules lined low-grade cuboidal cells containing extracellular mucin with presence of foamy macrophages. (Optical microscopy, Hematoxylin-eosin, x200). Source: The authors (2023).



FOLLOW-UP AND OUTCOMES

The patient's follow-up was established as semi-annual consultations at the Urology Service. It completed eighteen months without any meaningful events regarding the surgery. He had no further complaints, and the latest CT-scan showed no signs of lymphadenopathies in the retroperitoneal and pelvic chains. The left kidney maintained its normal characteristics, and laboratory exams had no alterations.

DISCUSSION

Mucinous, tubular and spindle cell carcinoma is an epithelial neoplasm characterized by tubules merging with bland fusiform cells and a myxoid stroma. Regarding its location, it typically occurs in the renal cortex but can involve or arise within the renal medulla. Most patients are asymptomatic with incidental renal masses (2). In terms of epidemiology, it represents less than 1% of all renal neoplasms. There is a female predilection (M:F ratio of 1:4) and a wide age range (13-82 years; median age in the sixth decade of life) (3). Histologically, MTSCC is a combination of tubular and spindle cells separated by varying amounts of mucoid material. The tubules can take on different shapes and may contain clear cells, oncocytic changes, or vacuolated cytoplasm. They are considered low-grade neoplasms with uniform nuclei and occasional small nucleoli, but there are reports of high-grade variants with atypical nuclei and sarcomatoid changes (3). Its imaging features are distinct from clear cell renal cell carcinoma (RCC) but resemble those of papillary RCC (1). (Table 2)

Genetic studies have shown various numerical aberrations involving multiple chromosomes 1, 4, 6, 8, 9, 13, 14, 15, and 22 (1,4) in MTSCC, and biallelic loss of Hippo is common signaling pathway tumor suppressor genes, including PTPN14, NF2, and SAV1. Deletion of CDKN2A or CDKN2B and additional complex genomic abnormalities may be present in high-grade tumors (5).

Macroscopically, tumors are mostly well-circumscribed masses with a solid, gray-white, tan, or yellow cut surface. In microscopy, they consist classically of compacted, elongated, anastomosing tubules lined by low-grade cuboidal cells merging with bland fusiform cells in a myxoid stroma containing basophilic extracellular mucin. Different proportions of these elements result in dominant fusiform cells, dominant epithelia, or mucin-poor morphology. Tufted or small papillary

Table 2: Comparison of mucinous, tubular and spindle cell carcinoma, papillary renal cell carcinoma and clear renal cell carcinoma

	Mucinous, tubular and spindle cell carcinoma	Clear renal cell carcinoma	Papillary renal cell carcinoma
Clinical Findings	Rare subtype of RCC. Typically affects middle-aged female adults	Most common subtype of RCC, is often seen in older male adults	Second most common type of RCC. Mostly affects middle-aged and older male adults
Radiological findings	Well-circumscribed, homogenous and solid masses. Iso or hypodense compared to kidney	Enhancing heterogenous masses with exophytic growth pattern and hypervascularity	Homogeneous, hypovascular and hypodense solid masses. May present with calcification and cystic changes
Pathological findings	Bland tubules merging with bland spindle cells in a myxoid stroma with absence of distinct, well formed papillae	Typically compact nests and sheets of cells with clear cytoplasm and distinct membrane	Predominantly tubulopapillary architecture, lined by cells with variation of morphologies (basophilic, eosinophilic cells)

tubules and foci of foamy macrophages can occur, leading to morphological overlap with papillary renal cell carcinoma, as in this reported case. The cells are low-grade with rare mitoses and may exhibit clear cytoplasm or oncocytic changes(1).

Immunohistochemically, both the tubular and spindle neoplastic cells express several markers, including PAX2, PAX8, low-molecular-weight cytokeratins (CK8/18, CK19, and CK7), EMA, alpha-methylacyl coenzyme A, and E-cadherin. 34bE12 and other high-molecular-weight keratins and vimentin show variable expression. However, they often test negative for CD10, CD15, and RCC markers. Carbonic anhydrase IX, p63, CK20, GATA3, and smooth muscle actin are negative as well. Increased Ki-67 proliferation index and nuclear p53 accumulation have been observed in high-grade tumors (1,5).

Tumors with high-grade transformation have high-grade nuclei, necrosis, increased mitoses, vascular invasion, and solid or infiltrative growth4. High-grade spindle cell component is defined as sarcomatoid transformation3. Areas with classic histology may be present. The TNM staging of this neoplasm follows the same rules as classic renal carcinomas (1). Regarding prognosis, cases with classic (low-grade) morphology are generally favorable. High-grade tumors, including those with sarcomatoid transformation, are often associated with recurrence, distant metastasis and an unfavorable outcome. Rare cases with classic morphology may also develop metastases, emphasizing the importance of follow-up regardless of histological characteristics (3,5).

Finally, mucinous tubular and spindle cell carcinoma of the kidney is a rare disease with difficulty in diagnosis due to the initial nonspecific findings. The differential diagnosis of MTSCC depends on its histopathological analysis and morphology, whether classic, mucin-poor, or high-grade (including sarco-

matoid) transformation. In cases of classic morphology, the main differential diagnosis is papillary renal cell carcinoma, which may rarely contain mucinous material. The absence of a spindle cell component and genetic studies can help differentiate between the two entities. Therefore, in this case, it is important to remember the importance of a correct histopathological analysis, the differential diagnosis and different morphological types, to better characterize the tumor and determine follow-up and prognosis.

MULTIDISCIPLINARY PERSPECTIVE

We consider the discussion of the present case in a multidisciplinary team of utmost importance. According to the radiologist who diagnosed the tumor: "Inside a multidisciplinary evaluation, early tumor detection in radiology, as well as characteristics which suggest mucinous, tubular and spindle cell cancer, should be considered while interpreting imaging exams, especially when differentiating between renal masses with irregular borders and heterogenous density, highlighting the need for correct clinical, radiological and pathological correlations".

As for the pathologist, "The current, 2022, World Health Organization Classification of renal tumors emphasizes the complexity of the histopathological analysis, and the distinction between different patterns of cells (mucinous, tubular and spindle). Therefore, the correct differential diagnosis with other types of renal cancer requires attention to morphological and immunohistochemical patterns for its correct definition, as mucinous, tubular and spindle cell carcinoma is a rare diagnosis."

POINTS OF LEARNING

- Multidisciplinary attention is mandatory for managing rare renal cancer subtypes
- Correct radiological and pathological assessment is necessary to make the correct diagnosis
- Genetic and immunohistochemical patterns are helpful and must be considered during pathological analysis

PATIENT PERSPECTIVE

Patient didn't respond to attempts made to obtain his perspective on the disease.

INFORMED CONSENT

All attempts to obtain written consent for publication were made, however the patient was unavailable after loss of follow-up. We were granted waiver of the Informed Consent Form, which was granted by the Institutional Ethics Committee (Comitê de Ética e Pesquisa do Hospital Universitário Evangélico Mackenzie - Curitiba/PR) under CAAE: 73703023.2.0000.0103..

ABBREVIATIONS

MTSCC = Mucinous tubular and spindle cell carcinoma
RCC = renal cell carcinoma; CT-scan = computed tomography scan

ACKNOWLEDGEMENTS

We thank Pathology and Radiology Services of Hospital Universitário Evangélico Mackenzie, Curitiba, Brazil, for providing on the images acquisition.

ETHICS APPROVAL

This case report is in accordance with ethics aspects study was approved by the Institutional Ethics Committee (Comitê de Ética e Pesquisa do Hospital Universitário Evangélico Mackenzie - Curitiba/PR).

CONFLITO DE INTERESSE

Nenhum declarado.

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Submissão em:
06/2024
Aceito para publicação em:
02/2025