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Association of Kidney Stones with Upper Tract Urothelial Carcinoma Revealed Incidentally by an Attempt at Percutaneous Nephrolithotomy: About A Case

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Abstract **Case Report**

The applicability of the recommendations of the European Association of Urology (EAU) concerning the diagnostic evaluation of upper urinary tract urothelial carcinoma (UTUC) can sometimes come up against complex clinical features such as the association of upper urinary tract (UUT) stones with UTUC where it is masked by stones thus making its diagnosis difficult. Hence its incidental discovery during the treatment of the stones, thus reflecting a non-recommended diagnostic approach to UTUC. We report a case of UTUC revealed incidentally by an attempt at right percutaneous nephrolithotomy (PCNL) for kidney stones in a 72-year-old Moroccan with history of chronic smoking, extra corporal shock wave lithotripsy (ESWL) for right kidney stone, who consulted at the Military Hospital in Rabat for chronic right low back pain associated with intermittent macroscopic hematuria. In whom the reference diagnostic assessment of UTUC and retrograde pyelography (RP) could not establish the diagnosis. The interest of this case is to insist on the possibility of a coexistence of stones with UTUC in the event of macroscopic hematuria associated with UUT stones. In addition, this case makes it possible to report the limitations of the accuracy of the reference diagnostic assessment of UTUC.

Keywords: macroscopic hematuria, association of kidney stones with UTUC, percutaneous nephrolithotomy, incidental reveal of UTUC, accuracy limitations of the reference diagnostic assessment of UTUC.

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INTRODUCTION

UTUC represent 5 to 10% of all urothelial carcinomas, with a twice higher incidence of pyelocalyceal tumors compared to ureteral location [1]. Many risk factors have been identified in the development of urothelial carcinomas, in particular smoking, consumption of certain herbs and occupational exposure to aromatic amines [1]. EAU assigns grade A to the recommendation for the performance of cystoscopy, urinary cytology, CT urography (CTU) and flexible ureterorenoscopy (URS) in the diagnostic work-up of UTUC. However, the applicability of these recommendations can sometimes come up against complex clinical features such as the association of UUT stones with UTUC where the latter is masked by the stones, thus making its diagnosis difficult. Hence its incidental discovery during stone treatment [2-4], thus reflecting a non-recommended diagnostic approach to UTUC. We report a case of UTUC revealed incidentally by an attempt of right PCNL for kidney stones in a 72-year-old Moroccan. In whom neither the reference diagnostic assessment of UTUC, nor the RP could highlight a suspicious process in the UUT. The interest of this case is to insist on the possibility of a coexistence of stones with UTUC in the event of macroscopic hematuria associated with UUT stones. In addition, this case makes it possible to report the limitations of the accuracy of the reference diagnostic assessment of UTUC.

CASE REPORT

Mr. HH is Moroccan, 72-year- old, retired soldier. He consulted on May 2022 at the Military Hospital in Rabat for chronic right low back pain associated with intermittent macroscopic hematuria evolving for two weeks. He had history of chronic smoking, ESWL for right kidney stone.

The clinical examination found a preserved general condition. There was no lumbar contact, rectal examination was unremarkable. Based on the anamnesis and the clinical examination we first evoked

the diagnosis of bladder tumor, then in differential an UTUC or other urogenital tumor, the presence of a foreign bodies in the UUT such as a recurrence of right kidney stones, a hemorrhagic renal cyst.

On evaluation, laboratory reports revealed haemoglobin 11g/dl, serum creatinine 15mg/l and urine culture was sterile. The non-contrast CT scan abdomen and pelvis (figure 1) showed right pyelocalyceal dilation with hematic content and multiple stones. Bladder with heterogeneous contents and hematic zones. The patient was admitted to the urology department for further exploration of hematuria. An exploratory cystoscopy was performed through which randomized biopsies were done on just an inflamed bladder mucosa covered with clots in places and associated with minimal bleeding from the right ureteral meatus. Based on the right pyelocalyceal dilation and the inconclusive cystoscopy, a complementary RP and drainage by double j stenting were carried out. RP did not show any suspicious image in addition to the stones. A sample for urinary cytology was taken in situ before RP, its pathological result and that of the randomized biopsies were without malignancy.

CTU (figure 2), mentioned doubts about a suspicious upper polar lesion of the right kidney. Hence the indication 2 days later for additional exploration by a flexible URS coupled with in situ urinary cytology. URS did not remove the doubt; urinary cytology was still without malignancy.

In view of the inconclusive diagnostic work-up, we thought that the hematuria was probably due to the irritative effect of the right kidney stones, hence the decision to perform PCNL. After introducing the nephroscope, we proceeded to an exploration which allowed us to discover with amazement a superior polar papillary lesion surrounded by blood clots (fig-3). The lesion was biopsied and then we decided to stop the procedure. The pathological result of this biopsy was in favor of UTUC (high-grade urothelial carcinoma). Thoracic CT scan was done to complete the extension assessment and was negative.

We performed right laparoscopic radical nephroureterectomy (RNU) with excision of the peri-meatic bladder cuff in combination with lymphadenectomy two days later. The dissection of the surgical specimen (figures 4a, 4b) revealed blackish and whitish stones as well as a macroscopically malignant aspect of the upper kidney polar. In addition, an early postoperative instillation of intravesical chemotherapy had been performed. The definitive pathology was in favor of a 5 cm tumor focus of a high-grade papillary urothelial carcinoma infiltrating the renal parenchyma and the perirenal fat, classified T4NxMx, TNM 2017 (AJCC 8th edition).

The patient was referred to the oncology department for platinum-based chemotherapy started within 90 days of RNU; he was also referred to the nephrology department for basic follow-up.

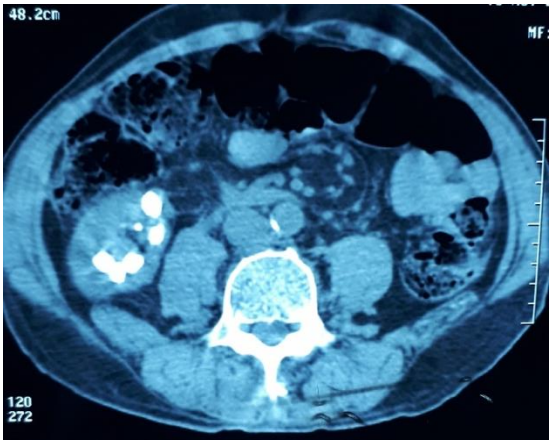

Fig. 1: The non-contrast CT scan abdomen and pelvis showing right pyelocalyceal dilation with hematic content and multiple stones

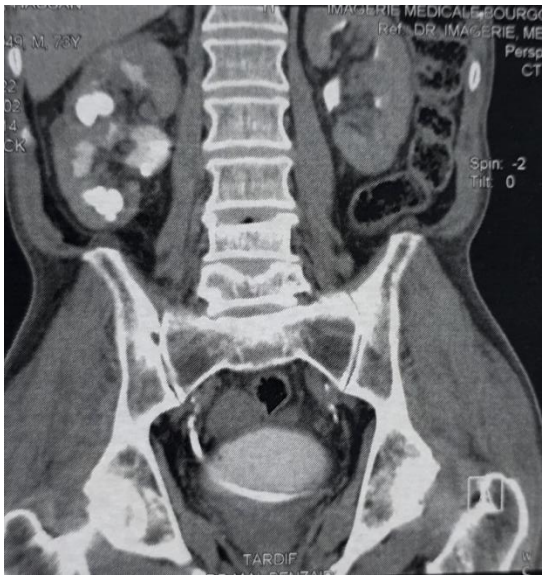

Fig. 2: CTU confirming right kidney stones and mentioning doubts about a suspicious upper polar lesion of the right kidney

Fig 3: picture that showing the incidental discovery of the tumor during attempt PCNL.

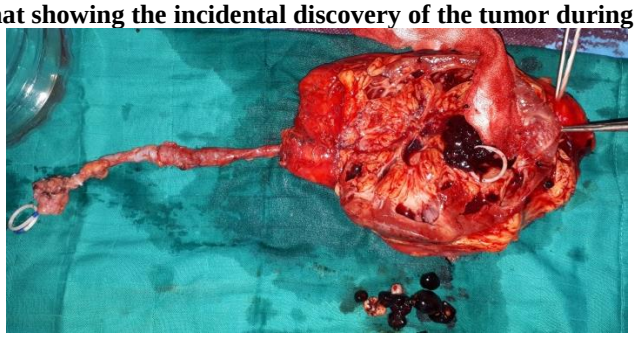

Fig. 4a: The dissection of the surgical specimen showing blackish and whitish stones as well as a macroscopically malignant aspect of the upper kidney polar. It can also present a large blood clot in the middle calyx of the kidney

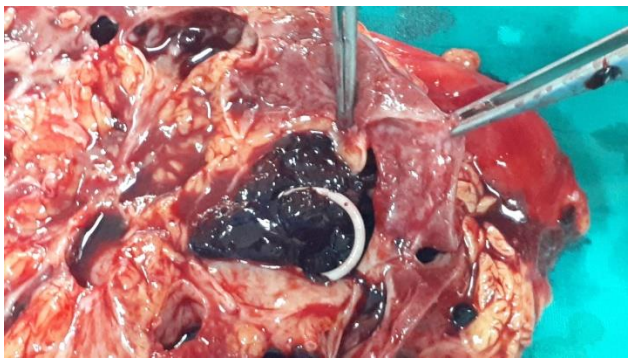

Fig. 4b: The dissection of the surgical specimen showing a macroscopically malignant aspect of the upper kidney polar and a large blood clot in the middle calyx of the kidney

DISCUSSION

UTUC represent 5 to 10% of all urothelial carcinomas with twice the incidence of pyelocalyceal tumors compared to ureteral location [5]. Many risk factors have been identified in the development of urothelial carcinomas, in particular smoking, consumption of certain herbs and occupational exposure to aromatic amines [5]. Smoking is the most likely risk factor in our case because Chronic infections and inflammations (lithiasis) are risk factors of epidermoid or adenocarcinomatous type UTUC [6]. Hematuria is the main complaint of the majority of patients (70–80%), lumbar pain is generally associated, as well as very few general signs [1, 7]. The clinic of our patient was predominated by hematuria and low back pain which can also be attributable to the clinical manifestations of kidney stones.

The diagnostic assessment of UTUC includes imaging, endoscopy and histology modalities. CTU is the reference imaging modality in patients with creatinine clearance > 30 ml/min [8, 9]. Its efficiency for the diagnosis of UTUC is high (> 90%) with a pooled sensitivity = 92% and a pooled specificity = 95% [1, 10]. UTUCs appear on unenhanced phase as soft tissue masses, with lower density than renal calculi, except for indinavir ones. After contrast medium

administration, UTUCs show early enhancement, unlike non-enhancing clots, while in the excretory phase, they appear as filling defects or luminal narrowing in the urinary tract [1]. None of these aspects was described by the radiologists who performed the imaging of our patient; we therefore considered imaging evaluation as inconclusive. When tumors involve the caliceal system, a calyx could be entirely missing in the excretory phase due to complete filling by solid tissue, the so-called "oncocalyx"; calyx dilation and absence of urine opacification, classically described as "phantom calyx", occur if tumor develops in the infundibular neck determining its amputation [1]. It is probably by one of these mechanisms that the tumor, although large (5 cm), could not be found by CTU. In addition, with lithiasic coexistence, the stones would also be responsible for the amputation of the infundibular neck thus preventing the opacification of the tumor.

The diagnostic performance of CTU decreases in case of flat lesions or less than 5 mm or in the event of a non-functioning kidney [2-4, 7]. Paradoxically our patient did not present any of these conditions, his right renal parenchyma was not laminated, the size of the tumor was 5cm and it was a papillary urothelial carcinoma.

Urinary cytology is recommended in the diagnosis of UTUC although it is less sensitive and specific than in cases of bladder tumor, including for high-grade lesions [11], this was the case for our patient, in whom the urinary cytology was negative on 2 successive samples, although it was a high-grade tumor.

Performing a cystoscopy is recommended in the systematic assessment of a UTUC because of a risk of synchronous bladder lesion in 8 to 13% of cases. A normal cystoscopic examination associated with suspicious cytologies for a high-grade carcinoma is suggestive of a high-grade UTUC [7, 11]. Cystoscopy and urinary cytology were all negative in our case, we could not predict UTUC.

URS improved the preoperative evaluation of UTUC by allowing macroscopic exploration of more than 95% of the entire UUT including the lower calyxes [5, 11]. It provides information on the macroscopic appearance, the number of lesions (7 to 23% of multifocal lesions) and allows the performance of biopsies and cytology in situ [5]. The effectiveness of the URS described above has not been verified in our case probably due to the absence of optimal conditions (the presence of stones, inflammation and blood clots) or technical limitations such as reported by JL. Roberts *et al.*, [7].

The biopsy grade is consistent with the definitive tumor grade in 69 to 91% of cases. There is also an association between biopsy grade and definitive tumor stage [11]. This result is similar to our case, however, it must be recognized that the biopsy which revealed the tumor was performed atypically through the nephroscope during the PCNL attempt. This diagnostic approach was nevertheless reported by Katz R *et al.*, [3], except that at that time, there was no CTU, nor URS.

RNU with excision of the peri-meatic bladder cuff is the gold standard surgical treatment for UTUCs regardless of location [11]. Our patient underwent this intervention and then adjuvant chemotherapy according to the recommendations of the EAU.

CONCLUSION

This clinical case has highlighted the diagnostic difficulties of UTUCs especially in case of coexistence of these with stones into the UUT which can mask them. It also made it possible to show the performance limitations of the diagnostic work-up of UTUCs which induced renal puncture for PCNL considered therefore as an atypical diagnostic means of UTUCs. Hence always be in optimal conditions during the diagnostic evaluation of hematuria in order to minimize these limits.

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