Retropubic Laparoscopic Prostatectomy: Initial Experience

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Abstract: Background: Benign prostatic hyperplasia (BPH) is one of the most common diseases in middle-aged and old males. Medical intervention is not effective in all cases and surgical prostatectomy is the curative treatment. **Aim of the work:** to presented our experience with retropubic laparoscopic simple prostatectomy. **Patients and methods:** This study was conducted on 33 patients with BPH who underwent laparoscopic retropubic simple prostatectomy between January 2012 and June 2014; they were selected from Urology Departments, Theodor bilharz Research Institute (urology department). Before the surgery, full history taking, physical examination, digital rectal examination (DRE), routine lab tests, IPSS, transrectal ultrasonography (TRUS), prostate-specific antigen (PSA) measurement, and uroflowmetric studies were performed. IPSS and uroflowmetry were performed again 2 months after the surgery for comparison with the preoperative data. To rule out cancer in patients whose PSA values were 4 and over or who had any other risk factor (nodule on the DRE or hypoechoic lesion on TRUS), prostate biopsy was performed before surgery. **Results:** Age ranged from 54 to 73 years with a mean of 60.82±4.02 years; the mean prostate volume was 92.66±11.48; while the mean enucleate volume was 73.57±7.44 g; mean operative time was 176.21±16.68 minutes; mean blood loss was of 350.30±73.50 cc; mean postoperative hospital stay was 6.42±1.06 days; drain removed in day 3 to 6 with mean of 4.36±0.78 and Foley urethral catheter duration was ranged from 4 to 8 days with a mean of 5.36±1.08 days. IPPS was significantly decreased from 26.77±2.06 preoperatively to 4.84±0.79 postoperatively ($p < 0.001$). Five cases were presented by acute urinary retention. Thus, Qmax was reported only for 28 cases preoperatively, the mean value was 5.63±1.34 that increased significantly at postoperative value to 16.94±2.27. Finally, post voiding residual urine was decreased significantly from 94.17±8.99 at preoperative evaluation to 16.06±5.53 at 2 months postoperative evaluation. **Conclusion:** laparoscopic retropubic simple prostatectomy may be a useful treatment option for patients with large volume BPH, especially with experienced hands.

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1. Introduction

Benign prostatic hyperplasia (BPH) is one of the most common diseases in middle-aged and old males; the incidence and importance of BPH have increased as the aged population has increased with continuous development in medical care. As a result, treatments have been diversified and continuously advanced **(Yun *et al.*, 2010).**

Management options for men with symptomatic benign prostatic hyperplasia (BPH) have increased over the last 2 decades **(Yu *et al.*, 2008).**

Development of new energy sources has added to the efficacy of procedures available for transurethral prostate surgery **(Metcalfe and Poon, 2011),** and the use of lasers has gained popularity due to its lower morbidity compared with traditional transurethral resection of the prostate (TURP) **(Reich *et al.*, 2008).** However, open simple prostatectomy (OSP) remains particularly well suited for patients with large glands (>100 g) due to the greater volume of adenoma removed and the subsequent excellent long-term functional outcomes **(Suer *et al.*, 2008; Varkarakis *et al.*, 2004).**

The first laparoscopic simple prostatectomy (LSP) was conducted in 2002 **(Mariano *et al.*,2002),** and subsequent studies have demonstrated functional outcomes to be equivalent to OSP **(Baumert *et al.*, 2006; McCullough *et al.*, 2009).**

However, the technical difficulty and steep learning curve of the purely laparoscopic approach has prevented wider acceptance of LSP among urologists **(Leslie *et al.*,2014).**

Here, we presented our experience with retropubic laparoscopic simple prostatectomy.

2. Patients and methods

This study was conducted on 33 patients with BPH who underwent laparoscopic retropubic simple prostatectomy between January 2012 and June 2014; they were selected from Urology Departments, Theodor bilharz Research Institute (Urology department).

Inclusion criteria: included the following conditions: prostate volume was at least 75 g, acute

urinary retention repeatedly occurred or the maximal urine flow rate (Qmax) was at most 10 ml/s, and the International Prostate Symptom Score (IPSS) was at least 12.

Before the surgery, full history taking, physical examination, digital rectal examination (DRE), routine lab tests, IPSS, transrectal ultrasonography (TRUS), prostate-specific antigen (PSA) measurement, and uroflowmetric studies were performed. IPSS and uroflowmetry were performed again 2 months after the surgery for comparison with the preoperative data.

To rule out cancer in patients whose PSA values were 4 and over or who had any other risk factor (nodule on the DRE or hypoechoic lesion on TRUS), prostate biopsy was performed before surgery.

Surgical technique was done as described by Yun *et al.* (2010) as the following:

Laparoscopic retropubic simple prostatectomy was performed with the patients under general anesthesia in the Trendelenburg position with bilateral arms at each side. A 20 French 3-way Foley catheter was introduced into the bladder, and the skin was incised 1 to 1.5 cm along the fold beneath the umbilicus. Then, the anterior sheath of the rectus abdominis muscle was transversely incised. After incision, the rectus muscle was exposed and spread bilaterally to expose the posterior sheath. Digital dissection of the preperitoneal space was performed. A balloon dilatator with a 10 mm-trocar was inserted between the rectus abdominis muscle and the posterior sheath, and the balloon was inflated with air to get enough extraperitoneal space under the direct vision. In this process, four trocars were used in all. The 10 mm-trocar was used as the camera port, after being separated from the dilatator. The other 10 mm port was set up on the border of the left rectus abdominis muscle, and a 5 mm port was located medially 2 fingers from the left anterior superior iliac. The other 5 mm port was placed on the border of the right rectus abdominis muscle.

Extraperitoneal dissection of the space of Retzius was performed and the endopelvic fascia was not opened. After the Retzius space and the fat covering the prostatic capsule were completely dissected, the boundary between the bladder and the prostate was clearly identified by moving the Foley catheter. The superficial venous complex that runs the anterior surface of the prostate was carefully coagulated with bipolar electrocautery cranially and far away from the puboprostatic ligaments. Then a 2 or 3 cm incision was made on the anterior part of the prostatic capsule. The capsular incision was deepened with the aid of J-hook electrocautery and bipolar electrocautery until the plane between the surgical prostate capsule and the adenomatous tissue was exposed. The adenoma was dissected along the surgical capsular plane in the same fashion as the open procedure using the endoscopic scissors and the suction irrigation cannula.

Once the catheter was identified, the dissection proceeded until the whole adenomatous tissue had been freed. We divided the adenomatous tissue into two parts corresponding to the lobes (right and left) to ease its dissection and posterior excision. After excision of the adenoma, the specimens were placed outside the capsule in the lateral iliac space. The bleeding of the prostatic capsule and prostatic fossa was controlled by the use of bipolar electrocautery. The anterior prostatic capsule was closed by two Vicryl 3-0 running sutures each initiated at the external edges of the capsular incision and ligated at the midpoint. Saline solution was irrigated through the Foley catheter, and the bladder was filled with the saline solution to check whether the sutured region leaked. A Jackson-Pratt drain was inserted, and the detached adenoma was placed in the endobag sac. The specimen was finally removed through the 10 mm port site beneath the umbilicus. As for a large adenoma, a wider dissection was applied to allow for an intact retrieval.

Statistical analysis of data: the collected data coded, organized and tabulated using statistical package for social science (SPSS) version 16; arithmetic mean, standard deviation (SD), minimum and maximum was calculated. For comparison between preoperative and postoperative values, the paired samples (t) test was used. P value ≤ 0.05 was considered significant for interpretation of results.

3. Results

Table (1) presented patient characteristics and operative details in studied cases; age ranged from 54 to 73 years with a mean of 60.82±4.02 years; BMI ranged from 21.72 to 26.09 kg/m2; PSA ranged from 0.90 to 10.80ng/ml; the prostate volume ranged from 58.0 to 88.0 with a mean of 92.66±11.48; while enucleate volume ranged from 58 to 88 with a mean of 73.57±7.44 cc; operative time ranged from 146 to 208 minutes with a mean of 176.21±16.68 minutes; blood loss ranged from 250 to 500 cc with a mean of 350.30±73.50 cc; postoperative hospital stay ranged from 5 to 9 days with a mean of 6.42±1.06 days; drain removed in day 3 to 6 with mean of 4.36±0.78; finally Foley catheter duration was ranged from 4 to 8 days with a mean of 5.36±1.08 days.

Table (2) presented data of pre and two months postoperatively; IPPS was significantly decreased from 26.77±2.06 preoperatively to 4.84±0.79 postoperatively ($p < 0.001$). Five cases were presented by acute urinary retention. Thus, Qmax was reported only for 28 cases preoperatively, the mean value was 5.63±1.34 that increased significantly at postoperative value to 16.94±2.27. Finally, post voiding retention

was decreased significantly from 94.17±8.99 at preoperative evaluation to 16.06±5.53 at 2 months postoperative evaluation.

Table (1): Patient characteristics and operative data of studied cases

	Mean	±S. D	Minimum	Maximum
Age	60.82	4.02	54	73
Weight	68.66	4.59	62.00	79.00
Height	1.71	0.024	1.66	1.75
BMI	23.45	1.18	21.72	26.09
PSA	5.40	2.55	0.90	10.80
Prostate volume	92.66	11.48	75.00	121.00
Enucleated volume	73.57	7.44	58.00	88.00
Operative time	176.21	16.68	146.00	208.00
Blood loss	350.30	73.50	250.00	500.00
PO stay	6.42	1.06	5.00	9.00
Drain removal	4.36	0.78	3.00	6.00
Foley Duration	5.36	1.08	4.00	8.00

Table (2): Pre- and postoperative data of studied cases

	Preoperative			Postoperative			Paired (t)	*p*
	N	Mean	±S. D	N	Mean	±S. D		
IPPS	33	26.27	2.06	33	4.84	0.79	62.01	<0.001*
Qmax	28	5.63	1.34	33	16.94	2.27	20.69	<0.001*
PVR	28	94.17	8.99	33	16.06	5.53	41.52	<0.001*

4. Discussion

The morbidity of benign prostatic hyperplasia is extremely high in elderly men **(Jo *et al.*, 2013).** Such morbidity included lower urinary tract symptoms (LUTS) secondary to benign prostatic hyperplasia (BPH). LUTS are common and interfere with the quality of life (QoL) of elder men **(Barry *et al.*, 2013; Kupelian *et al.*, 2013).** LUTS which includes obstructive (voiding) symptoms and irritative (storage) symptoms **(Roehrborn , 2005)** can be quantitatively evaluated by questionnaires such as the International Prostate Symptom Score (IPSS) **(Barry *et al.*, 1992).** The prevalence of BPH is approximately 40% for men in their fifties and reaches to 90% for men in their nineties [6] and the incidence of LUTS is around 25% for men in their 50 s or older **(Wang *et al.*, 2014).**

First line medical therapy for symptomatic BPH frequently involves treatment with α1-adrenergic blockers (α-blockers) to relax smooth muscle tone. If α-blockers do not adequately reduce symptom severity, 5α-reductase inhibitors (5ARI) may be administered to inhibit dihydrotestosterone (DHT) production and androgen receptor (AR) signaling, decreasing prostatic volume. 5ARI's may also be chosen as first line therapy in certain patients, particularly those with large prostates. According to several studies, approximately one-third of patients respond to these therapies individually, while approximately two-thirds of patients respond to combination therapy with both α-blockers and 5ARIs. Nevertheless, a significant number of patients will become refractory to existing medical treatments, often then requiring surgical intervention **(Lin-Tsai *et al.*, 2014).**

In prostates weighing 30 to 80 g, TURP has been recognized as the gold standard **(Madersbacher *et al.*, 2004).** However, the problem is that TURP is apt to cause complications such as transurethral resection syndrome and bleeding, and the procedure takes more time as the prostate size increases. Given the fact that open simple prostatectomy is superior to TURP in recurrence rate and can remove the prostatic adenoma perfectly and is free from the transurethral resection syndrome, the open simple prostatectomy procedure is still more effective for patients whose prostates weigh 75 g and over **(Mariano *et al.*, 2006).**

In addition, photoselective vaporization of the prostate (PVP) was reported to be effective for treating prostates weighing 60 g **(Alivizatos *et al.*, 2008; Park *et al.*, 2010).** However, it is usually effective for small or moderate prostates, and it has the disadvantage that the tissue cannot be taken after the surgery, and it also causes complications in large BPH **(Hwang *et al.*, 2007).**

Subsequently, holmium laser enucleation of the prostate (HoLEP) has been used for giant prostatomegaly, even in prostates in excess of 100 g.

In spite that, open simple prostatectomy currently remains the technique of choice in most patients with hugely enlarged BPH **(Kuntz *et al.*, 2008).**

Open simple prostatectomy practiced in about 14% to 32% of the total invasive procedures for BPH in Europe for example **(van Velthoven *et al.*, 2004; Serretta *et al.*, 2002; Tubaro *et al.*, 1999).** However, it has many disadvantages; it causes considerable bleeding during the surgery, it takes the patient a long time to recover and it leaves a big scar **(Yun *et al.*, 2010).**

With advancement of technical devices in surgery, laparoscopic simple prostatectomy started to gain acceptance in place of simple prostatectomy even for voluminous glands. It causes less intra-operative blood loss than does open simple prostatectomy, has minor surgical scars, shorter hospital stay, less analgesic utilization, and more rapid return to physical activities **(Mariano *et al.*, 2006).**

We designed the present study to present our experience in laparoscopic retropubic simple prostatectomy; we used extraperitoneal approach because of the expectation of rapid postoperative recovery and the rare possibility of bowel complications; we did it by Millin procedure (transversely incised the prostatic capsule), with an important technical caution that subcapsular dissection proceeded in close contact with the whitish surface of the prostate adenoma bluntly **(Sotelo *et al.*, 2005).**

The first laparoscopic simple prostatectomy was done by **Mariano *et al.* (2002)** on a patient with BPH whose prostate weighed 173 g on TRUS. The prostatic capsule and the bladder neck were vertically incised through the transperitoneal approach, and the resected adenoma was 120 g. The estimated blood loss and the operation time were 800 ml and 225 minutes, respectively. Blood loss was higher and operative time was longer when compared to the present study.

Comparable to results of the present work, **van Velthoven *et al.* (2004)** performed a laparoscopic extraperitoneal adenomectomy (Millin's procedure) on 18 patients. The surgery was to transversely incise the prostatic capsule. The operation time and the estimated blood loss were 145 minutes and 192 ml, respectively. They reported that the method was effective at reducing blood loss and shortening the time taken for the catheter to indwell.

In addition, **Nadler *et al.* (2004)** performed a preperitoneal laparoscopic simple prostatectomy, making a transverse incision on the prostatic capsule just proximal to the bladder neck . The operation time and the blood loss were 350 minutes and 300 ml, respectively. The operative time was longer than mean operative time in the present work, while blood loss was comparable to that of the present study.

In accordance with the present study, **Mariano *et al.* (2006)** reported their 6-year experience in laparoscopic simple prostatectomy for BPH and concluded that it significantly improved IPSS, Qmax, and QoL after the surgery. Their study has the advantage of long-term follow up; which is beyond the scope of the present study.

To study the advantage of laparoscopic over open prostatectomy, **Baumert *et al.* (2006)** compared 30 cases of laparoscopic prostatectomy with 30 cases of open prostatectomy. They reported that the laparoscopic surgery was statistically superior to the open surgery in operation time, blood loss, specimen weight, irrigation time, catheterization time, and hospital stay.

In their study, **Yun *et al.* (2010)** reported that, mean operation time was longer than reported in other papers, and also mean blood loss was greater. However, operation time and blood loss have been remarkably shortened and reduced as the number of cases has increased. Actually, the first surgery took 276 minutes and blood loss was 800 cc, but in the last surgery, these variables were 132 minutes and 200 cc, respectively. These improvements imply that with time, better results may be achieved.

In short, results of the present study, revealed that, laparoscopic retropubic simple prostatectomy achieved the benefits of both open surgery and laparoscopic surgery, including perfect removal of the adenoma and short recovery time. However, long-term data and further comparative studies are needed. Finally we can say that, laparoscopic retropubic simple prostatectomy may be a useful treatment option for patients with large volume BPH, especially with experienced hands.

Although, the results of the present study reported the usefulness of laparoscopic simple prostatectomy on a relatively large number of cases, it has the limiting step of short follow up time. Long term follow up is needed to clarify the usefulness of laparoscopic retropubic simple prostatectomy.

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