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Impact of bladder neck preservation in transurethral resection of the prostate on postoperative retrograde ejaculation

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Abstract

Introduction. Prostatic enlargement with bladder outlet obstruction is one of the major problems that face many men after reaching 40 years old. There are different modalities for management of obstructed benign prostatic hyperplasia (BPH), while choose certain modality depends on many factors.

Aim. To evaluate the safety and efficiency of transurethral resection of the Prostate (TURP) with preservation of the bladder neck and compare it with the conventional standard TURP and its impact on retrograde of ejaculation.

Materials and methods. This prospective randomized comparative clinical study was conducted on 70 patients with obstructed benign prostatic hyperplasia attended to urology department outpatient clinic at Ain Shams university hospitals during the period from July 2021 to September 2023.

Results. Mean operative time was 57.14 min in group A and 56.66 min in group B. Reduction of hemoglobin postoperative was 1.24 g/dl in group A and 1.21 g/dl in group B. Mean hospital stay postoperatively was 2.71 days in group A and 2.77 days in group B. Catheter was removed after mean 2.96 days in group A and 3.11 days in group B. As regard postoperative incontinence, at the third month of follow up there were two patients in group A and eight patients in group B with statistically significant difference between the two groups.

Discussion. The study evaluated the safety and effectiveness of transurethral resection of the prostate (TURP) with bladder neck preservation compared to standard TURP. Bladder neck preservation significantly reduces retrograde ejaculation rates (14.3% vs. 74.1% after 12 months) while maintaining comparable efficacy and complication rates.

Conclusion. The TURP with preservation of the bladder neck is applicable technique for men with obstructed BPH with good efficacy and outcome comparable to conventional TURP. TURP with preservation of the bladder neck plays an important role in the armamentaria of ejaculation preservation post TURP.

Keywords. benign prostatic hyperplasia, bladder neck preservation, retrograde ejaculation, transurethral resection, urology

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Влияние сохранения шейки мочевого пузыря при трансуретральной резекции простаты на ретроградную эякуляцию в послеоперационном периоде

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Резюме

Введение. Увеличение предстательной железы с обструкцией выходного отверстия мочевого пузыря – одна из основных проблем, с которой сталкиваются многие мужчины после 40 лет. Существуют различные методы лечения обструктивной доброкачественной гиперплазии предстательной железы (ДГПЖ), при этом выбор определенного метода обусловлен многими факторами.

Цель. Оценить безопасность и эффективность трансуретральной резекции простаты (ТУРП) с сохранением шейки мочевого пузыря и сравнить этот метод с традиционной ТУРП и ее влиянием на ретроградную эякуляцию.

Материалы и методы. В проспективное рандомизированное сравнительное клиническое исследование было включено 70 пациентов с obstructивной доброкачественной гиперплазией предстательной железы, наблюдавшихся в урологическом отделении поликлиники при клинической университетской больнице Айн-Шамс в период с июля 2021 г. по сентябрь 2023 г.

Результаты. Средняя продолжительность операции в группе А составила 57,14 мин, в группе В – 56,66 мин. Снижение уровня гемоглобина в послеоперационном периоде в группе А составило 1,24 г/дл, в группе В – 1,21 г/дл. Средняя продолжительность пребывания в больнице после операции в группе А составила 2,71 дня, в группе В – 2,77 дня. Катетеры в среднем использовали в группе А в течение 2,96 дня, в группе В – 3,11 дня. В послеоперационном периоде на 3-м месяце наблюдения недержание мочи в группе А возникло у двух пациентов, в группе В – у восьми пациентов, различие между группами является статистически значимым.

Обсуждение. В исследовании оценивали безопасность и эффективность трансуретральной резекции простаты (ТУРП) с сохранением шейки мочевого пузыря в сравнении с традиционной ТУРП. Сохранение шейки мочевого пузыря значительно снижает частоту ретроградной эякуляции (14,3 и 74,1 % через 12 месяцев) при сопоставимой эффективности и частоте осложнений.

Заключение. ТУРП с сохранением шейки мочевого пузыря – метод, используемый у мужчин с obstructивной ДГПЖ, который продемонстрировал хорошую эффективность и результаты, сопоставимые с традиционной ТУРП. ТУРП с сохранением шейки мочевого пузыря играет важную роль в арсенале методов сохранения эякуляции после ТУРП.

Ключевые слова: доброкачественная гиперплазия предстательной железы, сохранение шейки мочевого пузыря, ретроградная эякуляция, трансуретральная резекция, урология

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● INTRODUCTION

Benign prostatic hyperplasia (BPH), as the most common disease in male urological pathology, represents a major health problem in our society. Despite it is benign, this disease has been shown to have a negative impact on the patient's quality of life [1].

Despite continuing development of new minimally invasive surgical methods, transurethral resection of the prostate remains the gold standard surgical treatment for lower urinary tract symptoms due to BPH, with more than 90% of the patients reporting improved urinary voiding over the 10-year follow-up period [2].

Even though transurethral resection of the prostate (TURP) has undergone significant improvements in the last decade, there is a high rate of postoperative retrograde ejaculation approximated 70–90%. Postoperative retrograde ejaculation not only accounts for male infertility but also impaired sexual satisfaction [3].

A competent ring of smooth muscle at the bladder neck in the male has been described. The bladder neck plays a significant role in reproduction. For men, bladder neck closure facilitates antegrade ejaculation. It actively contracts during ejaculation through a rich noradrenergic innervation by sympathetic nerves [3].

The internal urethral sphincter (smooth sphincter of the bladder neck) is regarded as an indispensable part of the “compression chamber”, delimited anteriorly by the external sphincter of the urethra (striated sphincter), in which the seminal fluid accumulates and resides when it reaches the prostatic urethra before being expelled during ejaculation. Therefore, retrograde

ejaculation was considered a physiological result of the removal of the smooth sphincter of the bladder neck [4].

The key point of standard TURP is resecting the tissues enveloped in the prostatic capsule and the bladder neck, while protecting the urethral tissues below the verumontanum. To achieve an improved bladder outlet, circumferential over resection of the bladder neck has been performed, which is commonly thought to cause excessive hemorrhage, uncontrolled perforation of the bladder, prostatic capsule or prostatovesical junction during the operation, as well as sexual dysfunction and bladder neck contracture in the long-term follow-up [5].

The TURP with preservation of the bladder neck was performed in order to retain tissues in the bladder neck, resection started from 0.5 cm to 0.8 cm away from the bladder neck, while the rest of the procedures were comparable with those of the standard TURP. In the case of the lobes that highly proliferate or protrude into the bladder, operations aiming at removing those prostate tissues that broke into the bladder and that highly proliferate around the bladder neck were performed, avoiding any injury to the muscle fibers in the bladder neck [3].

The **aim** of our work is to evaluate the safety and efficiency of TURP with preservation of the bladder neck and compare it with the conventional standard TURP and its impact on retrograde of ejaculation.

Ethics approval and consent to participate. The Declaration of Helsinki's guiding principles were followed in the conduct of this investigation. Approval was granted by the Research Ethics Committee (REC) at Faculty of Medicine, Ain Shams University (Date: December 11, 2019, No. 476).

MATERIALS AND METHODS

We begin this prospective randomized comparative clinical study with seventy men who presented with obstructed benign prostatic hyperplasia during the period from July 2021 to September 2023 at urology department outpatient clinic at Ain Shams university hospitals.

Patients were divided into two groups. Group A: 35 patients underwent TURP with preservation of the bladder neck. Group B: 35 patients underwent standard or conventional TURP.

Any man who had bladder outlet obstruction due to B.P.H and had one or more of the relative or absolute indication for prostatectomy were included. While, patients with untreated: acute urine retention, urinary tract infection or gross hematuria, preoperative incontinence

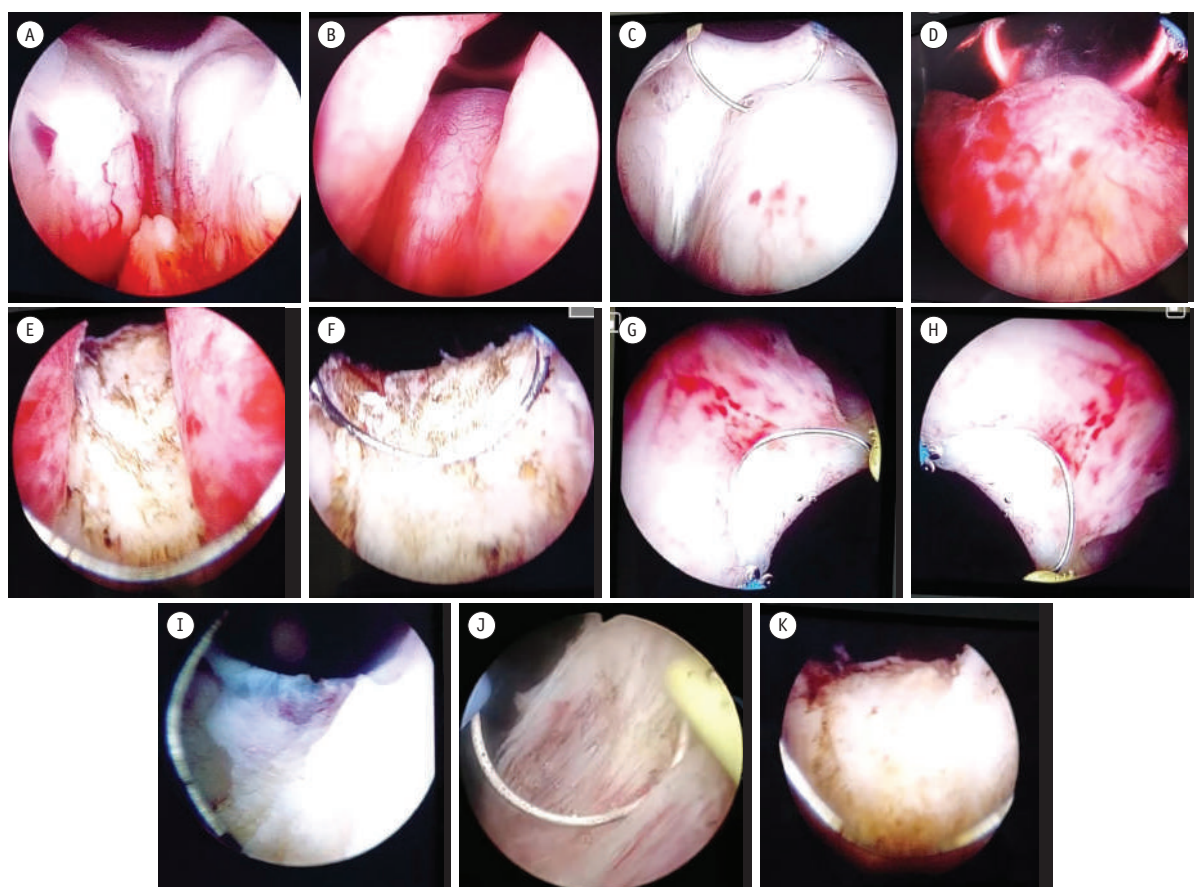
or retrograde ejaculation, previous urethral, bladder neck or prostate operations and neurologic disorders that affect detrusor activity or bladder neck closure, cancer prostate were excluded from the study.

Preoperatively, all patients were subjected to history taking, clinical examination, laboratory investigations, imaging modalities with especial emphasis on pelvi-abdominal US and Trans rectal US and biopsy in cases suspicious of cancer prostate by DRE or PSA.

During the operation, prophylactic antibiotic was given with induction of anesthesia, all patients in both groups underwent spinal anesthesia, as regard conventional or standard TURP, the key point is resecting the tissues enveloped in the prostatic capsule and the bladder neck, while protecting the urethral tissues distal to the verumontanum.

Figure. Illustrative depictions of transurethral resection of the prostate (TURP) techniques with bladder neck preservation

Рисунок. Иллюстративное описание методик трансуретральной резекции простаты (ТУРП) с сохранением шейки мочевого пузыря



A – Bi-lobar prostate; B – Tri-lobar prostate; C – Start resection at 0.5 to 0.8 cm away from the bladder neck; D – Start resection at median lobe protruding into the bladder; E – Flatten the median lobe at the bladder neck without over resection; F – After flattening start resection at 0.5 to 0.8 cm away from the bl. neck; G – Start right lobe resection at 0.5 to 0.8 cm away from the bl. neck; H – Start left lobe resection at 0.5 to 0.8 cm away from the bl. neck; I – Preservation of the tissues at the bladder neck at the end of the procedure; J – This is how bladder neck looks like at the end of the conventional TURP; K – This is how bladder neck looks like at the end of bl. neck preservation TURP.

For bi-lobar prostate resection was started from 0.5 cm to 0.8 cm away from the bladder neck, while the rest of the procedures were comparable with those of the standard TURP (Figure).

For tri-lobar prostate (when the median lobe protrudes into the bladder) resection was started from protruding prostate tissues into the bladder and the tissues that highly proliferate around the bladder neck until it was flattened (without complete or over resection), with avoiding any injury to the muscle fibers in the bladder neck. Then resection continued from 0.5 cm to 0.8 cm away from the bladder neck, while the rest of the procedures were comparable with those of the standard TURP. Also, this resection was applied for both bi-lobar and tri-lobar prostate. As regard TURP with preservation of the bladder neck, it also aims to resect the tissues enveloped in the prostatic capsule but retains tissues in the bladder neck (Figure, K).

Both procedures were carried out using a 26 F continuous flow resectoscope (Karl Storz) with normal saline as an irrigating fluid and bipolar electrosurgical unit was used for cutting and coagulation.

Postoperative steps

The patients returned to the ward on continuous irrigation with normal saline through the three-way catheter to prevent urinary bladder hematoma and clot retention. The rate of the flow of normal saline was gradually decreased until stopped when the wash was clear. The patients were discharged after 24 hours of clear urine postoperative without wash. The first visit was after 3 to 7 days postoperative. The next two visits were at 1st month and 2nd month postoperative to reassess of short-term complications and if they responded to treatment or not. The next visits regimen was at 3,6,12 month for assessment of Procedures efficacy (by reassessment of IPSS, PVR, Q max, prostate volume). Long-term complications which extend beyond the first 6 weeks after surgery (postoperative retrograde ejaculation was assessed by urine analysis shortly after ejaculation).

Statistical analyses

Data collected throughout history, basic clinical examination, and outcome measures coded, entered and analyzed using Microsoft Excel software. Data were then imported into Statistical Package for the Social Sciences (SPSS version 20.0) software for analysis. According to the type of data qualitative represent as number and percentage, quantitative continues group represent by mean \pm SD, then proper statistical analyses were used. P value was set at <0.05 for significant results $\<0.001$ for high significant result.

RESULTS

Patients were allocated into two groups. Group A includes 35 patients who underwent TURP with preservation of the bladder neck. Group B includes 35 patients who underwent standard or conventional TURP. Patients were evaluated during a follow up period of 1 year.

During follow up period 15 patients dropped out (7 from group A & 8 from group B). Those 15 patients dropped out after about two months postoperative. We finally formulated our results on 55 patients (28 in group A & 27 in group B).

The baseline clinical characteristics of both groups were closely similar to each other without any significant difference between the two groups. This is illustrated and tabulated in the following tables and diagrams.

Table 1 shows that the patients age in group A was ranged (59–70 years) with mean (63.82) and in group B was ranged (58–70 years) with mean (64.0). The range of prostate volume in group A was (46–65 gm) with mean (55.67) and in group B range was (49–66 gm) with mean (56.74). As regard PSA, in group A the range was (1.9–3.2 ng/ml) with mean (2.53) and in group B the range was (1.8–3.5 ng/ml) with mean (2.65). PVR ranged between (83–108 ml) in group A with mean (94.67), while group B ranged between (83–111 ml) with mean (95.92). Also, Q max range was (5–9 ml/s) in group A with mean (6.67) and (5–8 ml/s) in group B with

Table 1. Baseline characteristics

Таблица 1. Характеристики на исходном уровне

Parameters	Group (A) mean \pm SD	Group (B) mean \pm SD	t	P
Age (years)	63.82 \pm 3.36	64.0 \pm 3.46	0.194	0.847
Prostate volume (gm)	55.67 \pm 5.80	56.74 \pm 5.38	0.703	0.485
PSA (ng/ml)	2.53 \pm 0.41	2.65 \pm 0.42	1.060	0.294
PVR (ml)	94.67 \pm 7.15	95.92 \pm 8.04	0.608	0.546
QMAX (ml/s)	6.67 \pm 1.21	6.48 \pm 0.80	0.706	0.484
IPSS	21.75 \pm 1.53	21.74 \pm 2.14	0.019	0.985

Table 2. Perioperative results

Таблица 2. Результаты лечения в периоперативном периоде

Parameters	Group (A) mean \pm SD	Group (B) mean \pm SD	t	P
Operative time (min)	57.14 \pm 7.50	56.66 \pm 7.20	0.240	0.811
HB reduction (g/dl)	1.24 \pm 0.41	1.21 \pm 0.36	0.432	0.674
Catheterization time (days)	2.96 \pm 0.83	3.11 \pm 0.80	0.664	0.510
Hospital stay (days)	2.71 \pm 1.04	2.77 \pm 0.97	0.232	0.817

Table 3. Prostate volume distributed at base time and follow ups between studied groups**Таблица 3.** Распределение объема простаты на исходном уровне и при последующих визитах между исследуемыми группами

gm	Group (A) mean \pm SD	Group (B) mean \pm SD	t	p
Prostate volume pre	55.67 \pm 5.80	56.74 \pm 5.38	0.703	0.485
Prostate volume 3M	18.64 \pm 1.06	18.18 \pm 1.44	1.344	0.185
Prostate volume 6M	19.07 \pm 1.18	18.70 \pm 1.56	0.985	0.329
Prostate volume 12M	19.14 \pm 1.17	18.55 \pm 1.25	1.794	0.079

Table 4. PVR distributed at base time and follow ups between studied groups**Таблица 4.** Распределение остаточного объема предстательной железы на исходном уровне и при последующих визитах между исследуемыми группами

ml	Group (A) mean \pm SD	Group (B) mean \pm SD	t	p
PVR pre	94.67 \pm 7.15	95.92 \pm 8.04	0.608	0.546
PVR 3M	18.53 \pm 1.23	19.37 \pm 1.88	1.952	0.056
PVR 6M	18.67 \pm 1.12	18.70 \pm 1.26	0.078	0.938
PVR 12M	18.28 \pm 1.21	18.33 \pm 1.14	0.150	0.882

Table 5. Q max distributed at base time and follow ups between studied groups**Таблица 5.** Распределение максимальной объемной скорости потока (Qmax) на исходном уровне и при последующих визитах между исследуемыми группами

ml / s	Group (A) mean \pm SD	Group (B) mean \pm SD	t	p
Q max pre	6.67 \pm 1.21	6.48 \pm 0.80	0.706	0.484
Q max_3M	19.88 \pm 0.95	19.98 \pm 0.57	0.482	0.632
Q max_6M	20.61 \pm 0.87	20.32 \pm 0.79	1.891	0.061
Q max 12M	21.12 \pm 1.06	20.86 \pm 0.91	1.423	0.143

Table 6. IPSS distributed at base time and follow ups between studied groups**Таблица 6.** Распределение количества баллов по шкале IPSS на исходном уровне и при последующих визитах между исследуемыми группами

Score	Group (A) mean \pm SD	Group (B) mean \pm SD	t	p
IPSS pre	21.75 \pm 1.53	21.74 \pm 2.14	0.019	0.985
IPSS_3M	9.65 \pm 0.64	9.43 \pm 0.58	1.365	0.125
IPSS_6M	9.52 \pm 0.79	9.28 \pm 0.80	1.689	0.089
IPSS_12M	9.38 \pm 0.91	9.17 \pm 0.88	1.526	0.096

Table 7. Intra and short-term postoperative complications distribution between studied groups**Таблица 7.** Распределение интра- и краткосрочных послеоперационных осложнений между исследуемыми группами

Complications Incidence		Group		X2	P
		Group A	Group B		
Intraoperative bleeding plus transfusion	N	2	2	0.001	0.97
	%	7.1%	7.4%	**	**
Hematuria	N	4	5	0.18	0.67
	%	14.3%	18.5%	**	**
Clot retention	N	1	1	0.001	0.97
	%	3.6%	3.7%	**	**
UTI	N	4	5	0.18	0.67
	%	14.3%	18.5%	**	**

mean (6.48). IPSS ranged in group A between (19–24) with mean (21.75) and in group B (18–25) with mean (21.74).

Table 2 shows that there was no significant difference in the operative time, catheterization time, hemoglobin reduction or hospital stay between the two groups.

For assessment the outcomes of the procedures, we assessed: 1. Efficacy 2. Complications. Firstly, we assessed efficacy by comparing between preoperative and postoperative (3, 6, 12 month) measurements of the following parameters: prostate volume (Table 3), PVR (Table 4), Q max (Table 5) and IPSS (Table 6). Both procedures were effective and ended with improvements in all the measured variables. These improvements were similar in the two groups without any significant difference.

Secondly, we assessed the complications and compared these complications between the two groups during 1 year of follow up. The complications include:

Intraoperative.

Short-term postoperative complications which don't extend beyond the first 6 weeks after surgery.

Long-term postoperative complications which extend beyond the first 6 weeks after surgery.

Except for some long-term postoperative complications (incontinence and retrograde ejaculation) all the complications (intra, short and long-term postoperative) had the same rate without any significant difference between the two groups.

Table 7 shows that two patients in each group developed intraoperative bleeding with hypotension and needed intraoperative blood transfusion. This was occurred in patients with relatively large prostate (65 gm) and refractory retention with long time of catheterization preoperative. Early post operative hematuria was developed in four patients in group A and five patients in group B (mostly due to straining from catheter

irritation). Application of urethral catheter traction on the thigh for about four hours and usage of antimuscarinic drugs (sofenacin 10 mg) were sufficient to control hematuria without need to reenter the operation room again to control hematuria. Two cases from early postoperative hematuria patients developed colt retention, one in each group. In one case the hematoma was evacuated by repeated wash with normal saline and 60 cc Ryle syringe. The other one reentered the operation room to evacuate the hematoma by cystoscope and Ellik evacuator without any bleeder in the fossa.

Urinary tract infection (UTI) was developed in four patients in group A and five patients in group B (mostly due to patients in appropriate catheter care). Urine culture and sensitivity (C/S) was done for all cases. Antibiotics (according to results of C/S) were administrated for 10 days. Another urine sample was obtained after three days of the last dose of antibiotics to redo C/S. All cases resolved within 10 days of treatment with no bacterial growth in the second C/S.

Table 8 shows that as regard urethral stricture and bladder neck contracture both are long-term complications. 2 patients in group A and 1 patient in group B developed urethral stricture which was managed later by visual internal urethrotomy. The site of the stricture in both cases was in the penile urethra at the penoscrotal junction. Mostly it was developed due to insufficient urethral dilation before insertion of the resectoscope in a tight urethra.

One patient in group A and 3 patients in group B developed bladder neck contracture with obstructive L.U.T.S due to formation of a tight membrane at the level of the bladder neck. Mostly it was developed due to affection of tissue healing post resection which ends with fibrous tissue formation by ischemic changes due to infection, hematoma and over resection. Bladder neck incision was done to open the pathway.

Table 9 shows that at the third month of follow up two patients (7.1%) complained from incontinence in group A. On the other hand, there were eight patients (29.6%) complained from incontinence in group B with statistically significant difference between the two groups (P value 0.031). All of them were complained from urge incontinence only 3 patients from group B also had stress incontinence (which mean those 3 patients had mixed incontinence during the first 3 months postoperative). This difference mostly due to early efficient closure of the internal urethral sphincter with bladder neck preservation.

By reaching the sixth month of follow up the two patients in group A were resolved from incontinence

Table 8. Long-term complication distribution between studied groups

Таблица 8. Распределение долгосрочных осложнений между исследуемыми группами

Long-term Complications Incidence		Group		X2	P
		Group A	Group B		
Urethral stricture	N	2	1	0.001	0.97
	%	7.1%	3.7%		
Bladder neck contracture	N	1	3	0.001	0.97
	%	3.6%	10.7%		

Table 9. Incontinence distribution between studied groups at all follow ups

Таблица 9. Распределение недержания мочи между исследуемыми группами на всех последующих визитах

Incontinence Percentage		Group		X2	P
		Group A	Group B		
Incontinence 3M	N	2	8	4.67	0.031
	%	7.1%	29.6%		
Incontinence 6M	N	0	2	2.15	0.14
	%	0.0%	7.4%		
Incontinence 12M	N	0	0	0.001	0.97
	%	0.0%	0.0%		

Table 10. Retrograde ejaculation distribution between studied groups at all follow ups

Таблица 10. Распределение ретроградной эякуляции между исследуемыми группами на всех последующих визитах

Erectile Function Score		Group		X2	P
		Group A	Group B		
Retrograde ejaculation 3M	N	11	24	14.61	0.00
	%	39.3%	88.9%		
Retrograde ejaculation 6M	N	6	20	6.78	0.009
	%	21.4%	74.1%		
Retrograde ejaculation 12M	N	4	20	10.35	0.001
	%	14.3%	74.1%		

also in group B six patients were resolved while two patients remained complain (the urge incontinence was resolved in those 2 patients, but stress incontinence was still). This was occurred spontaneously or with some help of antimuscarinic or beta 3 agonist drugs and pelvic floor muscle exercises.

After one year of follow up no patient had incontinent in either group. There is no statistically significant difference between the two groups at 6 and 12 months of follow up. There was early recovery from incontinence in group A patients when compared with group B patients which most probably attributed to bladder neck preservation that closed adequately early postoperative.

Table 10 shows that 35 patients (11 patients in group A and 24 patients in group B) complained from retrograde ejaculation in the third month of follow up with statistically high significant difference between the two groups. (P value 0.00)

Retrograde ejaculation showed regressive course in follow up at 6 and 12 months with spontaneous improvement but still with statistically high significant difference between the two groups (at 6-month P value 0.009, at 12-month P value 0.001). In group the patients decreased from 11 in third month to 6 in the sixth month and finally 4 by the end of the year. In the group B the patients decreased from 24 in the third month to 20 in the sixth and remains 20 by the end of the year.

Redo TURP due to prostate regrowth one of the important points that may be a draw back for bladder neck preservation TURP and must be assessed. In our study there were not any case needed redo due to prostate regrowth but the follow up period was not sufficient to really assess this point.

DISCUSSION

Prostatic enlargement with bladder outlet obstruction is one of the major problems that face many men after reaching 40 years old. There are different modalities for management of obstructed B.P.H, while choose certain modality depends on many factors. Prostatic surgery is one of the important modalities to release the obstruction caused by the prostate. There are many techniques to achieve this goal either recent or old, invasive, or minimally invasive.

TURP is still considered as gold standard treatment for B.P.H or as a reference treatment for the B.P.H. Despite amazing outcomes of TURP but there are still annoying complications. One of these complications is retrograde ejaculation, which occurs up to about 70–90% of the patients post TURP. Postoperative retrograde ejaculation doesn't only accounts for male infertility but also impaired sexual satisfaction. So, there are many procedures and trials developed to reduce this annoying complication as much as possible. These procedures are called ejaculation preservation TURP, this includes bladder neck preservation, supramontanal ejaculation preservation or combined bladder neck and supramontanal ejaculation preservation together [3].

Rather than TURP for treatment of obstructed B.P.H, there is an old technique which is called Urolift and recent technique which is called Rezuim. Both techniques have almost no retrograde ejaculation postoperative [6].

The occurrence of retrograde ejaculation after transurethral resection of the prostate is mainly related to the following factors:

The integrity of the bladder neck is compromised as, conventional prostatic surgery requires the bladder neck to be fully open and this was assumed to solve the urination function, but this often leads to over-excision of the bladder neck, which destroys the annular fibers with disturbance of the function of the internal sphincter and makes them unable to close during ejaculation, resulting in retrograde ejaculation [3].

The internal urethral sphincter (smooth sphincter of the bladder neck) is regarded as an indispensable part of the “compression chamber”, delimited anteriorly by the external sphincter of the urethra (striated sphincter), in which the seminal fluid accumulates and resides when it reaches the prostatic urethra before being expelled during ejaculation [7].

P. Li et al. [8] reported that retrograde ejaculation after holmium laser enucleation with intact bladder neck was 11.7%. Q. Yang et al. [9] reported that the incidence of retrograde ejaculation after transurethral incision of the prostate, was only 21%. SS. Yang et al. [10] reported that the incidence of retrograde ejaculation after transurethral incision of the bladder neck, preserving a portion of the superior temporal tissue, was only 15.4%. J. Liao et al. [3] reported that the retrograde ejaculation post bladder neck preservation TURP was 32.8%.

Injury of the ejaculator muscle *musculus ejaculatorius*, whose contractions can cause semen secretion and ejaculation and play a leading role in antegrade ejaculation. There is direct expulsion of seminal fluid when the striated sphincter opened, with no accumulation phase but with the coordinated contraction of the bladder neck, *musculus ejaculatorius* and the perineal muscles [11].

During conventional prostatic surgery, this muscle system is damaged especially *musculus ejaculatorius*, leading to retrograde ejaculation [12] reported that the retrograde ejaculation post supramontanal ejaculation preservation TURP was 20%. S.H. Alloussi et al. [13] also reported that 89 BPH patients underwent TURP with preserving 1 cm of mucosa proximal to the verumontanum, showed that retrograde ejaculation after surgery was only 9.2%.

The synergy between the previous 2 mechanisms or theories is more accepted. In conventional prostatic surgery (either resection or enucleation), there is disruption of these 2 mechanisms resulting in retrograde ejaculation postoperative. While preserving both mechanisms or one of them mostly results in preserving antegrade ejaculation.

In our study, TURP with preservation of the bladder neck was performed on 28 patients in group A and

compared with conventional TURP which was performed on 27 patients in group B, the results of the preservation technique were compared with those of standard or conventional TURP. There was no significant difference between the two groups in terms of Perioperative parameters that include the operative duration, catheterization period, hemoglobin decrease and hospital stay.

Parameters for assessment of efficacy that include IPSS, Qmax, PVR and prostate volume.

Post-operative complications that include the rate of hematuria, clot retention, UTI, bladder neck contracture and urethral stricture.

While early post-operative incontinence (3 month follow up) showed significant difference between the two groups (7.1% in group A and 29.6% in group B), mostly due to early efficient closure of internal urethral sphincter in group A as a result of bladder neck preservation with early impaired closure of internal urethral sphincter in group B as a result of bladder neck resection. But in late follow up (6&12 month follow up) there were no significant difference mostly due to restoring efficient closure of the internal urethral sphincter.

As regard retrograde ejaculation there is statistically high significant difference between the two groups during 3, 6, 12 months of follow up. The end result in group A was 14.3% with retrograde ejaculation while 74.1% in group B.

J. Liao et al. [3] had a retrospective study on 137 patients with obstructed B.P.H dividing them into two groups, group A TURP with preservation of the bladder neck contained 58 patients and group B conventional or standard TURP contained 79 patients. J. Liao et al. [3] used monopolar TURP while, in our study we used bipolar TURP. Most of the results of the two studies are closely related without great difference. The mean of postoperative hospital stay in bladder neck preservation group was 2.71 days in our study while it was 7.4 days in J. Liao et al. [3] our study reported 14.3% of postoperative retrograde ejaculation while J. Liao et al. [3] reported 32.8%.

Other studies using different techniques aiming to preserve postoperative antegrade ejaculation by preserving 1cm of supramontanal mucosa like G. Ronzoni et al. [12] and S.H. Alloussi et al. [13]. The mean of prostate volume

preoperative in grams was 32 in G. Ronzoni et al. [12] 36.23 in S.H. Alloussi et al. [13] and 55.67 in our study. The rate of bladder neck contracture was 12.7% in Alloussi SH., et al. while in our study it was 3.6 %, those patients need retreatment. The rate of postoperative retrograde ejaculation was 20% in G. Ronzoni et al. [12] and 9.2% in S.H. Alloussi et al. [13] while in our study it was 14.3%.

Another alternative treatment option for BPH is transurethral incision of the prostate (TUIP), which has been proved to be an effective treatment option decreasing the rate of retrograde ejaculation, but the weaknesses of TUIP were reported to be the insufficiency in reducing prostate volume at the median lobe hyperplasia and the inability to obtain specimens for pathology so that the incidental prostate cancer cannot be diagnosed. Q. Yang et al. [9] reported that the incidence of postoperative retrograde ejaculation after transurethral incision of the prostate, was only 21%. S.S. Yang et al. [10] reported that the incidence of postoperative retrograde ejaculation after transurethral incision of the bladder neck, preserving a portion of the superior temporal tissue, was only 15.4%.

In many different studies of Urolift and Rezum reported 0% of postoperative retrograde ejaculation but with high possibility of re do and the inability to obtain specimens for pathology so that the incidental prostate cancer cannot be diagnosed. Also, both techniques have high cost in comparison with TURP and limited availability.

CONCLUSION

By the end of the study and after statistical data analysis, we can conclude that the TURP with preservation of the bladder neck is applicable technique for men with obstructed BPH with good efficacy and outcome comparable to that of the standard or conventional TURP. TURP with preservation of the bladder neck plays an important role in the armamentaria of ejaculation preservation post TURP (which is a point of importance in sexual satisfaction for men).

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