

## Squamous cell carcinoma of the renal pelvis with stones and inferior vena cava infiltration. Case report

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**SUMMARY:** Squamous cell carcinoma of the renal pelvis with stones and inferior vena cava infiltration. Case report.

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*We report a rare case of a 50 year old man with renal squamous cell carcinoma (SCC) who first came to our attention with renal colic and fever not responding to antibiotic or analgesic treatment. He had a long history of kidney stones, but had not undergone any imaging in the last 5 years.*

*Physical examination revealed tenderness and a palpable mass in the right flank and lumbar region. A whole body CT scan was performed, revealing an 11 cm mass in the right kidney infiltrating the inferior vena cava. There were areas of calcification within the mass and multiple stones within the renal pelvis. The tumor was considered unsuitable for resection according to radiological and clinical criteria. The mass was biopsied percutaneously under CT guidance and histological examination revealed squamous cell carcinoma of the renal pelvis. The patient was treated with neoadjuvant chemotherapy and embolization of the renal artery. He died one month after diagnosis.*

*To our knowledge this is the second reported case in the world of renal SCC infiltrating the inferior vena cava and with kidney stones.*

**RIASSUNTO:** Carcinoma squamocellulare della pelvi renale associato a calcoli con infiltrazione della vena cava inferiore. Case report.

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*Gli Autori presentano un raro caso di carcinoma squamocellulare della pelvi renale in un uomo di 50 anni. Il paziente si è presentato alla nostra osservazione con un episodio di colica renale e febbre di tipo urosettico non rispondenti alla terapia antidolorifica e antibiotica. All'anamnesi veniva riferita una storia di microlitiasi renale. Negli ultimi cinque anni il paziente riferiva un apparente stato di buona salute e pertanto non si era sottoposto ad alcun controllo clinico o radiologico.*

*L'esame obiettivo mostrava una dolorabilità alla palpazione del fianco e in regione lombare destra; alla palpazione profonda si apprezzava una formazione di consistenza duro-parenchimatosa e superficie irregolare, con confini non ben definiti. La TC metteva in evidenza una formazione di 11 cm nel rene destro con presenza di aree di calcificazioni al suo interno e calcoli nella pelvi renale. La formazione neoplastica infiltrava la vena cava inferiore e si estendeva a strutture adiacenti. La valutazione clinica e dell'imaging sconsigliava l'intervento chirurgico. Veniva effettuata una biopsia TC-guidata e l'esame istologico evidenziava un carcinoma squamocellulare della pelvi renale. Il paziente veniva trattato con embolizzazione dell'arteria renale e chemioterapia. Il paziente è deceduto ad un mese dalla diagnosi.*

*A nostra conoscenza è il secondo caso in letteratura di carcinoma squamocellulare della pelvi renale associato a calcolosi renale e infiltrazione cavale.*

**KEY WORDS:** Kidney - Squamous cell carcinoma - Stones - Inferior vena cava.  
Rene - Carcinoma squamo-cellulare - Calcoli - Vena cava inferiore.

### Introduction

Squamous cell carcinomas (SCC) make up 0.5-8% of tumors of the upper urinary tract (UUT), which themselves account for around 5-6% of all urothelial tumors (1,2).

We report a rare case of squamous cell carcinoma of the renal pelvis infiltrating the inferior vena cava (IVC) in a patient with a history of kidney stones. To our know-

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ledge, this is only the second time in the world that such an association has been reported (3,4).

## Case report

In November 2010 a 50-year-old man was admitted to our Department with right renal colic and fever not responding to antibiotic and analgesic therapy. He had a long history of kidney stones, but had not undergone any imaging (e.g. echotomography - ETG) in the last 5 years.

Physical examination revealed tenderness and a palpable mass in the right flank. Blood tests showed leukocytosis (16,690/ $\mu$ L) with neutrophilia (14,440/ $\mu$ L), raised PCR,  $\alpha$ 2-globulin, serum ferritin (678 ng/mL) and total serum iron deficiency (24 ng/dL). Urine examination revealed microscopic hematuria (12 RBC/HPF). A whole body multislice spiral CT scan carried out with and without organic iodine contrast showed an 11 cm neoplasm involving the renal parenchyma and infiltrating the inferior vena cava (Fig. 1). CT revealed right renal parenchyma subverted by pathologic tissue with infiltrative features (maximum diameter 11 cm) and non-homogeneous due to the presence of fluid (in keeping with the finding of calyceal dilatation and multiple calcifications with a maximum diameter of 18 mm could be seen) (Figs. 2 and 3). The lesion infiltrated the vascular peduncle to the inferior vena cava and the proximal tract of the ipsilateral ureter (Fig. 4). It also infiltrated the prerenal fascia through the right crus of diaphragm, which was also affected; at this level the adipose cleavage plane was barely recognizable. A further lesion, with similar contrast features and pseudo-nodular morphology, was found proximal to the right psoas muscle; this was thought to be a metastasis. The CT scan also showed non-homogenous perivisceral adipose tissue and some colliquative paraaortic lymph nodes, the largest of which had a maximum diameter of 12 mm. The physiologic concentration and excretion of the contrast agent were altered during the last scans. The left kidney and other abdominal organs were unremarkable, and no bony, intracranial or pulmonary metastases were seen. There was no evidence of free fluid in the abdomen.

Given the widespread infiltration, the tumor was not surgically resectable according to radiological and clinical criteria. Following a multidisciplinary discussion (surgeon, radiologist, and oncologist), two biopsy samples (Fig. 5) were taken by CT-guided biopsy for histopathological examination to clarify the nature of the lesion and establish the plan for further treatment. These revealed dense con-



**Fig. 1 - CT showing the 11 cm solid mass subverting the right kidney. Stones and calcifications can be seen.**



**Fig. 2 - CT showing the mass extending from the right renal vascular pedicle to the inferior vena cava.**



**Fig. 3 - Axial CT image showing the renal mass infiltrating the inferior vena cava and the proximal ureter.**

nective tissue at the site of the infiltration, consisting of nested and solid cords of epithelial cells with occasional keratin pearls. The neoplastic cells had an altered nucleus-cytoplasm ratio, with a roundish, large nucleus, barely visible nucleoli and distinct eosinophilic cytoplasm borders, with some intercellular spines (Fig. 6). Some abnormal mitosis and a focus of necrosis were also seen. The neoplastic cells tested positive for cytokeratin (MNF116 clone), EMA, cytokeratin 5/6, and CD10 and negative for vimentin, cytokeratin 8, cytokeratin 20, and BerEP4 on immunohistochemical testing (Fig. 7). Both the morphological and the immunohistochemical features confirmed the diagnosis of squamous cell carcinoma. The pathology and imaging reports and clinical findings led to the diagnosis of squamous cell carcinoma of the renal pelvis.

It was decided to attempt the treatment with renal artery embolization and chemotherapy eventually followed by surgery. The right renal artery was embolized via femoral catheterization using ethyl alcohol 95%, Spongostan and a 6 mm metal coil. Three cycles of combined chemotherapy (Cisplatin 50 mg/m<sup>2</sup>, Gemcitabine 1000 mg/m<sup>2</sup> and Paclitaxel 125 mg/m<sup>2</sup>) were then scheduled but the pa-



Fig. 4 - CT-guided needle biopsy of the right kidney lesion performed with 18 Gauge trucut needle.

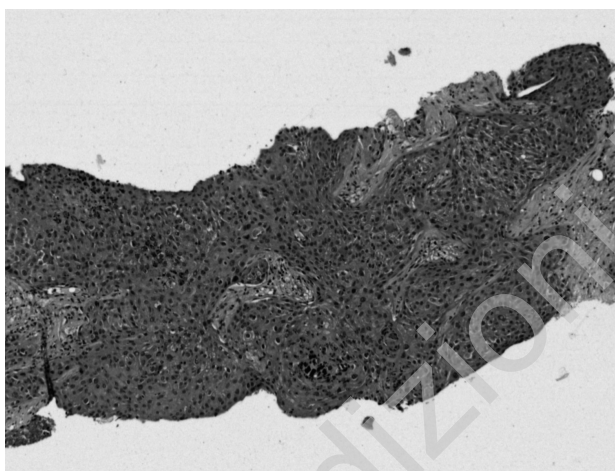


Fig. 5 - Biopsy sample (10x, EE) showing the tumor infiltration.

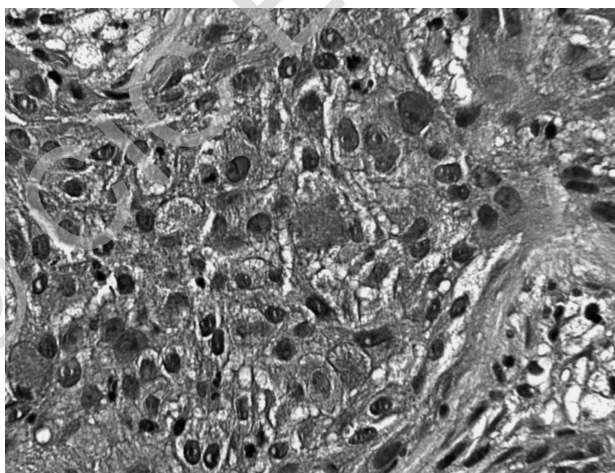


Fig. 6 - Higher magnification (60x, EE) showing nested and solid cords of epithelial cells with occasional keratin pearls and some intercellular spines.

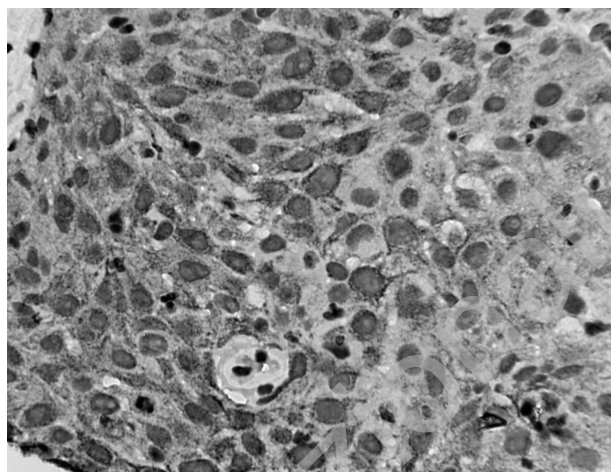


Fig. 7 - Diffuse cyokeratin 5/6 found on immunohistochemical testing.

tient died suddenly five days after the first cycle and exactly one month after diagnosis, probably due to pulmonary embolism.

## Discussion

Squamous cell carcinoma (SCC) is a rare condition, comprising just 0.5–8% of all upper urinary tract tumors (UTT) (1,2). Patients with SCC of the renal pelvis may present with micro- or gross hematuria, fever, abdominal tenderness, palpable abdominal mass, weight loss and, surprisingly, with a colicky pain; signs and symptoms suggestive of simple kidney stones. However, SCC is often found by chance through ultrasound (or other imaging techniques) performed for other reasons. This aggressive cancer can develop into a neoplastic thrombus infiltrating the inferior vena cava, and even the bilateral iliac veins, and may ultimately cause pulmonary embolism (4).

Squamous cell carcinoma of the upper urinary tract may present with paraneoplastic syndromes such as hypercalcemia, thrombocytosis and leukocytosis. SCC of the renal pelvis is often associated with chronic irritation, and conditions such as urolithiasis, hydronephrosis and pyonephrosis are believed to provoke squamous metaplasia in the urothelium, which may subsequently develop into squamous cell carcinoma (1, 5-8). Only a few isolated cases of SCC have been described in the literature in association with other pathological conditions, including transplanted kidneys, immune depression, horseshoe kidney, phenacetin abuse and kidney tuberculosis (8-14).

## Conclusions

The association between urinary tract SCC and chronic irritation is well-established. The chronic irritation



caused by urolithiasis is a recognized cause of squamous metaplasia of the urothelium, that may eventually develop into a carcinoma. For this reason, we believe that patients with urolithiasis should undergo a closer radiological and clinical follow up. In the early stages of

these types of tumor, a combined surgical and medical approach could lead to a better prognosis. In our patient an earlier ultrasound check would have identified the carcinoma at a less advanced stage, making radical surgery and a better prognosis possible.

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