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Robotic Assisted Laparoscopic Radical Prostatectomy without Proctorship: Early Experience of the First Series in Asia

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Abstract ***Introduction:*** **Robotic Assisted Laparoscopic Radical Prostatectomy has been shown to provide best surgical outcomes in terms of potency and continence. Robotic prostatectomy program was started at Siriraj Hospital without proctorship. Early result of the author's experience was evaluated.**

Objective: **To evaluate the feasibility of Robotic Assisted Laparoscopic Radical Prostatectomy performed at the author's institute without proctorship.**

Materials and Methods: **From February 2007 to June 2007, 15 patients with localized prostate cancer underwent robotic prostatectomy by one surgeon (the author). Perioperative data were evaluated.**

Results: **All patients successfully underwent the operation. Mean operating time was 263 minutes. Average blood loss was 825 ml. There was no conversion to open or laparoscopic prostatectomy in the series. One patient required a suprapubic cystostomy tube due to high tension at the vesico-urethral anastomotic site.**

Conclusions: **Early experience of robotic prostatectomy without proctorship has shown that it is feasible in robotic-naive-experience surgeon. However, oncological outcome can be improved when more experience is gained. Long term follow-up is needed to evaluate functional outcome including potency and incontinence rate.**

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Introduction

Open radical prostatectomy has been accepted as one of the standard treatments in clinically localized prostate cancer for many decades.[1] In 2006, the author reported 56 cases of transperitoneal laparoscopic radical prostatectomy.[2] Since then the number of laparoscopic radical prostatectomy has been increasing dramatically at our institute. Subsequently, the approach has been changed to extraperitoneal laparoscopic radical prostatectomy. Extraperitoneal laparoscopic radical prostatectomy is as good as open retropubic radical prostatectomy at the author's institute.[3] Since 2001, robotic prostatectomy has been reported.[4] The procedure has been popular among potent patients suffered from prostate cancer. With experience in laparoscopic radical prostatectomy, the program of robotic prostatectomy was started. Early experience of robotic prostatectomy without proctorship was analyzed and reported here.

Materials and Methods

From February 2007 to June 2007, 15 patients with localized prostate cancer underwent robotic prostatectomy at the Department of Surgery, Faculty of Medicine Siriraj Hospital, Bangkok. All patients were proved histologically from biopsy as having adenocarcinoma of the prostate. All patients were given an informed consent for the procedure. Patients' data were collected and reported.

Operative technique:

Robotic prostatectomy is usually performed under general anesthesia. Patients are placed in a dorsal supine position with 30°-45° head down tilt.

The first step is to create a pneumoperitoneum and placement of the first camera cannula. Then the 2nd and 3rd 8 mm working cannulae were placed 9 cm lateral to the first cannula at the level of 1 cm below the umbilicus. The 4th and 5th 12 mm assisting trocars are placed at right and left anterior axillary line to the level of the umbilicus. Finally the 6th 5 mm trocar is placed in the right subcostal area.

The next step is the dissection of the space of Retzius with the incision on the peritoneum. The anterior surface of the bladder neck, the anterior surface of the prostate and the endopelvic fascia are exposed and the fatty tissue overlying these structures is gently swept away. The superficial branch of the deep dorsal vein complex often runs along the anterior aspect of the prostate and divides at the bladder neck into two branches. This vein is fulgurated with bipolar forceps and divided. The endopelvic fascia is then incised on both sides exposing the fibers of the levator ani muscle. Puboprostatic ligaments are divided sharply. After this, the urethra and the dorsal vein complex can be easily visualized at the level of the prostatic apex. The prostate is retracted caudally to get good access to the Santorini plexus. The Santorini plexus is ligated with 0-Vicryl by selective passage of the needle underneath the plexus from right to left.

The bladder neck can be identified after removal of all prevesicular fatty tissue. It overlaps the prostate in the shape of a triangle. The dissection starts at 12 o'clock position at the tip of this triangle. Palpation with the forceps can help to identify the border between the mobile bladder neck and the solid prostate in difficult cases. The incision of the bladder neck is enlarged from 10 to 2 o'clock position, and the urethra is developed. The urethra is incised and the deflated balloon-catheter is pulled up into the retropubic space by the assistant under continuous tension. The dissection is then continued in the lateral direction, in the plane between bladder neck and prostate.

Once the bladder neck is completely dissected, care is taken to carry down the dissection in the correct plane between the prostate and the bladder neck in order to avoid any intraprostatic penetration. This pitfall may occur in cases where the penetration is directed too caudally. The bladder neck is completely divided between the 5 and 7 o'clock positions. This is then extended bilaterally by blunt and sharp dissection. After this step, the anatomical landmarks of the ampullae and the seminal vesicles are visualized.

After complete dissection of the bladder neck, the prostate is elevated anteriorly by the assistant. The seminal vesicles are easily identified and completely dissected. However, the tips of the seminal vesicles can be left in place in order to avoid damage to the neurovascular bundles which run in close proximity to them. After dissection of the seminal vesicles, the assistant holds the right ampulla and the right seminal vesicle, the surgeon holds the left ampulla and the left seminal vesicle in a craniolateral direction. With this maneuvre, a "window" is developed which reaches from the dorsal aspect of the prostate to the prostatic

pedicles. Between these structures, the posterior layer of Denonvillier's fascia is incised and the prerectal fatty tissue is visualized. The posterior dissection is continued as far as possible towards the apex of the prostate.

If nerve sparing laparoscopic radical prostatectomy is performed, the lateral prostatic fascia is incised at the anterolateral surface of the prostate gland prior to the posterior dissection. During the posterior dissection, care must be taken not to injure the neurovascular bundles by avoiding the use of heat of any kind and staying in the middle and medial to lateral dissection. Using this principle, the neurovascular bundles should be easily retracted from the prostate gland and urethra distally.

The urethra is sharply divided at the apex. Coagulation of the urethral stump is to be avoided in order to prevent damage to the external striated sphincter. In case of minor bleeding in this area, the CO_2-pressure can be increased temporarily to 16-18 mmHg.

To create the urethrovesical anastomosis, the author uses a running suture with 3-0 monocryl double RB-1 needles tying ends together. The posterior layer is completed first and the catheter is inserted into the bladder. The anterior layer is then completed.

The water-tightness of the anastomosis is finally checked by filling the bladder with 200 ml sterile water. At the end of the procedure, a Jackson drainage catheter is placed into the retropubic space.

Cystography is performed on postoperative day 7 and a urethral catheter is removed if there is no leak of contrast media from urethrovesicle anastomosis.

Perioperative data, operative results, clinical outcomes and complication were analyzed.

Results

The mean age of patients was 68.1 ± 7.1 years. Mean PSA was 6.8 ± 3.4 ng/ml. Mean operative time was 263.8 ± 79.0 minutes. The average operative blood loss was 825.0 ± 128.0 ml and 2 patients required blood transfusion. Mean catheterization time was 10.0 ± 5.5 days. Mean hospital stay was 7.4 ± 6.2 days. Mean prostatic weight was 35.2 ± 11.0 gm (Table 1).

Of 13 patients, extraprostatic disease was found in 3 patients. In pathological T2 (pT2), surgical margin was positive at the rate of 50% (Table 2).

Table 1 Perioperative results

N = 15	Mean	S.D.
Age (year)	68.1	7.1
PSA (ng/ml)	6.8	3.4
Hospital stay (day)	7.4	6.2
Prostatic weight (gm)	35.2	11
Operative time (minute)	263.8	79.0
Blood loss (ml)	825.0	128.0
Catheterization time (day)	10.0	5.5

Table 2 Number of cases with two different marginal status in pathological T2 and pathological T3 diseases

	T2	T3
Margin free	5	1
Margin positive	5	2
Total	**10**	**3**

There was no conversion of the robotic prostatectomy to either open prostatectomy or laparoscopic prostatectomy. One patient with high tension at the anastomotic site required a suprapubic cystostomy tube for 3 weeks.

Discussion

Robotic prostatectomy was first reported in 2001.[4] With the use of three-dimension view and endo-wrist technology, the outcomes of robotic prostatectomy is comparable to the conventional laparoscopic radical prostatectomy.[5] Patients undergoing robotic prostatectomy can gain the benefit of minimally invasive surgery. The recently developed surgical techniques provide a good oncological control with excellent functional outcomes.[6-12] In the largest cohort study, it has been shown that 5-year biochemical recurrence of PSA was 2.3%. Median duration of incontinence was 4 weeks with 0.8% of patients having total incontinence at 12 months. The intercourse rate was 93% in men with no preoperative erectile dysfunction.[13] With experiences, complication rate becomes considerably low.[14]

In the present study, positive surgical margin rate was 50%, which is higher than the author's experience with conventional laparoscopic radical prostatectomy.[3] This is probably due to an early experience with the

new approach of the robotic surgery in recognizing the tissue plane without tactile sensation. Transfusion rate was too high compared to others.[7,15,16] However, there was no conversion of robotic prostatectomy to either open prostatectomy or laparoscopic prostatectomy. Complication rate and operative time can be reduced with experience in laparoscopic prostatectomy prior to the use of robotic prostatectomy. This has been shown in the recent study from the United States.[15] Oncological outcome is affected by the experience in robotic prostatectomy. Positive surgical margin rate can be reduced after approximately 30 cases of robotic prostatectomy.[17] To gain a better functional outcome, one needs to gain experience of more than 150 cases of robotic prostatectomy.[18]

Robotic prostatectomy appears to offer a significant benefit to laparoscopically naive surgeons with respect to learning curve when compared to laparoscopic radical prostatectomy. This, however, comes at an increased cost.[16,19-22] At Siriraj Hospital, cost of robotic prostatectomy is approximately 2 to 2.5 times more than those of laparoscopic radical prostatectomy. Therefore, more cases are required to make use of the robotic machine efficiently.

Conclusions

In the present study, robotic prostatectomy without proctorship is feasible. The surgical technique must be improved in order to match with oncological outcomes of those world series. A long-term study comparing nerve-sparing laparoscopic radical prostatectomy to robotic assisted laparoscopic radical prostatectomy is required to access quality of life after radical prostatectomy.

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