0022-5347/01/1652-0483/0
THE JOURNAL OF UROLOGY®
Vol. 165, 483–485, February 2001
Printed in U.S.A.

Urologists at Work

A NOVEL ENDOSCOPIC APPROACH TOWARDS RESECTION OF THE DISTAL URETER WITH SURROUNDING BLADDER CUFF DURING HAND ASSISTED LAPAROSCOPIC NEPHROURETERECTOMY

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KEY WORDS: laparoscopy; carcinoma, transitional cell; endoscopy

The experience and use of hand assisted laparoscopic renal surgery continues to expand among urologists.[1–3] Hand assisted laparoscopic nephroureterectomy appears to be a safe, effective technique that provides intact specimen removal and appropriate pathological staging.[4] However, as with the standard laporoscopic approach to nephroureterectomy, no consensus has been reached regarding the optimal technique for excising the distal intravesical ureter with an adequate bladder cuff.

Classic oncological protocol requires resection of a 1 cm. bladder cuff around the involved ureteral orifice to excise and remove completely the distal intravesical ureter. In an attempt to adhere to these oncological principles, a variety of endoscopic techniques have been used for complete resection of the distal intravesical ureter during laparoscopic nephroureterectomy. These approaches include transurethral unroofing of the ureteral orifice before laparoscopic nephrectomy, endoscopic extravesical clipping or stapling of the bladder cuff, combination bladder port/transurethral unroofing of the ureteral orifice, transurethral bladder cuff excision alone and the "pluck" technique with or without transurethral resection.[1–6]

Since the most safe and effective method to complete distal intravesical ureteral resection has not been agreed upon by laparoscopic urologists, all of these techniques continue to be used, each with their own specific advantages and disadvantages. We describe an alternative approach to the removal of the distal ureter with a surrounding bladder cuff during hand assisted laparoscopic nephroureterectomy. The potential advantages of this approach may facilitate hand assisted laparoscopic nephroureterectomy.

METHODS

A 62-year-old man initially presented with gross hematuria. Computerized tomography and retrograde pyelography revealed a 3 × 3 × 5 cm. left renal pelvis mass. Left renal pelvic cytology and ureteroscopy confirmed the diagnosis of transitional cell carcinoma. Cystoscopy and cytology of the bladder revealed no evidence of carcinoma, and metastatic evaluation indicated no evidence of distant disease.

After informed consent was obtained a general anesthetic was given and the patient was placed in the left lateral position without the use of the kidney rest. Hand assisted laparoscopic nephrectomy was performed through a 6.5 cm. midline, periumbilical incision using a pneumosleeve with 2, 5 to 12 mm. ports, 1 of which was in the midclavicular line and the other was in the anterior axillary line at the level of the umbilicus. Before dissection of the renal unit 2 large clips were placed on the proximal ureter to prevent any potential tumor spillage during nephrectomy. After left nephrectomy was completed, a combination of blunt and sharp dissection was used to free the ureter inferiorally to the bladder.

The bladder was filled with 400 cc sterile water through a 3-way Foley catheter. A 1 cm. suprapubic skin incision was then made 3 finger breadths cephalad to the pubic ramus in the midline. A spinal needle was introduced vertically through the incision until water return was evident, thus confirming safe entry into the bladder. Using the hand assist port, the surgeon's left hand was used to palpate and push the bladder upward towards the abdominal wall. A 10 mm. laparoscopic trocar was then placed directly into the bladder, taking care to remain within the extraperitoneal space (fig. 1). A 24Fr offset nephroscope was introduced through the 10 mm. port into the bladder, and the trigone and left ureteral orifice were identified. Through the hand assist port the surgeon's left hand was then used to push the left hemitrigone manually towards the Collins knife, which was introduced through the working port of the nephroscope (fig. 2). To prevent bladder over distention and possible excessive extravasation during the bladder cuff dissection, the bladder was emptied and left to urethral catheter drainage before instillation of irrigant and subsequent endoscopic resection.

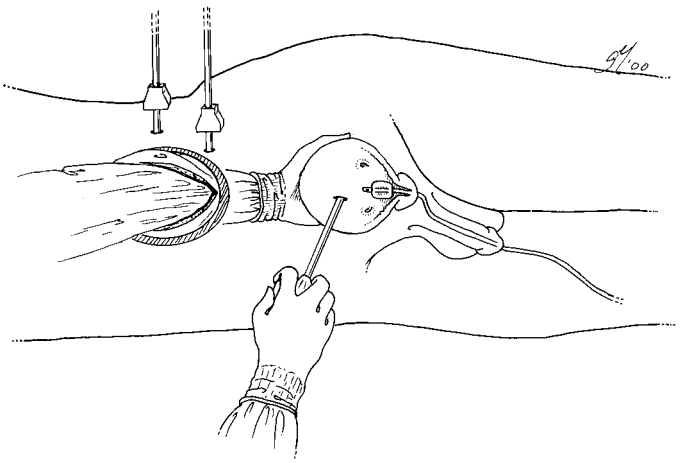

FIG. 1. Extraperitoneal placement of 10 mm. laparoscopic trocar into distended bladder. Surgeon's left hand through hand assist port is used to push bladder upward toward abdominal wall to facilitate placement.

Accepted for publication September 15, 2000.
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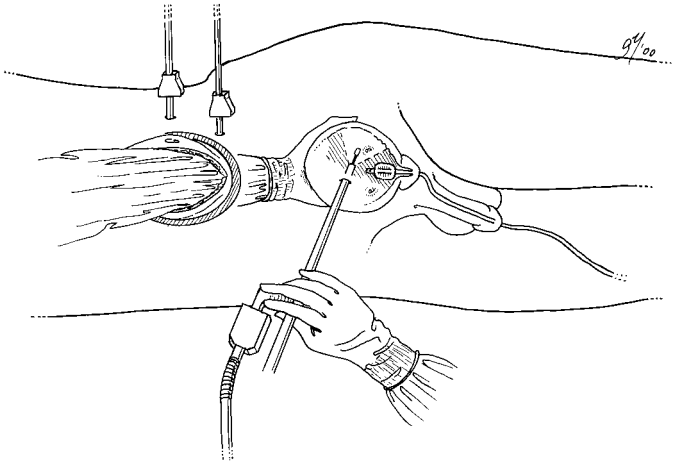

FIG. 2. Nephroscopic visualization of left hemitrigone through 10 mm. port is used to position Collins knife properly before bladder cuff resection. Surgeon's left hand is used to elevate left hemitrigone towards Collins knife. Urethral catheter is left to gravity drainage.

Under direct vision a circumferential 1 cm. incision was made around the left ureteral orifice using the Collins knife at 80 W. of pure cutting current. The tactile sensation of the surgeon's left hand behind the bladder wall was used to facilitate safe, accurate removal of an appropriate sized bladder cuff (fig. 3). Once the bladder cuff was free the surgeon's left hand was used to remove the nephroureterectomy specimen in tact. The bladder was reinspected for bleeding and fulgurated as needed. The bladder port was removed and the urethral catheter was left to gravity. Neither the suprapubic cystotomy nor the bladder cuff resection site was closed with suture. A Jackson Pratt drain was placed in the prevesical retroperitoneal space through the midclavicular port site.

RESULTS

Our patient had American Society of Anesthesiologists class 2 and body mass index of 36 kg./m.^{2}. Total operating time was 290 minutes, which included 60 minutes for intraoperative replacement of a malfunctioning carbon dioxide tank. Estimated blood loss was 250 cc. The postoperative course was unremarkable, and the patient was discharged home 48 hours after the procedure. At the time of discharge Jackson Pratt drainage of the prevesical retroperitoneal space was less than 50 cc daily. Final surgical pathology revealed a pT1N0M0 grade III transitional cell carcinoma of the left renal pelvis. The distal ureter and bladder cuff had no histopathological evidence of carcinoma. The Foley catheter was removed on postoperative day 10 and the patient voided without difficulty. Repeat cystoscopy, cystogram, urine cytology and biopsy of the bladder cuff and port site were normal 2 months postoperatively.

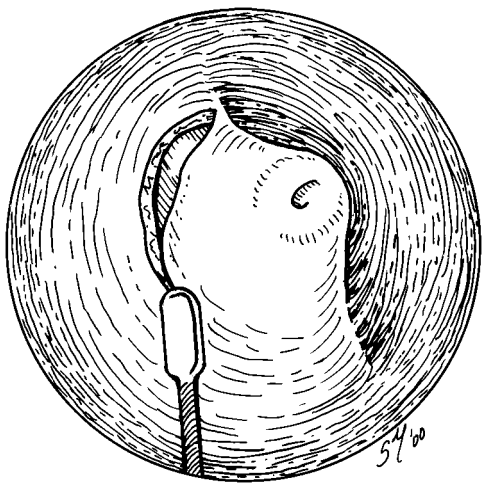

FIG. 3. Bladder cuff resection of left hemitrigone using tactile sensation of surgeon's hand behind bladder and direct visualization through nephroscope.

DISCUSSION

The oncological efficacy of laparoscopic nephroureterectomy appears to be equivalent to that of open nephroureterectomy.[1,5,6] However, the major concern with a laparoscopic approach toward upper urinary tract transitional cell carcinoma involves potential intraperitoneal, retroperitoneal or port site tumor recurrence. Although this type of recurrence has been reported with laparoscopic nephroureterectomy for upper urinary tract transitional cell carcinoma, it is rare.[7–10] In 1 of the largest and most comprehensive series to date comparing open to laparoscopic nephroureterectomy Shalhav et al found no significant difference in cancer specific survival, lower urinary tract recurrence or incidence of metastatic disease between the 2 groups.[6] Furthermore, there was no evidence of excessive intraperitoneal or port site recurrence of transitional cell carcinoma in the laparoscopic group compared to that of the open group at 2-year postoperative followup. Similarly, Gill et al reported the safety and use of percutaneous bladder ports during laparoscopic nephroureterectomy.[5] Their technique involved the percutaneous placement of 2, 2 mm. bladder ports in conjunction with transurethral instrumentation for en bloc removal of the distal ureter with bladder cuff. As in our case primary bladder transitional cell carcinoma was excluded preoperatively. There were no intraoperative or postoperative complications, and at 3-month followup no evidence of port site, lower urinary tract or retroperitoneal carcinoma recurrence.

Our approach involved the use of only a single percutaneously placed 10 mm. bladder port for the entire dissection of the distal ureter and bladder cuff, thus eliminating the need for transurethral instrumentation and associated intraoperative repositioning. The presence of the surgeon's hand through the hand assist port allowed us the distinct advantage of tactile manipulation, which greatly facilitated the ability to perform the entire endoscopic en bloc resection of the distal ureter and bladder cuff through a single port. The use of a larger 10 mm. bladder port did not cause excessive extravasation of water throughout the endoscopic portion of the case. This potential problem was circumvented through the use of manual bladder compression toward the abdominal wall coupled with continuous drainage of irrigant through a large bore urethral catheter. Postoperatively, urine extravasation through the cystotomy sites (bladder port and cuff resection site) was limited as Jackson Pratt drainage of the prevesical retroperitoneal space yielded only 125 cc in 48 hours. Finally, in a further attempt to eliminate any possible upper urinary tract tumor spillage or seeding, we placed 2 large clips on the ureter distal to the known area of upper tract transitional cell carcinoma before nephrectomy.

The major advantages of our technique include use of the surgeon's hand for manual retraction and dissection, eliminating the need for intraoperative repositioning and transurethral instrumentation, adequate drainage of irrigant from the bladder via a large bore urethral catheter and the avoidance of the endoscopic gastrointestinal anastomosis stapler, a device that may leave entrapped transitional cell epithelium behind in a nonabsorbable bladder staple line. Some of the possible disadvantages of this approach include increased postoperative urine extravasation through the creation of 2 cystotomy sites and potential laparoscopic port site tumor spillage or seeding. Previous data on laparoscopic nephroure-

terectomy and the use of percutaneous bladder ports do not seem to indicate that an increased risk of local, intraperitoneal or port site tumor recurrence exists compared to that of other surgical approaches for the management of upper urinary tract transitional cell carcinoma. However, since we have demonstrated this technique in only 1 patient, further data with this procedure are needed to define its role, if any, for the surgical management of upper urinary tract transitional cell carcinoma.

CONCLUSIONS

We describe an alternative surgical approach to endoscopic removal of the distal ureter and bladder cuff during hand assisted laparoscopic nephroureterectomy. The use of only a single bladder port may facilitate complete endoscopic en bloc removal of the distal ureter and bladder cuff without the need for intraoperative repositioning, transurethral instrumentation or dual bladder ports.

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