Laparoscopic Radical Prostatectomy Technical Aspects and Experience with 100 Cases in Rajavithi Hospital

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Objective: *To determine technical aspects, preoperative data and perioperative outcomes in 100 cases of Laparoscopic Radical Prostatectomy (LRP) in Rajavithi Hospital.*
Material and Method*: Retrospective study from October 2005 to January 2010, the first 100 consecutive patients who underwent LRP by the same surgeon were assessed in Rajavithi Hospital. Mean age, clinical stage, preoperative PSA level, Gleason score, operative time, estimated blood loss, perioperative complications, pathological stage and margin status were recorded and analyzed. Statistical analysis is shown in median (Q1-Q3), means ± SD.*
Results*: The mean age was 67.9 ± 6.5 years and preoperative PSA was 19.28 (0.39-105.10) ng/dl. The most clinical stage was T1c (64.8%), Median operation time was 425 (360-600) minutes and blood loss was 1,400 (800-2,475) ml. Laparoscopic bilateral pelvic lymph node dissection was 60 cases and pathologic positive lymph node was 8 cases (13%). The positive surgical margin rate was 21.6%. There were 28 post-operative complications: urine leakage more than 2 weeks (11 cases), rectal injury (10 cases), hematoma (3 cases), lymphatic leakage more than 2week (3 cases), DVT (1 cases). Median catheter time was 7 (6-25) days.*
Conclusion*: Laparoscopic radical prostatectomy is a feasible option for the surgical treatment of localized prostate cancer. LRP can help improve vision and outcome of pelvic surgery which depends on clinical stage and learning curve.*

Keywords*: Prostate cancer, Laparoscopy, Radical prostatectomy, Laparoscopic radical prostatectomy*

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Laparoscopic radical prostatectomy (LRP) is a demanding procedure that requires a long learning curve and significant laparoscopic expertise. We began to perform laparoscopic radical prostatectomy in 2005 according to the technique described by Guillonneau and Vallancien[1]. Now authors would like to report our experience with 100 laparoscopic radical prostatectomies, especially about the technical points and oncological as well as functional results. Since this is a new technique, only short follow-up data are available.

Material and Method

The study was approved by the Research Ethics Committee of the Rajavithi hospital. The authors performed retrospective review of the first 100 consecutive patients who underwent laparoscopic radical prostatectomy with the same surgeon for clinically localized prostate cancer from October 2005 to January 2010 at Rajavithi Hospital.

The authors recorded and analyzed data including mean age, clinical stage, preoperative PSA level, Gleason score, operative time, estimated blood loss, perioperative complications, pathological stage and margin status. The authors followed the technique of laparoscopic prostatectomy described by Guillonneau and Vallancien[1] with some modifications. The patient is placed in the steep Trendelenburg position. The first port was created at infraumbilical area by opened technique. The other port was created under laparoscopic vision. Intraperitoneal approach was performed in the first 50 patients and extraperitoneal approach was performed in the last 50 cases. The extraperitoneal space was created by balloon dissector and port site was created after that.

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The authors used a total of 5 trocars (1 optical 10 mm diameter trocar, 1 working 10 mm trocars and 3 working 5 mm trocars). They were arranged as shown in Fig. 1. The last 5 mm trocar was inserted into suprapubic area that would be beneficial to dissection at posterior and apex of prostate gland. Pelvic lymphadenectomy was performed first in 60% of the patients. The authors operated standard pelvic lymph node dissection as shown in Fig. 2. The authors started procedure by cleaning periprostatic fat and opening endopelvic fascia on both side as shown in Fig. 3A and 3B.

Dissection of bladder neck (BN) was performed by bladder neck preservation technique and then transected the bladder neck as shown in Fig. 3C and 3D. After the transection of BN the authors incised Denonviere's fascia and identified vas deference on both sides. Transection of vas deference was performed and posterior aspect of prostate gland was approached as shown in Fig. 4A. Apex of prostate gland was dissected. Dorsal venous complex was controlled and sutured as shown in Fig. 4B. Prostatic apex and urethra were transected at level of verumontanum as shown in Fig. 4C. Prostate gland was removed from prostatic fossa as shown in Fig. 4D. Vesicourethral anastomosis was performed by Vicryl 2/0 curve 5/8 intracorporeal interrupted fashion. The authors started suture at 5 o'clock and follow suture at 7, 3, 9, 1 and 11 o'clock as

Fig. 1 Number and arrangement of trocars

Fig. 2 Pelvic lymphadenectomy

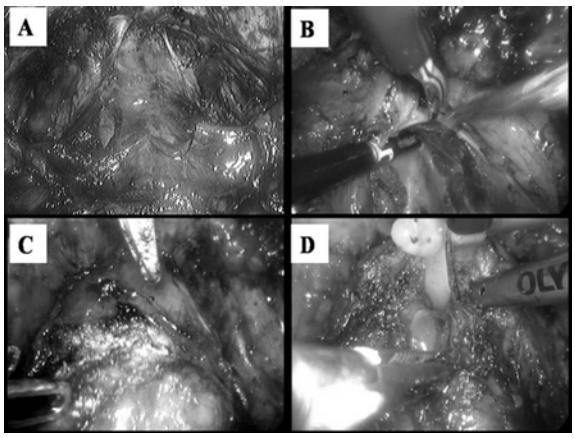

Fig. 3 A: Clean periprostatic fat, B: Opened endopelvic fascia, C: Identified bladder neck, D: Transection of bladder neck

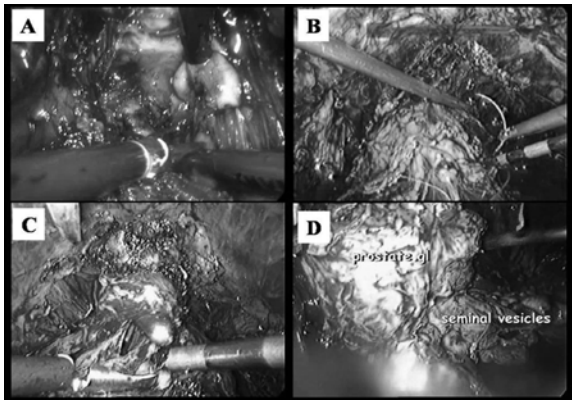

Fig. 4 A: Identified seminal vesicle, B: Control dorsal venous complex vas deference, C: Transection of urethra, D: Removed prostate gland from prostatic fossa

shown in Fig. 5. The last one at 12 o'clock was performed the figure of eight stitch. This technique can reduce leakage at 12 o'clock stitch especially in case of large bladder neck as shown in Fig. 5C. The authors inserted Foley catheter no. 18 Fr before closing the last stitch. The authors also tested leakage by saline irrigation. The prostate specimen was pushed in the bag and tube drain was inserted into the pelvis. The specimen was removed pass through infraumbrilical port and closed abdomen at port site. Skin was closed by subcuticular stitches.

Results

Demographic data

The mean age is 67.9 ± 6.5 years, preoperative PSA is 19.28 (0.39-105.10) ng/dl and the most clinical stage was T1 (70%) as shown in Table 1, Gleason score summary: Score < 7: 39%, Score = 7: 15%, Score > 7: 46%.

Perioperative results

Median operation time was 425 (360-600) minutes. Operation time was compared by Kruskal-Wallis test and between group 1-25 and 26-50, 51-75, 75-100, p-value by Mann-Whitney test were $p < 0.001$ every pair. Median blood loss was 1,400 (800-2,475) ml. Blood loss was comparisons between group 1-25 and 51-75, 75-100, p-value by Mann-Whitney test were p = 0.431, 0.006 and 0.025, respectively as shown in Table 2.

Postoperative results

Laparoscopic bilateral pelvic lymph node dissection: 60 cases, pathologic positive lymph node: 8 cases (13%), Median of prostatic volume: 58 gm (29), positive surgical margin rate: 21.6%, Patient ambulation: post-operative day 2nd, median of catheter time was 7 (4) days. Median of the hospital stay was 8 (4) days. There were 28 postoperative complications: urine leakage more than 2 weeks (11 cases), rectal injury (10 cases), hematoma (3 cases), lymphatic leakage more

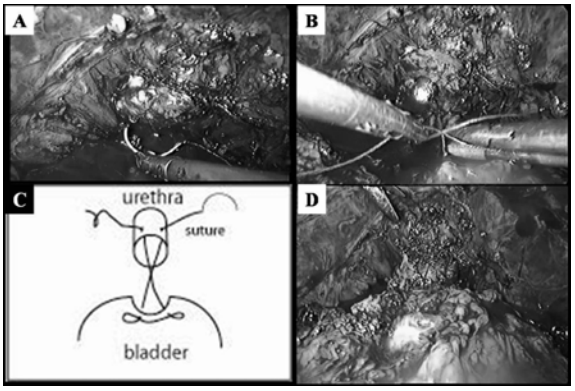

Fig. 5 A: Vesicourethral anastomosis, B: Intracorporeal knot, C: Figure of eight suture, D: Complete vesicourethal anastomosis

Table 1. Clinical Stage

Clinical Stage (T)	Number of patient (n = 100)
T1	70
T2	26
T3	4

Table 2. Perioperative Data

	Total n = 100	Number of Procedure (n)				p-value[A]
		1-25	26-50	51-75	75-100	
Operation time(min)[B]						< 0.001
Mean ± SD	474.0 ± 165.9	665.6 ± 140.7	485.8 ± 139.7	383.6 ± 73.2	360.8 ± 93.0	
Median (Q1,Q3)	425 (360-600)	660 (600-720)	480 (370-580)	360 (360-420)	360 (305-375)	
Estimate blood loss(cc)[C]						0.010
Mean ± SD	1,713.0 ± 1,226.4	2,234.0 ± 1,490.3	1,926.0 ± 1,252.3	1,260.0 ± 896.2	1,432.0 ± 993.1	
Median (Q1-Q3)	1,400 (800-2,475)	1,800 (1,100-3,250)	1,500 (900-2,800)	800 (600-2,000)	1,000 (700-2,300)	

A = p-value from Kruskal-Wallis Test. B = comparisons between group 1-25 with 26-50, 51-75 and 75-100 by Mann-Whitney test were $p < 0.001$ every pair. C = comparisons between group 1-25 with 26-50, 51-75 and 75-100 by Mann-Whitney test were p = 0.431, 0.006 and 0.025, respectively.

than 2 weeks (3 cases), and DVT (1 case), as shown in Table 3.

Discussion

Retropubic radical prostatectomy is the standard therapy for clinical stage T1 and T2 prostate cancer. It promises a long tumor-free survival for most of patients with organ-confined tumor. Laparoscopy is a minimally invasive alternative to the open procedures. Transperitoneal laparoscopic radical prostatectomy was first performed by Schuessler et al[5] in 1992, but only in 1998 Guillonneau et al[3] reported an initial series of 28 cases with a standardized technique based on the primary access to the seminal vesicles. In 2001 Rassweiler et al[6] modified this approach with early division of the urethra. Extraperitoneal laparoscopic radical prostatectomy was described by Raboy et al[2] in 1997 but it was standardized by Bollens et al[7] in 2000.

The authors began to perform laparoscopic radical prostatectomy with a transperitoneal approach for the first 50 cases and extraperitoneal approach for the last 50 cases. The advantages mentioned were less postoperative pain and, consequently, rapid recovery and an excellent cosmetic result. Disadvantage was that this challenging technique involved a steep learning curve. The present series were passed learning curve after 25 to 50 cases in parameter of the operation time and blood loss as shown in Table 2.

Our series of laparoscopic radical prostatectomy was compared with world's series. Regarding operating data, a series of Ballens et al[7] reported LRP for 50 cases, mean operating time 317 minutes, mean blood loss 680 ml. Rassweiler et al[8] showed a series of LRP for 180 cases, mean operating time 271 minutes, and mean blood loss 1,230 ml. In Guillonneau et al[9] series, LRP was performed in 120 cases; mean operating time 230 minutes, mean blood loss 300 ml. For our series LRP was performed in 100 cases, mean operating time 477 minutes, mean blood loss 1,400 ml, as shown in Table 4.

Complications of LRP in the world series were compared to that of our series as shown in Table 5. The most common complication was anastomotic leakage that we corrected with prolong catheter. If not improved, we would perform suprapubic cystostomy. Rectal injury is a serious complication. Rassweiler et al[8] reported 3/180 (1.6%) cases: 2 patients had extensive transrectal biopsies and prostatic abscess and rectal injuries were detected at intraoperatively and laparoscopically sutured; one patient required conversion to open surgery. Guillonneau et al[10] reported 8/567 (1.4%) cases: after 3 years in 7 patients rectal injury was detected intraoperatively and laparoscopically sutured, including 1 who required re-operation for a perirectal abscess. One case was detected on post-operative day 3rd and required reintervention as shown in Table 5. The present series found 10 cases of rectal injury because of under clinical staging and short period after TRUS-biopsy. The present series had one case in delayed detection that was corrected by colostomy with prolong catheter and delayed closure fistula. After that the authors performed preoperative one day bowel preparation all cases.

Table 3. Postoperative complications, n = 28

Complications	n	Therapy
Urine leakage more than 2 weeks	11	Prolong catheter suprapubiccystostomy
Rectal injury	10	Laparoscopic repair
Hematoma	3	Explorlaparotomy and stop bleeding
Lymphatic leakage more than 2week	3	Low pressure drainage
Deep vein thrombosis	1	Anti-coagulant

Table 4. Operative times and Blood loss data to compare the world's series

	Bollen et al[7] n = 50	Rassweiler et al[8] n = 180	Guillonneau et al[9] n = 120	Present n = 100
Mean operative time[mins]	317	271	230	477
Blood loss [ml]	680	1,230	300	1,400

Table 5. Complications reported in the various published series

Complications	Bollen et al[7] n = 50	Rassweiler et al[8] n = 180	Guillonneau et al[9] n = 120	Present series n = 100
Anastomotic leakage	2 (4%)	35 (19.4%)	9 (7.3%)	11 (11%)
Rectal injury	-	3 (1.6%)	1 (0.8%)	10 (10%)
Hematoma	-	18 (10%)	-	3 (3%)
Lymphatic leakage more than 2week	-	-	-	3 (3%)
Deep vein thrombosis	1 (2%)	-	-	1 (1%)
Trocar hernia	1 (2%)	1 (0.5%)	-	-
Ureteral injury	-	-	-	-
Bladder injury	-	-	-	-
Ileal or sigmoid injury	-	-	-	-
External iliac vein injury	3 (6%)	-	-	-

The other case was early detected intraoperatively and was treated with laparoscopic suture and colostomy. The last 3 cases was detected intraoperatively and was treated with laparoscopic suture without colostomy but patient NPO for 7 days and nutrition support by TPN. Barium enema was done in all cases after 10 days. Overall distribution of intraoperative complications reported in the various published series[6,8,9] are shown in Table 5.

Conclusion

Laparoscopic radical prostatectomy is a feasible option for the surgical treatment of localized prostate cancer. LRP can help improve vision and outcome of pelvic surgery which depends on clinical stage and learning curve. Although overall data from our series is not superior to the various published series but further improvement of the operative technique and precision of dissection can be expected as more and more teams adopt this technique. All of the above mentioned are important for our patients, who were treated at an increasingly younger age for smaller tumors. If the data of cancer control can be confirmed in the future, laparoscopy promises to become the access of choice in the surgical treatment of prostate cancer for the patient's benefit.

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รายงานประสบการณ์และเทคนิคการผ่าตัดมะเร็งต่อมลูกหมากด้วยวิธี laparoscopic radical prostatectomy ผู้ป่วย 100 ราย ในโรงพยาบาลราชวิถี

ธเนศ ไทยดำรงค์, ดนัยพันธ์ อัครสกุล, สมจิตร์ ดวงแข

วัตถุประสงค์*: เพื่อรายงานประสบการณ์, เทคนิคการผ่าตัดและผลการรักษามะเร็งต่อมลูกหมากด้วยวิธี laparoscopic radical prostatectomy (LRP) ผู้ป่วย 100 ราย ในโรงพยาบาลราชวิถี*

วัสดุและวิธีการ*: ศึกษาและเก็บข้อมูลย้อนหลังในผู้ป่วย 100 ราย ที่ได้รับการผ่าตัดด้วยวิธี LRP ที่โรงพยาบาล ราชวิถี ในระหว่างเดือน ตุลาคม พ.ศ. 2549 ถึง มกราคม พ.ศ. 2553 โดยเก็บข้อมูลเกี่ยวกับข้อมูลพื้นฐาน, ค่า PSA, Gleason score, ระยะเวลาการผ่าตัด, ปริมาณการเสียเลือดระหว่างผ่าตัด, ภาวะแทรกซ้อนระหว่างและหลังการผ่าตัด, ผลตรวจพยาธิสภาพชิ้นเนื้อหลังผ่าตัด นำข้อมูลมาวิเคราะห์ค่าทางสถิติเป็นค่า median (Q1-Q3), means $\pm$ SD และค่าข้อมูลร้อยละ*

ผลการศึกษา*: ค่าเฉลี่ยอายุผู้ป่วย 67.9 $\pm$ 6.5 ปี, ค่าเฉลี่ย PSA ก่อนการผ่าตัด 19.28 (0.39-105.10) ng/dl, ค่าเฉลี่ยระยะของโรค T1 (70%), ค่าเฉลี่ยระยะเวลาการผ่าตัด 425 (360-600) นาที, ปริมาณการเสียเลือดระหว่างผ่าตัด 1,400 (800-2,475) ml, ทำการผ่าตัด laparoscopic bilateral pelvic lymph node dissection 60 ราย พบการกระจายของมะเร็งต่อมลูกหมากมาที่ต่อมน้ำเหลือง 8 ราย (13%), อัตรา positive surgical margin 21.6%, พบภาวะแทรกซ้อน 28 ราย (urine leakage more than 2 weeks (11 ราย), rectal injury (10 ราย), hematoma (3 ราย), lymphatic leakage นานเกิน 2 สัปดาห์ (3 ราย), DVT (1)), ระยะเฉลี่ยการคาสายสวนปัสสาวะประมาณ 7 (6-25) วัน*

สรุป*: การผ่าตัดมะเร็งต่อมลูกหมากด้วยวิธี LRP เป็นทางเลือกหนึ่งในการรักษามะเร็งต่อมลูกหมากระยะเริ่มแรก การผ่าตัดมะเร็งต่อมลูกหมากด้วยวิธี LRP สามารถช่วยให้การมองเห็นสำหรับการผ่าตัดในอุ้งเชิงกราน รวมถึงผลการผ่าตัดดีขึ้นโดยต้องอาศัยความชำนาญและทักษะในการผ่าตัดรักษา*