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Ureteroscopic Management of Patients with Upper Tract Transitional Cell Carcinoma

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Abstract

Objectives: This paper reviews the indications, technique, and treatment outcomes for the ureteroscopic management of upper tract transitional cell carcinomas (UTTCCs).
Methods: The author reports on his experience and reviews of the most recent data published in the literature.
Results: The expanding experience with minimally invasive techniques to treat UTTCCs has demonstrated its safety and efficacy in selected patients. Diagnostic accuracy can be enhanced and pathologic confirmation of tumour grade and stage can be regularly obtained. In selected patients with unique, small tumours with low grade and low stage, the results of endoscopic management are encouraging. Patients with a functional solitary kidney, bilateral disease, or renal insufficiency can also be considered for conservative treatment. The patient must be willing to and capable of undergoing vigilant and frequent endoscopies during the follow-up. However, conservative management remains controversial in a patient with low-grade/low-stage disease and a normal contralateral kidney.
Conclusions: Ureteroscopic management of UTTCC is feasible and safe using, preferably, laser fulguration.

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1. Introduction

Advances in the ureteroscopic approach include the development of best optics, small-calibre actively deflecting endoscopes, specific instrumentation, and usable laser technology. With these advances, the treatment of upper tract transitional cell carcinoma (UTTCC) can be considered, particularly when standard nephroureterectomy may leave the patient functionally anephric, that is, with a solitary kidney (anatomically or functionally), bilateral UTTCC, or renal insufficiency. Conservative management of UTTCC can also be considered in case of significant medical disease.

This paper reviews the indications, technique, and treatment outcomes for the ureteroscopic management of UTTCC.

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2. Epidemiology, natural history, and pathology

The incidence of UTTCC is highest in the sixth and seventh decades of life and has a 2:1 male-to-female ratio and involves twice as many whites as African Americans [1]. UTTCC is uncommon, accounting for 5% of all urothelial neoplasms and approximately 10% of all renal tumours. Distal ureteral lesions seem to be more common than middle or upper ones (7:2:1), but ureteral tumours occur at a rate one fourth to one half the incidence of tumours in the renal pelvis. UTTCCs are multifocal in 33% of patients, are bilateral simultaneously in 1% of patients, and occur in 2–4% of patients with bladder cancer [1].

The risk of developing bladder tumours following the diagnosis of UTTCC is significant, with an incidence of 30–50%. Like bladder tumours, there is a significant risk for multiple tumour recurrences with respect to time and space, but generally recurrences are located in the ipsilateral renal unit [1].

The natural history of UTTCC is different from TCC of the bladder; as many as 60% of UTTCCs are invasive in comparison with 15% of bladder tumours [1].

Risk factors for UTTCC include cigarette smoking, exposure to carcinogens (chemical and petrochemical, coke, asphalt and other aniline exposures), cyclophosphamide treatment, history of urinary tract infections, stones, use of Chinese herbs for weight loss, and inherited tendencies. An association with Balkan nephropathy has also been described [1].

Grading for UTTCC is similar to bladder tumours. **Tumour grade** and **stage** represent the most important factors in predicting recurrence and survival for patients with UTTCC. Mufti et al found the survival rate to be >90% for patients with superficial well-differentiated tumours regardless of treatment by radical nephroureterectomy or more conservative resection [2].

Charbit found that 79% of grade 2 or 3 UTTCCs invaded into or beyond the muscle layer. All patients with low-grade tumour in whom lymphadenectomy was performed had negative lymph nodes, whereas 39% of patients with high-grade tumours had positive lymph nodes [3].

3. Symptoms and diagnosis

The most common presenting symptom of UTTCC is gross or microscopic hematuria (70–90% of patients) [1]. Flank pain is the second most common presenting symptom (30% of patients) corresponding to ureteral obstruction by blood clots or tumour. The tumour is found incidentally on an imaging study in 10–15% of patients. A flank mass corresponding to hydronephrosis or tumour mass is found in 10–20% of patients. Constitutional symptoms, such as weight loss, anorexia, or bone pain, are rarely present initially unless there is an advanced disease.

Radiography is the primary diagnostic modality for UTTCC; a filling defect on intravenous pyelography (IVP) is seen in 50–70% of cases (Fig. 1). However, computed tomography (CT) with contrast is actually the best modality to diagnose a UTTCC. This modality is accurate in distinguishing radiolucent stones (80–250 Hounsfield units [HU] from soft-tissue masses [10–70 HU]). CT has a sensitivity of 90%, but it does not readily distinguish low-volume Ta, T1, T2, and T3 tumours. It also has a false-negative rate of 59% for the detection of invasiveness and does not predictably identify multifocal lesions [1]. However, its role is essential to determine the stage preoperatively when a decision is needed regarding radical or conservative treatment. It can be helpful in evaluating the local extent of tumour, especially if there is high-volume disease involving renal parenchyma, regional lymph nodes, periureteral soft tissue, renal vein, and adjacent structures (Fig. 1). Metastases to the liver can also be identified. Evaluation of a filling defect seen on CT or IVP includes a voided urine cytology, cystoscopy for bladder evaluation, selective upper tract urine cytology, and sometimes retrograde pyelography. The role of urine cytology is limited for the diagnosis of filling defects, with a sensitivity that ranges from 10% to 71% and a specificity of about 60%. However, urine cytology can be useful in the setting of high-grade UTTCC or carcinoma in situ (CIS). Selective upper tract urine cytology for CIS has a reported accuracy as high as 80%. However, voided urine cytology for low-grade lesions has a false-negative rate as high as 96% [1].

Urine obtained from the collecting system through ureteral catheterisation improves the diagnostic accuracy, but reported sensitivities with this approach are 65–78%. Saline washings of the ureter following catheterisation and brush biopsy seem to improve the diagnosis. The sensitivity and specificity of brush biopsy are estimated to range from 72% to 91% and 88% to 94%, respectively [1,4]. To avoid false-positive results from contamination, it is recommended to removed primarily all bladder tumours before evaluating the upper tract.

Ureteroscopy (URS) to evaluate an upper tract filling defect can greatly enhance diagnostic accuracy