Comparison of Urinary Continence Outcome between Robotic Assisted Laparoscopic Prostatectomy versus Laparoscopic Radical Prostatectomy

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Objective: *To compare urinary continent rate at six and 12-month postoperative period, and perioperative outcome between robotic-assisted laparoscopic radical prostatectomy (RALP) and laparoscopic radical prostatectomy (LRP) at Siriraj Hospital.*

Material and Method: *All medical records of patients performed RALP and LRP between 2005 and 2010 were reviewed. Data composed of demographic information, perioperative outcome, and oncologic outcome. Moreover, the urinary continence rate was also collected at six and 12-month postoperative period by questionnaires based research design.*

Results: *Between 2005 and 2010, we performed 548 cases of RALP and 613 cases of LRP. Only 486 cases of RALP (88.6%) and 561 cases of LRP (91.5%) had been followed-up more than 12 months. All demographic data including age, biopsy Gleason score, and preoperative PSA level in both groups were comparably. On the other hand, the perioperative outcome in RALP differed from LRP group significantly, including operative time (210 min vs. 255 min), blood loss (449 ml vs. 766 ml), blood transfusion rate (7.6% vs. 25.2%), and length of hospital stay (7 days vs. 8.6 days) ($p<0.001$). The oncological outcome including pathologic tumor staging and Gleason score were comparably. Late complication such as anastamosis stricture was not different between the two groups (3.1% in RALP vs. 2.4% in LRP, $p = 0.584$).*

The continence rate of RALP and LRP groups at 6-month was 67.8% and 39% and at 12-month was 80% and 63.7%, respectively. The continence rate of RALP was better than LRP significantly.

Conclusion: *From our experience, perioperative outcome and continence rate at six and 12-month of RALP group was significantly better than LRP group. The demographic data, oncological outcome, and anastamosis stricture rate were comparably in both groups. The most relevant preoperative predictors of urinary continence were patient's age and prostatic weight.*

Keywords: *Laparoscopic radical prostatectomy (LRP), Robotic-assisted laparoscopic prostatectomy (RALP), Outcome, Continence*

J Med Assoc Thai 2014; 97 (4): 393-8
Full text. e-Journal: *http://www.jmatonline.com*

Radical prostatectomy is the standard for treatment for localized prostatic cancer and significantly reduced disease-specific mortality[1]. At present, robotic assisted laparoscopic prostatectomy (RALP), and laparoscopic radical prostatectomy (LRP) are widely accepted in treatment options for localized prostatic cancer. Although operative results are quite good, the continence function is the major problem that concern most patients.

Though meta-analysis studies demonstrated that urinary continence and oncological outcome in both procedures are comparable, there have been many definitions of urinary continence in various studies[2,3]. In some studies, for example, Coelho's study showed that RALP produced better urinary continence outcome than in LRP[4].

Therefore the authors would like to compare urinary continence rate at six and 12-month and oncological outcome in RALP and LRP performed in Siriraj Hospital in order to answer the patients' enquiries.

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Material and Method

All data of prostatic cancer patients performed RALP and LRP at Siriraj Hospital between 2005 and 2010 were collected and reviewed. Both RALP and LRP were performed by nine surgeons who were

experience in these operations. The patients who had history of urinary incontinence and had been followed-up less than 12 months were excluded. The data composed of four aspects including demographic information, perioperative outcome, oncological outcome and urinary continence rate at six and 12-month.

Urinary continence was defined as using no pad or dry protective pad. These data were assessed by questionnaires based research design.

SPSS version 15 was used for all statistical analyses. The numeric parameters between both groups were compared using Student's t test or the Mann-Whitney U test, as appropriate. The Chi-square test was used for comparison of the categorical variables. The $p<0.05$ was considered statistically significant. Multivariable analysis was used to find the predictive factors of urinary continence outcome.

Results

Between 2005 and 2010, 548 cases underwent RALP and 613 cases underwent LRP. All cases were reviewed, only 486 cases of RALP (88.6%) and 561 cases of LRP (91.5%) were completely followed-up for more than 12 months.

The demographic data including mean age (67 years old in both groups), preoperative PSA (18.67 in RALP vs. 16.81 in LRP), biopsy Gleason score, and preoperative hormonal therapy (9% in RALP vs. 11.6% in LRP) were comparably in both groups (Table 1).

The perioperative outcome demonstrated that RALP was significantly better than LRP in terms of mean operative time (210 min vs. 255 min), mean estimated blood loss (449 ml vs. 766 ml), blood transfusion rate (7.6% vs. 25.2%), and mean length of hospital stay (7.0 days vs. 8.6 days). The data showed no difference in anastamotic stricture between both groups (3.1% in RALP vs. 2.4% in LRP, $p = 0.584$).

The oncological outcome in both groups was comparable. Most cases in both groups were Gleason score 7 (54.7% in RALP vs. 54.6% in LRP) and were pathological tumor stage 2 (pT2) (57.7% in RALP vs. 53.3% in LRP).

The urinary continence rate at six and 12-month showed that RALP was better than LRP significantly. At 6-month, the continence rate of RALP and LRP was 67.8% and 39%. At 12-month, the continence rate of RALP and LRP was 80% and 63.7%, respectively (Table 3).

All demographic data and perioperative parameters were analyzed to find the factors related to urinary continence outcome. In univariate analysis all parameters including nerve sparing technique, LUTS, mean estimated blood loss, and mean operative time clearly showed significant correlation. However, in multivariate analysis, no parameters showed any statistically significance. There were only the patient's age less than 65 years old and the prostate weight less than 60 grams that showed significant correlation to urinary continence rate in multivariate analysis (OR = 1.63 (95% CI 1.18-2.26) and OR = 1.51 (95% CI 1.01-2.28), respectively) (Table 4).

Discussion

The present study demonstrated that RALP was significantly better than LRP in term of shorter operative time, less estimated blood loss, lower blood

Table 1. Demographic data

	RALP (n = 486)	LRP (n = 581)	*p*-value
Age (years), mean ± SD (min-max)	67.00±7.6 (40-84)	67.00±7.4 (42-83)	0.946
PSA, mean ± SD (min-max)	18.67±26.9 (1-300)	16.81±19.8 (0.26-174)	0.524
Gleason score			
≤6	197 (43.1%)	230 (42.9%)	0.706
7	181 (39.6%)	203 (37.9%)	
≥8	79 (17.3%)	103 (19.2%)	
Neoadjuvant HT	43 (9.0%)	65 (11.6%)	0.18
Nerve sparing			
None-nerve sparing	291 (60.0%)	385 (68.6%)	
Unilateral nerve sparing	35 (7.2%)	51 (9.1%)	
Bilateral nerve sparing	159 (32.8%)	125 (22.3%)	

RALP = robotic-assisted laparoscopic radical prostatectomy; LRP = laparoscopic radical prostatectomy; PSA = prostatic specific antigen; Neoadjuvant HT = neoadjuvant hormonal therapy

Table 2. Perioperative, postoperative and oncologic outcome

	RALP (n = 486)	LRP (n = 561)	*p*-value
Operative time (min)	210 (105-730)	255 (125-680)	<0.001
Blood loss (cc)	449 (20-2,600)	766 (40-6,000)	<0.001
LOH	7 (2-35)	8.6 (3-149)	<0.001
Early postoperative complication			
Bleeding (require blood transfusion)	37 (7.6%)	141 (25.2%)	<0.001
Bowel injury	3 (0.6%)	8 (1.4%)	0.2
MI	4 (0.8%)	3 (0.5%)	0.711
Wound infection	2 (0.4%)	8 (1.4%)	0.117
CVA	2 (0.4%)	1 (0.2%)	0.6
Anastomosis leakage	39 (8.0%)	65 (11.7%)	0.054
Late complication			
Anastomosis stricture	15 (3.1%)	13 (2.4%)	0.584
Gleason score			
≤6	99 (20.8%)	104 (19.4%)	0.761
7	260 (54.7%)	293 (54.6%)	
≥8	116 (24.4%)	140 (26.1%)	
Pathological T staging			
No tumor	10 (2.1%)	26 (4.6%)	0.097
pT2	280 (57.7%)	299 (53.3%)	
pT3a	102 (21.0%)	137 (24.4%)	
pT3b	84 (17.3%)	87 (15.5%)	
pT4	9 (1.9%)	12 (2.1%)	

LOH = length of hospital stay; MI = myocardial infarction; CVA = cerebrovascular accident

Table 3. Continence outcome at 6 and 12 month

	RALP (n = 484)	LRP (n = 537)	p-value
6 month	328 (67.8%)	209 (39.0%)	<0.0001
12 month	387 (80.0%)	342 (63.7%)	<0.0001

transfusion rate, and shorter length of hospital stay. The results were similar to previous studies from Dr. Willis, Hakimi, Hu that compared result of RALP and LRP in the same surgeon[5-7]. The advantages of RALP could be explained by many reasons such as good 3D vision and short learning curve so it could be performed fast and precisely[8].

Several definitions are used in continence outcome. These differences may have more to do with significant impact on patient's quality-of-life (QOL) than with the perception of continence. Liss et al[13] evaluated the association of pad usage with QOL and found that even the use of one pad per day or a pad just for security resulted in significant decreases in QOL measurement. Continence should be strictly defined as 0 pad. Therefore, urinary continence in the present study was defined as using no pad or dry protective pad.

For urinary continence rate at six and 12-month, the present study demonstrated that RALP was significantly better than LRP because the technique of RALP could preserve more urethral length and avoid sphincteric injury during surgery. Both factors could help continence function returning to normal faster[9]. Many studies confirmed these different outcomes. Some studies, which were systematic review, demonstrated that both technique offered the same continence outcome[3,10,11] and some study showed that RALP has better early urinary continence outcome than LRP[2]. In contrast, Coelho reviewed literatures having more than 250 cases. It showed that RALP offered better continence outcome than LRP, but definition of urinary continence in each study was different so that the conclusion could not be made clearly[4].

When our data was analyzed by univariable analysis. Factors affecting urinary continence rate were patient's age less than 65 years, presenting lower urinary tract symptoms, prostate size less than 60 grams, bilateral nerve sparing technique, lower estimated blood loss, and operative time. All factors were analyzed by multivariate analysis. Only two

Table 4. Factors related to urinary continence outcome (n = 1,021)

	Incontinence group (n = 292)	Continence group (n = 729)	Univariable analysis		Multivariable analysis	
			OR (95% CI)	*p*-value	OR (95% CI)	*p*-value
Age (years)						
≤65	93 (22.3%)	324 (77.7%)	1.71 (1.29-2.28)	<0.0001	1.63 (1.18-2.26)	<0.0001
>65	199 (32.9%)	405 (67.1%)	1		1	
Prostate weight (gm)						
≤60	219 (26.5%)	607 (73.5%)	1.66 (1.14-2.41)	<0.0001	1.51 (1.01-2.28)	0.04
>60	52 (37.4%)	87 (62.6%)	1		1	
RALP/LRP						
RALP	97 (20.0%)	387 (80.0%)	2.28 (1.71-3.02)	<0.0001	2.18 (1.58-3.01)	<0.0001
LRP	195 (36.3%)	342 (63.7%)	1		1	
LUTS						
LUTS	188 (32.2%)	395 (67.8%)	1	0.003	1	0.63
No LUTS	103 (23.8%)	330 (76.2%)	1.53 (1.15-2.02)		1.08 (0.79-1.49)	
Nerve sparing						
None	209 (31.6%)	453 (68.4%)	1		1	
Unilateral	30 (36.6%)	52 (63.4%)	0.80 (0.50-1.29)	0.360	0.77 (0.45-1.31)	0.33
Bilateral	53 (19.2%)	223 (80.8%)	1.94 (1.38-2.73)	<0.0001	1.44 (0.97-2.14)	0.07
Blood loss (ml)	700 (50-3,600)	578 (20-6,000)	1 (0.99-1)	0.01	1 (1-1)	0.65
Operative time (min)	245 (120-730)	229 (105-680)	0.99 (0.99-1)	0.01	1 (1-1)	0.71
Previous TURP						
TURP	11 (36.7%)	19 (63.3%)	1	0.32	1	0.19
No TURP	277 (28.2%)	704 (71.8%)	1.47 (0.69-3.13)		1.73 (0.76-3.94)	
OC						
OC	160 (26.6%)	442 (73.4%)	1.28 (0.97-1.68)	0.083	1.26 (0.93-1.71)	0.14
Non OC	132 (31.6%)	286 (68.4%)	1		1	

LUTS = lower urinary tract symptom; TURP = transurethral resection of prostate gland; OC = organ confined tumor (pT2) and non OC = pT3-pT4

Table 5. Subgroup analysis: LUTS, nerve sparing technique and age group

	Age <65 (n = 417)	Age >65 (n = 604)	Total	*p*-value
LUTS	195 (32%)	403 (68%)	596	0.003
No LUTS	233 (52%)	213 (48%)	446	
Non nerve sparing	207 (31%)	469 (69%)	676	
Unilateral nerve sparing	43 (50%)	43 (50%)	86	
Bilateral nerve sparing	177 (62%)	107 (38%)	284	<0.0001

factors, patient's age less than 65 years and prostate size less than 60 grams affected urinary continence rate. Because the bigger prostate size was removed, the more difficult urethral and sphincteric functions could be preserved.

Ficarra[12] reported that patient's age, body mass index, comorbidity index, lower urinary tract symptom, and prostatic volume were significant factors affecting urinary continence rate in patients performed RALP. In the present study, patients presenting with lower urinary tract symptoms were usually older. Bilateral nerve sparing technique is often performed in young patient. Therefore, our results were not similar as Ficarra study.

Conclusion

From our experience, perioperative outcome and continence rate at six and 12-month of RALP group were significantly better than LRP group, whereas demographic data, oncological outcome, and anastomosis stricture rate were comparably in both groups.

The most relevant preoperative predictors of urinary continence were patient's age, more than 65 years old and prostatic weight more than 60 grams.

What is already known on this topic?

Meta-analysis studies demonstrated that urinary continence and oncological outcome in both procedures are comparably, but there used many different definitions of urinary continence. Some studies showed that RALP has better urinary continence outcome than in LRP.

Ficarra study reported that patient's age, body mass index, comorbidity index, lower urinary tract symptoms, and prostate size were significant factors affecting urinary continence rate in patients performed RALP.

What this study adds?

From our experience, perioperative outcome and continence rate at six and 12-month of RALP group was better than LRP group, significantly. While demographic data, oncological outcome, and anastamosis stricture rate were comparably in both groups.

The most relevant preoperative predictors of urinary continence were patient's age of more than 65 years old and prostatic weight more than 60 grams.

Acknowledgements

The authors wish to thank the staff and coordinators of the Siriraj Hospital for facilitating the data collection, as well as all participants in the present study.

Potential conflicts of interest

None.

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การเปรียบเทียบการผ่าตัดมะเร็งต่อมลูกหมากในแง่ของการกลั้นปัสสาวะระหว่างการใช้หุ่นยนต์ช่วยผ่าตัดและการส่องกล้องผ่าตัด

กิตติภัค อัศวภารุจ, ภควัฒน์ ระมาตร์, ไชยยงค์ นวลยง, สุนัย ลีวันแสงทอง, สิทธิพร ศรีนวลนัด, ธวัชชัย ทวีมั่นคงทรัพย์, บรรณสิทธิ์ ไชยประสิทธิ์, ธีระพล อมรเวชสุกิจ, ศิรส จิตประไพ, สุชาย สุนทราภา

จุดประสงค์: เพื่อศึกษาเปรียบเทียบอัตราการกลั้นปัสสาวะ (continence rate) ภายในระยะเวลา 6 และ 12 เดือน หลังการผ่าตัดต่อมลูกหมาก ระหว่างโดยวิธีใช้หุ่นยนต์ช่วยผ่าตัด (RALP) และวิธีส่องกล้องผ่าตัดต่อมลูกหมาก (LRP)

วัสดุและวิธีการ: เก็บรวบรวมผู้ป่วยที่เข้ารับการผ่าตัด RALP และ LRP ในโรงพยาบาลศิริราชระหว่างปี พ.ศ. 2548 ถึง พ.ศ. 2553 โดยเก็บรวบรวมข้อมูลในด้าน demographic data, perioperative outcome, oncologic outcome และการกลั้นปัสสาวะที่ 6 และ 12 เดือน หลังเข้ารับการผ่าตัดต่อมลูกหมาก โดยการเก็บข้อมูลในด้านการกลั้นปัสสาวะจะใช้การส่งแบบสอบถาม

คำจำกัดความของการกลั้นปัสสาวะได้ในการศึกษานี้คือ การที่ผู้ป่วยไม่มีปัสสาวะเล็ด โดยไม่ต้องใช้ผ้าอนามัยรอง หรือใช้ผ้าอนามัยรองเพื่อป้องกันโดยที่ผ้าอนามัยที่รองไม่มีการเปื้อนปัสสาวะ (pad free or protective pad)

ผลการศึกษา: มีผู้ป่วยเข้ารับการผ่าตัด RALP 548 ราย และ LRP 613 ราย ในระหว่างปี พ.ศ. 2548ถึง พ.ศ. 2553 และมีจำนวนผู้ป่วยที่เข้ารับการผ่าตัด RALP 486 ราย (88.6%) และ LRP 561 ราย (91.5%) เท่านั้นที่มีข้อมูลที่ต้องการครบถ้วนและเข้ารับการติดตามการรักษาต่อเนื่องเป็นระยะเวลานานกว่า 12 เดือน พบว่าอายุ biopsy Gleason score ค่า PSA, pathologic tumor staging, Gleason score, positive surgical margin, stricture anastomosis นั้นไม่มีความแตกต่างกันระหว่างสองกลุ่มนี้ แต่พบว่าผู้ป่วยที่เข้ารับการผ่าตัด RALP ได้ผลที่ต่างจากผู้ป่วยที่เข้ารับการผ่าตัด LRP ในเรื่องของระยะเวลาการผ่าตัด (210 นาที vs. 255 นาที) การสูญเสียเลือด (449 ml vs. 766 ml) อัตราการให้เลือด (7.6% vs. 25.2%) ระยะเวลาการอยู่โรงพยาบาล (7 วัน vs. 8.6 วัน) อย่างมีนัยสำคัญทางสถิติ

ผู้ป่วยเข้ารับการผ่าตัด RALP มีการกลั้นปัสสาวะที่ 6 เดือน หลังเข้ารับการผ่าตัดต่อมลูกหมากได้ร้อยละ 67.8 และกลุ่มที่เข้ารับการผ่าตัด LRP ร้อยละ 39 และผู้ป่วยเข้ารับการผ่าตัด RALP มีการกลั้นปัสสาวะที่ 12 เดือน หลังเข้ารับการผ่าตัดต่อมลูกหมากได้ร้อยละ 80 และกลุ่มที่เข้ารับการผ่าตัด LRP ร้อยละ 63.7 โดยมีความแตกต่างกันอย่างมีนัยสำคัญทางสถิติ ($p<0.001$)

สรุป: ผู้ป่วยที่เข้ารับการผ่าตัด RALP มีอัตราการกลั้นปัสสาวะที่ 6 และ 12 เดือนหลังเข้ารับการผ่าตัดต่อมลูกหมากที่สูงกว่าผู้ป่วยที่เข้ารับการผ่าตัด LRP อย่างมีนัยสำคัญทางสถิติ และข้อมูล demographic data, oncological outcome, anastamosis stricture rate ของผู้ป่วยทั้งสองกลุ่มนั้นไม่มีความแตกต่างกันอย่างมีนัยสำคัญทางสถิติ

อายุและน้ำหนักต่อมลูกหมากนั้นเป็นปัจจัยสำคัญที่มีผลต่อการกลั้นปัสสาวะของผู้ป่วยที่เข้ารับการผ่าตัดต่อมลูกหมาก