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*Piotr L. Chłosta[1, 2, 3, 5], Tomasz Drewa[3, 4], Paweł Olejniczak[3], Jakub Dobruch[1, 2], Mateusz Obarzanowski[3], Łukasz Nyk[2], Michał Andrzej Skrzypczyk[2], Andrzej Borówka[1, 2, 3]

Laparoscopic radical cystectomy: operative and pathologic outcomes

Radykalne wycięcie pęcherza moczowego metodą laparoskopii: ocena wyników pooperacyjnych i patologicznych

[1]Department of Urology, Medical Centre of Postgraduate Education Warsaw
Head of the Dept.: Prof. Andrzej Borówka, MD, PhD
[2]Department of Urology, European Health Centre Otwock
Head of the Dept.: Prof. Andrzej Borówka, MD, PhD
[3]Department of Urology, Holy Cross Cancer Centre Kielce
Head of the Dept.: Prof. Piotr L. Chlosta, MD, PhD
[4]Department of Tissue Engeneering Collegium Medicum Nicolaus Copernicus University, Bydgoszcz
Head of the Dept.: Prof. Tomasz Drewa, MD, PhD
[5]Department of Health Science, Jan Kochanowski University, Kielce

S u m m a r y

Introduction and Objectives. The standard management in invasive bladder cancer patients is radical cystectomy (RC). After cystectomy urinary diversion is often based on conduit or ileal neobladder. Last decade to minimize invasiveness of RC, laparoscopic radical cystectomy was proposed. Wordwide experience in LRC is not high, neverless the nuber of this procedure increases in time.

We report our experience with lLRC evaluating efficacy and safety.

Material and methods. From February 2006 to June 2008 we performed 22 LCRs in the 22 consecuitive cases of locally advanced bladder cancer (cT2-3N0M0).

Results. In 21 patients the procedure was preformed laparoscopically. In one case, because of technical difficulties, conversion to standard, open technique was necessary. The mean time of the surgery was 290 min (270-340 min). The mean blood loss during LCR was 220 mL (from 190 to 550 mL). Blood transfusion was necessary in two cases of LCR. Mean number of removal lymph nodes was 17 (15-25). Three patients (13.5%) had active tumor in the resected lymph nodes. The postoperative course was uncomplicated. Mean hospital stay was 8 days (5-18 days)

Conclusions. LCR is technically advanced surgical procedure in the management of invasive bladder cancer. LRC offers complete bladder removal based on oncological criteria in well selected patients and in some of them to create urinary diversion without widespread laparotomy. LRC is less invasive procedure than standard open RC.

Key words: bladder cancer, laparoscopic radical cystectomy, operative and pathologic utcomes

S t r e s z c z e n i e

Wstęp. Klasycznym sposobem chirurgicznego leczenia raka naciekającego błonę mięśniową pęcherza moczowego jest otwarta cystektomia radykalna (RC). Po wycięciu pęcherza wytwarza się nadpęcherzowe odprowadzenie moczu lub rekonstruuje sie pęcherz z izolowanego fragmentu jelita. W ostatnim czasie, w celu zmniejszenia inwazyjności RC, zaproponowano wykonywanie tej operacji metodą laparoskopową (LRC). Doświadczenie światowe dotyczące LRC nie jest jeszcze duże, niemniej liczba zwolenników tej operacji stopniowo zwiększa się.

Cel pracy. Dokonanie analizy własnych doświadczeń, dotyczących LCR oraz oceny jej skuteczności i bezpieczeństwa.

Materiał i metody. LRC w okresie od lutego 2006 r. do czerwca 2008 r. wykonano u 22 chorych (21 mężczyzn i jednej kobiety) na miejscowo zaawansowanego raka pęcherza moczowego (cT2-3N0M0).

Wyniki. Operację przeprowadzono w całości metodą laparoskopową u 21 chorych. U jednego chorego, wobec trudności technicznych uniemożliwiających kontynuowanie operacji w technice endoskopowej, dokończono ją w sposób klasyczny (konwersja). Średni czas LRC wynosił 290 min (270-340 min). Średnia utrata krwi w czasie LRC wynosiła 220 ml (190-550 ml). Średnia liczba usuniętych węzłów chłonnych wynosiła 17 (15-25). U trzech chorych stwierdzono przerzuty w regionalnych węzłach chłonnych. Przebieg pooperacyjny nie był powikłany. Średni czas pobytu chorych w szpitalu po operacji wyniósł 8 dni (5-18 dni).

Wnioski. LRC jest operacją trudną technicznie, jednak stwarza możliwość usunięcia pęcherza dotkniętego rakiem zgodnie z zasadami radykalnej chirurgii uro-onkologicznej i u niektórych chorych pozwala na wytworzenie nadpęcherzowego odprowadzenia moczu bez konieczności wykonywania rozleglej laparotomii. Inwazyjność LRC jest wyraźnie mniejsza od inwazyjności RC otwartej.

Słowa kluczowe: rak pęcherza moczowego, laparoskopowa cystektomia radykalna, wyniki pooperacyjne i patologiczne

INTRODUCTION

Radical cystectomy (RC) ist the treatment of choice in both muscle invasive and locally advanced bladder cancer, and for selected patients in non-muscle invasive bladder cancer with highr risk of progression (1, 2).

RC is based on urinary bladder removal in conjunction with the prostate and seminal vesicles in male patients, while urethra and anterior vaginal wall in females.

Integral part of RC in both sexes is regional pelvic lymph node dissection (PLND). After urinary bladder excision urinary diversion is created during the same surgery. It is usually made by ileal conduit or by orthotopic intestinal neobladder reconstruction.

Oncological efficacy is related of pathological stage of disease (T) and regional lymph node invasion (N) (3). The most important criteria is cancer specific survival (CSS) Cafter surgery.

The large series data indicates 5 and 10 years CSS 65-80% and 40-60% respectively after RC (4-6).

In uro-oncology leading centers of excellence, with the biggest experience of laparoscopic urological surgery, the laparoscopic techniques was successfully development to perform RC. They created the fundamental principles to perform both laparoscopic radical cystectomy (LRC) and robot – assisted radical cystectomy (RALRC) in male and female patients (7-10).

Based on our experience with comparison the early results of another centres, we started LRC in Holy Cross Cancer Centre in 2006 (11). Since that time we developed the this technique, and now we perform LRC routinely in properly selected patients, especially those with no – contraindications to laparoscopic surgery.

OBJECTIVE

Aim of this study is to analize our experience in LCR and its short term safety and efficacy.

MATHERIAL AND METHODS

From February 2006 to June 2008 we performed 22 LCRs (21 males and one female) in the 22 consecuitive cases of locally advanced bladder cancer with no clinically lumph nodes involvement (cT2-3N0M0) (tab. 1). Mean patients age was 65,4 yrs (from 55 to 72 yrs).

Laparoscopic radical cystectomy was performed in following steps. Patients positioning in operation table was in Trendelenburg position (fig. 1). During surgery 5 trocars were used (both three 10 mm and two 5 mm trocars) (fig 2). In males, surgery was started from perineal incision between rectum and bladder, than vasa and seminal vesicles were divided together with posterior prostate surface. After that, proximal part of both ureters was controlled and cut off from the bladder. Anterior surface of the prostate was exsposed in the third part of LCR, and lateral bladder ligaments were controlled hemostaticly; endopelic fascia was sharply divided from the lateral pelvic walls, and dorsal vein complex was ligated and divided. Than the specimen was removed in silicon laparoscopic bag after his cut off from urethra, via minilaparotomy way (fig. 3). In selected patiennts minilparotomy approach was susscesfully used to create urinary diversion.

Table 1. Pathological stage (pT) of the bladder cancer and lymph nodes status in LRC patients.

pT	Number/percentage patients	Lymph nodes involvement (N+)
pT2b	9 (41,5%)	0
pT3a	10 (45%)	0
pT3b	3 (13,5%)	3 (13,5%)

In female patient LCR was started of control uteral ligaments and Douglas cavity peritoneal incision. Than urinary ligaments was controlled. Anterior vaginal wall was completely removed with conjunction with urethra and posterior bladder wall. The specimen consisting with urinary bladder, urethra, uterus, anterior vaginal wall and adnexes was completely removed via vagina. Than, before PLND vagina was completely closed.

PLND was started usually from right side (fig. 4). Lymphatic tissue around external, internal iliac vessels and obturator foss were removed initially. After that, commom iliac llumphatic tissue and presacral nodes were excised. Cranial margin of LND was always the region above aorta and vena cava inferior bifurcation. During LND two bipolar graspers, monopolar Metzenbaum scisors, suction tube and harmonic scalpel were used.

Ileal conduit urinary diversion was made by minilaparotomy approach, after left ureter to right side reposition below the mesentery in18 (82%) patients (fig. 5).

Otrhotopic bladder replacement was made in three (13,5%) patients via both minilaparotomy and pure laparoscopy technique (fig. 6). Ureterocutaneostomy was made in one (4,5%) patient because simoultanously performend laparoscopic contralateral nephroureterectomy.

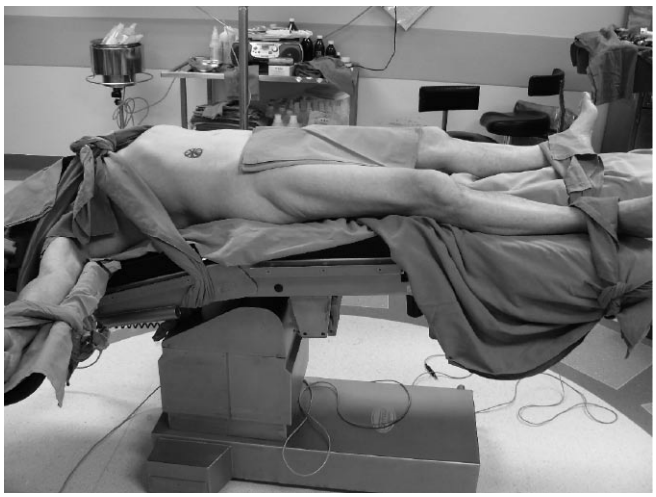

Fig. 1. Patient positioning for laparoscopic radical cystectomy.

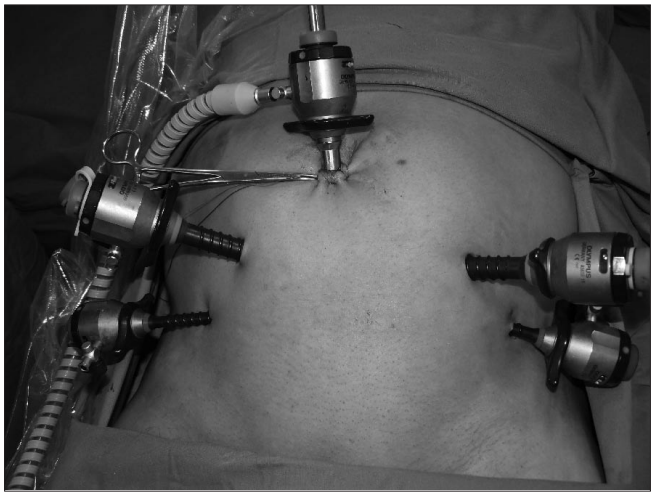

Fig. 2. Trocars placement for laparoscopic radical cystectomy.

Fig. 3. Specimen removal via minilaparotomy way.

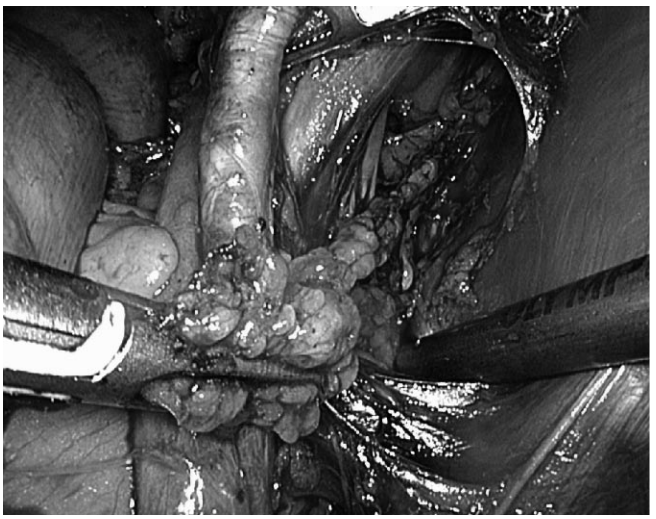

Fig. 4. Pelvic lymph node dissection on the right side.

Fig. 5. Abdomen view after laparoscopic radical cystectomy (LCR) and ileal conduit urinary diversion.

Fig. 6. Abdomen view after LCR and orthotopic bladder replacement via minilaparotomy way.

The choice of the ileal fragment to neobladder creation was made in endovision technique in pure laparoscopic way. Ileal anastomosis, ileal loop detubularisation, totally posterior and partially anterior neobladder wall formation was made by minilaparotomy. Neobladder and urethra anastomosis, uretero – ileal anastomosis and final anterior neobladder formation was made by pure laparoscopic way. Uretero – ileal anastomosis was usually stented by 6F ureteral catheters. Tightness control of urethro – neobladder anastomosis was made by irrigation of 200-300 mL physiological solution of

natrium chloratum via transurethral catheter. After surgery two 14 F suction Redon's tube was left.

RESULTS

LCR patients was 40% of total number radical cystectomy patients in that time.

LCR without conversion were performed in 21 patients. I one case (4.5%) because of technical problems we decided not to continue the surgery in laparoscopic technique and converted it to standard, open method. I one case iatrogenic injury of the sigmoid colon was occured. This injury was immediately sutured in the same, laparoscopic was by two layers knot sutures. Despite that, in any one case was not intraoperative complications of LRC. Meas operarative time was 290 min (270-340 min). Mean blood loss was 220 mL (190-550). In two casses blood transfussion was necessary. In postoperative course temporary paralytic ileus was observed in 3 (13.5%) patients. One patient (4.5%) in the six day after LRC develop anastomotic digestive leak in palce of mechanical suturing of the ileum,which required surgical intervention by laparotomy. The postoperative course in the rest of the patients was not complicated. The full mobilisation of patients after LRC was achieved on average in the second day. The average hospital stay was 8 days (5-18 days).

Based on postoperative specimen histopathological examination transitional cell cancer was found in 16 (73%), transitional with planoepithelial component in 5 (22,5%), and toally planoepithelial in one (4.5%) patient. Mean number of resected lymph nodes was 17 (15-25). Three patiens (13,5%) has lymph nodes involvement of bladder cancer.

DISSCUSSION

The LRC pioneers are French urologists, and LRC is an procedure with a high level of skills, requiring the urologist's both open and laparoscopic experience (12). However, despite the widespread implementation of the minimally invasive techniques to clinical practice (eg, laparoscopic nephrectomy, adrenalectomy, radicala prostatectomy), LRC shoul be introducing to urological oncology very carefully.

Some authors evaluated LRC with special caution (13, 14). However, the opinions presented in the most recent series are promissing(15-17). To assess the actual value of the LRC is necessary to consider all aspects of technique, perioperative and postoperative results oncological results, the functional outcomes based on urinary divarsion, perspectives and limitations. Than LRC to be similar in oncological efficacy must be complate reflection of standard, open surgery in the techical apects (18).

The intention to Reducing the risk of potential complications associated with LRC, including also shortening the time of the procedure, therefore to carry out the most efficient without limiting the extend of lymph node dissection (19, 20). One of the crucial points is to avoid spillage of cancer cells, by clipping or suturing urethral stamp and clipping ureters before division, and the cutting into any enlarged lymph nodes.

Early oncological results – including also a Polish data – are very promissing (11). The largest series short term data of reccurence free survival after LRC is comparable with open series (21, 22).

The laparoscopic way in advanced bladder cancer surgery may be controversial technique, especually for those, who are not laparoscopic surgeons by have a big experience in open surgery. Final aswer will be available after long term prospective data of large number of patients. Despite pure laparoscopic cystectomy should not be controversial, laparoscopic urinary diversion performed completelly intracorporeally seems to be very difficult.

There is no doubt that the LRC is another step of the development of urological laparoscopy. LRC is less invasive than standard, open RC and provides the same oncological efficacy assessed on histopathological examination, and an equal opportunity to lymph node dissectrion like open RC in well selected patients (23, 24). However, without the data assesing the long-term oncological results, LRC should be considered as an experimental technique.

CONCLUSIONS

Laparoscopic radical cystectomy can be an attractive alternative to open radical cystectomy in well selected patients, especially in those, in whom was not extravesical expansion of cancer, and those in whom lymph nodes status is not suggestive of metastatic disease.

BIBLIOGRAPHY

1. Babjuk M, Oosterlink W, Sylvester R et al.: Guidelines on TaT1 (non muscle invasive) bladder cancer: European Association of Urology Guidelines 2008. EAU 2008; 1-22.
2. Stenzl A, Cowan NC, De Santis M et al.: Guidelines on muscle invasive and metastatic bladder cancer: European Association of Urology Guidelines 2008. EAU 2008; 1-59.
3. Bassi P, Ferrante GD, Piazza N et al.: Prognostic factors of outcome after radical cystectomy for bladder cancer: a retrospective study of homogenous patient cohort. J Urol 1999; 161: 1494-7.
4. Stein JP, Lieskovsky G, Cote R et al.: Radical cystectomy in the treatment of invasive bladder cancer: long-term results in 1.054 ptients. J Clin Oncol 2001; 19: 666-75.
5. Gschwend JE, Dahm P, Fair WR: Disease specific survival as endpoint of outcome for bladder cancer patients following radical cystectomy. Eur Urol 2002; 41: 440-8.
6. Shariat SF, Karakiewicz PI, Palapattu GS et al.: Outcomes of radical cystectomy for transitional cell carcinoma of the bladder: a contemporary series from Bladder Cancer Research Consortium. J Urol 2006; 176: 2414-22.

7. Cathelineau X, Arroyo C, Rozet F et al.: Laparoscopic assisted radical cystectomy: the Montsouris experience after 84 cases. Eur Urol 2005; 47: 780-4.
8. Haber GP, Campbell SC, Colombo Jr JR et al.: Perioperative outcomes with laparoscopic radical cystectomy: ''pure laparoscopic'' and ''open-assisted laparoscopic'' approaches. Urology 2007; 70: 910-5.
9. Haber G-P, Gill IS: Laparoscopic radical cystectomy for cancer: oncological outcomes at up to 5 years. BJU Int 2007; 100: 137-42.
10. Wang GJ, Barocas DA, Raman JD et al.: Robotic vs. open radical cystectomy: prospective comparison of perio-perative outcomes and pathological measures of early oncological efficacy. BJU Int 2008; 101: 89-93.
11. Chłosta P, Antoniewicz AA, Jaskulski J et al.: Technika radykalnego wycięcia pęcherza moczowego metodą laparoskopową: Urol Pol 2008; 61, Supl. 1: 37-38.
12. Wang GJ, Barocas DA, Raman JD et al.: Robotic vs. open radical cystectomy: prospective comparison of perio-perative outcomes and pathological measures of early oncological efficacy. BJU Int 2008; 101: 89-93.
13. Hautmann RE: The oncologic results of laparoscopic radical cystectomy are not (yet) equivalent to open cystectomy. Curr Opin Urol 2009; 19: 522-6.
14. Schumacher MC, Jonsson MN, Wiklund NP: Does extended lymphadenectomy preclude laparoscopic or robot-assisted radical cystectomy in advanced bladder cancer? Curr Opin Urol 2009; 19: 527-32.
15. Chade DC, Laudone VP, Bochner BH et al.: Oncological outcomes after radical cystectomy for bladder cancer: open versus minimally invasive approaches. J Urol 2010; 183: 862-69.
16. Kasraeian A, Barret E, Cathelineau X et al.: Robot-assisted laparoscopic cystoprostatectomy with extended pelvic lymphadenectomy, extracorporeal enterocystoplasty, and intracorporeal enterourethral anastomosis: initial Montsouris experience. J Endourol 2010; 24(3): 409-13.
17. Ng CK, Kauffman EC, Lee MM et al.: A comparison of postoperative complications in open versus robotic cystectomy. Eur Urol 2010; 57: 274-81.
18. Haber G-P, Gill IS: Laparoscopic radical cystectomy for cancer: oncological outcomes at up to 5 years. BJU Int 2007; 100: 137-42.
19. HaberGP,CampbellSC,Colombo Jr JR et al.: Perioperative outcomes with laparoscopic radical cystectomy: ''pure laparoscopic'' and ''open-assisted laparoscopic'' approaches. Urology 2007; 70: 910–5.
20. Huang J, Lin T, Liu H et al.: Laparoscopic radical cystectomy with orthotopic ileal neobladder for bladder cancer: oncologic results of 171 cases with a median 3-year follow-up. Eur Urol 2010; 58: 442–9.
21. Chade DC, Laudone VP, Bochner BH et al.: Oncological outcomes after radical cystectomy for bladder cancer: open versus minimally invasive approaches. J Urol 2010; 183: 862-9.
22. Kauffman EC, Ng CK, Lee MM et al.: Early oncological outcomes for bladder urothelial carcinoma patients treated with robotic-assisted radical cystectomy. BJU Int 2011; 107: 628-35.
23. Wang GJ, Barocas DA, Raman JD et al.: Robotic vs open radical cystectomy: prospective comparison of peri-operative outcomes and pathological measures of early oncological efficacy. BJU Int 2008; 101: 89-93.
24. Cathelineau X, Arroyo C, Rozet F et al.: Laparoscopic assisted radical cystectomy: the Montsouris experience after 84 cases. Eur Urol 2005; 47: 780-4.

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Address/adres:
*Piotr L. Chłosta
Department of Urology,
Holly Cross Cancer Centre
Artwińskiego Str. 3, 25-734 Kielce
tel.: +48 (41) 367-47-74
e-mail: piotr.chlosta@onkol.kielce.pl