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Original Article

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Outcome of Transurethral Incision Around the Ureteric Orifice to Remove the Bladder Cuff Versus Open Excision of Bladder Cuff in Patients Undergoing Nephroureterectomy for Upper Urinary Tract Transitional Cell Carcinoma

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Keywords: Upper tract urothelial carcinoma, Radical ephroureterectomy, Distal ureter and bladder cuff management, Operative outcome, Oncological outcome.

Abstract

Introduction: *Radical nephroureterectomy with excision of ipsilateral bladder cuff is the gold standard treatment for high risk upper urinary tract transitional cell carcinoma. This procedure requires two incisions. However endoscopic detachment of distal ureter and bladder cuff by transurethral incision and removal of kidney requires single abdominal incision. Though the intention is to decrease morbidity by avoiding a second lower abdominal incision, argument exists regarding oncological outcome*

Methods: *This Quasi-Experimental study was conducted from September, 2020 to August, 2022 in the department of urology, Bangabandhu Sheikh Mujib Medical University. Here 15 patients were in Group A who underwent transurethral incision around the ureteric orifice to remove the bladder cuff (Pluck technique) with single abdominal incision for open radical nephroureterectomy and 17 patients were in Group B who underwent open extravesical approach for excision of cuff of bladder during radical nephroureterectomy making two abdominal incisions. Both techniques were compared to assess the operative and oncological outcome.*

Results: *Operative time was longer in group B ($p<0.001$). Post-operative pain was more in group B ($p<0.001$), median duration of catheterization was 10 days in group A and 7 days in group B ($p<0.001$). Median duration of hospital stay 7 days in group A and 8 days in group B ($p<0.069$). In both group no patient had recurrence of TCC in urinary bladder at 3 months. However at 6 months 3 (20%) patients in group A and 2 (11.76%) patients in group B had recurrence of TCC in urinary bladder ($p=0.645$). In group A 1 (6.7%) patient had metastasis in pelvic cavity at 6 months postoperatively. But no patient in group B had metastasis in pelvic cavity ($p=0.469$).*

Conclusion: *Transurethral incision around the ureteric orifice up to perivesical fat followed by extraction of distal ureter and bladder cuff by pluck technique is technically feasible and oncologically safe operation with a shorter operative time, less postoperative pain but need longer duration of catheterization and drain.*

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Introduction

Upper urinary tract transitional cell carcinoma represents 5% to 10% of all urothelial cancers[10]. Majority (75%) of them are located in the pelvicalyceal system. It is frequently multifocal and usually diagnosed at a more advanced stage than bladder transitional cell carcinoma[4].

Peak incidence occurs in 70-80 years. Most common presentation is haematuria and flank pain, 15% patients are asymptomatic,19% patients present with metastasis at presentation. CT urogram is the diagnostic imaging of choice. Rarely URS biopsy is needed. For all low risk upper tract TCC treatment is nephron sparing surgery [10].

High-grade upper tract urothelial carcinoma is frequently multifocal and carries a risk of ipsilateral ureteral recurrence and thus, standard management for high risk upper tract TCC with contralateral normal kidney is complete removal of the kidney, ureter including the distal segment and bladder cuff regardless of tumor location[1]. Open radical nephroureterectomy with excision of bladder cuff is the gold standard treatment for upper urinary tract transitional cell carcinoma irrespective of tumor location. Two incisions (Flank incision is made for nephrectomy and proximal ureter dissection and Gibson or Pfannenstiel or midline incision is made for management of distal ureter and bladder cuff[7].

In case of extravesical approach mobilization of the distal ureter is done towards its insertion into the bladder. The bladder cuff is excised en block with the full intramural ureter using extravesical clamp[1]. An endoscopic alternative is transurethral circumferential incision 1 cm around the ureteric orifice deep up to perivesical fat with a Collins knife at the onset of the case prior to nephroureterectomy and subsequent plucking of the distal ureter and bladder cuff from above during nephrectomy. The intention is to decrease morbidity by avoiding a second lower abdominal incision. This is known as the 'pluck' technique [1].

Some study compared the intravesical technique for open excision of bladder cuff, extravesical technique for open excision of bladder cuff, and transurethral incision around the ureteric orifice to remove the bladder cuff by pluck technique for distal ureter and bladder cuff management. They found bladder recurrence, local retroperitoneal metastasis in median follow up among intravesical, extravesical and transurethral incision around the ureteric orifice groups. But none of these differences were statistically significant[8].

Concern persist regarding its clinical and oncological (bladder and pelvic cavity tumor recurrence) safety. Because there is theoretical risk of urine extravasation and tumor seeding during endoscopic procedure as the non-occluded ureter along with adjacent bladder cuff is dismembered from the bladder[13].

Different methods have been described for management of distal ureter and bladder cuff. These approaches include open excision of by extravesical or intravesical technique, tranrurethral incision of intamural ureter, an intussusception technique, a transvesical laparoscopic detachment and a laparoscopic stapling method. Each technique has distinct advantages and disadvantages. However there are some oncological debates related to procedure. Several authors mention a theoretical risk of bladder extravasation in endoscopic resection and the possiblity of tumor cell implantation, leading to increased bladder recurrences in the perimeatal area of the resected ureter and metastasis to adjacent pelvic cavity[14].

The aim of the present study was to evaluate the impact of distal ureter management on the operative and oncological outcome after open nephroureterectomy, comparing transurethral incision around the intramural ureter to remove the bladder cuff to conventional open excision of the bladder cuff by extravesical technique.

Methods

After obtaining approval from the Institutional Review Board (IRB) of BSMMU, this Prospective Quasi-Experimental study was conducted in the Department of Urology, BSMMU from September 2020 to August 2022. Study population was patient diagnosed as upper tract TCC admitted in inpatient department of Urology, Bangabandhu Seikh Mujib Medical University. It was 500. Study sample was patients who were selected for radical nephroureterectomy on the basis of my inclusion and exclusion criteria. All patients admitted with upper tract TCC planned for operation in BSMMU who have given consent having age between 18 to 75 years of both gender and tumor located in the renal calyces, renal pelvis and upper ureter. Patients with previous or synchronous bladder cancer, who had locally advanced disease or distant metastasis at the time of diagnosis and any history of

previous ureteric surgery were excluded from the study.

All patients were evaluated pre-operatively by detailed history, physical examination, urinalysis and culture sensitivity, USG of Kidney, Ureter and Urinary Bladder region with MCC and PVR (by Philips affinity 30 model), Urine cytology, Serum creatinine, Computed tomography urography, cystoscopy. Preoperative ureteroscopic biopsy was considered in selective cases when imaging and urine cytology were inconclusive for diagnosis. Fitness for general anaesthesia was assessed. Informed written consent were signed by all patients after being informed about the diagnosis, planned operation technique, probable complications and their management, outcome of treatment and follow-up related to the procedure.

A total of 40 Participants were allocated into two groups. Group A (Endoscopic group or Experimental group): Patients who underwent transurethral incision around the ureteric orifice to remove the bladder cuff (Pluck technique) with single abdominal incision for open radical nephroureterectomy Group B (Open Group or Comparison group): Patients who underwent open extravesical approach for excision of cuff of bladder during radical nephroureterectomy making two abdominal incisions. First cystoscopy was performed to rule out coexisting bladder tumor in both groups. The bladder was thoroughly examined by a 19Fr cystoscope (Karl storz) with a 30° optical system (Hopkins Telescope). Mucosa was carefully checked and correlated with preoperative imaging findings.

In case of group A for next procedure irrigation fluid was changed and 1.55 glycine was used. Bladder was kept partially filled to prevent excessive extravasation during the procedure. Then a circumferential incision 1cm around the ureteric orifice was made up to prevesical fat using Collins knife and 26Fr continuous flow resectoscope with monopolar electrode with cutting power set at 110-120W in a semi-filled bladder. After compete haemostasis patient was catheterized. The patient was repositioned for open nephroureterectomy in modified flank position. Flank incision (Single) was made. Retroperitoneal space was entered. After making an incision along the white line of Toldt, the ipsilateral colon was mobilized to expose the fascia of Gerota. Renal hylum was esposed, reflecting duodenum medially on right side. For left sided tumor care was taken to avoid injury to the pancreatic tail and spleen. While approaching for open nephroureterectomy initially the ureter was identified and ligated below the level of tumor prior to mobilizing the kidney. Initially renal artery then renal vein were ligated and divided using 2/0 vicryl. Then entire kidney was mobilized taking care to stay outside the fascia of gerota. On the right side attachment between liver and kidney and on the left side splenorenal ligament are incised allowing mobility of the kidney. Adrenal gland was not removed. Meticulous periureteric dissection was performed and for the last few centimeters movement was blind. We felt the avulsion of the ureter by gentle pulling. Ureter was checked for complete removal by identifying coagulated tip which is called Pluck technique.

In group B standard steps for open radical nephroureterectomy was followed by making two abdominal incisions. For kidney and upper part of ureter patient was kept in modified flank position. Flank incision was made. Retroperitoneal space was entered. After making an incision along the white line of Toldt, the ipsilateral colon was mobilized to expose the fascia of Gerota. Renal hylum was esposed, reflecting duodenum medially on right side. For left sided tumor care was taken to avoid injury to the pancreatic tail and spleen. While approaching for open nephroureterectomy initially the ureter was identified and ligated below the level of tumor prior to mobilizing the kidney. Initially renal artery then renal vein were ligated and divided using 2/0 vicryl. Then entire kidney was mobilized taking care to stay outside the fascia of gerota. On the right side attachment between liver and kidney and on the left side splenorenal ligament are incised allowing mobility of the kidney. Adrenal gland was not removed. Meticulous periureteric dissection was performed. Again patient was repositioned in supine position. For distal ureter and bladder cuff Gibson incision was made. Retroperitoneal space was entered. Peritoneum was mobilized to expose the iliac vessels and ureter was identified while crossing infront of the common iliac artery. Ureter was mobilized and superior vesical pedicle was ligated.Urinary bladder was rotated anteriorly. Two stay sutures were taken on each side of the ureteric orifice. Circumpherential dissection was done away from the detrusor muscle and Waldeyer seath by cutting electrocautery until a rim of bulging bladder mucosa is seen completely surrounding it. Then distal ureter with 10 mm cuff of bladder mucosa was excised extravesically. Then bladder mucosa was closed with 3/0 vicryl round bodied and detrusor

muscle and adventitia was closed with 2/0 vicryl round bodied needle by continuous suture.

Total operative time, post-operative pain (assessed by visual analogue scale on 1st post-operative day), duration of catheterization and duration of hospital stay, duration of drain was assessed. When there was no hematuria, a single post-operative dose of intravesical Mitomycin-C (40mg dissolved into 50 ml 0.9% NaCl), was instilled on all the patients within 2-10 days after surgery. The radical nephroureterectomy specimen was sent to the Department of Pathology, BSMMU with appropriate labeling. When drain tube collection became 10-15 ml serous fluid it was removed. When there was no urine leak and drain tube collection was 10-15 ml catheter was removed. All patients were referred to oncologist postoperatively. During discharge the patients who had enlarged prostate on cystoscopy capsule tamsulosin 0.4 mg was given to continue at night to prevent urine leak.

First out-patient follow–up had been performed at 3 months by history, physical examination, urine cytology and cystoscopy. Second follow–up had been performed at 6 months by history, physical examination, urine cytology and cystoscopy, CT scan of abdomen and pelvis and CT scan of chest. Cystoscopic examination was done at 3 months and 6 months to monitor any recurrence in bladder post operatively. CT scan of abdomen and pelvis was performed at 6 months to monitor any metastasis in the pelvic cavity post operatively.

All the study subjects were assured about their confidentiality and freedom of withdrawing themselves from the study at any time. Among total 40 patients from group-A 5 patients were lost from follow up and from group-B 3 patients were lost from follow up. Finally, 32 patients were analyzed for this study where group A comprised of 15 patients and group B comprised of 17 patients.

Results

Total 32 participants were included in this study. Patients who underwent transurethral incision around the ureteric orifice to remove the bladder cuff (Pluck technique) with single abdominal incision for open radical nephroureterectomy were included in group A and patients who underwent open extravesical approach for excision of cuff of bladder during radical nephroureterectomy making two abdominal incisions were included in group B.

Operative time was longer in group B, median operative time 168 minutes and in group A it was 110 minutes (p<0.001). It has been observed that on visual analogue scale post operative pain was more in group B (p<0.001), median duration of catheterization was 10 days in group A and 7 days in group B (p<0.001). Median duration of hospital stay 7 days in group A and 8 days in group B (p<0.069) and median duration of drain was significantly higher in group A (6.0) compared to group B (4.0) (p=0.004). In both group no patient had recurrence of TCC in urinary bladder at 3 months. However at 6 months 3 (20%) patients in group A and 2 (11.76%) patients in group B had recurrence of TCC in urinary bladder (p=0.645) and there was no significant statistical difference between two groups. In group A 1 (6.7%) patient had metastasis in pelvic cavity at 6 months postoperatively. But no patient in group B had metastasis in pelvic cavity (p=0.469).

Table I: *Distribution of the study subjects by age (n=32)*

Age (in years)	Group A (n=15) n (%)	Group B (n=17) n (%)	Statistics
50-59	4 (26.7%)	2 (11.8%)	p=0.345ns
60-69	9 (60.0%)	9 (52.9%)	
70-75	2 (13.3%)	6 (35.3%)	

n= Total number of patients
Figure within parenthesis indicates percentage
ns= not significant

Table I shows distribution of the study subjects by age that majority of the patients in both groups (group A : 60.0%, group B : 52.9%) were from 60-69 years age group. Fisher's exact test showed that there was no significant statistical difference between the groups regarding age of the patients as p=0.345.

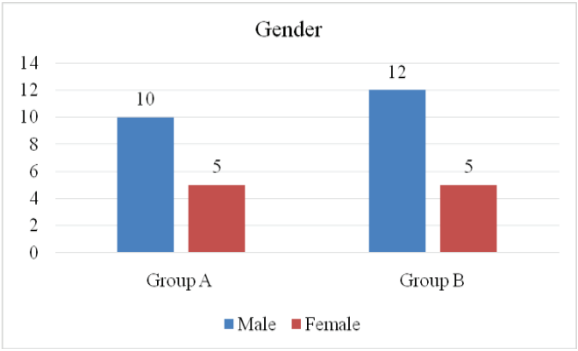

Figure 1: *Distribution of patients by gender*

Figure 1 shows that 10 (66.7%) patients in group A and 12 (70.6%) patients in group B were male.

Table II : *Comparison of patients by duration of operation (n=32)*

Criteria	Group A Median [IQR]	Group B Median [IQR]	Statistics
Duration of operation (in minutes)	110.0 [105.0-120.0]	168.0 [147.0-180.0]	p<0.001[s]

n= Total number of patients
IQR= Interquartile range
s= significant

Table II shows that the median duration of operation time was significantly higher in group B (168.0 minutes) compared to group A (110.0 minutes) (p<0.001). p value obtained from Mann-Whitney U test.

Table III: *Comparison of patients by duration of catheterization (n=32)*

Criteria	Group A Median [IQR]	Group B Median [IQR]	Statistics
Duration of catheterization (in days)	10.0 [10.0- 10.0]	7.0 [7.0- 7.0]	p<0.001[s]

n= Total number of patients
IQR= Interquartile range
s= not significant

Table III shows that the median duration of catheterization was significantly higher in group A (10.0 days) compared to group B (7.0 days) (p<0.001). p value obtained from Mann-Whitney U test.

Table IV: *Comparison of patients by duration of hospital stay (n=32)*

Criteria	Group A Median [IQR]	Group B Median [IQR]	Statistics
Hospital stay (in days)	7.0 [6.0- 10.0]	8.0 [8.0- 9.0]	p=0.069[ns]

n= Total number of patients
IQR= Interquartile range
ns= not significant

Table IV shows that there was no significant statistical difference between the groups regarding duration of hospital stay as p=0.069. p value was obtained from Mann- Whitney U test.

Table V: *Comparison of patients by post-operative pain using Visual analogue Scale (n=32)*

Post-operative pain	Group A (n=15) Median [IQR]	Group B (n=17) Median [IQR]	Statistics
Visual analogue scale	6.0 [5.0- 6.0]	9.0 [8.0- 9.5]	p<0.001[s]

n= Total number of patients
IQR= Interquartile range
s= significant

Table V shows that the median pain score in Visual Analogue Scale was significantly higher in group B (9.0) compared to group A (6.0) (p<0.001). p value obtained from Mann-Whitney U test.

Table VI: *Comparison of patients by recurrence of TCC in the urinary bladder (n=32)*

Growth in urinary bladder	Group A (n=15)	Group B (n=17)	Statistics
At 3 month	0 (0.0%)	0 (0.0%)	NA
At 6 month	3 (20%))	2 (11.76%)	p=0.645[ns]

n= Total number of patients
ns= not significant

Table VI shows that no patient in any group had recurrence of TCC in urinary bladder at 3 months. However, at 6 month, 3 (20%) patients in group A and 2 (11.76%) patients in group B had recurrence of TCC in urinary bladder. Fisher's Exact test showed that there was no significant statistical difference between the groups regarding recurrence of TCC in urinary bladder at 6 months p=0.645.

Table VII : *Comparison of patients by metastasis in the pelvic cavity at 6 months (n=32)*

Pelvic growth	Group A (n=15)	Group B (n=17)	Statistics
Present	1 (6.7%)	0 (0.0%)	p=0.469[ns]
Absent	14 (93.3%)	17 (100.0%)	

n= Total number of patients
ns= not significant

Table V**II** shows that at 6 month, 1 (6.7%) patient in group A had metastasis in pelvic cavity. But, no patient in group B had pelvic growth at 6 month. Fisher's exact test showed that there was no significant statistical difference between the groups regarding metastasis in pelvic cavity at 6 month as p=0.469.

Table VIII : *Comparison of patients by duration of drain (n=32)*

Duration of drain (in days)	Group A (n=15) Median [IQR]	Group B (n=17) Median [IQR]	Statistics
Duration	6.0 [5.0- 7.0]	4.0 [4.0- 5.0]	p=0.004 [s]

n= Total number of patients
IQR= Interquartile range
s= significant

Table VIII shows that the median duration of drain was significantly higher in group A (6.0) compared to group B (4.0) (p=0.004). p value obtained by Mann Whitney U test.

Discussion

The present quasi-experimental study was performed to compare the operative and oncological outcome of transurethral incision of bladder cuff and distal ureter to conventional open radical nephroureterectomy for UUT-TCC. In this study the mean age of the patients was 64.4 years where majority of the patients in both groups were between 60-69 years. In group A it was 60.0% and in group B it was 52.9%. So, relatively elderly patients were majority in number. In a study it was found that median age of the patients in endoscopic group was 69.6 years and in open group was 67.7 years.[14] Which was similar to current study. In another study they found that in transurethral incision group out of 91 patients 52 were above 65 years of age and in open extravesical bladder cuff excision group out of 129 patients 71 were above 65 years of age.[8] Which was also similar to current study. Upper tract TCC was more common in elderly population as long duration is required between exposure to environmental risk factors and occurrence of disease.

According to Rouprêt men are three times more likely to develop UUT-TCC. The majority of the study's participants were men[11]. Male to female ratios in groups A and B were respectively 2:1 and 2.4:1. Other studies also revealed a male majority 2-4:1[6.] Male predominance were more likely to smoke and work in the manufacturing industry and exposure to carcinogen.

The present study found that the total operative time was significantly less in the endoscopic group. The median duration of operation time was significantly higher in group B (open group) (168.0 minutes) compared to group A (Endoscopic group) (110.0 minutes) (p<0.001).

In a retrospective study they reviewed data of 378 patients. The operative time was 143 and 115 min in open and endoscopic Groups, respectively ($P < 0.001$)[4]. In a retrospective study of 30 patients who underwent radical nephroureterectomy at their clinic from January 1997 to January 2007 for upper urinary tract urothelial carcinoma. They found that open group required a longer operation time (mean operation time was181 minutes versus 128 minutes for open and endoscopic group; p<0.05). They found similar results like above mentioned studies. In another study done by Walton et al. (2009), they found that operative duration was significantly decreased in the endoscopic detachment group compared with the open bladder cuff excision group (117 vs 198 minutes, p <0.01). The reason of longer operative time in open group was making two incisions and closure of them required longer time. On the other han for two incisions two positioning of patients were needed.[15]

The pain score was significantly higher in open group (Group B) assessed by visual analogue scale compared to transurethral incision group (Group A) (p<0.001). This result suggests that the transurethral incision has better operative outcome. This might be due to two incisions in group A. One in flank and another one in lower abdomen.

So, far to the best of our knowledge no study compared the post-operative pain between transurethral incision of distal ureter and bladder cuff (Pluck technique) and conventional open excision of distal ureter and bladder cuff in case of radical nephroureterectomy for upper tract transitional cell carcinoma. But visual analogue scale or other score helps to describe standard surgical morbidity due to post-operative pain after major surgery.

Median duration of hospital stay was 7 days and 8 days in group A and group B respectively in our study. However, there was no significant statistical difference

between the groups regarding duration of hospital stay as p=0.069. In a retrospective study they reviewed that there was no significant difference in hospital stay, which was 7.1 days in open surgical group and 6.9 days in endoscopic group (P = 0.14) and the result is similar to this study.[4] In another study they found that in endoscopic group mean duration of hospital stay was 8 days and in open bladder cuff excision group 10 days. Which was not significant statistically (P=0.105) .[15] Its result was also similar to this study. Median duration of hospital stay didn't vary so much. As in open group patient stayed for long time due to pain and in endoscopic group patient stayed for long time due to increase drain tube collection and increase duration of catheterization.

In a retrospective study of thirty patients they divided into two groups according to procedure performed to deal with the distal ureter and bladder cuff. Group I (n:12) was comprised of patients who underwent an open surgical procedure, and group II (n:18), was comprised of patients who underwent an endoscopic approach. They found that Group I had mean duration of hospital stay 5.6 days and group II had mean duration of hospital stay 9.2 days with a p<0.05 and it was statistically significant. This result doesn't match with this study.[15] But they did not explained the cause of short duration of hospital stay in open group.

In present study patients treated with an open approach had a significantly shorter duration of catheterization. The median duration of catheterization was significantly higher in group A (10.0 days) compared to group B (7.0 days) (p<0.001).

In a retrospective study they reviewed for the duration of catheterization. Patients in Group A (open group) were catheterized for less time than those in Group B (Endoscopic group) (5.1 vs 5.8 days, P < 0.001) which was similar to current study[4]. In another study they found that in endoscopic group mean duration of catheterization was 8 days and in open bladder cuff excision group 9 days. P value was 0.14. This is not similar to present study but they have not explained the cause.[15] In current study shorter duration of catheterization was needed in open excision group as we have closed the bladder wall with suture. So there was less chance of leakage of urine. But in endoscopic group bladder was not closed, so longer duration of catheterization was needed. In this study the median duration of drain was significantly higher in group A (6.0) compared to group B (4.0) (p=0.004). In pluck technique longer duration of drain was required as urinary bladder was not closed by suture and there was probably urine leak. So there was more drain tube collection for longer duration. In a retrospective study they found that open surgical Group had mean duration of catheterization 5 days and in endoscopic group mean duration of catheterization 8.5 days and p value was <0.05 which was similar to current study.[15]

From an oncological point of view the major concern after nephroureterectomy for UUT-TCC is locoregionl and intravesical recurrence of TCC.[6] The rate of bladder recurrence after classic nephroureterectomy is between 23% to 30%. In up to 80% of cases, bladder recurrence appears during the initial 2 or 3 years after treatment of primary UUT-TCC.[7]

In the present study, no recurrence of TCC was observed in urinary bladder at 3 months. However, at 6 month, 3 (20%) patients in group A and 2 (11.76%) patients in group B had recurrence of TCC in urinary bladder during cystoscopic evaluation. P value was 0.999. Overall 15.0% patients had recurrence of TCC in urinary bladder. In a retrospective study they found that bladder TCC recurrence was detected in 96 patients (25.4%). They found recurrence in 46 cases of Group A (24%) and 50 cases of Group B (27%). Despite the trend of higher rates of intravesical recurrence in Group B (endoscopic) the results were not statistically significant (P = 0.51) which is similar to this study.[4]

A study done for 301 patients from January 1990 to December 2007. Among them 81 (26.9%) underwent the intravesical method, 129 (42.9%) underwent the extravesical technique, and 91 (30.2%) underwent TUI. The study showed the recurrence of bladder TCC in 23.5%, 24.0% and 17.6% cases respectively (p = 0.485). Also this result was not statistically significant like current study8. This is more in endoscopic group probably due to tumor seedling during periureteric incision. On the other hand in this study during follow up at 6 month we found only one patient developed metastasis in pelvic cavity in group A (6.7%) and no patient had metastasis in pelvic cavity in group B. No statistical significant difference was found between the groups when follow up at 3 and 6 months. In endoscopic

group it was found probably due to urine extravasation during the procedure. Other investigators found more recurrence of TCC in bladder and metastasis in pelvic cavity due to their longer duration of study. The present result of our study may be due to short duration of follow up only for 6 months. A study was done for 301 patients from January 1990 to December 2007. Among them 81(26.9%) underwent the

intravesical method, 129 (42.9%) underwent the extravesical technique, and 91 (30.2%) underwent transurethral incision. The study showed that local retroperitoneal recurrence of TCC were found in 7.4%, 7.8%, and 5.5% respectively (p = 0.798). Also this result was not statistically significant like current study.[8]

Conclusion

In this study transurethral incision around the ureteric orifice up to perivesical fat to remove bladder cuff followed by extraction of distal ureter and bladder cuff by pluck technique is technically feasible operation with a shorter operative time, less postoperative pain but need longer duration of catheterization and drain. Recurrence of TCC in the urinary bladder and metastasis in pelvic cavity is found more in pluck technique than open extravesical excision of bladder cuff though difference in both group is not statistically significant.

Conflict of interest

Authors declared no conflicts of interest.

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