Original Articles/นิพนธ์ต้นฉบับ

Outcome of Robotic Assisted Laparoscopic Radical Prostatectomy: Initial Experience in Ramathibodi Hospital

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Abstract

Background: Robotic Assisted Laparoscopic Prostatectomy (RALRP) has been shown to improve functional outcomes when compared to open or laparoscopic prostatectomy with similar oncologic results. It has become a famous procedure for treating patients with localized prostate cancer. The program of RALRP has just been started at Ramathibodi Hospital for about a year. The feasibility of this procedure in our institution has to be established.

Objective: To evaluate the feasibility of the RALRP that was performed early at Ramathibodi Hospital.

Materials and Methods: Medical records of 30 patients with clinically localized prostate cancer who underwent RALRP by two laparoscopic-experienced urologists in Ramathibodi Hospital from May 2013 to January 2014 were retrospectively reviewed including outcomes, complications, and cost per admission for RALRP.

Results: Mean operative time was 4.2 hours (range 2.0 to 7.3) and mean estimated blood loss was 527 ml (range 100 to 2200) without blood transfusion requirement in 80% of all patients. There were no intra-operative complications and no conversions to open surgery. Twenty-four patients (80%) had pT2 disease and 6 patients had pT3 disease. Positive surgical margin rate was 53%. There were 20% minor post-operative complications, and no major post-operative complications and mortalities. Mean length of hospital stay was 8 days (range 5 to 19) and mean duration of urethral catheter indwelling was 11 days (range 5 to 22). Mean post-operative serum PSA level was 0.08 ng/ml (range 0.00 to 1.12) with mean follow-up duration of 86 days. Total cost per admission for RALRP was 126,875 baht (range 50,968 to 343,027).

Conclusion: RALRP for prostate cancer in Ramathibodi Hospital is safe but additional studies are needed to indicate the feasibility of this procedure.

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Introduction

Prostate cancer is the ninth common malignancy in Thai men with an incidence of 3.5 per 100,000.[1] Because of the era of PSA screening and the quite long life expectancy of Thai men, there are more patients diagnosed with the early stage of prostate cancer. The only surgical treatment for the localized prostate cancer is radical prostatectomy.[2] Although it is the risk-taking operation, the patient might be completely cured by the treatment.

Regarding the radical prostatectomy, there are many techniques including open retropubic or perineal, pure laparoscopic, and most recent robotic-assisted laparoscopic approaches. In the past, we have performed only open retropubic radical prostatectomy for the patients with prostate cancer, but now we prefer to do laparoscopic prostatectomy because of its minimally invasive advantages. Nowadays, the da Vinci Surgical System has become the dominant robotic surgical device in the field of urology, especially in the field of prostate surgery. In the United States, 69% to 85% of prostatectomy are performed robotically.[3] Recent meta-analyses have demonstrated that robotic assisted laparoscopic radical prostatectomy (RALRP) has been shown to improve functional outcomes when compared to open or laparoscopic prostatectomy with similar oncologic outcomes.[4-6] At Ramathibodi Hospital, we have started performing RALRP since May 2013. The aim of this study was to retrospectively review and report outcomes, complications, and cost per admission for RALRP at our institution.

Materials and Methods

This study was approved by the Ethics Committee on Human Experimentation Involving Human Subjects at the Faculty of Medicine Ramathibodi Hospital, Mahidol University. Medical records of 30 patients who underwent RALRP by two urologists in Ramathibodi Hospital from May 2013 to January 2014 were retrospectively reviewed. All patients were diagnosed as having clinically localized prostate cancer with pathological confirmation. The patients were evaluated and prepared preoperatively to minimize the surgical risk, including medical history review, physical examination, and basic laboratory testing (complete blood count, blood chemistry, urinalysis, serum prostate-specific antigen (PSA), chest radiography, and electrocardiography). We chose to do Magnetic Resonance Imaging (MRI) with endorectal coil in the patients who were suspected to have locally advanced disease by PSA or digital rectal examination. The patients were counselled about the advantages and disadvantages of all options for radical prostatectomy, not only the RALRP but also laparoscopic radical prostatectomy (LRP) and open retropubic radical prostatectomy (RRP). Finally, the patients chose the option of surgery by themselves.

Regarding the surgical technique of the RALRP, we used the 4-arm da Vinci Surgical System (Intuitive Surgical Inc., Sunnyvale, CA, USA) with an intraperitoneal approach. Neurovascular bundle preservation was performed in selected patients with prostate-confined disease and low risk for recurrence. A Jackson-Pratt drain was routinely placed and removed around postoperative on day 2. The urethral catheter was removed around postoperative day 7 with or without cystography.

We collected data regarding demographic data [age, weight, height, body mass index (BMI), American Society of Anesthesiologists (ASA) classification], pre-operative PSA, intra-operative data [operative time, estimated blood loss (EBL), number of blood transfusion, operative technique such as neurovascular bundle

preservation, conversion to open surgery], peri-operative complications, post-operative data [duration of urethral catheter removal, length of hospital stay (LOH)], oncologic results (pathological stage, surgical margin status), and total hospital cost per admission. During follow-up period, we recorded the serum PSA and the follow-up time.

Descriptive statistics was reported using mean, standard deviation, and range. Pathological findings and complications were described in terms of frequency and percentage. Statistical analysis was conducted using Stata software version 11.0 (Stata Corp, College Station, Texas, USA).

Results

Of 30 patients undergoing RALRP, the mean age was 66.2 years (range 44.0 to 77.0), mean BMI was 24.2 kg/m^2 (range 17.9 to 31.2), and mean pre-operative serum PSA level was 11.27 ng/ml (range 5.40 to 29.59). Fifty-three percent of patients were classified as grade III physical status by the ASA classification system.

Mean operative time was 4.2 hours (range 2.0 to 7.3) and mean EBL was 527 ml (range 100 to 2200) without blood transfusion requirement in 80% of all patients. There were no intra-operative complications and no conversions to open surgery.

Regarding the TNM pathological staging, 24 patients (80%) had pT2 disease and 6 patients had pT3 disease. Overall, positive surgical margin rate was 53% and the final Gleason scores were 3+4 (11), 4+3 (8), 3+3 (8), 4+5 (1), 4+4 (1), and 2+3 (1). There were 20% minor post-operative complications (Clavien classification grade I-II), and no major post-operative complications (Clavien classification grade III-IV) and mortalities. The post-operative complications were bowel ileus (2), ascites (1), intra-abdominal infection (1), femoral nerve neurapraxia (1), and ulnar nerve entrapment (1).

Table 1 Demographic data of the patients (* indicates mean ± standard deviation).

Variables, units	
Number of patients	30
Age*, year (range)	66.20±7.49 (44-77)
PSA*, ng/ml (range)	11.27±6.37 (5.40-29.59)
ASA classification	
1	1 (3.3%)
2	11 (36.7%)
3	16 (53.3%)
4	2 (6.7%)
Height*, cm(range)	166.66±6.29 (153-182)
Weight*, kg(range)	67.13±9.55 (50-90)
BMI*, kg/m^2 (range)	24.22±3.55 (17.99-31.24)
<18.5	2 (6.7%)
18.5-23.4	10 (33.3%)
23.5-28.4	15 (50.0%)
28.5-34.9	3 (10.0%)

Table 2 Intra-operative outcomes (* indicates mean± standard deviation).

Intra-operative outcomes	
Operation time* (hr)	4.18±1.06 (2.0-7.3)
EBL* (ml)	526.67±430.86 (100-2200)
PRC transfusion (units)	
0	24 (80.0%)
1	3 (10.0%)
2	1 (3.3%)
4	1 (3.3%)
Missing data	1 (3.3%)
Nerve preservation	
Both	7 (23.3%)
Left	1 (3.3%)
Right	7 (23.3%)
Not performed	15 (50%)

Table 3 Final pathological findings.

Pathological stage	
T2	1 (3.3%)
T2a	6 (20.0%)
T2c	17 (56.7%)
T3a	3 (10.0%)
T3b	3 (10.0%)
Margin status	
Free	14 (46.7%)
Positive margin	16 (53.3%)
Gleason score	
2+3	1 (3.3%)
3+3	8 (26.7%)
3+4	11 (36.7%)
4+3	8 (26.7%)
4+4	1 (3.3%)
4+5	1 (3.3%)
Side	
Both	21 (70.0%)
Left	3 (10.0%)
Right	3 (10.0%)
Missing data	3 (10.0%)

Table 4 Complications.

Post-operative complications	
Bowel ileus	2 (6.7%)
Ascites	1 (3.3%)
Intra-abdominal infection	1 (3.3%)
Femoral nerve neurapraxia	1 (3.3%)
Ulnar nerve entrapment	1 (3.3%)

Table 5 Post-operative outcomes (* indicates mean± standard deviation).

Post-operative outcomes	
Length of hospital stay* (day)	8.00±3.57 (5-19)
Duration of urethral catheterization* (day)	10.93±4.60 (5-22)
Serum PSA level* (ng/mL)	0.08±.21 (0-1.12)
Follow-up time* (day)	85.55±43.70 (15-160)

Mean length of hospital stay was 8 days (range 5 to 19) and mean duration of urethral catheter indwelling was 11 days (range 5 to 22). Mean post-operative serum PSA level was 0.08 ng/ml (range 0.00 to 1.12) with mean follow-up duration of 86 days. Total cost per admission for RALRP was Baht 126,875 (range Baht 50,968 to 343,027).

Discussion

Radical prostatectomy is a standard treatment for clinically localized prostate cancer,[2] and the RALRP has become a popular technique for this procedure.

The objective of this study was to report the outcomes of the first 30 consecutive cases of the RALRP performed by the two LRP-experienced surgeons at Ramathibodi Hospital. Thus, this report demonstrates the learning curve of the surgeons.

By using meta-analysis, Novara et al analyzed 72 papers for peri-operative outcomes and complications following RALRP and found that the mean operative time is 152 minutes, mean EBL is 166 ml, mean transfusion rate is 2%, mean catheterization time is 6.3 days, and mean length of hospital stay is 1.9 days.[7] The mean complication rate is 9%.[7] Comparing to this study, we found the higher mean of all above parameters. This is limited by a small sample size and the experience of the surgeons. With regard to the LOH, we preferred to discharge the patients after removal of the urethral catheter, and this explains the very longer LOH in our study. Moreover,

Novara reported the very low rate of urinary leakage after RALRP (1.8%)[7] and our study demonstrated the similar result that there was no urinary leakage post-operatively.

Yossepowitch et al reported an average rate of PSM in a contemporary RALRP series of 15% (range 6.5 to 32%) in a systematic review.[8] We reported the higher rate of PSM (53%). Although the PSM rate is higher in patients with a more advanced pathologic stage[8], our study also shows the higher rate of PSM even in the patients with pT2 disease (46%). This is again due to a small sample size and the experience of the surgeons. The oncologic outcome should be improved with more experience of the surgeons.

The most prevalent post-operative complication was bowel ileus, and this might be caused by the intra-peritoneal approach of the procedure. There was one patient that had intra-abdominal infection after the operation. This might be explained by an increase in infection risk from the longest operative time of 7.3 hours. The patient could be treated with intravenous antibiotics. Among the post-operative complications, there were two complications, femoral nerve neurapraxia and ulnar nerve entrapment, which were the positioning-related complications. Actually, the surgical-related complication rate of the RALRP in our series was accounted for 13%.

In addition to a small sample size, another limitation of our study is a short follow-up period. Because of this short follow-up period, we could not completely evaluate the continence and potency outcomes. However, the serum PSA level was less than 0.1 ng/ml at about 3 months post-operatively.

The cost-effectiveness of the RALRP should be further studied to evaluate the feasibility of this procedure.

Conclusions

RALRP for prostate cancer in Ramathibodi Hospital is safe but additional studies are needed to indicate the feasibility of this procedure. To evaluate the functional outcomes including potency and continence rates, long term follow up is necessary.

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