Clinical Urology
International Braz J Urol
Official Journal of the Brazilian Society of Urology
Vol. 30 (3): 192-198, May - June, 2004

LAPAROSCOPIC PARTIAL CYSTECTOMY IN BLADDER CANCER – INITIAL EXPERIENCE

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ABSTRACT

Proposal: The authors present their initial experience with a selected group of patients who underwent laparoscopic partial cystectomy for treating bladder cancer.

Materials and Methods: In the period from June 1997 to April 2000, 6 patients, aged between 38 and 76 years, having transitional cell carcinoma of the bladder, were identified as candidates to partial cystectomy. The procedure employed consisted in laparoscopic partial cystectomy and lymphadenectomy with exclusive intracorporeal suture technique.

Results: The proposed procedure was completed in all cases. Mean surgical time was 205 minutes and mean blood loss was 200 mL. There were no significant complications during both intra- and post-operative period. Two patients (33%) presented urinary extravasation of less than 50 mL, with spontaneous resolution. Mean hospitalization period was 4 days (2 to 6). The histological analysis of the resected specimens revealed transitional cell carcinoma, stage pT1G3 in case 1, pT2aG2 in cases 2 to 4, pT2bG2 in case 5 and pT3aG3 in case 6. The resection margins, as well as lymph nodes, were free of neoplasia. One patient developed local and metastatic disease, and was treated with salvage chemotherapy. No other case of local or systemic recurrence was observed with a mean follow-up of 30 months.

Conclusions: Laparoscopic partial cystectomy can be an alternative surgical method for treating selected cases of patients with transitional cell carcinoma of the bladder.

Key words: bladder neoplasms; carcinoma; cystectomy; laparoscopy
Int Braz J Urol. 2004; 30: 192-8

INTRODUCTION

Radical cystectomy is the most effective therapy for patients with bladder cancer and remains as the treatment of choice for muscle-invasive disease (1). The success of laparoscopy in the most diverse urological procedures led to its employment in complex pelvic surgeries and in the treatment of bladder cancer (2-5). In selected patients having bladder carcinoma, open partial cystectomy can be performed with similar results and lower morbidity when compared with series of radical cystectomy (6,7).

We report here our initial experience with a selected group of patients with transitional cell carcinoma of the bladder who were treated with laparoscopic partial cystectomy.

MATERIALS AND METHODS

During the period from June 1997 to April 2000, 6 patients aged between 38 and 76 years, having transitional cell carcinoma of the bladder, were identified as candidates to partial cystectomy.

All cases underwent a throughout clinical assessment and radiological and endoscopic examinations for staging the neoplasia. The location, tumor mobility and histological type with grade of invasion were determined by endoscopic assessment, bimanual examination under anesthesia and resection and/or biopsies material, respectively. The staging system adopted in our work was the TNM as proposed by the American Joint Committee on Cancer (AJCC) (8). None of the patients who underwent laparoscopic partial cystectomy presented evidences of extravesical or systemic tumoral involvement at the time of surgery neither had undergone any form of neoadjuvant treatment.

Classic partial cystectomy is contra-indicated in patients with multiple vesical tumors, in the presence of in situ carcinoma, or with tumors involving the bladder neck or the posterior urethra. The selection criteria for laparoscopic partial cystectomy were: single invasive bladder neoplasia located far from the bladder neck or trigone, with no evidence of tumor in other vesical locations according to randomized biopsies, especially in situ carcinoma; bladder with good capacity, with the possibility of obtaining a tumor-free margin of 1,5 to 2 cm; absence of recent history of superficial tumors; and patients with tumors in bladder diverticula.

SURGICAL TECHNIQUE

The surgical preparation for the laparoscopic partial cystectomy is similar to that of open surgery, including the use of mild laxatives for colon hygiene and admission on the day of procedure, with an 8-hour fasting. Crossed testes and blood reservation are routinely performed. All patients receive antibiotic prophylaxis that is started at the moment of anesthetic induction. The procedure is performed under general anesthesia with orotracheal intubation and insertion of vesical and nasogastric catheters, with the latter being removed at the end of the surgery. Ureteral catheterization for eventual identification and/or protection of ureters is performed whenever the lesion is too close to the ureteral meatus.

With the patient under general anesthesia and in Trendelenburg position, the transperitoneal approached is made with 5 ports, similarly to the technique described for laparoscopic radical prostatectomy (4,9). A 10/11 mm trocar is inserted at the level of the umbilical scar and the 0-grade optics is then inserted for reviewing the cavity and inserting the other ports under direct view (Figure-1). The trocars are arranged in the shape of an inverted V, with the vertex at the umbilicus level for the optics, other 2, measuring 10/11 mm, placed adjacent and below the camera for the working forceps and ultrasonic scalpel, respectively, and another 2, measuring 5 mm, laterally close to the antero-superior iliac spine for the aspirator and the auxiliary clamp forceps.

Pelvic lymphadenectomy is performed from the bifurcation of the common iliac vessels following the external and internal iliac vessels along their full length, having the genitofemoral nerve as the lateral limit (4). The empty bladder is posteriorly dissected with the incision of the peritoneum adjacent to the Douglas' cul-de-sac, and is also completely released from the anterior abdominal wall, thus allowing access to the retropubic space. The bladder should be widely mobilized in order to provide enough wall dimensions for the safety margins and vesical closure without tension. A small cystotomy is performed on the bladder dome aiming to inspect the tumor area inside the bladder. Once it is open, while keeping the urethral stent clamped, the bladder rapidly distends with gas, which makes the inspection easier (Figures-2 and 3). The ultrasonic scalpel is used for peritumoral dissection with a safety margin measuring at least 1.5 to 2 cm of apparently normal vesical tissue (Figure-4).

After the tumor is resected, the extraction pouch is inserted and the specimen is placed inside it, being routinely placed in the right iliac fossa for subsequent removal. Freezing biopsies are obtained from the bladder margins and, if negative, closure is performed with continuous suture in 2 separate planes of mucosa and musculature, totally intracorporeal with absorbable 3-0 polyglactine suture (Figures 5 and 6). A vesical catheter is kept inside the bladder and a tubular drain is left in the vesical bed, being exteriorized by one of the orifices in the lateral trocars. The vesical catheter is maintained for 7 to 10 days and the tubular drain is removed as soon as it drains less than 50 mL in 24 hours.

Figure 1 – *Initial laparoscopic viewing of the bladder following umbilical puncture (0-grade optics).*

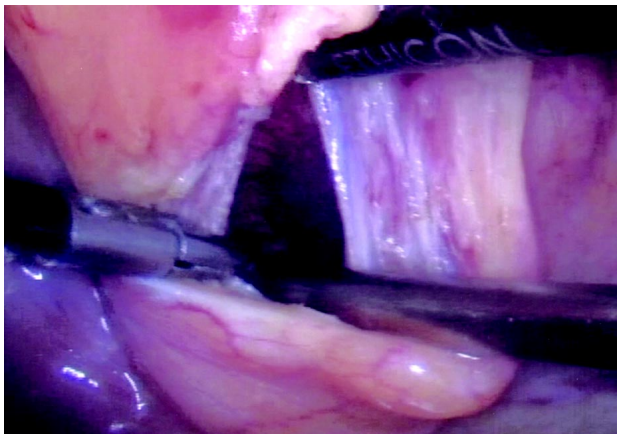

Figure 2 – *Cystotomy for intravesical inspection with optics. Note that the bladder is distended by gas, since the Foley catheter is clamped, making this surgical step easier.*

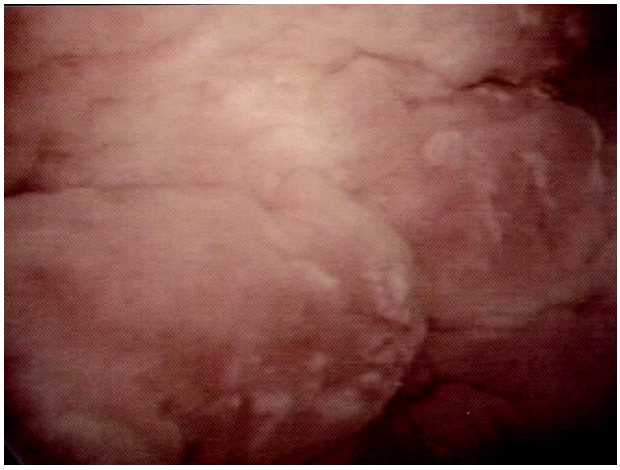

Figure 3 – *Laparoscopic view of the tumor area to be resected.*

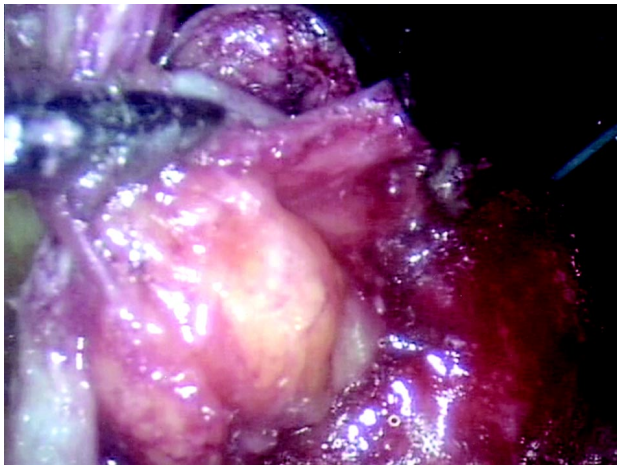

Figure 4 – *Technical transoperative detail of laparoscopic partial cystectomy.*

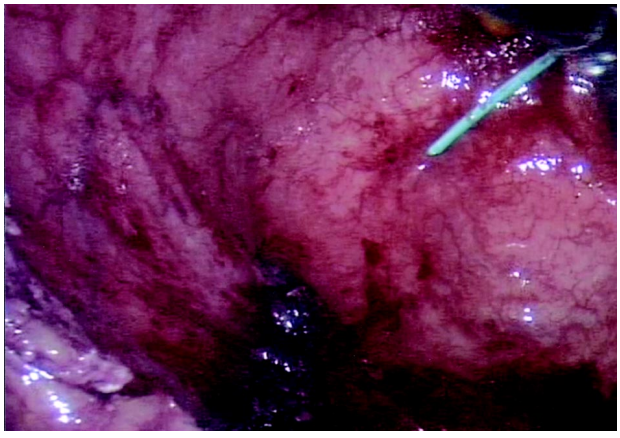

Figure 5 – *Final aspect of the resected area closed in 2 planes with intracorporeal continuous suture.*

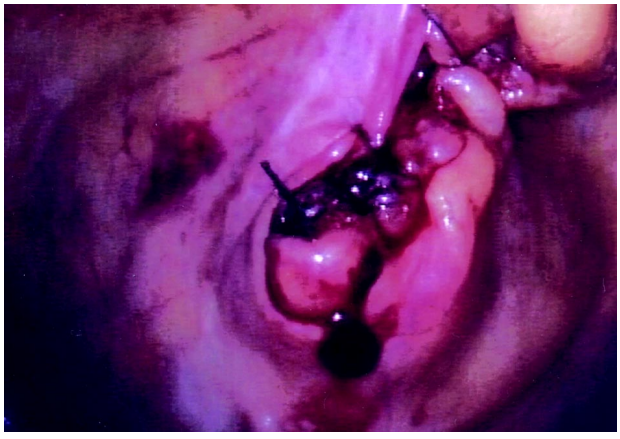

Figure 6 – *Final aspect of cystotomy closure.*

In the first 2 years, the patients in this series were followed by cystoscopy and urinary cytology every 3 months and by pelvic and abdominal computerized tomography and chest radiography every 6 months. If there were no signs of local o systemic recurrence after this period, the exams above were repeated, respectively, semestrally and yearly.

RESULTS

General data relative to patients is listed in Tables 1 and 2. All 6 procedures were completed by laparoscopically without transoperative complications. Sugical time ranged from 150 to 260 minutes (mean = 205 minutes), with blood loss estimated between 100 and 300 mL (mean = 200 mL). Mean hospitalization time was 4 days; 3 patients were released from hospital up to the third post-operative day, 1 was released on the fourth day, and 2 patients remained in hospital until the sixth post-operative day due to urinary drainage by tubular drain of up to 50 mL.

The histological examination of the resected specimens revealed stage pT1G3 in case 1, pT2aG2 in cases 2 to 4, pT2bG2 in case 5 and pT3aG3 in case 6. Lymph nodes and resection margins were free from neoplasia.

All patients remained continent and with normal renal function. With a mean follow-up of 30 months (12 to 50 months) no local or vesical recurrence was detected in 5 patients. One patient presented local-regional disease and metastases in bone and liver after 9 months of follow-up, and was treated with salvage chemotherapy.

DISCUSSION

Some studies have demonstrated that laparoscopic radical cystectomy is feasible, involving lower morbidity, a quicker return of the patient to his/her daily activities and a shorter hospitalization period (3,4,7,10). Other technical advantages with the method include non-performance of laparotomy, re-

Table 1 – *Patients' data.*

Patient	Age	Gender	Clinical stage	Pathology	Complication	Follow-up
1	76	M	Diverticulum	T1G3N0 / CaT	urinary drainage	12 months
2	38	F	T2N0M0	T2aG2N0 / CaT	urinary drainage	15 months
3	59	M	T2N0M0	T2aG2N0 / CaT	no	50 months
4	42	M	T2N0M0	T2aG2N0 / CaT	no	45 months
5	63	M	T2N0M0	T2bG2N0 / CaT	no	45 months
6*	66	M	T2N0M0	T3aG3N0 / CaT	no	16 months

** Patient developed metastatic disease and received chemotherapy.*

Table 2 – *Trans- and post-operative parameters of the present series.*

Patient	Surgical time (min)	Blood loss (mL)	Hospital stay (days)	Opioids (meperidine - dose)
1	240	100	6	-
2	180	150	6	100 mg
3	150	200	3	-
4	200	150	4	30 mg
5	240	80	2	-
6	260	300	3	60 mg

duction in blood loss, lower level of post-operative pain and excellent esthetic results.

Partial cystectomy must be reserved for a group of patients with bladder cancer that comply with strict selection criteria (11-15). Those with single muscular invasive lesion, with no evidence of in situ carcinoma or previous history of superficial multiple tumors, without involvement of trigone or posterior urethra and where a safety margin of at least 1.5 to 2 cm can be obtained would be good candidates to partial cystectomy. Other potential indications for using the technique are vesical tumors enclosed in diverticula and possibly some cases of urachal adenocarcinoma that involve the bladder neck (6,7,11).

In this initial series of laparoscopic partial cystectomy the transperitoneal approach was used with 5 working ports. The use of 5 punctures seems to technically make the procedure easier due to providing 2 lateral punctures with 5-mm trocars for using the aspiration and one additional auxiliary forceps for traction and/or withdrawal, with the latter being highly useful especially during posterior dissection of the bladder, for the reconstructive time and in pelvic lymphadenectomy. In the inevitable comparison with open partial cystectomy, performed by extraperitoneal approach, we have considered to use the laparoscopic extraperitoneal approach in the near future, though we are quite satisfied with the results of laparoscopic transperitoneal approach for all our cases, from nephrectomies to radical cystectomies, with low morbidity rates. We get the impression that the transperitoneal access allows an easier approach, with wider viewing and working fields.

Vesical closure, which is totally intracorporeal, was performed with continuous absorbable suture in 2 planes in the way it is traditionally performed. Two of the 6 patients presented low-volume urinary drainage that resolved spontaneously within a few days. Such fact reinforces the need of 2 important technical precautions: 1) the bladder should be widely mobilized both anteriorly and posteriorly in order to allow for its easy and tension-free closure and 2) the surgeon should properly master the techniques of intracorporeal suture, which, once the learning curve is overcome, are very precise due to the ideal luminosity and the increase in the vision field provided by the camera. The surgeon who chooses this approach should also be prepared for the possibility of transoperative ureteral lesion and laparoscopic ureteral reimplantation. Finally, though the camera provides a better visualization of the area to be removed, we continue to routinely obtain transoperative freezing biopsies of the vesical margins before their closure.

The patients need minimal analgesics and none of them required parenteral medication after 36 hours from the procedure (Table-2). Additionally, very low rates of post-operative complications were observed, following the trend in the majority of published series on laparoscopic procedures in urology (2-5,9,10).

In relation to hospitalization time following laparoscopic surgeries, and using the increasing experience with radical prostatectomy, we considered that differences reported in the literature do not result from the endourologic procedure itself, but to the local health system. In the United States, mean hospitalization time following radical prostatectomy is 2 to 3 days, clearly shorter than European series of laparoscopic radical prostatectomies (9,15). American reports confirm such fact, since laparoscopic radical prostatectomies performed more recently have shown a mean hospital stay of 1,6 days (15). Mean hospitalization time in our series of laparoscopic partial cystectomies was 4 days, reminding that in 2 cases there was urinary extravasation and the patients remained in hospital for 6 days as a cautionary measure. As larger experience is acquired, the hospitalization period should be shortened.

The comparison between our data and historical series, mostly from the 70s, in terms of morbidity, is hard to be done and no conclusion can be drawn from those. However, we could observe an incidence of urinary fistula of approximately 15%, indexes of operative wound infection around 10% and hospitalization period of 1 to 3 weeks (11). There is no well described data concerning surgical time, amount of analgesics employed, bleeding and performance of lymphadenectomies, among others, for proper comparison.

Urinary extravasation following partial cystectomy due to transitional cell carcinoma of the bladder, a fact observed in 2 of our cases, brings an unde-

niable risk of neoplastic cellular implantation. The issue of local and working port recurrences in laparoscopy is controversial and, to this moment, lacks a definitive answer. Peritoneal metastases following laparoscopy have also been sporadically reported, in conditions that are often associated with advanced disease, neoplastic ascites and others, especially gynecologic and gastrointestinal cancers (16-19).

In this initial experience with laparoscopic partial cystectomy, we performed lymphadenectomy and the entire bladder release before accomplishing the cystotomy, in order to minimize the handling of local tissues after the bladder opening. Once the resection of the specimen is concluded, it is immediately placed in the extraction pouch, which is closed and left in the iliac fossa for removal at the end of the surgery. One of the patients with high grade tumor developed local recurrence and metastatic disease, a common fact in cases of high grade bladder carcinoma. We did not identify recurrence in the working ports, neither was this fact observed in the available reports of laparoscopic radical cystectomy and radical prostatectomy, though there are isolated reports on port implantation following laparoscopic pelvic lymphadenectomy in patients with advanced transitional cell carcinoma of the bladder, which is known to have a high dissemination potential (2-5,10,16). In this aspect, a valuable piece of information is provided by historical data on partial cystectomy due to bladder cancer: local recurrences in operative wounds or cystectomy sites were uncommon, and measures such as neoadjuvant radiotherapy or intravesical instillations are probably unnecessary before partial cystectomy (6,11,13). However, a local recurrence has been a constant concern when treating transitional cell carcinoma of the urinary tract by endourology.

There are several publications relative to laparoscopic partial cystectomy in benign bladder diseases, mostly addressing the treatment of vesical endometriosis and, sporadically, other benign rarities such as pheochromocytoma (17-19). In relation to the use of laparoscopic partial cystectomy in transitional cell carcinoma of the bladder, there are no descriptions in the literature to this moment. An unique report, relating therapies of vesical preservation and laparoscopy, was made by Gerber and colleagues who used neodymium: yttrium-aluminum-garnet laser (Nd:YAG laser) with combined cystoscopy and laparoscopy in 5 patients with non-invasive transitional cell carcinoma of the bladder who were candidates to radical cystectomy. Laparoscopy was used to keep the intestinal loops away from the bladder and to monitor the use of intravesical laser, and in 2 cases the bladder serosal surface was treated with laser by laparoscopic route as well. Results were quite poor after 9 months, with 4 of the 5 patients developing systemic disease (20).

While reviewing the literature, it is clear that many issues concerning isolated surgical procedures for vesical preservation in bladder carcinoma remain incompletely evaluated. Classic series of partial cystectomy achieve considerable 5-year survival rates, ranging from 50% to 70% when strict selection criteria are employed (6,7,11,12). It must be stressed, however, that less than 10% of patients in large series reporting bladder cancer have criteria for indicating partial cystectomy (12-14). Our initial series with selected patients presents disease-free survival rates around 80%, with a mean follow-up of 30 months. Finally, though the majority of authors do not recommend laparoscopic radical cystectomy before the surgeon has properly mastered the technique of laparoscopic radical prostatectomy, the laparoscopic partial cystectomy is relatively easier to be performed, though some experience with urologic laparoscopic pelvic surgery is required, as well as skills in intracorporeal suture (4,5).

CONCLUSIONS

In spite of not being performed frequently, there is a place for partial cystectomy in a special group of patients with transitional cell carcinoma of the bladder. Technically, the laparoscopic partial cystectomy can be performed while keeping the same basic principles for resection and reconstruction established for classic open partial cystectomy. Potential advantages of laparoscopic technique in patients undergoing partial cystectomy are lower post-operative morbidity, shorter hospital stay and faster return to daily activities.

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Received: September 29, 2003
Accepted after revision: April 2, 2004

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