Distal ureterectomy techniques in Laparoscopic Nephroureterectomy (LNU) and Robotic-assisted Laparoscopic Nephroureterectomy (RALNU) - A Review of the Literature.

Komninos Christos, Manolas Victor, Stravodimos Konstantinos.

A’ Urological Clinic, School of Medicine, National and Kapodistrian University of Athens, “Laiko” University Hospital, Attica

Corresponding author
Komninos Christos, A’ Urological Clinic, School of Medicine, National and Kapodistrian University of Athens, “Laiko” University Hospital, 17, Ag.Thoma street, PC 11527, Athens, Attica, Greece, Tel. 2132060800, Email: chrkom@yahoo.gr

Abstract
Laparoscopic Nephroureterectomy and Robotic-Assisted Laparoscopic Nephroureterectomy are reported as alternative procedures to the open approach in the management of Upper Tract Transitional Cell Carcinoma (UTTCC). Although, they are considered to be equivalently effective to Open Nephroureterectomy (OUN), controversy still exists regarding the best method for managing the distal ureter and bladder cuff during the laparoscopic and robotic-assisted laparoscopic approach.

This review describes the surgical steps, the advantages and disadvantages of several techniques used for ureter and bladder cuff resection including open excision, transurethral resection of ureteral orifice ('Pluck' Technique), ureteric intussusception and total laparoscopy or robotic-assisted laparoscopy. Although, the existing data does not confirm the superiority of one technique over another, total laparoscopic and robotic-assisted laparoscopic nephroureterectomy with complete laparoscopic dissection and suture reconstruction of ureter and bladder cuff seem to be better tolerated than open nephroureterectomy providing equal efficacy and without deteriorating the oncological outcome. Transurethral resection of the ureteric orifice and the bladder cuff after occlusion of the ureter with a balloon catheter seems to be an attractive alternative option for low
stage, low grade tumors of the renal pelvis and the proximal ureter, in case we would like to avoid a low abdominal incision.

**Key words:**

*Distal Ureterectomy, Laparoscopic Nephroureterectomy, Robotic-Assisted Laparoscopic Nephroureterectomy, Bladder Cuff excision.*

**Introduction**

Upper Tract Transitional Cell Carcinoma (UTTCC) accounts for 5% of all renal tumors and 5% of all urothelial tumors. It commonly develops as multifocal, related to low grade disease and with increased recurrence rates. Given the above disease characteristics, Open Nephroureterectomy (ONU) with bladder cuff excision constitutes the treatment choice of the urothelial carcinoma, irrespectively of the tumor’s localization.

Laparoscopic Nephroureterectomy (LNU) was initially reported back in 1991 as an alternative approach to ONU. Though LNU is considered equivalent to ONU, controversy still exists over the treatment of the ureter’s distal part during LNU and Robotic-Assisted Laparoscopic Nephroureterectomy (RALNU). Until today, none of the said techniques prevail over another in terms of perioperative morbidity and oncological outcomes, and so the management of the distal part of the ureter is subject to the surgeon’s discretion.

In surgical oncology, the en bloc resection of the distal part of the ureter and bladder cuff represents the preferred method in managing urinary tract cancer, independently of the technique followed, i.e. ONU, RALNU or LNU. Additionally, it is of great importance that the ureter is clipped prior to ureterectomy to avoid cancer cells dissemination in the perivesical space.

The present review describes the surgical steps followed in every technique for the resection of the distal part of the ureter and bladder cuff when LNU or RALNU is performed and compares the advantages and disadvantages among them.

**Advantages of LNU and RALNU**

Both LNU and RALNU offer the benefits of the minimally invasive techniques; less blood loss, reduced administration of post-operative analgesia and shorter hospitalisation. Moreover, the Da Vinci Robotic System, with its advantageous properties, such as the 7 degrees of freedom, 3-dimensional imaging and tremor stabilization, is featured to significantly reduce the technical difficulty of the intra-corporeal suturing. The robotic instruments provide the surgeon with the ability to EndoWrist, which is of essential significance in the preparation and dissection of the distal ureter and bladder cuff since these anatomic elements are not easily approached due to the narrow width of the pelvic
cavity. However, despite the fact that the robot offers significant facilitation in resecting the ureter’s distal part, the patient’s re-positioning and the robot’s re-docking are time-consuming processes and they prolong operation time.

Ureterectomy Techniques

Total ureterectomy with the resection of the bladder cuff, the ipsilateral ureteral orifice and the surrounding vesical wall is deemed necessary, given it reduces the recurrence rate of the disease\(^2\).\(^{10}\). The removal of an en block ‘closed’ system, followed by ureteral orifice occlusion, reflects the ideal method for ureter removal. The avoidance of urine leak is considered a significant parameter in the reduction of any possible cancer cells dissemination.

Several techniques have been reported in the resection of the distal ureter, such as open ureterectomy, ureteral orifice transurethral resection (TUR) (‘pluck’ technique), ureteric intussusception and total LNU or total RALNU\(^{11}\). The oncologic outcomes of the above techniques are summarized in Table 1.

Open Ureterectomy Technique

Open ureterectomy technique is the gold-standard technique to which all the rest techniques are compared. It is usually performed subsequently to nephrectomy. The patient is put in a supine position and a modified Pfannenstiel or Gibson incision is performed. The distal ureter is initially clipped and then resected followed by the bladder cuff. The bladder cuff can be removed either extravesically or via posterior cystotomy, however, the intravesical approach is judged as the most reliable approach in the complete removal of the bladder cuff of the ureter. Subsequently, the bladder is stitched with continuous sutures in 2 layers. The specimen is removed through the same incision. Open ureterectomy can be combined with LNU as well as with RALNU\(^{12}\).

This particular technique is an excellent choice when managing tumors at the distal part of the ureter and conditions for accurate histological examination. Early ureter clipping reduces any possible cancer cells dissemination. Blind extravesical clipping of the ureter should be dealt with special care; the contralateral ureteral orifice may be damaged and the complete removal of the ureter’s distal part is not guaranteed\(^5\). In addition, transvesical removal of the ureteral orifice should be avoided when the urinary bladder nests an active tumor.

The open transvesical method may deliver sufficient resection of the ureter’s distal part and bladder cuff, yet, it violates the continuation of the wall of the urinary bladder both at the cystoscopy and the incision sites. Ureteral orifice TUR constitutes an attractive technique in avoiding the condition.
Ureteral Orifice TUR (‘Pluck’ Technique)

The endoscopic resection of the ureteral orifice has been suggested as supplementary time in ONUs or LNU's, aiming to avoid low abdominal incisions. It is achieved either by transurethral resection of the ureter’s intra-wall segment via the resectoscope’s loop or by an orbicular incision of the ureteral orifice using a Collins knife. The ureteral orifice’s resection is performed in depth, up to the perivesical fat, allowing for the unrestricted extravesical retraction of the ureter. It usually precedes LNU or RALNU, for which the patient has to be re-positioned on his/her side.

Termed as ‘pluck’ technique, this procedure is suggested as oncologically safe in patients with low stage tumors of the proximal ureter. However, it does not constitute the applicable technique in multifocal diseases, tumors detected at the lower tertile of the ureter and in extensive carcinoma in situ, due to the increased possibility of cancer cells dissemination, local recurrence and positive surgical margins (+SM). Furthermore, the procedure is not advised in patients who underwent pelvic radiation and manifest active inflammatory conditions of the urinary bladder.

The non-occlusion of the ureter prior to its incision raises concerns over the possibility of cancer cells dissemination or extraperitoneal recurrences. To avert such condition, various modifications have been postulated.

Tan et al. proposed that the LNU and the ureter's clipping should precede and then proceed with the ureteral orifice TUR with the Collins knife.

Another original technique was described by Agarewal et al. They suggested partial orbicular resection of the ureteral orifice with the Collins knife at first and then the insertion...
of a PDS Endoloop through the cystoscope to ligate the ureteral orifice and finally to completely dissect it.\textsuperscript{16}

Cormio et al.\textsuperscript{18} recently described an innovative technique with the endoscopic placement of a 5-Fr Fogarty balloon catheter prior to the orbicular ureteral orifice TUR. The technique obstructs the affected ureter and urine leak is avoided. Complete ureteral obstruction is intraoperatively checked by intravenous instillation of 5ml of indigo carmine. According to their outcomes, the mean operative time of orifice TUR was 21 minutes; all subjects had negative surgical margins (-SM) and the resection site and the perivesical space were recurrence-free. The authors suggest the above technique as a simple and effective management choice of the intra-wall segment of the ureter during nephroureterectomy for it observes the oncological principle on extravesical cancer cells dissemination avoidance.

In 1999, Gill et al.\textsuperscript{19} suggested an original albeit complex method of safe removal of the intra-wall part of the ureter using two 5mm laparoscopic trocars transvesically placed. In this modified ‘pluck’ technique, a ureteral catheter is introduced inside the affected ureter and an orbicular transurethral incision of the ureter with the Collins knife is performed. Next, the orifice is ligated with a transvesically placed Endoloop through the two trocars. Afterwards, the ureteral orifice is completely resected. The authors reported that the technique in question observes the basic oncologic principles of complete and controlled en bloc resection with minimal urine leak. Comparable techniques, though using 3 trocars but with similar outcomes, have been demonstrated by other authors as well.\textsuperscript{21, 22}

Zou et al.\textsuperscript{17} simplified Gill et al’s technique by using a laparoscopic trocar in the bladder, through which an Hem-O-Lock clip was inserted for the ureter’s obstruction. In this technique, assisted by a resectoscope, via which CO\textsubscript{2} is insufflated, pneumovesicum was established (10-12mmHg). The ureteral orifice and the bladder cuff are resected with the Collins knife. Next, a 10mm trocar is introduced inside the bladder, right above the symphysis pubis and under direct vision with the resectoscope. Then, using the forceps through the trocar, the resected ureteral orifice and the bladder cuff are retrieved to facilitate the placement of 1 or 2 Hem-O-Lock clips to occlude the ureter. The bladder defect is usually not sutured. The technique’s results showed that no patient developed local or distant recurrence during their 18-month follow up. The authors reported that the use of air inside the bladder is presumed to minimize the possibility of cancer cells dissemination compared to the use of liquids, since no floating cells are present in the bladder.

In most of the aforementioned techniques, the extravesical management of the distal ureter can be realized with hand-assisted LNU. Wong et al.\textsuperscript{23} described a hand-assisted LNU technique with cystoscopic en bloc resection of the distal ureter and the ureteral orifice, avoiding the introduction of a trocar in the bladder and the re-positioning of the patient. The patient is placed in a modified lithotomy position and his/her side, where the tumor is detected, is raised by 30° angle. Thusly, we are able to transvesically place the resectoscope for the resection of the ureteral orifice. The first step of the technique includes the transperitoneal LNU, subsequent to the clip placement in the ureter to avoid cancer cells
migration. The rest ureteral part is prepared endoscopically. In particular, while the surgeon provides hand-assisted extravesical tension on the ureter via a low abdominal incision, a second surgeon resects the ureteral orifice transurethrally with the Collins knife allowing for the manual en block removal of the specimen. In this technique, the bladder is not sutured whereas any cancer cells leakage can be averted with the occlusion of the distal ureter either via clips or manually. The authors stated that no patient relapsed after a 10.6-month follow up period.

Similar techniques, avoiding patient re-positioning, have been reported by Vardi et al.\textsuperscript{24} with the use of a flexible cystoscope combined with a 5F electrode.

**Ureteric intussusception**

Various modifications of this approach have been reported\textsuperscript{25,26}; generally, a ureteral catheter is endoscopically inserted at the beginning of the procedure, seconded by nephrectomy. The ureter is prepared up to the bladder, ligaments are placed at the tip of the ureteral catheter to ensure its safety and then the ureter is resected above the catheter. In continuance, the patient is placed in a lithotomy position and the ureter is intravesically intussuscepted, exercising alternating stress on the ureteral catheter. Synchronously, a resectoscope is inserted alongside the reversed ureter to resect the orifice.

Ureteric intussusception is counter-indicated for intraureteral tumors and limited to low stage renal pelvic tumors.

**Total LNU and total RALNU**

Total LNU and total RALNU include the technique of the laparoscopic or robotic-assisted preparation of the distal ureter, which is either extravesically resected- low ‘stapling’ technique- or is totally retrieved along with the surrounding vesical wall. The trocar spacing is similar to that of nephrectomy, albeit differentiated in that all the trocars are moved slightly caudally to ensure better access to the distal ureter. Mainly, they are used in the management of high stage tumors or endoscopically untreatable low stage extensive diseases.

Distal ureter extravesical laparoscopic resection staple-assisted technique has been proposed in an effort to reduce the operative time, while maintaining a dry urinary tract system and avoiding cancer cells dissemination. The technique comprises the initial placement of ureteric clips, followed by the preparation of the ureter up to the ureterovesical junction (UVJ); last, a stapling device (GIA stapler or large Hem-O-Lock clips) is laparoscopically inserted to perform a synchronous resection of the distal ureter and suturing of the vesical segment. If needed, complementary cystoscopic detachment of the ureteral orifice may be performed\textsuperscript{27}. Respectively, the surrounding vesical wall can be laparoscopically staple-free resected with LigaSure\textsuperscript{28}. 
A simpler variation of the ‘stapling’ technique is the hand-assisted laparoscopic en bloc ureterectomy via a harmonic lancet, which seems to be time-effective\(^29\). During the ‘stapling’ technique, the surgeon must be very careful not to compromise the contralateral ureteral orifice or leave any residual parts of the ureter.

Several techniques have been reported on complete resection of the distal ureter, the bladder cuff and the bladder’s suturing. Various combinations, such as total LNU or laparoscopic nephrectomy and robotic excision of the distal ureter\(^30\) or total RALNU with or without re-positioning of the patient \(^31,32\) or re-docking of the robot\(^33\) have been reported to reduce operation time without limiting the visualisation and exposure of the distal ureter and the suturing of the bladder cuff. The basic principles of the above technique include the preparation of the distal ureter, the extravesical orbicular resection of the surrounding bladder deficit and finally the double-layer suturing of the bladder deficit. Commonly, the integrity of the suturing is assessed by filling the bladder with 120 ml of normal saline.

Nanigian et al.\(^30\), in an attempt to portray open ureterectomy, described a transvesical technique, using the robot to complete the ureterectomy. In this technique, laparoscopic nephrectomy precedes and then, the bladder is filled with 250ml of normal saline, followed by a robotic incision at the bladder dome and intravesical resection of the ureteral orifice. The bladder deficit is robotically sutured.

In total RALNU, as described by Tracy C.R\(^31\), a 12-mm trocar is laterally placed at the level of the umbilicus to facilitate the camera view and 3 8-mm robotic trocars are inserted in the midclavicular line 2-3 cm below the coastal arch (A), in the anterior axillary line at the height of the camera’s trocar (B) and in the midclavicular line approximately 8 cm below the camera’s trocar (C), respectively. For the assistant working port, a fifth 12-mm trocar is placed in the median line, 5-8 cm supraumbilically. If the tumor is detected on the right side, an extra (sixth) 5-mm trocar can be placed in the median line below the xiphoid process to retract the liver. Subsequent to the completion of nephrectomy, the robotic arms are detached from the trocars (un-docking) while the patient maintains position. Next, the instrumentation is relocated so that trocar B houses the unipolar scissors converting into the surgeon’s right hand and trocar C which houses the bipolar forceps converting into the surgeon’s left hand. Trocar A is used as a 4\(^{th}\) arm to assist in cystotomy and final restoration. The ureter is prepared up to the UVJ, a supportive suture is placed anteriorly the ureteral orifice’s surface and the distal ureter and bladder cuff resection follow.

Park et al.\(^23\) announced an innovative technique of total RALNU using a hybrid trocar. They inserted a 12-mm trocar supraumbilically to accommodate the camera and two robotic 8-mm trocars, the first in the lateral rectus margin, 3-4 mm infraumbilically and the second in the median line between the umbilicus and the xiphoid process. Additionally, a double-use assistant 12-mm hybrid trocar was introduced midway between the umbilicus and the symphysis pubis. The hybrid trocar houses the insertion of an 8-mm robotic trocar. After the completion of the robotic nephrectomy, the configuration of the trocars changed, i.e. the trocar for the first robotic arm during nephrectomy shifted into an assisting trocar for the
distal ureter management, the trocar for the second robotic arm during nephrectomy replaced the first robotic instrument for the ureter’s resection and the assistant trocar during nephrectomy shifted into a second robotic instrument. The authors announced reduction of the total operative time by 50 minutes compared to patients re-positioned to lithotomy position, better exposure of the lower ureter and facilitation in suturing the bladder deficit.

Hemal et al.$^{33}$ revealed surgical secrets and described an original technique of total RALNU with bladder cuff excision not requiring re-positioning of the patient or re-docking of the robot. Surgical secrets for a successful procedure include the strategic configuration of the trocars to access the kidney, the ureter and the bladder and the early placement of ureter clips immediately after the ligation of the renal arteries. In this way, we minimize the risk of cancer cells dissemination during renal management, the wide bladder cuff excision, in cases where the tumor is detected in the ureter, and the placement of ‘guiding sutures’ laterally to the UVJ. In this technique, at the level of the umbilicus and laterally to the rectus sheath, one 12-mm trocar is placed for the camera and three 8-mm trocars are placed laterally to the rectus abdominal and 7-8cm cephalic to the camera trocar (A), laterally to the rectus abdominal and 7-8cm caudal to the camera trocar (B) and cephalic to the iliac crest in the anterior axillary line (C), respectively. A fifth assistant trocar is placed in the median line, 2-3cm cephalic or caudal to the umbilicus. For the nephrectomy and lymphadenectomy, trocar A is used as the right hand (unipolar scissors) and trocar C as the left hand (Maryland bipolar forceps). Trocar B is an assistant, useful in renal retraction (Prograsp forceps). Following the completion of nephrectomy, the Maryland bipolar forceps is attached to trocar B, the unipolar scissors to trocar C and the Prograsp forceps to trocar A. The instrumentation rearrangement assists in the easy management of the lower ureter. The authors reported that the certain technique produces excellent oncologic outcomes and reduces operative time.

Finally, a novel and promising nephroureterectomy technique is the Laparoendoscopic single-site surgery (LESS), which seems to deliver both operative and aesthetic favourable outcomes. In this particular technique, as described by Lim et al.$^{34}$, one port wrapped by a No7 glove, is supraumbically placed via an incision measuring 4-5 cm. Two 8-mm robotic trocars and two 12-mm assistant trocars are inserted through the 4 fingers of the glove. Nephroureterectomy is completed without re-positioning of the patient while the distal part of the ureter is extravesically removed along with the bladder cuff. Given the LESS technique is the most recent approach in nephroureterectomy, several other studies should be conducted in order to obtain safer conclusions.

**Comparison of the Techniques**

The ideal procedure for nephroureterectomy is the removal of the whole ureter, avoiding the extravesical urine leak containing cancer cells, in reasonable operative time and with
fewer operative complications. A less radical treatment, leaving a residual ureteral abutment, is correlated with recurrence in one third of the patients. All techniques should be compared to open ureterectomy, which remains the gold-standard technique.

Open ureterectomy can be performed either extravesically or intravesically. Li et al. compared the two approaches to the ‘pluck’ technique and concluded that neither of them falls short in lower ureter and bladder cuff excision.

It is not clear whether distal ureter TUR allows for the +SM-free wide ureteral orifice excision. Local recurrence after the ‘pluck’ technique has been reported in a number of cases. On the contrary, Palou et al. reported that 31 patients who had undergone ‘pluck’ ureterectomy, manifested no local recurrence after a median follow up period of 20 months. The above outcomes stress the need for the conduction of randomized studies.

An interesting multicenter retrospective study was conducted on 2,681 patients by Xylinas et al. They compared 3 different approaches in distal ureter management and bladder cuff excision: intravesical, transvesical and extravesical. The study concluded that the endoscopic removal delivers a significantly higher rate of intravesical recurrences compared to the other two equivalent approaches. However, cancer-specific survival (CSS) and overall survival (OS) were the same in all three groups. Furthermore, the study assumes that the laparoscopic approach may constitute an independent factor of increased vesical recurrences. The hypothesis is established in a recently published retrospective study elaborated by the same author both in terms of single factor analysis (SFA) and multiple factor analysis (MFA).

It is still a matter of consideration whether the bladder defect should be sutured following the bladder cuff excision. Brown et al’s findings, raise worries over the oncologic outcome when the cystotomy remains open, particularly in patients ailing in the lower ureteral tertile or the contralateral ureter or in patients with a history of urinary bladder neoplasm.

Comparing the ‘pluck’ technique to that of ureteric intussusceptions, Geavlete et al. alleged that the two techniques share operative time, complications and oncologic outcomes. Their findings were also reproduced by other authors.

Gill et al. announced the distal ureter TUR assisted by two transvesically placed trocars, to achieve early ureter occlusion. Yet, the possibility of metastases at the incision sites creates preoccupation. Also, comparing the technique with the laparoscopic stapling technique, they reported that in the ‘stapling’ technique, +SM, local recurrences and distant metastases, albeit more frequent, were statistically insignificant.

The laparoscopic stapling technique avoids cystotomy and consequently cancer cells dissemination is minimized. Nevertheless, the possibility of residual ureteral mucus, may lead to a higher frequency of +SM. Additionally, any remaining exposed staplers inside the bladder predispose for stone formation; moreover, no histological assessment of the
margins can be carried out⁴⁵. Many authors have compared several ureterectomy
techniques and reported higher rates of +SM and local recurrence in the laparoscopic
stapling technique⁴¹,⁴⁶. However, Tsivian et al. described a variation of the laparoscopic
stapling; they used LigaSure Atlas in 13 patients and reported that the approach did not
induce any local recurrence²⁸.

Hand-assisted LNU is advocated as an intermediary technique between ONU and total LNU.
In a prospective study, patients who had undergone hand-assisted LNU had less
complications, shorter hospitalization and comparable oncologic outcomes in relation to
ONU⁴⁷. In a retrospective study comparing hand-assisted LNU to the laparoscopic stapling
technique and the transurethral ‘pluck’ technique, Brown et al.⁴¹ reported that the
operative time was 60 to 90 minutes longer, the estimated blood loss and the duration of
the catheterization were doubled or tripled in the ‘pluck’ technique, whereas the stapling
technique exhibited higher rate of +SM compared to the other two groups. The authors
suggested that the hand-assisted laparoscopic en bloc ureterectomy with bladder deficit
suturing provides excellent control over the disease and can be performed without
cytoscopy, thusly reducing the operative time.
Total LNU is not widely accepted at present. Disseminated tumor cells (DTCs) via the trocars continue to raise worries although, thankfully, it is uncommon and cited only in case reports\(^4^8\). However, recent data show similar oncologic outcomes between LNU and ONU; LNU prevails given the advantage of a minimally invasive technique\(^7\),\(^4^9\). LNU is reported as equivalent to ONU regarding the negative surgical margins (-SM), the frequency of local recurrences or metastases and CSS\(^5\). Total LNU can be performed either with total laparoscopic distal ureter and bladder cuff excision or with extravesical ‘stapling’. The laparoscopic resection of the distal ureter followed by intracorporeal suturing of the bladder deficit theoretically combines the benefits of a minimally invasive technique with the oncologic outcome of the open technique. Ritch et al.\(^5^0\) undertook a retrospective study in 36 patients. They compared open ureterectomy to the laparoscopic ‘stapling’ technique and the total laparoscopic distal ureter and bladder cuff excision. The study findings showed that the laparoscopic ‘stapling’ technique and the total laparoscopic distal ureter and bladder cuff excision require less operative time and shorter hospitalization compared to open ureterectomy. They also reported that in 50% of the patients who had undergone the ‘stapling’ technique, a residual ureteral orifice was present; the other two groups had no such patient. The authors concluded that patients with extensive disease of the lower ureter should be managed with open ureterectomy, whereas patients with low stage disease should better be managed with total laparoscopic ureterectomy.

The comparative studies of the several nephroureterectomy techniques are outlined in Table 2.

**Conclusions**

Distal ureter excision constitutes an integral part of radical nephroureterectomy however the best technique to manage the distal ureter and bladder cuff resection remains questionable.

Current data do not confirm the superiority of one technique over another. Every technique has advantages and disadvantages; given that the majority of the data derives from case reports or retrospective studies, the conduction of prospective, randomized studies is deemed necessary. Moreover, there is a lack in studies directly comparing LNU to RALNU. In any case, total LNU and total RALNU with whole distal ureter and bladder cuff excision apparently provides equal efficacy and is better tolerated than open nephroureterectomy even though the latter remains the gold-standard, especially when expanded disease of the distal ureter is present. And with the strategic placement of the trocars, there is no need for patient re-positioning or robot re-docking. Similarly favourable results are cited for the hand-assisted laparoscopic nephroureterectomy.

Alternatively, in case we wish to avoid low abdominal incision, the ureteral orifice TUR, secondary to the placement of a balloon catheter for ureteral occlusion, appears to be an attractive choice in the management of low stage diseases in the renal pelvis and the
proximal ureter. However, intravesical approaches always bear the risk of increased intravesical recurrences. Laparoscopic ‘stapling’ technique presents a rather increased risk of +SM, excluding the cases where LigaSure is used.

Περίληψη

Η Λαπαροσκοπική Νεφροουρητηρεκτομή και η Ρομποτικά Υποβοηθούμενη Λαπαροσκοπική Νεφροουρητηρεκτομή αναφέρονται ως εναλλακτικές επιλογές της Ανοικτής Νεφροουρητηρεκτομής στη διαχείριση ασθενών με Καρκίνο Αποχετευτικής μοίρας του Ουροποιητικού Συστήματος. Παρόλο που όμως θεωρούνται ισοδύναμες επεμβάσεις με την Ανοικτή Νεφροουρητηρεκτομή, παραμένει αμφιλεγόμενος ο τρόπος έκτακτης της ενδοκυστικής μοίρας αυτού.

Η παρούσα ανασκόπηση περιγράφει τα χειρουργικά βήματα και τα πλεονεκτήματα και Μειονεκτήματα των διάφορων λειτουργικών πουχησημοποιούνται για την εκτομή του τελικού τμήματος του ουρητήρα, όπως είναι η ανοικτή ουρητηρεκτομή, η διουρηθρική εκτομή του ουρητηρικού στομίου (‘pluck’ τεχνική), η τεχνική εγκολεασμού του ουρητήρα και η ολική Λαπαροσκοπική ή ολική Ρομποτικά-Υποβοηθούμενη Λαπαροσκοπική εκτομή του ουρητήρα. Αν και οι υπάρχοντες μελέτες δεν επιβεβαιώνουν την ανωτερότητα κάποιας τεχνικής συγκριτικά με κάποια άλλη, η ολική Λαπαροσκοπική και η ολική Ρομποτικά-Υποβοηθούμενη Λαπαροσκοπική Νεφροουρητηρεκτομή με καθολική εκτομή της ενδοκυστικής μοίρας του ουρητήρα και του κυστικού τοιχώματος που τον περιβάλλει φαίνεται να είναι καλύτερα Ανεκτές σε σχέση με την ανοικτή εφροουρητηρεκτομή, παρέχοντας ισοδύναμη αποτελεσματικότητα, χωρίς να επηρεάζουν το Ογκολογικό αποτέλεσμα. Εναλλακτικά, σε περίπτωση που θέλουμε να αποφύγουμε τη Χαμηλή κολικική τομή, η διουρηθρική εκτομή του ουρητηρικού στομίου, μετά από τοποθέτηση ουρητηρικού καθετήρα με μπαλόνι απόφραξης, φαίνεται να αποτελεί μια καλή επιλογή για νόσους χαμηλού σταδίου της νεφρικής πυέλου και του εγγύς ουρητήρα.

Λέξεις ευρετηριασμού

Άπω ουρητηρεκτομή, Λαπαροσκοπική Νεφροουρητηρεκτομή, Ρομποτικά –Υποβοηθούμενη Λαπαροσκοπική Νεφροουρητηρεκτομή, εκτομή κυστικού τμήματος ουρητήρα

References


