Complications in Laparoscopic Radical Cystectomy. The South American Experience with 59 Cases

Octavio A. Castillo, Sidney C. Abreu, Mirandolino B. Mariano, Marcos V. Tefilli, Jorge Hoyos, Ivan Pinto, Joao B. Cerqueira, Lucio F. Gonzaga, Gilvan N. Fonseca

Sections of Urology, Clinica Santa Maria and Facultad de Medicina Oriente da Universidad de Chile (OAC, JH, IP), Hospital Urologico de Brasilia (SCA), Hospital Moinhos de Vento de Porto Alegre (MBM, MVT), Federal University of Ceara (JBC, LFG), Federal University of Goias (GNF)

ABSTRACT

Objective: In this study, we have gathered the second largest series yet published on laparoscopic radical cystectomy in order to evaluate the incidence and cause of intra and postoperative complication, conversion to open surgery, and patient mortality.

Materials and Methods: From 1997 to 2005, 59 laparoscopic radical cystectomies were performed for the management of bladder cancer at 3 institutions in South America. Twenty nine patients received continent urinary diversion, including 25 orthotopic ileal neobladders and 4 Indiana pouches. Only one case of continent urinary diversion was performed completely intracorporeally.

Results: Mean operative time was 337 minutes (150-600). Estimated intraoperative blood loss was 488 mL (50-1500) and 12 patients (20%) required blood transfusion. All 7 (12%) intraoperative complications were vascular in nature, that is, 1 epigastric vessel injury, 2 injuries to the iliac vessels (1 artery and 1 vein), and 4 bleedings that occurred during the bladder pedicles control. Eighteen (30%) postoperative complications (not counting mortalities) occurred, including 3 urinary tract infections, 1 pneumonia, 1 wound infection, 5 ileus, 2 persistent chylous drainage, 3 urinary fistulas, and 3 (5%) postoperative complications that required surgical intervention (2 hernias – one in the port site and one in the extraction incision, and 1 bowel obstruction). One case (1.7%) was electively converted to open surgery due to a larger tumor that precluded proper posterior dissection. Two mortalities (3.3%) occurred in this series, one early mortality due to uncontrolled upper gastrointestinal bleeding and one late mortality following massive pulmonary embolism.

Conclusions: Laparoscopic radical cystectomy is a safe operation with morbidity and mortality rates comparable to the open surgery.

Key words: laparoscopy; bladder neoplasms; cystectomy; intraoperative complications
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INTRODUCTION

Open radical cystectomy remains the gold standard for the treatment of muscle invasive bladder cancer. Over the last decade, this complex and time consuming operation has been refined and standardized into a safe procedure with a 1-3% operative mortality in most modern series (1). Nonetheless, the overall complication rate after open radical cystectomy and urinary diversion could be as high as 25% to 35% (1). Recently, there has been an increased interest in the laparoscopic approach for radical cystectomy, which could potentially have a positive impact on the morbidity of this operation (2). In this

study, we have gathered the second largest series yet published on laparoscopic radical cystectomy in order to evaluate the incidence and cause of intra and postoperative complications, conversion to open surgery, and patient mortality.

MATERIALS AND METHODS

From 1997 to 2005, 59 laparoscopic radical cystectomies were performed for the management of bladder cancer at 3 institutions in South America (Figure-1), including 51 cases of muscle invasive cancer, 4 cases of recurrent carcinoma in situ (CIS) and 4 cases of salvage operation after chemotherapy failure. All patients had negative metastatic work-out based on chest x-ray and abdominal computed tomography (CT). A 5-port transperitoneal approach was employed in all operations as described in details elsewhere (3,4). Nonetheless, more recently, in all institutions involved in this study, the camera port has been re-positioned 2 fingerbreadths above the umbilicus, thus facilitating the complete resection of the uracus. Pelvic lymphadenectomy was performed after radical cystectomy using the following boundaries; the pubic bone distally to the bifurcation of the common iliac artery proximally and from the genitofemoral nerve laterally and the obturator nerve inferiorly. All surgical specimens were extracted intact within an impermeable bag either through a 5-6 cm midline incision (46 cases), a 5-12 cm Pfannenstiel incision (6 cases), a perineal incision (1 case of radical cystectomy and concomitant uretrectomy in a male), extension of the stomal incision (1 case), and through the open vaginal vault (5 cases). Out of 13 cases of laparoscopic radical cystectomy in female patients, anterior pelvic exenteration was performed in 8 with concomitant uretrectomy in 5 cases. In 4 cases, the uterus and vagina were spared and in 1 case the patient had a prior hysterectomy. Twenty nine patients received continent urinary diversion, including 25 orthotopic ileal neobladders and 4 Indiana pouches. Only one case of continent urinary diversion was performed completely intracorporeally (Y-shaped ileal neobladder constructed with non-absorbable titanium staples) (5), the others were performed by open surgery through either an infra-umbilical midline incision or a Pfannenstiel incision in a hybrid laparoscopic assisted approach (6). The uretero-intestinal anastomosis were also performed using conventional open surgical techniques except in 2 cases of ileal neobladder, 1 totally intra-corporeally constructed and 1 in which the ureters did not reach the Pfannenstiel incision and had to be anastomosed to neobladder using free hand laparoscopic suturing. The uretero-intestinal anastomosis was performed open surgically in only one (through an extended 12 cm Pfannenstiel incision) case as described by Basillote (7). In the other cases, the recently fashioned reservoir was re-introduced into the abdominal cavity, pneumoperitoneum was restored and the urethra-intestinal anastomosis was preformed laparoscopically. Non-continent urinary diversion was used in 30 patients, including: ileal conduit and cutaneous ureterostomy (3 cases after salvage operation). All procedures were performed by the same primary surgeon at each institution. Data were collected prospectively and analyzed regarding morbidity, mortality and conversion to open surgery.

RESULTS

Mean operative time was 337 minutes (150-600). Estimated intraoperative blood loss was 488 mL (50-1500) and 12 patients (20%) required blood transfusion. All 7 (12%) intraoperative complications were vascular in nature, that is, 1 epigastric vessel injury, 2 injuries to the iliac vessels (1 artery and 1 vein), and 4 bleedings that occurred during the bladder pedicles control. All intraoperative hemorrhages (except the epigastric vessels injury) were managed laparoscopically either by free hand laparoscopic suturing or by the use of the Endo-GIA stapler device. Eighteen (30%) postoperative complications (not counting mortalities) occurred, including 3 urinary tract infections, 1 pneumonia, 1 wound infection, 5 paralytic ileus, 2 persistent chylous drainage, 3 urinary fistulas, and 3 (5%) postoperative complications that required surgical intervention (2 hernias – one in the port site and one in the extraction incision, and 1 bowel obstruction). Overall, the complication rate was
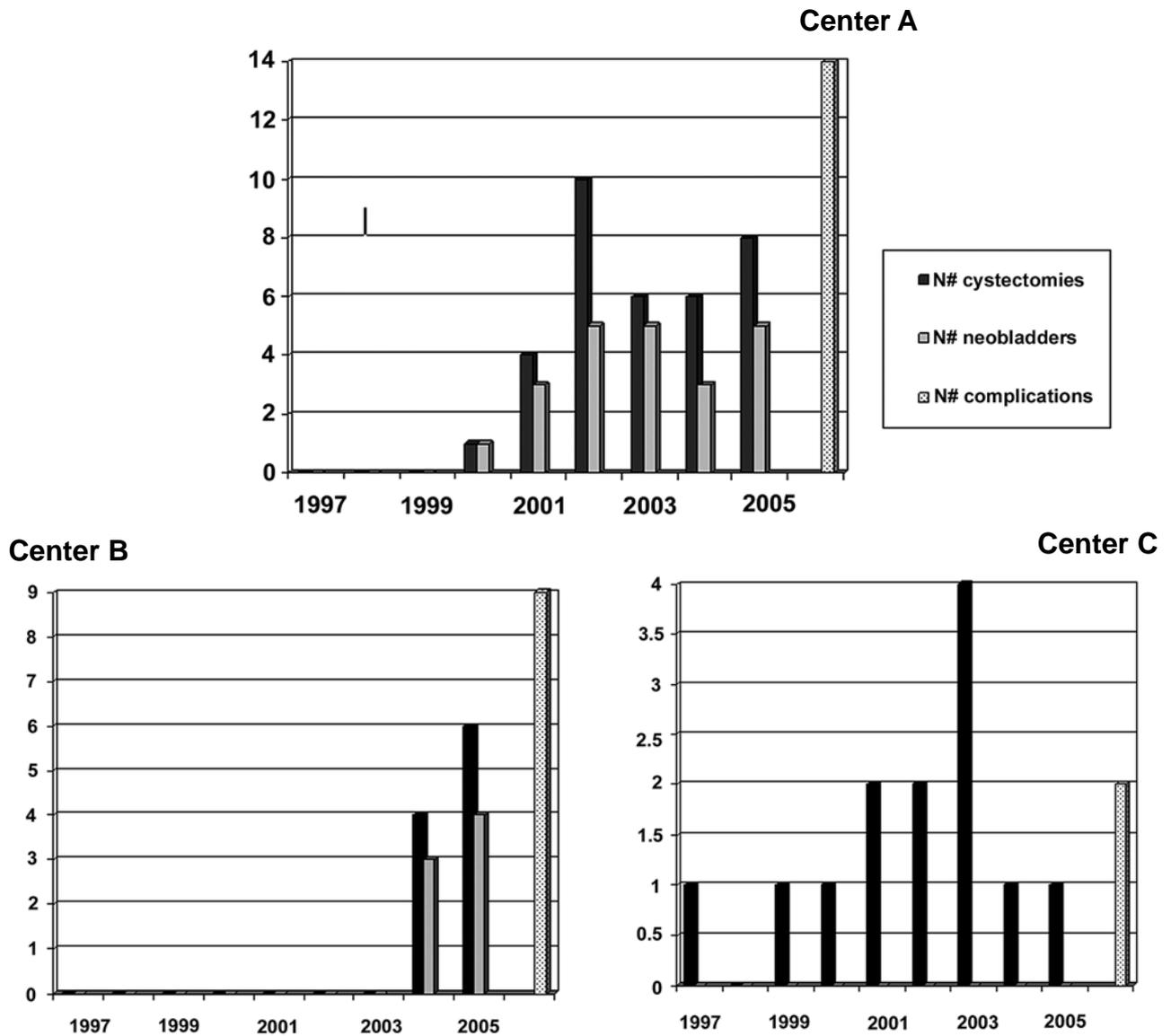
Center A

Center B

Center C

Figure 1 – *Year based distribution (from 1997 to 2005) of 59 cases of laparoscopic radical cystectomy, with the number of continent urinary diversions and also the overall complication rate from each center.*

42% (25 cases). One case (1.7%) was electively converted to open surgery. Two mortalities (3.3%) occurred in this series, one early mortality due to uncontrolled upper gastrointestinal bleeding and one late mortality following massive pulmonary embolism. Final pathology revealed 30 cases (50.8%) of pT2, 11 cases (18.6%) of pT3, 2 cases of pT4 (3.4%) and 8 cases with positive nodes (N+ = 13.5%).

DISCUSSION

Laparoscopic radical cystectomy seems to be a safe minimally invasive approach to bladder cancer. In our series, the overall incidence of complications was 42%, being 7 intraoperative (12%) and 18 postoperative (30%), which is comparable to the 30.5% of complications (only postoperative complica-

tions) that were found after studying 2,538 subjects that underwent open radical cystectomy, with ileus in 9.7%, urinary tract infection in 7.8%, dehiscence in 5.5%, wound infection in 5.2%, and postoperative hemorrhage in 1.8%, requiring transfusion greater than 4 units within 72 hours postoperatively (8). In fact, in a review of 152 laparoscopic radical cystectomies performed at 5 centers, the mean operative time was 398 minutes and the mean blood loss was 605 mL (7, 9-12). Twenty eight complications occurred (18.5%), including 1 dehydration, 1 obturator nerve paresis, 1 pelvic infection, 4 urinary tract infection, 1 injury to the external iliac vein, 1 subcutaneous emphysema in one patient with hypercarbia, 2 pulmonary embolism, 5 urinary fistulas (1 case of neobladder to vagina fistula), 3 hematomas, 1 ureteral obstruction secondary to misplaced ureteral catheter, 1 bladder neck contracture, 1 epididymal abscess, 1 wound dehiscence, 1 internal hernia requiring laparotomy 19 days postoperatively, 2 small rectal tears and 2 partial small bowel obstruction. Conversion to open surgery was required in 3 cases; one patient with a markedly enlarged size bladder tumor that prohibited the posterior dissection between the prostate and rectum safely. The other patient who previously had undergone left nephroureterectomy had to undergo conversion to open surgery after difficult dissection was encountered around the left lateral aspect of the bladder. The third one is also the single case of mortality in this series. This patient presented subcutaneous emphysema leading to hypercarbia, needing conversion to open surgery. Four weeks after surgery this patient died of multiple organ failure.

A few complications in our series are worth to be highlighted. Out of 7 intraoperative complications that occurred, 4 of them happened during control of the vascular pedicles. This may be related to the fact that we have mainly used clips (metallic or Hem-o-lock) or harmonic shears to control the vesical vascular pedicles in our cases, attempting to decrease the intraoperative costs related to the use of disposables such as the Endo-GIA stapler (up to 10 vascular loads could be used in one operation), which represents a great obstacle for laparoscopic radical cystectomy to gain acceptance, specially in developing countries (3,13). In one case, despite an uneventful operation, the patient developed chylous fistula (drain fluid analysis with a high concentration of triglycerides 1015 ng/dL and cholesterol 238 ng/dL). The patient was successfully treated with conservative dietary measures (high protein, low fat, medium chain triglyceride diet and salt restriction) for 3 weeks (3). In order to avoid this problem, we have subsequently carefully clip-ligated any larger lymphatic channel prior to its transaction (14). Overall, 3 patients developed urinary fistulas, one case in which the patient did not follow the recommendations in order to properly empty the neobladder, thus resulting in a significant post-void volume and consequently in a cutaneous urinary fistula formation. Fortunately, this fistula was managed conservatively and healed spontaneously with 14 days of indwelling catheterization. In the 2 remaining cases, a fistula developed due to leakage at the uretero-intestinal anastomosis. In both cases we have experienced difficulties to exteriorize the ureters through the Pfannenstiel extraction incision. In the first case, the uretero-intestinal anastomosis had to be performed intracorporeally using free hand laparoscopically suturing exclusively, which may had contribute to the fistula formation. In the second case, although we managed to perform the anastomosis open surgically, we have probably applied excessive tension and traction to the ureters to pull them up through the incision, perhaps leading to distal ureteral ischemia, focal necroses, and urinary extravasation. Based on these 2 cases, we only recommend the use of the Pfannenstiel incision to perform the urinary diversion in selected patients. In fact, if one anticipates any difficulty to perform bowel mobilization and uretero-intestinal anastomosis through a low Pfannenstiel incision, an infra-umbilical midline incision would certainly be a better option.

Only one case in our series required electively open surgical conversion due to lack of progression in a patient with a high-volume, larger tumor, which precluded proper exposure and dissection of the seminal vesicles and bladder pedicles. This is in line with what have been previously reported by Basillote et al. that had to convert a laparoscopic procedure due

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to the markedly enlarged size (10 cm) of the bladder tumor arising in posterior bladder wall that preclude the posterior dissection between the prostate and rectum safely (7). Based on this experience, we believe that the tumor size (high-volume tumors) is an important criteria for proper patient selection and may represent relative or even a formal contraindication for the laparoscopic approach.

In a review of 1,054 patients that underwent open radical cystectomy, Stein et al. reported a 2.5% (27 patients) perioperative mortality rate (15). In our series, 2 patients died of clinical related causes; one patient with pelvic ankyloses and limited ambulation capacity underwent an uneventful operation and presented deep venous thrombus and massive pulmonary embolism on postoperative day 21. The other patient with past history of peptic ulcer presented uncontrolled upper gastrointestinal tract bleeding on postoperative day 5. Nevertheless, gathering our series (2 deaths in 59 cases) with the series from the 5 centers (1 death in 152 cases) previously described we will have a 1.4% mortality rate (3 deaths in 211 procedures) following laparoscopic radical cystectomy that favorably compare to the modern series of the open surgery.

Finally, we would like to point out that although this series represents the South America's initial experience with laparoscopic radical cystectomy with encouraging results, all groups involved in this study have familiarity with major laparoscopic surgery, having already successfully performed more than 800 laparoscopic radical prostatectomies in the past years. Based on this, we can also suppose that the complication rate of each institution may be more related to the complexity of the operations performed (number of continent urinary diversions) rather than to the prior experience of each group, see Figure-1.

CONCLUSIONS

Laparoscopic radical cystectomy is a safe procedure with an acceptable morbidity and mortality rates. Although feasible and safe, long term oncological data are mandatory to evaluate its efficacy for the treatment of invasive bladder cancer.

CONFLICT OF INTEREST

None declared.

REFERENCES

1. Jimenez V., Marshall F: Surgery of Bladder Cancer. In: Walsh P (ed.), Campbell's Urology. Philadelphia, Saunders, 8th ed., 2003; vol. 4: chapter 79.
2. Moinzadeh A, Gill IS: Laparoscopic radical cystectomy with urinary diversion. Curr Opin Urol. 2004; 14: 83-7.
3. Abreu SC, Silveira RA, Cerqueira JB, Regadas RP, Gonzaga LF, Fonseca GN: Stapleless laparoscopic assisted radical cystectomy with ileal neobladder in a male and with ileal loop in a female: initial report from Brazil. Int Braz J Urol. 2005; 31: 214-20.
4. Abreu SC, Gill IS: Laparoscopic Radical Cystectomy: In: Cadeddu J (ed.), Laparoscopic Urologic Oncology. New Jersey, Humana Press Inc. 2003; p. 297-304.
5. Abreu SC, Messias FI, Argollo RS, Guedes GA, Araujo MB, Fonseca GN: Laparoscopic assisted radical cystoprostatectomy with Y-shaped orthotopic ileal neobladder constructed with non-absorbable titanium staples through a 5 cm Pfannenstiel incision. Int Braz J Urol. 2005; 31: 362-7; discussion 368-9.
6. Abreu SC, Fonseca GN, Cerqueira JB, Nobrega MS, Costa MR, Machado PC: Laparoscopic radical cystectomy with intracorporeally constructed Y-shaped orthotopic ileal neobladder using nonabsorbable titanium staples exclusively. Urology. 2005; 66: 657.
7. Basillote JB, Abdelshehid C, Ahlering TE, Shanberg AM: Laparoscopic assisted radical cystectomy with ileal neobladder: a comparison with the open approach. J Urol. 2004; 172: 489-93.
8. Huang J, Xu KW, Yao YS, Guo ZH, Xie WL, Jiang C, et al.: Laparoscopic radical cystectomy with orthotopic ileal neobladder: report of 33 cases. Chin Med J (Engl). 2005; 118: 27-33.
9. Moinzadeh A, Gill IS, Desai M, Finelli A, Falcone T, Kaouk J: Laparoscopic radical cystectomy in the female. J Urol. 2005; 173: 1912-7.
10. Cathelineau X, Arroyo C, Rozet F, Barret E, Vallancien G: Laparoscopic assisted radical cystectomy: the Montsouris experience after 84 cases. Eur Urol. 2005; 47: 780-4.
11. Hemal AK, Kumar R, Seth A, Gupta NP: Complications of laparoscopic radical cystectomy during the initial experience. Int J Urol. 2004; 11: 483-8.

12. Hollenbeck BK, Miller DC, Taub D, Dunn RL, Khuri SF, Henderson WG, et al.: Identifying risk factors for potentially avoidable complications following radical cystectomy. J Urol. 2005; 174: 1231-7; discussion 1237.

13. Abdel-Hakim AM, Bassiouny F, Abdel Azim MS, Rady I, Mohey T, Habib I, et al.: Laparoscopic radical cystectomy with orthotopic neobladder. J Endourol. 2002; 16: 377-81.

14. Finelli A, Gill IS, Desai MM, Moinzadeh A, Magi-Galluzzi C, Kaouk JH: Laparoscopic extended pelvic lymphadenectomy for bladder cancer: technique and initial outcomes. J Urol. 2004; 172: 1809-12.

15. Stein JP, Lieskovsky G, Cote R, Groshen S, Feng AC, Boyd S, et al.: Radical cystectomy in the treatment of invasive bladder cancer: long-term results in 1,054 patients. J Clin Oncol. 2001; 19: 666-75.

Correspondence address:
Dr. Sidney C. Abreu
Hospital Urológico de Brasília
SEP Sul, Q. 714/914
Ed. Sta. Maria, térreo
E-mail: sidneyabreu@hotmail.com