

Comparison of Extraperitoneal Laparoscopic Radical Prostatectomy and Open Retropubic Radical Prostatectomy at Ramathibodi Hospital, Thailand: A Retrospective Review

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Objective: To compare perioperative outcomes of open radical retropubic prostatectomies (O-RRP) and extraperitoneal laparoscopic radical prostatectomies (E-LRP), focusing on operative time, blood loss, length of hospital stay, time to drain removal, and surgical margin status.

Material and Method: The authors reviewed the medical histories of 173 patients treated for prostate cancer by radical prostatectomy at Ramathibodi Hospital between January 1997 and August 2010. Eighty-one patients were treated with O-RRP and 52 were treated with E-LRP. The remaining forty cases were omitted from the present study due to incomplete data (such as incomplete operative note, history) or if the patient had post transurethral prostatectomy or post androgen deprivation therapy. Open radical retropubic prostatectomies were performed by two experienced surgeons, and laparoscopic extraperitoneal radical prostatectomies were performed by a single surgeon. The following data were collected and compared between treatments, operative time, blood loss, length of hospital stay, time to drain removal, and surgical margin status.

Results: Preoperative patient data indicated that both groups were comparable in age, height, prostate-specific antigen (PSA) levels, and Gleason scores from transurethral ultrasound guided biopsy. However, body weight and BMI was significantly higher in the O-RRP group. Estimated blood loss was significantly lower in the E-LRP group (median = 600 ml, range = 50-4,000 ml) than in the O-RRP group (median = 2,000 ml, range 200-7,500 ml) ($p < 0.001$). The length of hospital stay in the E-LRP group (median = 8 days, range = 4-27 days) was significantly shorter than in the open group (median = 11 days, range = 5-37 days) ($p < 0.001$). There were no significant differences between operative times, times to drain removal, or surgical margin statuses.

Conclusion: The present study shows that patients who underwent E-LRP experienced less blood loss and shorter hospital stays than patients who underwent O-RRP.

Keywords: Laparoscopy, Prostatectomy, Extraperitoneal

J Med Assoc Thai 2012; 95 (8): 1035-40

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

The incidence of prostate cancer is on the rise in Thailand due to improved healthcare and active screening. As a result, medical professionals are treating more early-stage prostate cancer patients than in the past. There are many options for treating localized prostate cancer; the radical prostatectomy is the standard choice. Randomized control trials have shown that this procedure can reduce disease progression and cancer related death⁽¹⁾.

The radical prostatectomy technique has improved over time. A greater understanding of periprostatic anatomy has resulted in better surgical and oncological outcomes, improved continence function and sexual potency preservation, and reduced perioperative morbidity^(2,3). Radical prostatectomy can be undertaken using open, laparoscopic, or robotic-assisted laparoscopic techniques. Minimally invasive surgical techniques for the treatment of prostate cancer are widely accepted and performed because they provide better visualization of prostate and periprostatic anatomy. Additionally, surgical techniques and instruments are continuously being improved, making the operation simpler to perform, reducing operative time and providing better surgical outcomes⁽⁴⁾.

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However, laparoscopic radical prostatectomy requires a steeper learning curve and the cost of surgical instruments is greater^(5,6).

Laparoscopic surgery can be conducted with either a transperitoneal or an extraperitoneal approach. At the hospital included in this investigation, the extraperitoneal approach is preferred. Studies comparing the operative results of extraperitoneal laparoscopic radical prostatectomy (E-LRP) and open radical retropubic prostatectomy (O-RRP) in Thailand are still limited.

The objective of the present study was to compare the outcomes of O-RRP and E-LRP, with an emphasis on operative time, blood loss, length of hospital stay, time to drain removal and surgical margin status.

Material and Method

The authors reviewed the outcomes of 173 prostate cancer patients who were treated with surgery at Ramathibodi Hospital, Thailand, between January 1997 and August 2010. Eighty-one patients had been treated using O-RRP and 52 had been treated with E-LRP. The remaining forty cases were omitted from the present study due to incomplete data. O-RRP procedures had been performed by two experienced surgeons, while E-LRP had been performed by a single surgeon. The type of operation selected for each patient depended on the personal preference of the surgeon. Tissue samples were evaluated by an uropathologist in accordance with the TNM classification.

For both O-RRP and E-LRP groups the patients resumed oral intake on the first postoperative day. The analgesic drug was 4 mg of morphine administered intravenously for severe pain every

4 hours. The tube drain was kept in place until the drain content was less than 50 cc/day. The patients were discharged the day the tube drain was removed. All patients retained urethral catheters for 2 weeks. After this time, they were sent for cystograms. If no leakage was detected at the anastomosis site the catheter was removed. If a leakage was found the cystogram was repeated the following week.

The following preoperative parameters were evaluated for all patients, age, prostate-specific antigen (PSA) level, Gleason score from transurethral ultrasound-guided biopsy (TRUS-BX), weight, height, and body mass index (BMI). Perioperative parameters were also evaluated, operative time (minutes), blood loss (ml), length of hospital stay (days), time to drain removal (days), and histopathologic findings, including TNM stage, Gleason score, and surgical margin status. The data from both groups were compared using the student's t-test or the Mann-Whitney U test. Chi-square tests or Fisher's exact tests were used to compare the nominal data. Tests generating p-values of less than 0.05 were considered statistically significant. (Under Warranty of Ethic committee of Mahidol University ID 07-53-38)

Results

Preoperative data (Table 1) reveal that patients in the O-RRP and E-LRP groups were not statistically different in mean age (67.22 ± 5.89 years vs. 67.48 ± 6.67 years), mean height (165.06 ± 6.49 cm vs. 164.71 ± 6.35 cm), median PSA (11.45 ng/ml, range 0.79-108.4 ng/ml vs. 11.78 ng/ml, range 0.48-82.87 ng/ml) and Gleason score from TRUS-BX of prostate gland ($p = 0.999$). The mean body weight of the O-RRP group (67.43 ± 9.11 kg) was significantly

Table 1. Demographic and preoperative data

	O-RRP (n = 81)	E-LRP (n = 52)	p-value
Mean age	67.22 ± 5.89	67.48 ± 6.67	0.815
Mean body weight	67.43 ± 9.11	64.14 ± 9.34	0.047
Mean height	165.06 ± 6.49	164.71 ± 6.35	0.763
Mean BMI	24.72 ± 2.97	23.60 ± 2.92	0.034
Median PSA	11.45 (0.79-108.4)	11.78 (0.48-82.87)	0.680
No. Gleason score at biopsy (%)			0.999
≤ 6	48 (59.3)	31 (59.6)	
7	22 (27.2)	14 (26.9)	
≥ 8	11 (13.6)	7 (13.5)	

Data were presented as mean \pm SD or median (range)

Table 2. Perioperative result

	Median (range)		p-value
	O-RRP	E-LRP	
Estimate blood loss	2,000 (200-7,500)	600 (50-4,000)	<0.001
Operative time (minute)	195 (95-420)	232.5 (120-360)	0.325
Time to remove drain (day)	6 (3-35)	5 (3-24)	0.310
Hospital stay (day)	11 (5-37)	8 (4-27)	<0.001

Data were presented with median (range)

higher than that of the E-LRP group (64.14 ± 9.34 kg) ($p=0.047$). Similarly, O-RRP patients had a significantly higher mean BMI than the E-LRP patients (24.72 ± 2.97 kg/m² vs. 23.60 ± 2.92 kg/m²) ($p = 0.034$).

Perioperative data (Table 2) show that the median estimated blood loss was significantly lower in the E-LRP group (600 ml, range 50 to 4,000 ml) than in the O-RRP group (2,000 ml, range 200 to 7,500 ml). Patients who underwent E-LRP had a significantly shorter median hospital stay (eight days, range 4 to 27 days) than those in the O-RRP group (11 days, range 5 to 37 days). The median operative time and median time to drain removal did not differ significantly between the two treatment groups.

Pathological results (Table 3) indicate that there were no significant differences between the two groups in terms of pathological T stage, Gleason score or surgical margin status. The positive surgical margin was 28.4% in the O-RRP group and 34.6% in the E-LRP group. All positive lymph node patients were found to be in the O-RRP group.

Discussion

Surgeons at the Ramathibodi Hospital prefer to use an extraperitoneal approach for both open and laparoscopic surgeries. Although the open technique was originally preferred by two urologists, the laparoscopic technique has been the method of choice since 2007, due to its many advantages. The laparoscopic technique provides direct access to the Retzius space, minimizes the chance of bowel injury, and prevents the bowel from obscuring the operative field. Postoperative urine leakage from the uretrovesical anastomosis cannot contaminate the peritoneal cavity. Furthermore, ileus is seldom a problem with this approach^(7,8). However, the extraperitoneal approach does have certain limitations such as the working space requirements are greater, and it can cause increased tension at the vesicourethral anastomosis as well as higher carbon dioxide absorption⁽⁹⁾.

Table 3. Pathological data

	Number of patient (%)		p-value
	O-RRP	E-LRP	
Pathologic T stage			0.201
T0	0 (0)	0 (0)	
T2a	1 (1.2)	3 (5.8)	
T2b	18 (22.2)	9 (17.3)	
T2c	27 (33.3)	19 (36.5)	
T3a	25 (30.9)	10 (19.2)	
T3b	9 (11.1)	11 (21.2)	
T4	1 (1.2)	0 (0)	
Pathologic N stage			0.007
N0	70 (86.4)	52 (100)	
N1	11 (13.6)	0 (0)	
Gleason score			0.999
≤ 6	35 (43.2)	25 (48.1)	
7	34 (42.0)	19 (36.5)	
≥ 8	12 (14.8)	8 (15.4)	
Surgical margin status			0.448
Negative	58 (71.6)	34 (65.4)	
Positive	23 (28.4)	18 (34.6)	

In the present study, significantly lower estimated blood loss in the E-LRP group can be explained by better visualization of the periprostatic anatomy, and venous compression by pneumoperitoneum with CO₂⁽¹⁰⁾. Bleeding can be a problem if fibrosis is a factor or if patients are markedly obese. Fibrosis around the prostate gland can be caused by chronic infection or by wound-healing following the prostate TRUS-BX. Bleeding is associated with an increased risk of requiring blood transfusion and can affect surgical outcome. The greater BMI of the O-RRP group may also explain the increased blood loss seen in this group; other studies have found that increased

estimated blood loss is associated with BMI and prostate weight⁽¹¹⁾.

The length of hospital stay is an important component of treatment costs. The shorter hospital stays in the E-LRP group imply a reduction of treatment expenses⁽¹²⁾. However, a thorough examination of costs is beyond the scope of the present paper. Many factors can influence the length of hospital stay, such as the duration of drain retention, patient pain tolerance, and other disease complications.

The present study demonstrates that there is no statistical difference between O-RRP and E-LRP groups in terms of operative time or time to drain removal. The mean times of both surgical approaches are slightly longer for the earliest cases in the present study, but these means decrease over time, as surgical skill and experience increased. Therefore, less-experienced urologists should be mentored by senior surgeons, for the benefit of patients.

It was noted that obese patients who underwent the laparoscopic approach had shorter operative times than when the open approach was used. Prolonged operative time is related to prolonged exposure to anesthesia, increased perioperative complications such as deep vein thrombosis and pulmonary embolism⁽¹³⁾, and increased treatment costs⁽⁶⁾.

Analysis reveals no difference between groups in the time to drain removal. Typically, a 5 mm diameter silastic non-suction tube drain was used; drains were removed after drain content was less than 50 cc. Drainage tubes can cause discomfort and can be a source of infection; shorter durations of drains may decrease these risks⁽¹⁴⁾. Although no statistically significant difference was observed in the analysis, it is the authors' experience that the laparoscopic approach tends to result in a shorter time to drain removal (this general trend is evident in the data). With the laparoscopic approach, the anastomosis can be clearly visualized and water-tight anastomosis is easily accomplished.

Surgical margin status is an important oncologic outcome because it represents a risk factor for biochemical recurrence of prostatic cancer⁽¹⁵⁾. However, no difference in margin status was observed between the two groups.

Unfortunately, in the part of analgesic use, the authors could not collect the outcomes, due to this paper being a retrospective study. Nevertheless, for the outcomes of erectile dysfunction and incontinence, the authors are compiling the data and it will be reported in the next paper.

Conclusion

The present study shows that patients who underwent the E-LRP approach experienced less blood loss and a shorter hospital stay than patients in the O-RRP group. The time to drain removal and the surgical margin status were statistically similar for both groups. The laparoscopic radical prostatectomy tends to be preferred over the open technique due to the advantages of decreased blood loss, decreased hospital stay, decreased postoperative pain, and clearly visualized anatomy, which permits the surgeon to conduct more meticulous dissections in order to preserve the neurovascular bundle and urethral sphincter. Nonetheless, surgeons should be familiar with the open technique because some patients may have contraindications for laparoscopic surgery, such as severe obesity or severe chronic obstructive pulmonary disease.

Potential conflicts of interest

None.

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การผ่าตัดส่องกล้องเพื่อรักษามะเร็งต่อมลูกหมากโดยวิธีผ่านช่องนอกเยื่อผนังช่องท้องเปรียบเทียบกับวิธีผ่าตัดแบบเปิด

วิสูตร คงเจริญสมบัติ, นคร ตันติรังสี, สุชาติ ไชยเมืองราช, เจริญ ถีลานพินธุ์, วชิร คชการ, สุเทพ พัทธตระกูล

วัตถุประสงค์: เพื่อเปรียบเทียบผลการรักษามะเร็งต่อมลูกหมากโดยการผ่าตัดแบบเปิดกับการผ่าตัดส่องกล้อง โดยวิธีผ่านช่องนอกเยื่อผนังช่องท้อง ในด้านของเวลาที่ใช้ในการผ่าตัด, การเสียเลือด, ระยะเวลาที่พักรักษาตัวในโรงพยาบาล, ระยะเวลาในการใส่สายระบายช่องท้อง และผลของการตรวจทางพยาธิสภาพ

วัสดุและวิธีการ: ผู้นิพนธ์ได้ทำการเก็บข้อมูลย้อนหลังของผู้ป่วยที่ได้รับการรักษามะเร็งต่อมลูกหมาก โดยวิธีผ่าตัดทั้งการผ่าตัดแบบเปิดและแบบส่องกล้องโดยวิธีผ่านช่องนอกเยื่อผนังช่องท้องตั้งแต่เดือน มกราคม พ.ศ. 2541 ถึง สิงหาคม พ.ศ. 2553 ซึ่งมีจำนวนทั้งสิ้น 173 คน แบ่งเป็นการผ่าตัดแบบเปิด 81 คน แบบส่องกล้อง โดยวิธีผ่านช่องนอกเยื่อผนังช่องท้อง 52 คน โดยมีผู้ป่วย 40 คน ถูกตัดออกจากการศึกษาเนื่องจากข้อมูลไม่ครบถ้วน การผ่าตัดรักษามะเร็งต่อมลูกหมากแบบเปิดทำโดยศัลยแพทย์ที่มีความชำนาญ 2 คน ส่วนการผ่าตัดแบบส่องกล้องโดยวิธีผ่านช่องนอกเยื่อผนังช่องท้องทำโดยศัลยแพทย์คนเดียวกันแล้วนำข้อมูลที่ได้จากทั้งสองกลุ่มมาเปรียบเทียบกันในด้านเวลาที่ใช้ในการผ่าตัด, การเสียเลือด, ระยะเวลาที่พักรักษาตัวในโรงพยาบาล และระยะเวลาในการใส่สายระบายช่องท้อง (under warranty of Ethic committee of Mahidol University ID 07-53-38)

ผลการศึกษา: ผู้ป่วยทั้งสองกลุ่มไม่มีความแตกต่างกันในด้านอายุ, ส่วนสูง, ค่า PSA และ Gleason score จากการเจาะเนื้อต่อมลูกหมากทางทวารหนัก แต่ในด้านน้ำหนักและดัชนีมวลกายพบว่ากลุ่มผู้ป่วยที่ได้รับการผ่าตัดแบบเปิดมีน้ำหนักและดัชนีมวลกายมากกว่าอย่างมีนัยสำคัญทางสถิติ ในด้านผลการผ่าตัดพบว่าผู้ป่วยในกลุ่มที่ได้รับการผ่าตัดแบบส่องกล้องโดยวิธีผ่านช่องนอกเยื่อผนังช่องท้องมีการเสียเลือดน้อยกว่า (median = 600 ml, range = 50-4,000 ml กับ median = 2,000 ml, range 200-7,500 ml) ($p < 0.001$) และมีระยะเวลาที่พักรักษาตัวในโรงพยาบาลสั้นกว่า (median = 8 days, range = 4-27 days กับ median = 11 days, range = 5-37 days) ($p < 0.001$) ส่วนเวลาที่ใช้ในการผ่าตัด ระยะเวลาในการใส่สายระบายช่องท้อง และผลของการตรวจทางพยาธิสภาพนั้นไม่พบว่ามี ความแตกต่างระหว่างสองกลุ่ม

สรุป: ในการรักษามะเร็งต่อมลูกหมากโดยการผ่าตัดแบบส่องกล้องด้วยวิธีผ่านช่องนอกเยื่อผนังช่องท้อง มีการเสียเลือดและมีระยะเวลาที่พักรักษาตัวในโรงพยาบาลน้อยกว่าการผ่าตัดแบบเปิด แต่การผ่าตัดด้วยการส่องกล้องนั้น มีความจำเป็นต้องใช้ค่าใช้จ่ายสูงกว่าเนื่องจากมีค่าใช้จ่ายทางด้านอุปกรณ์ ในทางกลับกันก็มีระยะเวลาในการรักษาตัวในโรงพยาบาลสั้นกว่า นอกจากนี้การผ่าตัดด้วยการส่องกล้องมีความจำเป็นต้องได้รับการฝึกฝนที่ยาวนานกว่าการผ่าตัดแบบเปิด ดังนั้นศัลยแพทย์รุ่นใหม่ควรมีแพทย์ผู้มีความประสพการณ์คอยควบคุมชี้แนะในการทำหัตถการชนิดนี้ในช่วงแรก
