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Transurethral resection versus open bladder cuff excision in patients undergoing nephroureterectomy for upper urinary tract carcinoma: Operative and oncological results

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KEYWORDS

Upper tract;
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Distal ureter;
Bladder cuff

ABBREVIATIONS

CSS, cancer-specific survival;
(O) NU, (open) nephroureterectomy;
UUT-TCC, upper urinary tract TCC

Abstract ***Objectives:*** To evaluate the impact of distal ureter management on oncological results after open nephroureterectomy (ONU) comparing transurethral resection of the intramural ureter to conventional open excision, as controversy still exists about the method of choice for managing the distal ureter and bladder cuff during ONU.

Patients and methods: We retrospectively collected data from 378 patients who underwent ONU for upper urinary tract transitional cell carcinoma (UUT-TCC) from 1988 to 2009. Patients were divided into two subgroups according to the type of operation performed. Group A comprised 192 patients who had ONU with open resection of the bladder cuff from 1988 to 1997. Group B comprised 186 patients in whom transurethral resection of the intramural ureter plus single incision ONU was performed between 1998 and 2009. The mean operative time, hospital stay, duration of catheterisation, bladder recurrence rates, and cancer-specific survival (CSS) were assessed.

Results: The total operative time was statistically significantly less in the endoscopic group (Group B). For catheterisation, patients treated with an open approach

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(Group A) had a statistically significantly shorter duration of postoperative catheterisation. There was no statistical difference between Groups A and B for the bladder recurrence rate (Group A 24% vs 27% in Group B, $P = 0.51$). There was no difference in CSS at the 5-year follow-up.

Conclusions: ONU with transurethral resection of the intramural ureter up to the extravesical fat followed by ureter extraction is an oncologically safe and technically feasible operation.

Introduction

Upper urinary tract TCC (UUT-TCC) is a rare malignancy representing only 5% of all urothelial cancers with the vast majority located in the pelvicalyceal system [1]. UUT-TCC is frequently multifocal and usually diagnosed at a more advanced tumour stage than bladder TCC. The most common symptom is macroscopic or microscopic haematuria in 70–80% of patients [2]. High-risk disease with invasion of the muscle wall is associated with very poor prognosis, and stage, grade, and lymphovascular invasion are recognised prognostic factors [3]. Therefore, the standard treatment for patients with high-risk UUT-TCC and a normal contralateral kidney is open nephroureterectomy (ONU) with ipsilateral bladder cuff excision regardless of tumour location [4]. Currently, laparoscopic and robot-assisted NU are considered as alternative approaches to ONU for low-stage disease, with equivalent oncological results [5].

Nevertheless, controversy still exists concerning the method of choice for managing the distal ureter and bladder cuff during NU. Open resection of the bladder cuff is the 'gold standard' against which all other techniques are compared. An endoscopic alternative is transurethral resection of the intramural ureter deep up to extravesical fat, followed by extraction of the ureter from above the 'pluck' technique [6,7].

The aim of the present study was to evaluate the impact of distal ureter management on the oncological results after ONU, comparing transurethral resection of the intramural ureter to conventional open excision of the bladder cuff.

Patients and methods

In a retrospective single-centre analysis, we collected data from 498 patients who were treated in our Department for UUT-TCC from 1988 to 2009. Patients with previous or synchronous bladder cancer ($n = 26$), as well as patients in whom nephron-sparing surgery was performed (laser ablation or segmental ureterectomy, $n = 78$) were excluded. Patients who were lost during follow-up ($n = 16$) were also excluded. In all, 378 patients were finally evaluated. The patients were divided into two subgroups according to the type of operation performed: Group A, comprised 192 patients who had ONU with open resection of bladder cuff from 1988 to 1997; and Group B, comprised 186 patients in whom transurethral resection of the intramural ureter plus single incision ONU was performed between 1998 and 2009 (Table 1). In 1998, the surgical technique performed was altered to a less invasive novel approach for intramural ureter management. This was independent of tumour location. In the endoscopic approach, the patient was placed in lithotomy position. Cystoscopy was then performed, followed by resection of the intramural ureter with a 24-F monopolar resectoscope. We did not place any ureteric catheters. We treated the ureteric orifice and intramural ureter as we would have done in resecting a bladder tumour. The key point was to reach the level of the perivesical fat, considering that ureter is approximately displaced from under the bladder. During the endoscopic approach the bladder was not fully distended in order to prevent extravasation during the procedure. After catheterisation of the bladder and applying slight irrigation, the patient was repositioned for ONU. Before nephrectomy we dealt with

Table 1 The patients' characteristics.

Variable	Group A	Group B
Number of patients	192	186
Age, years, median	69.2	68.7
Male/female, %	65/35	66/34
n/*N* (%):		
pT Stage		
Ta-T1	92/192 (48)	84/186 (45)
T2	38/192 (20)	39/186 (21)
T3	54/192 (28)	56/186 (30)
T4	8/192 (4)	7/186 (4)
pN+	21/192 (11)	22/186 (12)
Primary tumour location		
Renal pelvis	127/192 (66)	125/186 (67)
Ureter	65/192 (34)	61/186 (33)
Tumour Grade		
I	15/192 (8)	13/186 (7)
II	48/192 (25)	43/186 (23)
III	129/192 (67)	130/186 (70)

the ureter. We meticulously dissected the periureteric tissue down to the lower part of it, pulling the ureter at the same time. Actually, for the last few centimetres the movements were 'blind'. We felt the 'avulsion' of the organ and we secured it by observing the coagulated tip. All patients had a minimum follow-up period of 5 years (median 6.7 years). In all patients, we assessed the mean operative time, hospital stay, and mean duration of catheterisation. Furthermore, bladder recurrence rates and the 5-year cancer-specific survival (CSS) rate were also assessed. A full statistical analysis was performed using the Kruskal–Wallis test to evaluate differences in continuous variables and the chi-square test was used to evaluate the association between categorical variables between Groups A and B. Statistical significance was set at $P < 0.01$.

Results

Of the 378 patients, 192 (51%, Group A) underwent the open surgical approach with resection of the bladder cuff and 186 (49%, Group B) underwent the endoscopic approach with transurethral resection of the intramural ureter followed by ureter extraction. All patients had a minimum follow-up period of 5 years with a 'check' cystoscopy and urinary cytology at 3 months after ONU, and then yearly. The operative time was 143 and 115 min in Groups A and B, respectively ($P < 0.001$). There was no significant difference in hospital stay, at 7.1 days in Group A vs 6.9 days in Group B ($P = 0.14$). For the duration of catheterisation, patients in Group A were catheterised for less time than those in Group B (5.1 vs 5.8 days, $P < 0.001$). Bladder recurrence was detected in 96 patients (25.4%): 46 in Group A (24%) and 50 in Group B (27%). Despite the trend of higher rates of intravesical recurrence in Group B the results were not statistically significant (24% vs 27%, $P = 0.51$). Moreover, there was no difference in CSS between the groups (Table 2).

Discussion

Although recent developments in technology have given urologists the opportunity of treating UUT-TCC with minimally invasive approaches in a kidney-sparing manner, ONU still remains the 'gold standard' therapy for high-risk tumours in patients with a normal functioning contralateral kidney [6–8]. Laparoscopic and robot-assisted NU constitute an alternative to ONU for low-stage disease but controversy still remains about the way in which the distal ureter should be managed [5,9]. Total excision of the distal ureter with its intramural portion, the ipsilateral ureteric orifice and bladder cuff, is essential for optimal treatment of UUT-TCC [10]. The open approach is considered the method of choice in both the transvesical and extravesical approaches [6,11]. There is no doubt that urologists remain sceptical about the endoscopic management of the distal ureter. Nevertheless, endoscopic resection of the intramural ureter followed by ureter extraction is not inferior in terms of overall survival and CSS but it is associated with higher bladder recurrence rates possibly due to tumour spillage or incomplete tumour removal [12–14]. Studies have reported the risk of tumour recurrence within the residual ureteric stump and the periureteric region in cases of incomplete bladder cuff removal to be 30–64% [7,11,15]. Moreover, Li et al. [16] reported no difference in intravesical recurrence rates among patients treated with an endoscopic approach compared to the standard transvesical or intravesical technique; however, the study was limited by the small sample size and short follow-up. Several studies have indicated that bladder recurrence rates are not correlated to the technique used for the distal ureter and further multivariate analysis suggest that a history of previous bladder cancer and multifocality as independent risk factors [17–20].

In the present study, there was no statistically significant difference in the bladder recurrence rates between Groups A and B (24% in Group A vs 27% in Group B, $P = 0.51$). Moreover, the total operative time was significantly less in the endoscopic group. For the postoperative period, patients treated with an open approach had a significantly shorter duration of catheterisation. There was no difference in the 5-year CSS rate between the groups.

Table 2 The perioperative and oncological results.

Variable	Group A ($n = 192$)	Group B ($n = 186$)	P
Mean:			
Operative time, min	143	115	<0.001
Hospital stay, days	7.1	6.9	0.14
Duration of catheterisation, days	5.1	5.8	<0.001
CSS, %	74	75	
Bladder recurrence rates, n/N (%)	46/192 (24)	50/186 (27)	0.51

Conclusions

In conclusion, ONU with transurethral resection of the intramural ureter up to extravesical fat followed by ureter extraction is an oncologically safe and technically feasible operation with a shorter operative time, a trend for shorter hospitalisation and similar bladder recurrence rates as the standard open resection of the bladder cuff.

Conflicts of interest

None.

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