

A Pilot Study on a New Technique for Vesicourethral Anastomosis, Using Two-Knot Running after Laparoscopic Radical Prostatectomy

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Background: Laparoscopic radical prostatectomy requires a significant learning curve. One area of difficulty is mastering laparoscopic suturing techniques to perform vesicourethral anastomosis.

Objective: To compare the efficacy and safety of a new technique for vesicourethral anastomosis using two-knot running.

Materials and Methods: Vesicourethral anastomosis was created using two Vicryl 3-0. The first running stitch was placed at the five o'clock position on the posterolateral aspect of the bladder outside-in and then through the urethra at the same location inside-out. Proceeding counterclockwise, the running suture was placed from the 5 o'clock to 12 o'clock position. The second running stitch was placed from 5 o'clock to 12 o'clock position, proceeding clockwise. A knot was then tied outside at the 12 o'clock position.

Results: The present anastomotic technique had been used in 20 laparoscopic radical prostatectomies. The average time for the anastomosis was 47 minutes, with a range of 38 to 65 minutes. No postoperative urinary leaks occurred, and no clinically evident obstructive symptoms resulted. The urinary continence rate one month after surgery was 20%, and 55% at three months.

Conclusion: Two-knot running technique is described as a safe and feasible technique for vesicourethral anastomosis without any experienced assistant. Further studies on a larger group of patients are needed to confirm the preliminary results.

Keywords: Prostate cancer; Vesicourethral anastomosis

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At present, the nationwide incidence rates of prostate malignancy in Thailand have raised at an average annual percent change of 2.7% over the last two decades⁽¹⁾. Laparoscopic surgery for prostate cancer is a treatment for patients with localized prostate cancer. It is a small incision, causing patients to have less pain at the surgical wound, less blood loss, and a short hospital stay, so patients can return to work earlier⁽²⁾. An important surgical procedure after prostatectomy is suturing the bladder into the urethra (vesicourethral anastomosis). This is a difficult

procedure used only by experienced surgeons. Studies have tried to improve the suturing⁽³⁻⁸⁾. In the early stage of vesicourethral anastomosis, stitching is performed using the interrupted technique, which is stitch-by-stitch. Later, continuous stitching was developed, which reduced the suturing time⁽⁷⁾. The standard technique is the Van Velthoven's single knot method⁽³⁾. However, when used at Nopparat Ratchathani Hospital, a lack of assistant to the surgeons made it difficult to suture using the Van Velthoven's technique. Although the suture technique uses a barb suture that allows the suture to be performed faster and easier⁽⁸⁾, there is an excess cost that the patient must pay. Therefore, the present research aimed to study a new technique.

The two-knot sutures are easy to do for vesicourethral anastomosis and the side effects are similar to the standard method, saves costs, and are appropriate for the context of general hospitals.

Materials and Methods

The two-knot running method (Figure 1) was made using two 3-0 coated Vicryl (Polyglactin 910)

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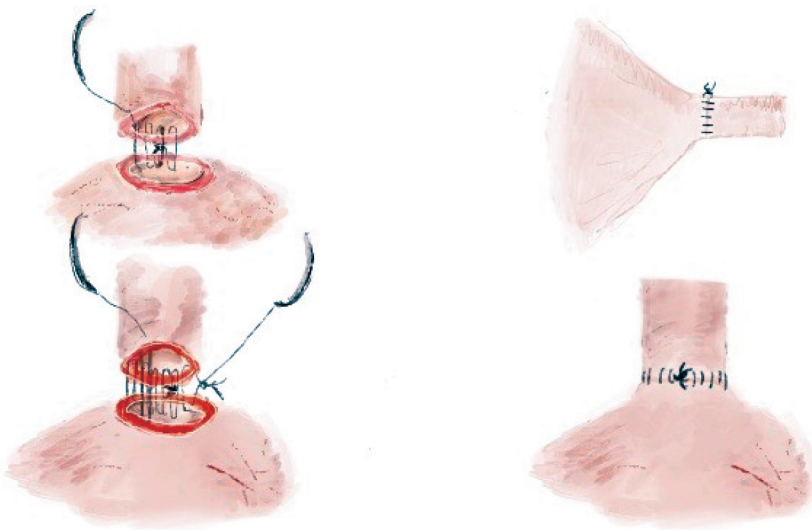


Figure 1. Coronal and transverse views illustrating the technique for performing the two-knot running vesicourethral anastomosis.

Suture of six inches long. The first running stitch was placed at the five o'clock position on the posterolateral aspect of the bladder outside-in and then through the urethra at the same location inside-out. Proceeding clockwise, the running suture was placed from the five o'clock to the 12 o'clock position. The second running stitch was placed from the five o'clock to the 12 o'clock position, proceeding counterclockwise. A knot was then tied outside at the 12 o'clock position. Once the posterior wall was sutured, a catheter No. 18 was inserted. For a patient who had a wide gap between the bladder and the urethra from the big prostate gland, the tissue under the urethra and bladder neck would be sutured to reduce the distance. A balloon was then inflated with 10 mL of distilled water. Upon completion of the anastomosis, the integrity of the urinary reconstruction was tested by filling the bladder with 200 mL of normal saline. If there was a leak, interrupted sutures were performed.

In all cases, attempts would be made to preserve the bladder neck. An anterior tennis racket-type closure would be performed for patients with a wide bladder neck.

Descriptive study

1) Review of literature related to laparoscopic radical prostatectomy

2) Population and sample population were prostate cancer patients requiring laparoscopic radical prostatectomy at Nopparat Rajathanee Hospital between October 2020 and March 2022 were studied. The inclusion criteria was patients with localized disease prostate cancer requiring surgery according

to the NCCN Guideline version 2.0 2020, May 2020. The exclusion criteria were patients who had abdominal surgery, radiation, or hormone therapy, patients with urinary incontinence before surgery, patients who had undergone prostate surgery or transurethral resection prostate, and patients with neurological diseases that cause urinary abnormalities such as paresis, Parkinson's, spinal injury, or multiple sclerosis.

3) The research data was collected in three times. At first, preoperative data were collected at the outpatient department and included age, prostate cancer stage, prostatic specific antigen (PSA), Gleason score, and prostate size from computed tomography/magnetic resonance tomography. Second, perioperative parameters, such as operative time, anastomosis time, blood loss, hospital length of hospital stay, length of catheter insertion, and side effects from surgery, were collected. Lastly, the urinary continence status was assessed at one month and the months after laparoscopic radical prostatectomy. Postoperative continence was defined as the absence of the need for pads.

4) Collect data according to the data collection form in the computer system

5) Collect data for analysis of results

6) Summarize the results and complete the written research report

Statistical analysis

The data were described in frequency and percentage. The comparisons were performed using the McNemar test. All statistical analysis were

Table 1. Patient demographics

Variable	
Age (years); mean±SD	66±4.32
Body weight (kg); mean±SD	68±13.34
BMI; mean±SD	25±5.22
PSA; n (%)	
<10	20 (100)
10 to 20	0 (0)
>20	0 (0)
Clinical stage; n (%)	
T1c	13 (65)
T2a	6 (30)
T2b	1 (5)
Gleason core; n (%)	
≤6	17 (85)
7	3 (15)
≥8	0 (0)
Prostate size (g); mean±SD	41±13.45

BMI=body mass index; PSA=prostatic specific antigen; SD=standard deviation

conducted by the Stata Statistical Software, version 16 (StataCorp LLC, College Station, TX, USA).

Results

Twenty patients were enrolled in the present study, with a mean age of 66±4.32 years, body weight of 68±13.34 kilograms, and BMI of 25±5.22. The T1 C-stage prostate cancer was the most common (65%). All patients had a PSA of less than ten (4.05 to 9.5). With a Gleason score of less than six (85%), the mean prostate size measured on the X-ray was 41±13.45, as shown in Table 1.

The operative time, from skin incision to skin closure, was 234±47.31 minutes. The time of suturing for the bladder and urethra was 47±6.33 minutes. Extraperitoneal laparoscopic radical prostatectomy with running urethrovesical anastomosis was successfully performed in all patients, and none of the cases required conversion to open surgery. One patient had rectal injury, the injured rectum was repaired, and an open colostomy was done. Mean blood loss was 504±156.89 cc, with a range of 250 to 850, and one patient required intraoperative blood transfusion. The length of hospital stay was 3.35±0.93 days. The mean urinary catheter was 15.5±3.77 days. Urethrography was not performed before catheter removal. The patient with rectal injury was hospitalized for seven days and had a urinary catheter inserted for one month. Twenty percent of the patients were continent one month after the surgery, and 55%

Table 2. Intra-and perioperative data

Variable	
Anastomosis time (minutes); mean±SD	47±6.33
Operative time (minutes); mean±SD	234±47.31
Blood loss (cc); mean±SD	504±156.89
LOS (days); mean±SD	3.35±0.93
Catheterization time (days); mean±SD	15.5±3.77
Perioperative complications (rectal injury); n (%)	1 (5)
LOS=length of stay; SD=standard deviation	

Table 3. Urinary continence outcomes

Time post-operation	n (%)	p-value
1 month	5 (20)	0.016
3 months	11 (55)	

were continent at three months. The change in urinary continence rate after surgery from the first to the third month was observed increasingly with statistical significance ($p=0.016$). There were no problems with bladder neck contractures that have come to clinical attention. However, there was no routinely performed cystoscopy on the present study patients to assess for this problem.

Discussion

Vesicourethral anastomosis is a challenging and time-consuming part of the operation. Both surgeons and assistants need experience to do it properly. Although robot-assisted surgery makes suturing easier, the cost is still high⁽⁴⁾. Therefore, the development of suturing techniques in endoscopic surgery is necessary.

The one knot technique^(5,6) has advantages in faster anastomosis, but experienced surgeons and assistants are crucial. For the two-knot running technique, the first knot secures the bladder with urethra makes it easier to run sutures without assistance. In some positions, locking sutures may be required to hold the tissue together. The mean anastomosis time was 47 minutes, which is 12 minutes slower compared to the standard Van Velthoven suture technique, which took an average of 35 minutes⁽³⁾. It is an acceptable speed.

In the present study, the author found that being able to preserve the bladder neck speeds up suturing and improves the early continence rate⁽⁹⁾.

Currently, there is no standard time for inserting a urinary catheter after surgery. A urinary catheter is usually inserted seven days after surgery⁽¹⁰⁾, although studies have removed the urinary catheter two days

after surgery⁽¹¹⁾. The author chose to have a urinary catheter inserted for 14 days to reduce the risk of future leakage. Moreover, the author did not perform retrograde cystography to assess the integrity of the anastomosis before catheter removal⁽¹²⁾.

Urinary incontinence in the present study was 20% at one month and improved at three months by 55%. However, none of the patients complained of urinary leakage at 12-month follow-up visits.

Conclusion

The vesicourethral anastomosis with two knots running technique is safe and feasible. It can be done easily without an experienced surgical assistant with basic sutures in a general hospital. However, more cases are needed to confirm the results of the present trial.

What is already known on this topic?

Vesicourethral anastomosis is a challenging and time-consuming part of the operation. In an attempt to simplify this critical step of laparoscopic radical prostatectomy, authors have proposed different techniques for vesicourethral anastomosis.

What this study adds?

Two knots running technique is a new technique that can be done easily and is safely done without an experienced surgical assistant with basic sutures in a hospital.

Conflicts of interest

The authors declare no conflict of interest.

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