



# Incidentally detected large upper tract urothelial carcinoma presenting without hematuria and treated with thulium fiber laser—a case report

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**Background:** Upper tract urothelial carcinoma (UTUC) frequently exhibits hematuria, flank pain, clot colic, and flank pain. They are very rarely detected as incidental renal masses in imaging studies. On a computed tomography (CT) scan, they usually appear as soft tissue masses with low-grade enhancement and a filling defect. Radical nephroureterectomy is the standard treatment for high-grade UTUC or large-volume low-grade UTUC. Ureteroscopic laser fulguration can be offered to low-grade,  $\leq 2$  cm UTUC, or sometimes for high-grade high volume disease in those with solitary kidneys. We present a case study of an incidentally detected large UTUC (3 cm) that was fulgurated using a thulium fiber laser (TFL).

**Case Description:** An 86-year-old female presented with symptoms of gastritis. CT scan done for further evaluation detected 3 cm urothelial mass arising left lower calyx and left renal pelvis. Endoscopic evaluation and biopsy confirmed left low-grade UTUC. Tumor adequately fulgurated using TFL. Because of patient's advanced age and asymptomatic presentation, she refused radical nephrectomy and opted for endoscopic treatment and surveillance. She is undergoing 3 monthly surveillance cystoscopies with no evidence of recurrence over last 15 months.

**Conclusions:** It is very unusual for large UTUC to have asymptomatic presentation. Appropriately selected patients who are not candidates for radical cystectomy can be managed with ureteroscopic laser fulguration.

**Keywords:** Upper tract urothelial carcinoma (UTUC); laser; ureteroscopy; case report

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## Introduction

Upper tract urothelial carcinoma (UTUC), with an estimated incidence of 1–2 cases per 100,000, is a rare diagnosis that makes up 5% of urothelial cancer and less than 10% of renal tumors (1). These cancers develop in

the lining of the urinary system, extending from the renal pelvis to the ureter. Gross hematuria is the most common symptom reported in 70–80% of patients (1,2). Other infrequent symptoms include flank pain (20%) and flank mass (10%). It is very unusual for a large UTUC to be asymptomatic. The typical work-up requires urinalysis,

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cystoscopy, urinary cytology, and upper tract imaging with computed tomography (CT) or magnetic resonance (MR) urogram. We present a case report in which gastrointestinal symptoms led to a workup and an eventual CT that revealed a large UTUC. We present this case in accordance with the CARE reporting checklist (available at <https://ales.amegroups.com/article/view/10.21037/ales-22-71/rc>).

## Case presentation

An 86-year-old female with a past medical history of hypertension, asthma, and gallbladder disease presented with dyspepsia and vague upper abdominal pain for lasting over 6 months. She denied having any severe flank pain, gross hematuria, or other urinary tract infection (UTI)-related symptoms. She underwent additional testing, such as an upper gastrointestinal endoscopy, an abdominal ultrasound, and a contrast-enhanced CT scan of the abdomen, while receiving treatment for duodenitis and gallstones. CT abdomen revealed mild left hydronephrosis, urothelial thickening, and soft tissue nodularity in the renal pelvis measuring, concerning urothelial carcinoma, therefore, the patient was referred to a urologist for further management (*Figure 1A*). Her urine microscopy didn't reveal microscopic hematuria and her urine cytology was negative for high-grade urothelial carcinoma. CT urogram was done which reveals a large 3 cm poorly enhancing mass lesion occupying the left renal pelvis and left lower calyx

(*Figure 1B,1C*). To further confirm we performed a left retrograde pyelogram, as well as a left flexible ureteroscopy. The retrograde pyelogram revealed a bifid left pelvicalyceal system, with both the left lower moiety's lower calyx and renal pelvis having significant filling defects (*Figure 2A,2B*). A fiberoptic flexible ureteroscope (P-6, Olympus®, Tokyo, Japan) was used to perform a left flexible ureteroscopy where we discovered a large papillary urothelial growth in the renal pelvis, lower calyx, and lower calyceal infundibulum of the left lower moiety. Several biopsies were taken with a 2.4 Fr stainless steel basket. Selective urine cytology was also sent from the left kidney. Biopsy revealed low-grade papillary urothelial carcinoma with no lamina propria invasion seen. All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committees and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the editorial office of this journal.

Using a thulium fiber laser (TFL; FiberDust, Quanta®, Samarate, Italy) and 200 µm laser fiber, we performed a complete tumor fulguration and resection of the tumor in the renal pelvis, inferior calyx, and inferior calyx infundibulum. 1 J × 20 Hz was used for fulguration. A thorough nephroscopy revealed no evidence of a tumor in the remaining pelvicalyceal system. Hemostasis was achieved adequately. She was given the option of undergoing a radical nephroureterectomy, receiving adjuvant intrarenal mitomycin gel (Jelmyto, UroGen Pharma, Inc., Princeton, NJ, USA), or simply having routine surveillance ureteroscopies with no adjuvant therapy. Given her advanced age, underlying comorbidities, and asymptomatic presentation, the patient refused radical nephroureterectomy or intrarenal Jelmyto instillation and was placed on a 3-month ureteroscopy surveillance schedule. After 3 months of low-grade UTUC treatment, surveillance ureteroscopy found no signs of any residual tumor, with the exception of scarring and a mild fibrotic narrowing of the left inferior calyx. With a flexible ureteroscope and TFL we performed a lower calyx laser infundibulotomy to widen the lower calx. The patient is doing well and is being followed up with ureteroscopies every 3 months and an annual CT urogram. No recurrence was seen upto 9 months after laser fulguration of UTUC.

### Highlight box

#### Key findings

- This is a rare presentation of a large upper tract urothelial carcinoma (UTUC), detected incidentally without hematuria.

#### What is known and what is new?

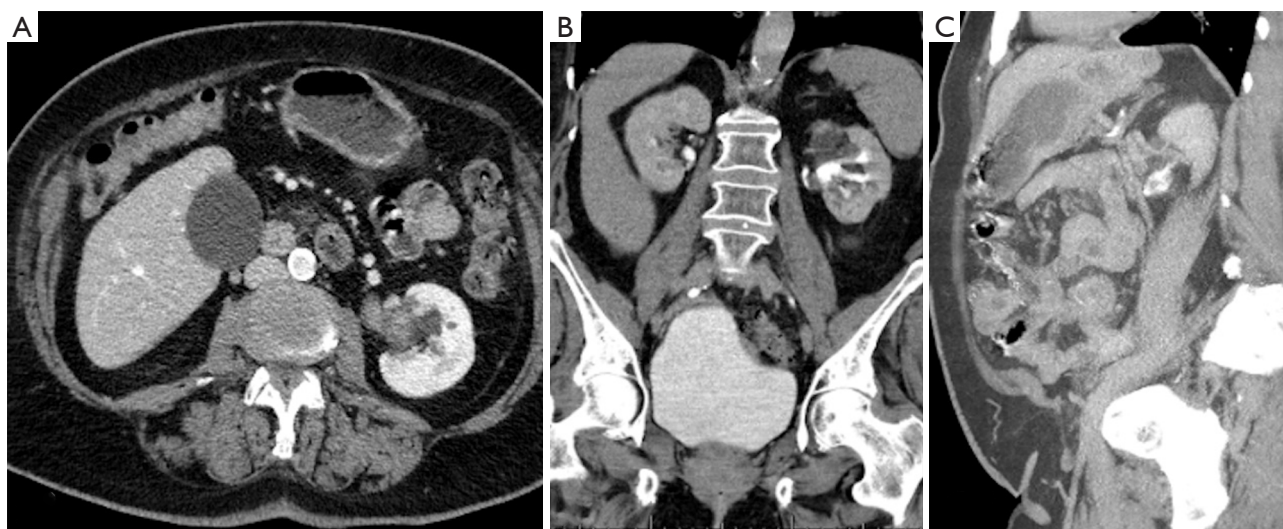
- It is known that UTUCs present with hematuria in 95% of cases. Small lesions can be incidentally detected and have been reported in the literature when found during endoscopic procedures done for other reasons.
- Further, this manuscript adds that it's very unusual for a large 3 cm upper tract urothelial tumor to be asymptomatic and be detected incidentally on computed tomography scan.

#### What is the implication, and what should change now?

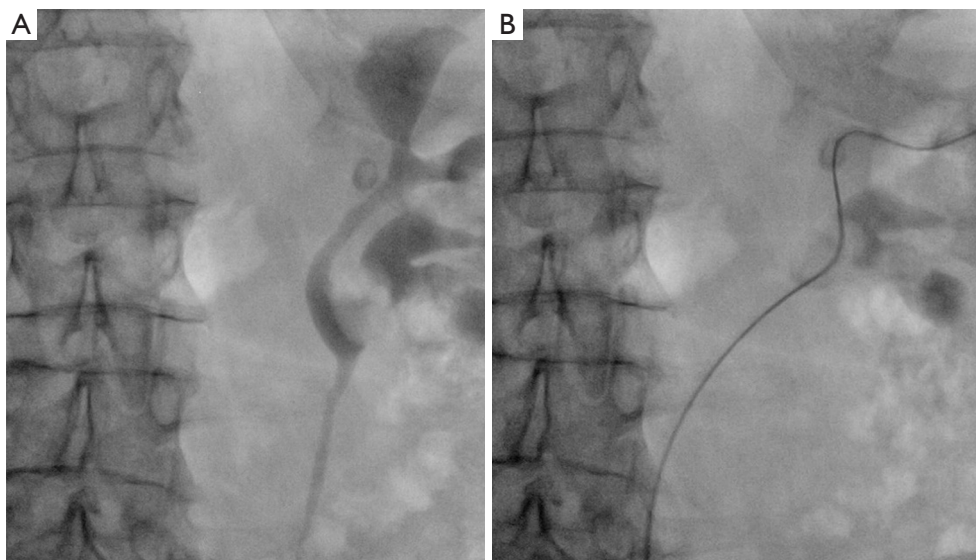
- Standard treatment for these tumors is radical nephroureterectomy. Rarely, large volume low-grade UTUC can be treated by ureteroscopic laser fulguration. Thulium fiber laser is an upcoming promising laser and can adequately fulgurate such lesions because of better hemostatic qualities.

## Discussion

In this case report, we present a large UTUC that was



**Figure 1** (A) Contrast CT abdomen reveals urothelial thickening, hydronephrosis and soft tissue nodularity of the left renal pelvis. (B) CT urogram, coronal view: large filling defect, occupying the left renal pelvis and calyx and exhibiting minimal contrast enhancement. (C) CT urogram, sagittal view: filling defect in the left renal pelvis and left lower calyx. CT, computed tomography.



**Figure 2** UTUC. (A) Left retrograde pyelogram: duplex moiety with a large filling defect in the lower moiety renal pelvis and lower calyx. (B) Left retrograde pyelogram: large filling defect suggestive of UTUC occupying left renal pelvis and lower calyx. UTUC, upper tract urothelial carcinoma.

discovered incidentally and manifested as generalized, non-specific gastrointestinal symptoms. UTUC are histologically similar to bladder carcinoma and are frequently classified as urothelial carcinomas; however, their incidence is much lower than that of bladder carcinoma (1-3). They account for 5% of all urothelial carcinomas

and are twice as common in men as in women. Hematuria, flank pain, a palpable flank mass, and clot colic are the most common symptoms. Around 15% of cases will have vague gastrointestinal or systemic symptoms, but this is usually due to advanced disease with local infiltration (4). Most asymptomatic UTUCs are very small and are discovered

during a flexible ureteroscopy for another pathology, such as renal stones (5,6). A large UTUC occupying the entire lower calyx and a portion of the renal pelvis that presents asymptotically is rare and unusual and has never been reported before.

According to recent literature, CT urography is the gold-standard imaging modality for diagnosing UTUC with the highest accuracy (7). On CT urogram, UTUC appears as low density and poorly enhancing soft tissue masses and can be granular, linear, or punctate. Furthermore, as seen in this patient, these tumors can cause urinary tract filling defects or luminal narrowing (8). Research has shown that the presence of hydronephrosis is associated with a worse prognosis as it is associated with advanced-stage disease (9). Cytology should be used in conjunction with biopsies, as positive cytology is suggestive of high-grade disease invariably needing radical nephroureterectomy. Flexible ureteroscopy is a highly effective method of diagnosis because it allows for direct visualization of UTUCs and ureteroscopic biopsy is the confirmatory test for UTUC and serves as the foundation for the definitive treatment of UTUC.

The gold standard treatment for UTUC is radical nephroureterectomy with ipsilateral bladder cuff excision. This method of treatment is associated with high morbidity and mortality particularly in elderly patients. Even though it can be performed using minimally invasive techniques such as a robotic or laparoscopic approach, there is an increased risk of postoperative chronic kidney disease as renal function is reduced after radical nephroureterectomy.

Improvements in instrumentation and available energy sources have facilitated retrograde ureteroscopic therapies. Low-grade UTUC can be treated with minimally invasive endoscopic procedures such as ureteroscopic laser fulguration. With more experience, indications for ureteroscopic therapy have expanded to include larger volume and multifocal low-grade lesions (10).

Cutress *et al.* demonstrated that endoscopic treatment of UTUC does provide effective oncological control in selected patients (11). Similarly, Shvero *et al.* demonstrated that patients with large, low-grade UTUC (>2 cm) can be effectively treated with ureteroscopic treatment when monitored closely. In this study, a cancer-specific survival rate of 84% was found with a recurrence rate of 51.2% (12). Following endoscopic control of low-grade, low-volume UTUC, intrarenal mitomycin (Jelmyto) treatment, which gels at body temperature and remains in the renal pelvicalyceal system, acting on the urothelium can result in better recurrence-free survival (13).

While holmium:yttrium-aluminum-garnet (Ho:YAG)

and neodymium:YAG (Nd:YAG) have been widely used for UTUC over the last two decades, there has been a surge of interest in TFLs in recent years. TFLs high water absorption coefficient results in improved hemostatic quality, which is especially useful when fulgurating UTUC.

## Conclusions

It is very unusual for large UTUC to present incidentally without causing any hematuria. Such tumors can be managed by ureteroscopic laser fulguration using TFL. Better hemostasis with TFL maintains good visibility during ureteroscopy allowing successful treatment of UTUC.

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## Footnote

*Reporting Checklist:* The authors have completed the CARE reporting checklist. Available at <https://ales.amegroups.com/article/view/10.21037/ales-22-71/rc>

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*Ethical Statement:* The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committees and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the editorial office of this journal.

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