

Vesicourethral anastomosis including rhabdosphincter in retropubic radical prostatectomy: Technique and results

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Summary Objective: Retropubic radical prostatectomy (RRP) is still widely used in clinical practice in localized prostate cancer because of its high oncological success. The aim of this study was to define the continence status in patients where rhabdosphincter was included in the vesicourethral anastomosis.

Materials and methods: Between November 2004 and September 2010, 90 cases who underwent RRP by the same surgeon in our clinic were taken into the study. In all cases vesicourethral anastomosis was performed include the rhabdosphincter. The anastomosis was performed with mean 2.9 (0-7) interrupted no 2-0 vicryl sutures, depending on the angulation of symphysis pubis and pelvic cavity. Pad test was performed to all patients at 1, 3, 6 and 12 months postoperatively. We defined patients as 'continent' when they no need pad, as 'mild incontinence' when they use only one pad daily, as 'moderate incontinence' when they use two or three pads daily and as 'severe incontinence' when they use more than three pads daily. Results: Preoperative total PSA value was 12.2 ng/ml (range: 2.7-84 ng/ml). Preoperative prostate biopsy results were found that Gleason scores were 5, 6, 7 and 8 in 7, 53, 21, 9 patients, respectively. Mean operation and urethral catheter removal time was 103 minutes (60-200) and 14,6 days (9-28), respectively. Mean hospital stay was 4.6 days (2-20). According to results of postoperative pad tests, 38 (42.2%), 48 (53.3%), 55 (61.1%) and 75 (83.3%) patients were defined as continent in first, third, sixth and twelfth months, respectively.

Conclusions: We think that, our novel technique of vesicourethral anastomosis in standard RRP provides more optimal urethral position during fixation of pelvic floor and urethra, protect caudal retraction, preserve functional urethral length. Also strong full thickness stitch on urethra provides better urinary continence by hanging urethra in our patients. Although our early continence rate is better, our long term continence rate is similar to literature.

KEY WORDS: Retropubic radical prostatectomy; Vesicourethral anastomosis; Incontinence; Rhabdosphincter.

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INTRODUCTION

Prostate cancer is common in man and is the second most common cause of death after lung cancer. Incidence of prostate cancer incline after 50 years old and change in different countries according to diet, ethnicity, life style and screening protocols (1).

Prostate cancer is organ defined in almost 40% of cases and gold standard treatment is radical prostatectomy (RP) if patient has ten-year life expectancy (2). After 1970s this procedure has been standard treatment especially after Walsh's contributions (3). Although this surgical procedure has important efficiencies it has also morbidities that should be considered. To get rid of morbidities and increase efficiency some modified techniques have been tried over years. Although in recent decades, laparoscopic and robot-assisted laparoscopic RP have been utilized as alternatives to traditional open surgery, RRP is still widely used in clinical practice (4).

In all surgical techniques main aim is to get oncologic control and at the same time to maintain erectile function and continence which otherwise affected can decrease patient quality of life.

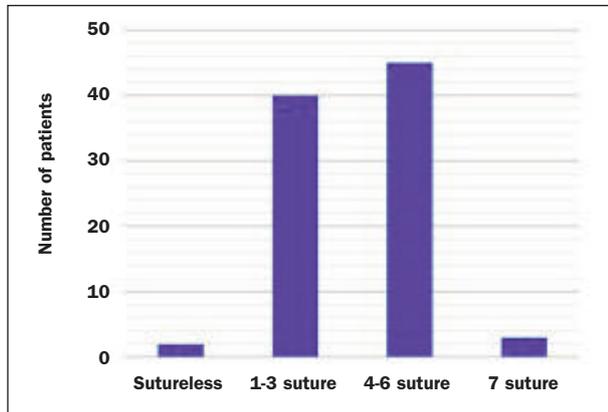
Perioperative and post-operative early complications of radical prostatectomy are bleeding, rectal injury, deep venous thrombosis, pulmonary emboli and lymphocele. Late complications are urinary incontinence, erectile dysfunction and anastomotic stricture. Most important complication that affect quality of life is urinary incontinence. According to studies incidence is between 5%-30% (5, 6). Although older studies indicate higher incidence of urinary incontinence in recent years with better knowledge about pelvic anatomy this incidence has decreased.

Vesicoureteral anastomosis is one of the most important step in radical prostatectomy and if it is not done properly it leads urinary leak, urine accumulation in surgical field and prolonged drainage (7). On the other hand, it leads periurethral fibrosis, bladder neck stricture and urinary incontinence (8).

Recently improvements in techniques of vesicoureteral anastomosis provides decrease in incidence of stricture and incontinence. Urinary continence recovery is a fundamental goal for patients RRP and several surgical techniques, mainly based on musculofascial posterior and/or anterior ligaments reconstructions, have been proposed with the aim of improving urinary continence recovery.

Aim of our study is to evaluate post-operative urinary incontinence in patients who underwent RRP and had vesicoureteral anastomosis that includes rhabdosphincter.

Figure 1.
Suture that involves the rhabdospinchter.



PATIENTS AND METHODS

Ninety patient who underwent RRP because of clinically localized prostate cancer between November 2004 and September 2010 in *Bezmialem Vakıf University Medicine* faculty hospital urology clinic was included in our study. Local ethics committee approval was taken for study and written consent for each patient was also taken. Preoperative and postoperative information of all patient was recorded prospectively. Exclusion criteria were: previous urethral or prostatic endoscopic procedures, preoperative urinary incontinence and concomitant neurological diseases (e.g. Parkinson disease). Bone scan was performed for intermediate and high-risk prostate cancer group and also patients who were symptomatic. In some patients MRI was used for confirmation of bone scan lesion. One experienced surgeon performed all surgeries and bladder neck preserved as much as possible. When indicated lymph node dissection was performed and in proper patients nerve sparing technique was used 2-0 vicryl suture was used in vesicourethral anastomosis. Sutures placed on urethra including rhabdospinchter from out to in and in to out for bladder (Figure 1). 22 F Foley catheter was placed. A watertight test was performed at the end of the procedure.

Age, psa levels, prostate volumes and prostate biopsy results of all patients were recorded preoperatively. Operation time, urethral catheterization time, retrieval of drainage time, hospital stay, suture number for vesicoureteral anastomosis and perioperative bleeding was recorded for all patient. Also, post-operative follow up period, pathological parameters and complications were recorded. For all patients postoperative third-generation cephalosporin, low-molecular-weight heparin, and elasto-compressive stockings were used for prophylaxis of infections and thromboembolic events, respectively. In postoperative period patients were followed up regularly for urinary incontinence. After retrieval of urethral catheter pad test were used for evaluation of urinary incontinence in 1, 3 and 12 months. Patients who didn't use pad in a day described as continent, patients who used one pad a day described as mild incontinent, patients who used 2-3 pad a day described as moderate incontinent and patients who used 4 pad and more described as severe incontinent.

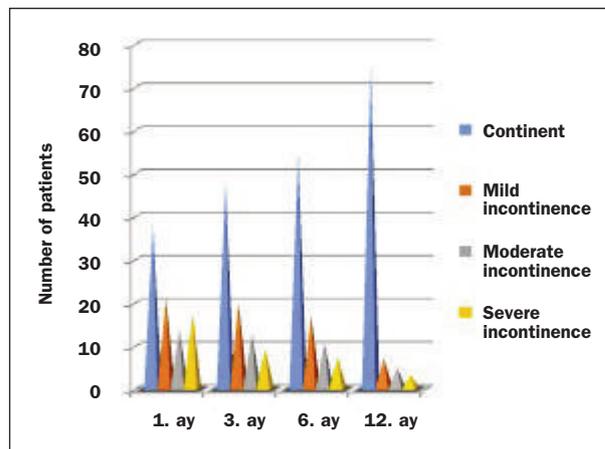
Table 1.
Preoperative clinical features, operative and early postoperative results of patient.

| | Mean ± Standard deviation (distribution) or number |
|--------------------------------------|--|
| Total number of patients | 90 |
| Age (year) | 64.3 ± 6.01 (51-78) |
| Prostate volume (ml) | 49.2 ± 24.18 (20-160) |
| Preoperative serum PSA level (ng/ml) | 12.2 ± 9.54 (2.7-84) |
| Preoperative Gleason score | 6.3 ± 0.42 (5-8) |
| Operation time (minute) | 103 ± 52 (60-200) |
| Intraoperative bleeding (ml) | 780 ± 723.25 (150-3500) |
| Drainage time (day) | 4.3 ± 2.82 (2-19) |
| Urethral catheterization time (day) | 14.6 ± 4.39 (9-28) |
| Hospital stay (day) | 4.6 ± 7.89 (2-29) |
| Mean follow up (month) | 15.3 ± 2.25 (14-25) |

RESULTS

Patient number, age, prostate volume, preop PSA values, prostate biopsy results, surgical parameters, hospitality and follow up period were summarized in Table 1. 48.8% (44) of patient had history of cigarette smoking. Mean operative bleeding was 780 ml (150-3500 ml) and 32,2% (29) of patient had blood transfusion. In one patient myocardial infarction occurred in postoperative second day and transferred to coronary intensive care unit. In this patient urethral catheter was taken off at postoperative 28th day. Average suture number for vesicourethral anastomosis was 2.9 (0-7) and in two patient there was no suture (Figure 2). In three patients (3.3%) acute urinary retention occurred after urinary catheter retrieval and these patients were catheterized with 12F catheter for three more day. In four patients (4.4%) rectal damage occurred in operation and primer reconstruction with two layers without colostomy was performed. In one patient omental flap with pedicul was used for strengthening rectal repair. In one patient during bladder neck dissection ureteral damage occurred and repaired intraoperatively with ureteroneocystostomy.

Figure 2.
Suture numbers for vesicourethral anastomosis.



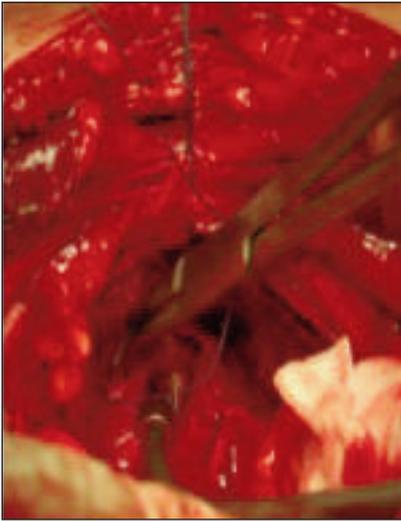


Figure 3.
Pad test
classification
according to
months after
catheter
removal.

After catheter retrieval bladder neck stenosis developed in 10 patients (11,1%) after a mean of 4.3 months (range 2-7 months) and treated with endoscopic incision. According to pathologic reports 13 (14.4%) patient had pT2a, 15 (16.6%) had pT2b, 28 (31.1%) had pT2c, 27 (30%) had pT3a and 7 (7.7%) patient had pT3b. On the other hand, 6 (6.6%) patient had positive surgical margin and 84 (93.3%) patient had negative surgical margin. In 6 patients with surgical margin positivity, 4 positivity was in prostatic apex while 2 positivity was in other regions of the prostate

At first year of follow up 75 (83.3%) patient was continent, 7 (7.7%) patient had mild urinary incontinence, 5 (5.5%) patient had moderate urinary incontinence and 3 (3.3%) patient had severe urinary incontinence.

The continence status of the patients according to the postoperative month was summarized in Figure 3.

Seven patients with moderate incontinence and three patients with severe incontinence were found to have endoscopic procedures due to bladder neck stenosis after RRP at the first year of follow-up

DISCUSSION

The most important factor that affect patient's quality of life after RRP is urinary continence status and early recovery of continence increases patient satisfaction (9). Although there was high rate of urinary incontinence in first years of radical prostatectomy prevalence has decreased over years with better understanding of pelvic anatomy, increase in experience, technology and surgical techniques. Although there are many studies that try to explain which factors like nerve sparing surgery, tabularization of bladder neck, anastomosis suture number and laparoscopic continuous suturing effect post prostatectomy incontinence, we still can't estimate which patient has urinary incontinence after radical prostatectomy (10-12). One of the most important step in radical prostatectomy is vesicourethral anastomosis. General principles for good anastomosis are watertight, non-stretch, anastomoses that provide the best urethral length and mucosa to mucosa anastomosis

Several surgical techniques have been proposed in the recent years, with the aim of reducing the urinary continence recovery time and/or improving long-term urinary continence rates. Some authors indicated that nerve sparing surgery had positive affect on recovery of urinary continence (12). On the other hand, few studies indicated that nerve sparing surgery had no effect on urinary continence (13). In summary nerve sparing surgery has positive contribution on urinary continence. In our study we did not evaluate the nerve-sparing technique variable in our study this deficiency can cause misconceptions.

Rhabdosphincter is major structure that influence continence anatomically. It extends like Ω -shaped from membranous urethra to prostatic apex anterolaterally. In normal conditions, the urethral sphincter is supported anteriorly by puboprostatic and pubourethral suspensory components, laterally by the medial portion of the levatori ani muscle forming a hammock around the urethra, and by the ischioprostatic ligaments. In our study we placed anastomotic sutures deeply unlike the traditional RRP described by Walsh especially in anterior urethra where intense rhabdosphincter that surrounds urethra exist (3). We suppose that anastomotic suture that includes rhabdosphincter provides almost original urethral length, prevent caudal retraction of urethra and provide better anatomic positioning of urethra and bladder on pelvic floor. In patients with our technique early functional results are better than literature but long-term outcomes are same. Proper and well done apical dissection leads to a better appearance of rhabdosphincter by protecting it. In 2005 *Montorsi et al.* demonstrated that well done apical dissection in nerve sparing surgery protects rhabdosphincter and after catheter retrieval 44% of patient was continent (14). In our study apical surgical margin positivity was seen only in four (4.4%) patient. Prevalance of apical surgical margin positivity in literature is between 6.5%-38% (15). We think that well done apical dissection for protecting rhabdosphincter provides better continence status.

Rocco et al. stated that restoration of rhabdosphincter posteriorly or in other word placing Rocco sutures provides retraction of rhabdosphincter caudally and prevents separation at posterior median raphe (16). In this study 250 patient who underwent posterior rhabdosphincter repair were compared to 50 patient who didn't. At the third month of follow up incontinence rate was 85.2% in first group who underwent rhabdosphincter repair while it was 46% in control group (16). Long term incontinence rate was same in both groups (94% vs 90%) and rhabdosphincter repair didn't cause additional complication.

There are conflicts in studies which evaluate the relationship between incontinence and intraoperative hemorrhage. In some studies, there was no relationship between intraoperative hemorrhage and post prostatectomy incontinence. On the other hand, some studies reported that there was significant relationship between intraoperative hemorrhage and post prostatectomy incontinence (13, 17). Intraoperative hemorrhage alone is not a predictive factor for post prostatectomy incontinence without evaluation of other surgical factors. In our

study at first year of follow up only 2 patients out of 15 patient who had mild, moderate and severe incontinence had more than 1000 cc intraoperative bleeding. Some studies stated that urethral length should be kept as long as possible for the recovery of continence after RRP and too many sutures for anastomosis shortens urethral length (18). Additionally, some studies indicated that less suture number for vesicourethral anastomosis had positive effects on urinary continence and bladder neck stenosis (19). In our study mean suture number was 2.9 (0-7). We think that too many sutures for anastomosis has negative effects on urethral length.

Another topic related to continence is preservation of bladder neck in radical prostatectomy. Many authors investigated relationship between urinary continence and preservation of bladder neck. *Licht et al.* reported in their study which includes 206 patients that preservation of bladder neck didn't have positive affect on urinary continence, but it was related to less bladder neck stenosis (20). Another study indicated that 24 patient who had bladder preserving radical prostatectomy had early recovery of urinary incontinence (21). When we look at these studies, the continence effect of preservation of internal sphincter is to passively keep urine above in the storage phase. In our study we didn't perform bladder neck preserving RRP and widely resected bladder neck with preservation of ureteral orifices. Preservation of puboprostatic ligaments is another topic which can be related to urinary incontinence. Some authors indicated positive effects of preservation of puboprostatic ligaments on post prostatectomy incontinence. *Poore et al.* preserved puboprostatic ligaments in 18 patients and compared them to control group which includes 25 patients (22). As a conclusion he founded early continence recovery in patients who underwent puboprostatic ligament preservation. In another study patients were divided into three groups. In first group bladder neck preserving surgery was done in second group puboprostatic ligament preserving surgery was done and to last group both bladder neck and puboprostatic preserving surgery was performed (23). There was no significant difference between three groups in long term urinary incontinence. But bladder neck preserving group had earlier urinary continence than ligament preserving group. In another study sling technique was performed by suturing bladder neck to pubic bone and significant earlier continence rates were indicated according to control group (24). In our study we didn't perform puboprostatic ligament preserving surgery. But we think that wide suturing in anterior urethra provides normal anatomic position of urethra and by this way it can help external sphincter functions by preventing urethral hypermobility. Lack of control group, randomization and the small number of patients included in this preliminary analysis could be considered as the main limitations of the present study.

CONCLUSIONS

Urinary incontinence after radical prostatectomy affects patients' quality of life and need to be treated early. Recovery of urinary continence depends on patient selection, surgical techniques and definition of conti-

nence. We think that by modifications in our vesicourethral anastomosis technique; urethra is placed more anatomically on pelvic floor; caudal retraction of urethra is prevented and by this way functional urethral length stays long and especially wide suturing on anterior urethra sling the urethra anteriorly. According to our experience placing vesicourethral anastomotic suture along with rhabdospinchter is easy to perform. We also think that It is safe and shortens operation time and on the same time offers promising functional results. Multi-centered, randomized controlled wide series is needed for these topics.

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