ประสบการณ์การผ่าตัดส่องกล้องเพื่อรักษามะเร็งต่อมลูกหมากในโรงพยาบาลวชิระภูเก็ต

Laparoscopic radical prostatectomy experience in Vachira Phuket Hospital

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บทคัดย่อ

ภูมิหลัง: ประสบการณ์การผ่าตัดต่อมลูกหมากแบบส่องกล้องช่วยรับประกันความแม่นยำ ลดภาวะแทรกซ้อน และเพิ่มผลลัพธ์ของผู้ป่วย นอกจากนี้ยังช่วยเพิ่มประสิทธิภาพการรักษาและเร่งการฟื้นตัว ในเวลาไม่กี่วินาที ผลลัพธ์ของผู้ป่วยจะดีขึ้นด้วยการผ่าตัดที่แม่นยำและมีปัญหาน้อยลง ซึ่งรับประกันได้จากประสบการณ์การผ่าตัดต่อมลูกหมากแบบส่องกล้อง นอกจากนี้ยังเพิ่มประสิทธิภาพการรักษามะเร็งและส่งเสริมการฟื้นตัวที่เร็วขึ้น

วัตถุประสงค์: เพื่อรายงานประสบการณ์และผลการผ่าตัดส่องกล้องเพื่อรักษามะเร็งต่อมลูกหมากผู้ป่วย 10 ราย ในโรงพยาบาลวชิระภูเก็ต

วัสดุและวิธีการ: ศึกษาและเก็บข้อมูลย้อนหลังในผู้ป่วย 10 รายที่ได้รับการผ่าตัดส่องกล้องเพื่อรักษามะเร็งต่อมลูกหมากในโรงพยาบาลวชิระภูเก็ต ในช่วงระหว่างเดือนตุลาคม พ.ศ. 2563 ถึงเดือนกันยายน พ.ศ. 2564 ซึ่งมีจำนวนทั้งสิ้น 10 ราย โดยนำข้อมูลมาวิเคราะห์ในด้านข้อมูลพื้นฐาน, ผลเลือด PSA ก่อนและหลังผ่าตัด, ระดับ Gleason , ระยะเวลาการผ่าตัด, ปริมาณการเสียเลือดระหว่างผ่าตัด, ภาวะแทรกซ้อนระหว่างและหลังการผ่าตัด, ผลการตรวจพยาธิวิทยาหลังการผ่าตัด

ผลการศึกษา: อายุเฉลี่ยของผู้ป่วยคือ 64.7 ปี ค่าเฉลี่ยผลเลือด PSA ก่อนผ่าตัด 38.89 นาโนกรัม/มิลลิลิตร ผู้ป่วยที่มีค่าระหว่าง PSA 10 ถึง 20 นาโนกรัม/มิลลิลิตร มีจำนวน 5 ราย (50%) ค่า PSA มากกว่า 20 นาโนกรัม/มิลลิลิตร มีจำนวน 4 ราย (40%) ผู้ป่วยที่มีผลการตรวจพยาธิวิทยาระดับ Gleason น้อยกว่า 7 มีจำนวน 4 ราย (40%) ระยะเวลาเฉลี่ยในการผ่าตัดเท่ากับ 254 นาทีและมีการเสียเลือดโดยประมาณเท่ากับ 280 มิลลิลิตร โดยไม่มีภาวะแทรกซ้อนรุนแรง ระยะเวลาของการรักษาในโรงพยาบาลเท่ากับ 9 วัน และค่าเฉลี่ยของการใส่สายสวนปัสสาวะคือ 23 วัน เมื่อติดตามผู้ป่วยเป็นระยะเวลา 3 เดือนหลังผ่าตัดพบว่าผู้ป่วยทั้งหมดมีระดับของผลเลือด PSA ที่ต่ำกว่า 0.1 นาโนกรัม/มิลลิลิตร และการกลั้นปัสสาวะกลับมาสู่ภาวะปกติได้ในระยะเวลา 6 เดือนหลังผ่าตัด

สรุป: การรักษามะเร็งต่อมลูกหมากด้วยวิธีการผ่าตัดส่องกล้อง เป็นทางเลือกหนึ่งในการรักษามะเร็งต่อมลูกหมากในระยะไม่ลุกลาม สามารถทำได้โดยปลอดภัยแม้ในศัลยแพทย์ทางเดินปัสสาวะที่มีประสบการณ์เริ่มต้น ซึ่งผลการผ่าตัดจะดีขึ้นต้องอาศัยทักษะและความชำนาญต่อไป

คำสำคัญ: มะเร็งต่อมลูกหมาก, การผ่าตัดต่อมลูกหมากแบบส่องกล้อง, การผ่าตัดแบบแผลเล็ก

Abstract

Background: The experience of laparoscopic radical prostatectomy guarantees accuracy, reduces complications, and enhances patient results. It also improves the effectiveness of treatment and speeds up recovery. For a few seconds, Patient outcomes are enhanced by accurate surgery and fewer problems, which are guaranteed by experience with laparoscopic radical prostatectomy. It also increases the efficacy of cancer treatment and encourages a quicker recovery.

Objective: To describe our experience in transperitoneal laparoscopic radical prostatectomy (LRP) and provide functional and oncological outcomes for the first 10 cases at our institution.

Materials and methods: A retrospective review from October 2020 to September 2021 identified 10 patients who underwent LRP for localized/locally advanced prostate cancer. The patient and tumor characteristics, pre-and postoperative prostate-specific antigen (PSA) levels, Gleason score, operative time, estimated blood loss, perioperative complications, and postoperative outcomes were recorded and analyzed.

Results: The median age of the patients was 64.7 years and the median preoperative PSA was 38.89 ng/mL. Five (50%) patients had PSA levels between 10 and 20 ng/mL and four (40%) patients had PSA levels >20 ng/mL. Four patients (40%) had Gleason scores <7 at the time of initial diagnosis. The median operative time was 254 minutes and the median estimated blood loss was 280 mL. Clavien-Dindo grade 3–5 complications were not observed. The median hospital stay and catheter time were 9 and 23 days, respectively. All patients achieved undetectable postoperative PSA after LRP at 12 weeks. Nine patients recovered continence completely at 3 months postoperatively.

Conclusion: LRP is the standard treatment for patients with non-metastatic prostate cancer. LRP is safe and feasible for the beginner urologist. The oncological and functional outcomes were similar to high-volume centers.

Keywords: Prostate cancer, Laparoscopic radical prostatectomy, Minimally invasive surgery

Introduction

Prostate cancer is the most common cancer diagnosed in genitourinary cancer. In 2020, according to the World Health Organization, prostate cancer was the third most commonly diagnosed malignancy preceded only by lung and colorectal cancer.[1] In Thailand, the estimated prostate cancer incidence was 7.2/100,000 and the mortality rate was 3.7/100,000.[2] The treatment options depend on the stage, life expectancy, and patient preference. Radical prostatectomy is the main treatment for localized and locally advanced prostate cancer. It can be performed in an open approach or as a minimally invasive procedure.[3] Currently, laparoscopic radical prostatectomy (LRP) and robotic-assisted laparoscopic radical prostatectomy (RARP) are the reference treatments of choice for non-metastatic prostate cancer. Recent studies revealed that the perioperative outcomes, such as estimated blood loss (EBL), transfusion rate, and hospital stay, were better in the minimally invasive approach than in the open approach.[4,5] The use of conventional

laparoscopy to perform a radical prostatectomy has decreased after the invention and widespread use of robotic technology. However, due to the high costs of robotic surgery, conventional laparoscopy is still used in many regions of the world, and it is an effective alternative to open surgery at the author's hospital. This research aimed to report our surgical experience in LRP and provide the outcomes in the first 10 cases of our institution.

Materials and methods

Study population

After ethical approval was received from the Vachira Phuket Hospital board committee (VPH REC 026/2022), a retrospective review was performed using the Vachira Phuket Hospital database between October 2020 and September 2021. After excluding patients with incomplete data and advanced-stage prostate cancer, we identified 10 patients with localized/locally advanced prostate cancer.

Data collection

Baseline patient characteristics including demographics and comorbidities, tumor characteristics, and prostate-specific antigen (PSA) level were collected. The tumor diameter, histologic grading, and stage were recorded. The disease stage was classified according to the 2016 American Joint Committee on Cancer/Union for International Cancer Control TNM system. PSA levels and risk stratification were classified by the European Association of Urology guidelines. Undetectable PSA was defined as a PSA level of <0.1 ng/mL after 12 weeks postoperatively. The Alinity I Total PSA Reagent Kit can measure PSA in a range of 0.000–100 ng/mL.

Operation procedure

The authors performed LRP using the intraperitoneal approach described by Karnjanawanichkul, et al.[6] with some modifications. Following general anesthesia, the patient was placed in the lithotomy position with a 10–15-degree head-down tilt. A Foley catheter and an NG tube were inserted. The first camera port was inserted at the umbilicus by the open technique (10 mm trocar). Gas flow was initiated to create an intraperitoneal space. A second 10 mm trocar (working trocar) was placed one handbreadth left lateral to the midline and a third 5 mm trocar was placed in the mirror image position as the previous one. A fourth 5 mm trocar was placed in the right lower quadrant two fingers breadth superomedially to the anterior-superior iliac spine. The last 5 mm trocar was placed in the midline between the camera trocar and the pubic symphysis, which is beneficial for dissection of the posterior and apex of the prostate gland. The second to fifth trocar positions were created under laparoscopic vision, and all positions of the trocars are shown in Figure 1. The operation was started by pulling the urachus to the bladder dome. Bilateral pelvic lymphadenectomy was performed and then these anatomical boundaries were used: cranial border at the bifurcation of the common iliac artery; lateral at the iliac vessels; medial at the medial umbilical ligament; and caudal at the pubic bone with the obturator nerve as the posterior border. Periprostatic fat was gently cleaned away and the endopelvic fascia was incised at both sides to expose the fibers of the levator ani

muscle. The puboprostatic ligaments were transected sharply and the Santorini (dorsal venous) plexus was ligated with 2-0 Vicryl suture and a CT-1 needle by passing the needle underneath the plexus from right to left. Dissection of the bladder neck at the anterior was assisted by traction of the Foley catheter to identify the junction between the prostate and bladder neck. Dissection continued laterally for complete separation at the dorsal border. Dissection then continued between the prostate and bladder neck at a 30-degree angle caudally by the bladder neck preservation technique. After this step, the anatomical landmarks of the ampullae and the seminal vesicles were seen. The vas deferens and seminal vesicles were identified laterally and completely dissected following transection. The prostate was retracted away from the rectum and dissection continued towards the apex of the prostate. The prostatic pedicles were cauterized. At the prostatic apex, the urethra was sharply transected starting at the anterior part and avoiding coagulation. The catheter was removed and the urethra was completely transected. After the prostate gland was free and moved cranially, the Rocco stitch was used to reapproximate the remnant of Denonvilliers fascia, posterior detrusor, and posterior rhabdosphincter. The vesico-urethral anastomosis was performed using 3-0 and 4-0 barbed sutures in a continuous fashion. Before tying the last couple of anterior stitches, we inserted an indwelling Foley catheter 18 Fr with a 12 mL balloon. The water-tightness of the anastomosis was checked by filling the bladder with 150 mL of normal saline. A hanging suture was placed at the anterior wall bladder and posterior rectus sheath with a barbed suture. The prostate specimen was pushed into a bag and removed by passing it through the umbilical port. At the end of the procedure, a closed suction drainage catheter was placed in the retropubic space and removed when the contents were less than 100 mL/day. The patient was then discharged. Normally, the authors keep the Foley catheter in place for three weeks and remove it later at the outpatient department. The skin was closed by subcuticular stitches.

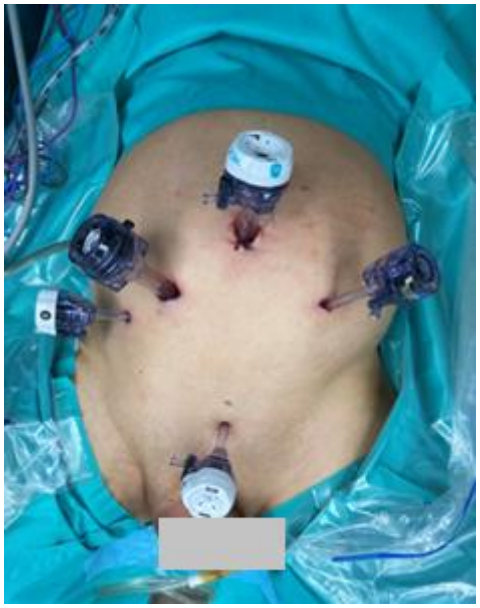

Figure 1. Five trocars were placed during the intraperitoneal approach for laparoscopic radical prostatectomy. The open technique was used to insert the first trocar (10 mm) via the umbilical ring. The other trocars were inserted under laparoscopic visualization to avoid intraperitoneal organ injury. The second trocar (10 mm) and third trocar (5 mm) were inserted at the right and left midclavicular lines 5 cm from the umbilical ring trocar, respectively. An assisting trocar (5 mm) was then inserted at the right anterior axillary line, and the last trocar (5 mm) was inserted at the suprapubic area to assist during bladder neck dissection.

Statistics

Continuous variables are reported as median (interquartile range), and categorical data are shown as numbers and percentages.

Results

The baseline patient and tumor characteristics for the 10 patients are shown in Table 1. The median age and median preoperative PSA level were 64.7 years and 38.89 ng/mL, respectively. Overall, five (50%) patients had PSA levels between 10–20 ng/mL, and four (40%) had PSA levels >20 ng/mL. Four patients (40%) had Gleason scores <7 at the preoperative time and two (20%) patients had Gleason scores >7. Tumor staging was performed by magnetic resonance imaging. Eight (80%) patients had cT3 stage prostate cancer. The median operative time was 254 minutes and the median EBL was 280 mL. The median hospital stay and catheter time were 9 and 23 days, respectively (Table 2). Eight patients (80%) were classified as T2 stage and one (10%) was T3 stage. None of the patients demonstrated nodal spreading (Table 2). Two patients (20%) experienced positive margin status. However, none of the patients received adjuvant treatment.

All patients achieved undetectable PSA after LRP and 12 weeks postoperatively. None of the patients were identified as Clavien-Dindo grade 3–5 complications. Continence was completely recovered in nine patients at an average of three months postoperatively. The one remaining patient recovered six months after surgery. None of the patients required further surgery. A summary of perioperative and postoperative outcomes is shown in Table 3.

Table 1. Patient and tumor characteristics (n = 10)

Variables	
Median age, years (IQR)	64.7 (61,73)
Preoperative PSA (ng/mL), median (IQR)	38.89 (8.6,225)
Preoperative PSA range (ng/mL), n (%)	
<10	1 (10)
10–20	5 (50)
>20	4 (40)

Variables	
Gleason score, n (%)	
<7	4 (40)
=7	4 (40)
>7	2 (20)
Clinical stage, n (%)	
T2	2 (20)
T3	8 (80)

Abbreviations: IQR = interquartile range; PSA = prostate-specific antigen; T = tumor staging

Table 2. Surgical outcomes

	Variables	Results
Perioperative outcomes	Operative time (min), median (IQR)	254 (155,300)
	Estimated blood loss (mL), median (IQR)	280 (50,650)
	Average volume of prostate (g), median (IQR)	52.5 (27,115)
	LOS (days), median (IQR)	9.3 (7,19)
	Catheter time (days), median (IQR)	23.2 (15,34)
	Postoperative PSA at 3 months, n (%)	
	PSA undetectable	10 (100)
	PSA detectable	0
Pathologic outcomes	Pathological stage, n (%)	
	T0	1 (10)
	T1	0 (0)
	T2	8 (80)
	T3	1 (10)
	T4	0 (0)
	Lymph node status, n (%)	
	N0	10 (100)
	Margin status, n (%)	
	Positive	2 (20)
	Negative	8 (80)

Abbreviations: IQR = interquartile range; LOS = length of stay; PSA = prostate-specific antigen

Table 3 Overall perioperative, postoperative, and pathologic outcomes

Patient no.	PSA (ng/mL)	Operation time (min)	EBL (mL)	Margin status	LOS (days)	Gleason score	pT	LN harvest status (number of positive node(s)/total nodes)	Urinary continent
1	28.4	275	500	Negative	7	3+3	2	N/A	yes
2	25	275	50	Negative	7	3+3	1	N/A	yes
3	12	290	200	Negative	9	3+4	2	Rt 0/8, Lt 0/7	yes
4	16.5	280	250	Negative	8	4+4	2	N/A	yes
5	17.4	275	500	Negative	19	3+3	2	Rt 0/5, Lt 0/3	yes
6	11	155	150	Negative	7	4+3	2	Rt 0/3, Lt 0/6	yes
7	13	275	250	Negative	9	3+4	2	Rt 0/2, Lt 0/2	yes
8	32	190	100	Positive	11	4+3	2	Rt 0/5, Lt 0/5	yes
9	225	300	650	Positive	9	4+3	3	Rt 0/1, Lt 0/1	yes
10	8.6	225	150	Negative	7	3+3	2	Rt 0/4, Lt 0/4	yes

Abbreviations: EBL = estimated blood loss; LOS = length of stay; Lt = left side; N/A = not available, Rt = right side; PSA = prostate-specific antigen; pT = pathologic stage; LN = lymph node

Table 4. Comparison of operative outcomes and complications

Study	N	Mean/median operation time (min)	Mean/median blood loss (mL)	Conversion rate (%)	LOS (days)	Transfusion rate (%)	Positive margin	Complications
Guillonneau et al. (1999)	59	265	400	9.2	4.5	15.4	12.3	1 Rectal injury 1 Bleeding
Abbou et al. (2000)	10	258	NA	0	9	4.7	27.9	1 Rectal injury 4 Urine leakage
Turk et al. (2001)	125	255	185	0	8	2	26.4	3 Rectal injury
Bollens et al. (2001)	50	317	680	2	NA	13	22	NA
Chaiyong et al. (2006)	56	350	883	16	NA	27.6	29.8	1 Rectal injury 5 Urine leakage
Tanet et al. (2011)	100	425	1400	NA	8	NA	21.6	10 Rectal injury
Watid et al. (2013)	16	437	1696	0	11	87.5	9	1 Rectal injury
Wichien et al. (2018)	20	180	400	5	5	10	30	1 Delayed bleeding 1 Urine leakage
Apiwich et al. (2022)	10	254	280	0	9.3	0	20	None

Abbreviations: N = number of patients; LOS = length of stay; NA = not available

Discussion

LRP and RARP are the reference therapies for clinically localized/locally advanced prostate cancer. Minimally invasive surgery (MIS) has replaced open surgery with superior outcomes that include small scars,

a short recovery period, and reduced blood loss.[7] In the past, most of the procedures were performed in a tertiary center because experienced urologists and a special assistance team were required. Improvements in laparoscopic equipment and surgical simulators have decreased the learning experience time for young urologists in MIS. Most of the published reports are from tertiary centers with excellent outcomes.[8–12] We performed LRP in our first 10 cases at our institution with similar outcomes.

Our main finding revealed all patients had experienced an undetectable PSA at three months after surgery. There were no grade 3–5 perioperative complications. Continence was achieved in 90% of patients at three months postoperatively. Clinical stage analysis revealed that 80% of patients were classified as cT3 and the median PSA was 39 ng/mL. Based on the T stage, Gleason grade group, and PSA level, all patients were classified as high-risk prostate cancer and most were challenging cases. Outcomes were surprisingly good and were comparable with previous studies. This suggested that the simulator machine and improvements in the surgical equipment decreased the time needed to gain experience and learn surgical skills, which improved the outcomes.

Nualyong and colleagues reported the first study of LRP in Thailand.[13] After that, several reports were published. There are two surgical approaches for LRP: intraperitoneal and extraperitoneal.[13–15] Each approach has pros and cons but the oncological outcomes and functional outcomes are similar. We were familiar with the intraperitoneal approach. This approach provides more working space and less skill for the assistance team. Our median operation time and blood loss results were lower than previous reports (Table 4). We used vessel sealing devices to control the dorsal vein complex instead of suture ligation. This technique likely reduced intraoperative bleeding with similar outcomes. Recent reports indicated that the MIS approach had less blood loss compared to the open approach The mean EBL for radical retropubic prostatectomy (RRP), LRP, and RARP was 935, 442, and 191 mL, respectively.[16,17] Performing urethrovesical anastomosis is the most important and difficult step. In this study, we routinely used barbed sutures to perform the urethrovesical anastomosis, which reduced the time to do the anastomosis.[18] The MIS approach showed a superior patency rate of urethrovesical anastomosis compared to the open approach. The strictures of urethrovesical anastomosis were 5.8% versus 14.0% in the MIS and open approach, respectively.[16,17]

All patients achieved continence within six months after surgery. The definition of continence in this study was using a diaper less than 1 pad/day. The result seemed to be superior compared to previous articles. Bladder neck, urethra length, and neurovascular bundle preservation are important factors for surgical recovery.[19,20] During the operations, we spared the bladder neck and performed bladder neck reconstruction if needed. We avoided thermal dissection at the prostate apex and both lateral pedicle sides, which probably improved the continence outcomes in our series. The MIS approach demonstrated better continence outcomes than the open approach. Recent literature reported that continence rates after surgery at 6 months were 73% and 64% in the MIS and open approaches, respectively. Also, erectile function after surgery is an important issue for patients. The recovery rates of erectile function at 12 months after

surgery were 81% and 56% in the MIS and open approaches, respectively. Again, the MIS approach provided better outcomes than the open approach.[16,17] Unfortunately, in this study, we did not collect data for erectile function after surgery.

Oncological outcomes are the most important for oncologic urology. All patients in this study experienced undetectable PSA after surgery even though 80% of patients were classified in the high-risk group. Chalieopanyarwong and colleagues reported that the PSA reached a nadir in 84% of high-risk patients after surgery.[21,22] Our results were the same way as that study. Margin status is an important factor for the recurrence of the disease that would indicate the need for adjuvant or salvage treatment or both. In this study, the positive margin rate was 20%. Margin status was comparable between the MIS and open approach. Positive margin rates were reported as 21% and 22% in the MIS and open approaches, respectively.[16,17] Positive margin is an important risk for local recurrence; however, the patients in this current study were free of disease recurrence. The PSA after LRP is a valuable tool for clinical judgment for further treatment.

Our study has limitations that include a single-institution retrospective design, a small population, and a short follow-up time. However, the strength of this study is that it is a report from a secondary hospital and a urologist with years of experience. We believe this study provided data regarding the potential to perform LRP in secondary centers.

Conclusion

LRP is the standard treatment for patients with non-metastatic prostatic cancer. LRP is safe and feasible for the beginner urologist. The oncological and functional outcomes were similar to high-volume institutions.

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