Extraperitoneal Robotic Assisted Laparoscopic Radical Prostatectomy: The New Approach for Early Prostate Cancer.

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Abstract

Introduction: Robotic Assisted Laparoscopic Radical Prostatectomy (RALRP) for treatment of localized prostate cancer has been shown to provide the best surgical outcomes in terms of potency and continence. Most RALRP has been done using transperitoneal approach at the expense of higher risk of small bowel injury, ileus and steep trendelenburg position during the procedure. With the use of extraperitoneal approach, those potential complications can be reduced. The program of Extraperitoneal Robotic Assisted Laparoscopic Radical Prostatectomy (EP-RALRP) was started at the Siriraj Hospital. Early result of the author's experience was evaluated.

Objective: To evaluate the feasibility of Extraperitoneal Robotic Assisted Laparoscopic Radical Prostatectomy (EP-RALRP) done at Siriraj Hospital.

Materials and methods: 6 patients with localized prostate cancer were undergone Extraperitoneal Robotic Assisted Laparoscopic Radical Prostatectomy (EP-RALRP). Perioperative data was evaluated and reported.

Results: Of 6 patients, 5 patients were undergone EP-RALRP with nerve sparing technique. There was no conversion to RALRP or Laparoscopic Radical Prostatectomy. Mean operative time was 135 minutes. The average blood loss was 450 mls. Mean catheterization time and hospital stay were 6.8 days and 5.4 days, respectively. There was no complication in all patients.

Conclusion: Our early experience has shown that EP-RALRP is feasible and safe. The operation should be encouraged among robotic surgeons as the patients can gain benefit from lower risk of intra-abdominal organ injury and lesser degree of trendelenburg position.

Keywords: radical prostatectomy, prostate cancer, robotic prostatectomy, impotency

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Introduction

Robotic Assisted Laparoscopic Radical Prostatectomy (RALRP) has been accepted as one of the standard treatment in clinically localized prostate cancer for years[1,2]. Srinualnad S firstly[3,4,5] reported cases reviews of transperitoneal Robotic Assisted Laparoscopic Radical Prostatectomy in Thailand. Reviewing the world literatures, the author has found that most RALRP have been done using transperitoneal approach[1,2,6-14]. However, transperitoneal approach has some down side effects including: risk of bowel injury; more ileus; difficult to gain access in patients with previous abdominal surgery; difficult to ventilate and cardiovascular unstable during the prolong deep trendelenburg position. To overcome these obstacles the author developed technique of Extraperitoneal Robotic Assisted Laparoscopic Radical Prostatectomy (EP-RALRP). Early experience of 6 cases of EP-RALRP has been analyzed and reported here.

Material and Method

Six patients with localized prostate cancer were undergone Extraperitoneal Robotic Assisted Laparoscopic Radical Prostatectomy (EP-RALRP) at the department of surgery, Faculty of Medicine Siriraj Hospital. All patients were histological proven as having adenocarcinoma of the prostate from biopsy. All patients were given an informed consent for the procedure. Patients' data was collected and evaluated.

Operative technique is described here:

Extraperitoneal Robotic Assisted Laparoscopic Radical Prostatectomy (EP-RALRP) is usually performed with the patient under general anesthesia. Patients are placed in a dorsal supine position with 10-15° head down tilt (not 45° head down like in transperitoneal approach).

The extra-peritoneal space has been developed as describe in the author's previous publication[15]. Once the retzius space has been dilated, the trocars are inserted as shown in the Fig. 1.
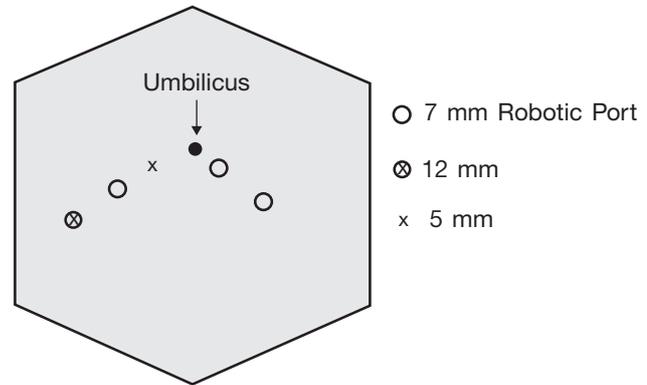

Fig.1 *Ports Placement*

The anterior surface of the prostate and the endopelvic fascia are exposed and the fatty tissue overlying these structures is gently swept away. Often, a superficial branch of the deep dorsal vein complex 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. Then, the endopelvic fascia is incised on both sides exposing the fibers of the levator-ani muscle.

The bladder neck can be identified after the removal of all of the prevesicular fatty tissue. It overlaps the prostate in the shape of a triangle. The dissection starts at a 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 the 10 to the 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 now 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 the case of a penetration directed too caudally. The bladder neck is first completely divided between the 5-7 o'clock position, 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 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 visualized. The posterior dissection is continued as far as possible towards the apex of the prostate.

(If nerve sparing EP-RALRP is performed, the lateral prostatic fascia is incised at the antero-lateral surface of the prostate gland prior to the posterior dissection. During the posterior dissection care must be taken not to injury the neuron-vascular bundles by avoid using heat of any kind and stay in the middle with medial to lateral dissection. Using this principle the neurovascular bundles should be easily retracted from the prostate gland and urethra distally.)

Puboprostatic ligaments are divided sharply. After this step, the urethra and the dorsal vein complex can be easily visualized at the level of the prostatic apex. The prostate is now retracted caudally by the assistant for 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 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.

For creation of the urethra-vesical anastomosis, the author uses interrupted suture with 2-0 vicryl UR-6 needles. The posterior layer is completed first and the catheter was 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 post-operative day 7 and a urethral catheter is removed if there is no leak of contrast media from urethro-vesicle anastomosis.

Peri-operative data, operative results, clinical outcomes and complication were analyzed.

Results

Of 6 patients undergone RALRP, 5 patients were undergone EP-RALRP with nerve sparing procedure.

The mean age of patients were 62.4±7.2 years. Mean PSA was 29.11 ng/ml. The average operative time was 135±34 minutes. Average blood loss was 450±193 ml There was no transfusion in any patients. Mean catheterization time was 6.8±0.4 days Mean hospital stay was 5.4±2.2 days. All data was shown in Table 1.

Table 1 *Shows mean (min-max) values of PSA, IPSS, SHIM, OR time, Blood loss, Catheter time, Hospital stay in all patients.*

	EP-RALRP (N=6)
Age (years)	62.4 (50-69)
PSA (ng/ml)	29.1 (4.3-146)
IPSS	12 (1-26)
SHIM	17.5 (10-24)
OR time (minutes)	135 (104-199)
Blood Loss(ml)	450 (300-750)
Catheter time (day)	6.8 (6-7)
Post operation stay(day)	5.4 (3-7)

There was no major complication in all patients

Discussion

Extraperitoneal Robotic Assisted Laparoscopic Radical Prostatectomy (EP-RALRP) was firstly reported in 2006[16]. EP-RALRP is comparable to the value of conventional Robotic Assisted Laparoscopic Radical Prostatectomy (RALRP). Patients undergone EP-RALRP can gain benefit of minimally invasive surgery, less ileus, fast recovery, less operative time and better incontinence rate[16-24]. There are some drawbacks of Extraperitoneal approach including, tension at the urethrovesical anastomosis, higher incidence of lymphocele, less working space, and more leakage of the anastomotic site[25-27]. However, in the author's experience in extraperitoneal Laparoscopic Radical Prostatectomy these drawbacks are not much seen and easy to manage[15,28].

In the present study the author reports 6 cases of EP-RALRP. The operation is safe and feasible. There was no major complication in the patients. The operation takes not longer than conventional RALRP. With the benefit of avoiding transperitoneal route, the patients can gain benefit of less ileus, reduce risk of bowel injury and faster recovery. The EP-RALRP operation is more suitable in elderly patients, whereby, steep trendelenburg position is to avoid.

As described above, EP-RALRP should be encouraged, however in patients with previous extraperitoneal surgeries, such as laparoscopic hernia repair, open distal ureterolithotomy, open ureteral reimplantation, open cystolithotomy and kidney transplantation, the extraperitoneal space is difficult to gain access to, therefore, conventional RALRP is more beneficial in such cases.

Conclusion

In the present study, Extraperitoneal Robotic Assisted Laparoscopic Radical Prostatectomy is feasible. The operation should be encouraged among robotic surgeons as more benefit to the patients are seen.

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