

Laparoscopic Radical Prostatectomy: Perioperative Outcomes and Morbidity of 559 Consecutive Cases in Siriraj Hospital, Thailand

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Objective: To evaluate perioperative outcomes and morbidity of laparoscopic radical prostatectomy in Siriraj Hospital during a 5-year experience.

Material and Method: Five hundred fifty nine patients who underwent laparoscopic radical prostatectomy (LRP) by seven surgeons at Siriraj Hospital between September 2004 and September 2009 were included in the study. Data of perioperative results and postoperative parameters were retrospectively evaluated.

Results: Mean operative time was 257 minutes SD 75 (range 125 to 680 min). The mean operative time of the first 100 cases was significantly higher than of the last 100 cases (307 ml/min SD 95 versus 223 ml/min SD 56; p -value = 0.001). Mean estimated blood loss was 779 ml SD 607 (range 40 to 6,000 ml). Of 559 patients, 148 patients (26.5%) had blood transfusions. The blood transfusion rate in the first 100 cases was significantly higher than those of the last 100 cases (36.5% versus 15%; p -value = 0.016). The median duration of catheterization time was 8 days. The mean time of drain insertion was 4.2 days SD 1.8 (range 2 to 18 days) postoperatively. Hospital stay was 8.8 days SD 7.6 (range 3 to 149 days). Overall perioperative complication rate was 17.1%. Of these patients, 13.4% were minor complication (Clavien 1, 2) and 3.7% were major complication (Clavien 3, 4). There were no mortalities. Late complication rate was 2.1%, which most of them were stricture of anastomosis.

Conclusion: Perioperative outcomes and morbidity of LRP in a 5-year period were acceptable. Laparoscopic radical prostatectomy is technically demanding with an initially longer operative time and higher blood transfusion rate. The learning curve of the surgical team is needed to achieve good results.

Keywords: Laparoscopic, Radical prostatectomy

J Med Assoc Thai 2011; 94 (6): 693-8

Full text. e-Journal: <http://www.mat.or.th/journal>

Prostate cancer is the most frequently diagnosed solid organ cancer in Western countries. In Asia, including Thailand, the incidence rates have increased over the years, owed mainly to the improved screening with the prostate specific antigen (PSA) blood test⁽¹⁾. Early detection has led to a downward stage migration and improved survival rates. Radical prostatectomy has been a mainstay in the treatment of localized prostate cancer for more than two decades⁽²⁾.

This oncological procedure should aim at achieving optimal cancer control with minimal morbidity and the best functional results. Along with a general trend towards minimally invasive surgery, laparoscopic radical prostatectomy (LRP) was first performed in 1992⁽³⁾ and became the standard technique used by two French groups in 1999 and 2000^(4,5). They reported modifications to the original technique, resulting in operative times that ranged from 4 to 5 hours, a mean blood loss of 402 ml, and a decreased mean hospital stay. This is due predominantly to earlier removal of the Foley catheter. Various centers worldwide now regularly perform LRP. The early results show encouraging oncological and functional

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outcomes with low perioperative morbidity and complications⁽⁶⁻¹⁰⁾.

The authors present their experience of 559 consecutive cases with laparoscopic radical prostatectomy at Siriraj Hospital, Thailand. The present study focused on perioperative outcomes and postoperative parameters of the patients that had undergone LRP without conversion to open retropubic radical prostatectomy (RRP).

Material and Method

Patients

From September 2004 and September 2009, 566 patients underwent an LRP at Siriraj Hospital, Bangkok, Thailand. For the present study, clinically localized and locally-advanced prostate cancer were retrospectively reviewed. Of 566 patients, seven patients (1.2%) were excluded because of conversion to open surgery. Therefore, 559 patients with complete operative data from outpatient and inpatient record forms were included in the present study. All patients had been followed-up for at least 12 months. All LRP (559 patient) were performed by seven surgeons, 206 (36.8%) patients by transperitoneal approach, 353 (63.2%) patients by extraperitoneal approach.

Perioperative status of the patients

The preoperative characteristics of the patients are shown in Table 1. Urinary catheters were routinely retained for 7 to 14 days. The urethral catheter was removed with or without cystography. If urine output into the drains continued or cystography found leakage, it was defined as anastomosis leakage. In the case of anastomosis leakage, the drains and urinary catheters were retained longer.

Complications

Complications were recorded as intraoperative, postoperative (within 30 days) or late complications (more than 30 days). The Clavien grading systems (grades 1 to 5) for complications were used to evaluate morbidities. Grade 1 morbidities are classified as deviations from the normal postoperative course. Grade 2 is defined as deviation from the normal course in addition to pharmacologic treatment or parenteral nutrition. Grade 3 is stratified into complications whose treatments do not require general anesthesia (3a) and treatments requiring general anesthesia (3b). Grade 4a indicates that single organ system damage had occurred; 4b indicates multiple organ system failure in intensive care unit settings. Clavien Grade 5

complications are death. Clavien classifications were used with regard to severity of injury, with minor complications receiving 1 and 2 and major receiving 3 and 4, as determined by the authors.

Data

All data were retrospectively collected on data sheets, transferred to a database and analyzed with SPSS. Data are presented as mean \pm SD with ranges in parentheses. The operative time was evaluated with Mann-Whitney U test. The blood transfusion rate was evaluated with Chi-square with Yate's correction. The operative oncological results and the follow-up cancer controls of these patients were evaluated in another study.

Results

Table 1 shows the patients' characteristic. The mean age was 66 years (range 42 to 83). Mean preoperative PSA level was 17.6 ng/mL. The most common PSA range of the patients was 4-10 ng/ml. The most common clinical stage was T1. The most common Gleason score was less than 7.

The perioperative data are presented in Table 2. The mean operative time was 257 min SD 75 (range 125 to 680 min). The mean operative time of the first 100 cases was shown to be 307 min SD 95 whereas those of the last 100 cases was 223 min SD 56 ($p < 0.05$ as show in Fig. 1 and 2). The operative time was decreased when the surgical team had more experience. Mean estimated blood loss was 779 ml SD 607 (range 40 to 6,000 ml). However, there was one major intraoperative bleeding (6,000 ml). Of

Table 1. Preoperative characteristics

Age (years)	66.91 \pm 7.2 (42-83)
PSA (ng/ml) (mean \pm SD)	17.60 \pm 22.84
Clinical stages, n (%)	
T1	242 (43.3%)
T2	196 (35.1%)
T3	120 (25.5%)
PSA level	
0-4 (ng/ml)	35 (6.3%)
4-10 (ng/ml)	239 (42.8%)
10-20 (ng/ml)	147 (26.3%)
> 20 (ng/ml)	125 (22.8%)
Gleason score	
< 7	216 (38.6%)
7	200 (35.5%)
> 7	114 (20.4%)

Table 2. Perioperative data

Mean operative times, min (range)	
Total of 559 cases	257.40 ± 75.69 (125-680)
First 100 cases	307.21 ± 95.27 (175-680)
Last 100 cases	223.80 ± 56.13 (125-435)
Hospital stay, day	
Mean (range)	8.80 ± 7.60 (3-149)
Median	8
Median duration of catheterization, day	8
Mean duration of drain, day (range)	4.20 ± 1.80 (2-18)
Mean blood loss, ml	779.49 ± 607.82
Blood transfusion rate, n / %	
Total of 559 cases	148/26.5%
First 100 cases	35%
Last 100 cases	15%
Mean size of prostate, g (range)	43.70 ± 23.40 (9.8-279)

559 patients, 148 (26.5%) had blood transfusions. However, the blood transfusion rate was decreased in the last period (35% in the first 100 cases vs. 15% the last 100 cases, $p < 0.05$ as shown in Fig. 3). The median catheterization time was 8 days. The mean drains inserted duration was 4.2 days SD1.8 (range 2 to 18 days) postoperatively. Mean hospital stay was 8.8 days SD 7.6 (range 3 to 149 days). However, one patient had an ischemic stroke postoperatively and stayed 149 days in the hospital. The mean prostate size was 43 g (range 9.8 to 279 g).

Postoperative complications were described as minor complications (Clavien 1-2). Those were anastomosis leaks, urinary tract infections, urinary retention, and wound infection. Major complications were described with Clavien 3-4 such as pulmonary embolism, deep vein thrombosis or rectal injury as shown in Table 3. The overall complication rate was 17.1%. The postoperatively minor and major perioperative complications were 75 cases (13.4%) and 21 cases (3.7%), respectively. No patient died postoperatively. One patient had bilateral ureteric orifices injury that caused postoperative acute renal failure. The patient was re-operated with exploratory laparotomy and bilateral reimplantation. One patient developed symptomatic lymphocele, which was confirmed by ultrasonography and was managed by percutaneous drainage. Three patients developed recto-vesical fistula, two of them were managed with sigmoid colostomy and another one was conservatively treated by controlled diet and cystostomy. Rectal injury

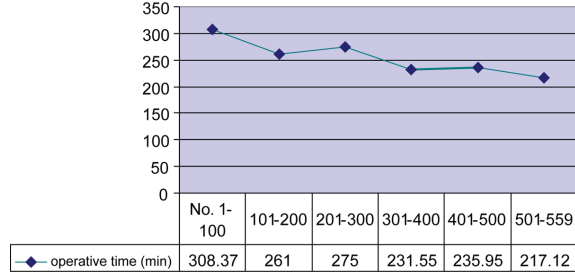


Fig. 1 Mean operative time of LRP according to period of case number

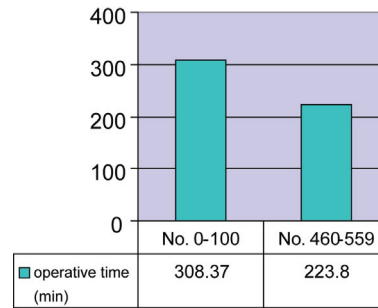


Fig. 2 Mean operative time in first 100 cases and the last 100 cases

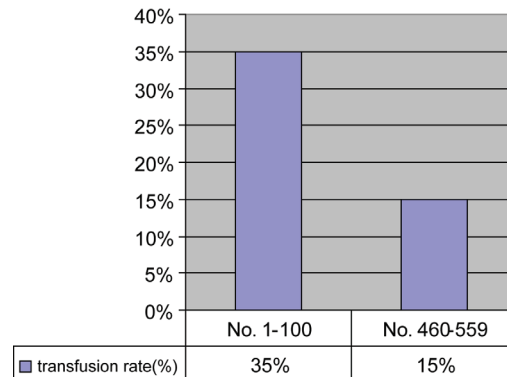


Fig. 3 Blood transfusion rate in first 100 and the last 100 cases

occurred in seven cases. All of them were detected intraoperatively. Six patients were laparoscopically repaired with 2-layer sutures and one patient was performed with sigmoid loop colostomy. One patient developed oliguria, fever, and suprapubic mass because of anastomosis leakage and drain obstruction. He was re-operated with suprapubic cystostomy and had a drain inserted within 24 hours.

Table 3. Complications of 559 laparoscopic radical prostatectomy

Total perioperative complications, n (%)	96 (17.1%)
Minor (Clavien 1-2)	75 (13.4%)
UTI	1 (0.17%)
Urinary retention	2 (0.35%)
Anastomosis leakage	71 (12.7%)
Wound infection	1 (0.17%)
Major (Clavien 3-4)	21 (3.7%)
Supraventricular tachycardia	1 (0.17%)
Acute myocardial infarction	2 (0.35%)
Congestive heart failure	1 (0.17%)
Deep vein thrombosis	1 (0.17%)
Pulmonary embolism	1 (0.17%)
Acute renal failure/ureteric injury	1 (0.17%)
Ischemic stroke	1 (0.17%)
Rectal injury (detected intraoperatively)	7 (1.2%)
Recto-vesical fistula	3 (0.5%)
Obturator nerve injury	1 (0.17%)
Symptomatic lymphocele	1 (0.17%)
Anastomosis leakage and drain obstruction (re-operation)	1 (0.17%)
Late complication	12 (2.1%)
Stricture anastomosis	11 (1.9%)
Incisional hernia	1 (0.2%)

Late complications were detected in 12 patients (2.1%). Of 12 patients, 11 (1.9%) had anastomosis strictures and were treated with an optical urethrotomy and urethral dilatation in three and eight patients, respectively. One patient had small incisional hernia. However, the patient did not need surgery.

Discussion

The present study reported data of perioperative parameters and morbidities. The authors' mean operative time was 257 min and blood transfusion rate was 26.5% whereas the other studies have reported mean operative time of 151 to 248 min^(4,13,14) and blood transfusion rate of 0.9-9.6%^(4,13,16). The authors' mean estimated blood loss also showed higher than in other studies^(4,9,16). The authors' study showed higher values than other studies because the present study had seven surgeons who had different technique, skill, and experience. However, these parameters were decreased in the last group when the surgical team had more experience (Fig. 2, 3).

Another reason is that blood loss in the present series was estimated, which was mixed with urine in intraoperative field and the irrigated fluid during surgery. In previous studies, rates of

complications of 9.6 to 36% have been associated with early experience of LRP^(3,4,6,7,12,15). The authors' complication rate (17.1%) was the same as those studies. The most common complication of this study was rectal injury. This complication occurred in 0.4 to 3.2% in a current series^(4,16). In the presented series, it occurred at 1.7%. Most patient who had rectal injury were locally advanced tumor (pT3a and pT3b). These patients had lots of adhesion around the prostate gland.

Leakage of urine from the urethro-vesical anastomosis (12.7%) was mostly found and described as a minor complication in the present study. This was the same as other studies. This complication may be under-reported because small leaks heal spontaneously with catheterization. However, a urinary leakage usually prolongs the hospital stay. It was reported to induce fibrosis and strictures.

The rate of urethro-vesical anastomosis strictures after LRP varies from 1.6% to 3.3%^(9,15) in other studies. This parameter may be associated with a good mucosa-mucosa apposition and a watertight anastomosis. The present study's low rate of stricture indicating that the authors had improved their experience in anastomosis. However, some strictures may be undiagnosed. The patients that had a stricture of anastomosis detected by cystoscopy were treated by optical urethrotomy and urethral dilatation. The present study reported the outcomes and morbidity of LRP from the first case. The present series included the initial experience period that is needed to contribute the skills required for success. Those included the surgeon's and the assistant doctors and other medical staff. During the 5-year period, we trained more surgeon in performing LRP. Therefore, during the last period, some surgeons just started to perform LRP, building their own learning curve. This is a reason why there was still high blood transfusion rate in the last 100 cases. However, the complication rates included both minor and major complications. They were acceptable. There was no mortality in the present series. This indicated that the authors technique and experience for LRP has become a standard method for prostate cancer surgery in Siriraj Hospital.

Conclusion

Perioperative outcomes of LRP in the 5 years period were satisfactory, based on the experience of the surgeon. The morbidity was acceptable. Laparoscopic radical prostatectomy is technically demanding with an initial longer operative time and

higher blood transfusion rate. The learning curve of the surgical team is needed to achieve good results.

Potential conflicts of interest

None.

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การผ่าตัดแบบส่องกล้องในมะเร็งต่อมลูกหมาก: ผลการผ่าตัดและผลแทรกซ้อนของผู้ป่วย 559 คน ที่ผ่าตัดที่โรงพยาบาลศิริราช

บัญชา ทิพย์ธีระพงศ์, สุนัย ลีวันแสงทอง, ไชยรงค์ นวลวงษ์, สิทธิพร ศรีนวลนัด, ธวัชชัย ทวีมันคงทรัพย์, บรรณสิทธิ์ ไชยประสิทธิ์, ธีระพล อมรเวชสุกิจ, กิตติพงษ์ พิณภูโสภณ, ศิรส จิตประไพ, พิสมัยพันธุ์ วัดตะยัง, พิชัย ศุภจินทรรัตน์, สุขชาย สุนทรภา

วัตถุประสงค์: ศึกษาถึงผลการผ่าตัดแบบส่องกล้องในมะเร็งต่อมลูกหมาก ของโรงพยาบาลศิริราชในระยะเวลา 5 ปีที่ผ่านมา

วัสดุและวิธีการ: ผู้ป่วยทั้งหมด 559 คน ผู้ซึ่งได้รับการผ่าตัดแบบส่องกล้องในมะเร็งต่อมลูกหมากที่โรงพยาบาลศิริราช โดยศัลยแพทย์ทั้งหมด 7 คน ระหว่างกันยายน พ.ศ. 2547 ถึง กันยายน พ.ศ. 2552 โดยเป็นการศึกษาแบบย้อนหลังถึงผลการผ่าตัด, ผลแทรกซ้อนทั้งขณะผ่าตัดและหลังผ่าตัด โดยข้อมูลได้รับการรวบรวมและวิเคราะห์

ผลการศึกษา: ค่าเฉลี่ยเวลาผ่าตัดทั้งหมดเป็น 257 ± 75 นาที (125-680 นาที) โดยผู้ป่วย 100 คนแรกที่มาผ่าตัดมีค่าเฉลี่ยเวลาผ่าตัดสูงกว่าในผู้ป่วยที่มาผ่าตัด 100 คนสุดท้าย อย่างมีนัยสำคัญทางสถิติ (307 ± 75 นาที เปรียบเทียบกับ 223 ± 56 นาที; $p = 0.001$) ค่าเฉลี่ยของการสูญเสียเลือดขณะผ่าตัดทั้งหมดเท่ากับ 779 ± 607 มิลลิลิตร (40-6,000 มิลลิลิตร) โดยในผู้ป่วย 559 คน มี 148 คน คิดเป็น 26.5% ที่ต้องได้รับการให้เลือด โดยกลุ่มผู้ป่วย 100 คนแรกที่มาผ่าตัดมีอัตราการให้เลือดสูงกว่าในกลุ่มผู้ป่วยที่มาผ่าตัด 100 คนสุดท้าย อย่างมีนัยสำคัญทางสถิติ (36% กับ 15%; $p = 0.016$) ระยะเวลาของการใส่สายปัสสาวะเท่ากับ 8 วัน, ค่าเฉลี่ยระยะเวลาของการใส่สายระบายหลังการผ่าตัดเป็น 4.2 ± 1.8 วัน (2-18 วัน), ค่าเฉลี่ยระยะเวลาของการนอนโรงพยาบาล 8.8 ± 7.6 วัน (3-149 วัน), ภาวะแทรกซ้อนของการผ่าตัดทั้งหมดคิดเป็น 17.1% โดยเป็นผลแทรกซ้อนประเภทไม่รุนแรง 13.4%, ประเภทรุนแรง 3.4% ไม่พบผู้ป่วยที่เสียชีวิตจากการผ่าตัด ส่วนผลแทรกซ้อนหลังการผ่าตัดพบ 2.1% ซึ่งส่วนใหญ่พบเป็นการตีบของจุดที่เย็บเชื่อมต่อระหว่างท่อปัสสาวะกับกระเพาะปัสสาวะ

สรุป: ผลการผ่าตัดแบบส่องกล้องในมะเร็งต่อมลูกหมากในช่วง 5 ปี ที่ผ่านมา มีผลลัพธ์ที่ใกล้เคียงกับการศึกษาที่อื่น ๆ โดยผลการผ่าตัดแบบส่องกล้องขึ้นกับความชำนาญของการผ่าตัด โดยช่วงแรกมีระยะเวลาการผ่าตัด, อัตราการให้เลือดที่สูงเมื่อมีความชำนาญที่มากขึ้นผลลัพธ์ต่าง ๆ ก็ดีขึ้น
