Evaluation of erectile function post TURP versus transvesical prostatectomy

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Background Benign prostatic hyperplasia (BPH) is a frequent disorder in old men. It is characterized by hyperplasia of the inner glands of the prostate. BPH induces urine outflow obstruction, consequently causing morphological and functional disorders of the lower and upper urinary tract. Patients with BPH frequently complain of weak or no erection at all. Many of patients at these age suffering from decrease in testesterone level. The older patients have sexual dysfunctions more frequently.

Objectives To choose the procedure that has the least effect on erectile function, we evaluated the effect of both operations on erectile function (open prostatectomy transvesical approach and transurethral resection of the prostate).

Patients and methods The study was carried out at the Urology Department at Al-Zahra University Hospital between April 2014 and July 2017. Our study included 60 patients suffering from BPH who were divided into two groups,: group A comprised 30 patients who underwent transurethral resection of the prostate and group B comprised 30 patients who underwent transvesical prostatectomy. All patients underwent complete history taking, including international index erectile function questionnaire-5, full clinical examination, kidney function tests, liver function tests, complete blood count, fasting glucose, prostatic specific antigen (PSA), serum testosterone, sex hormone-binding globulin, estradiol level, and penile duplex, uroflowmetry preoperatively and 6 months postoperatively.

Results By comparison, in group A and group B, international index erectile function questionnaire-5 was not significantly changed in both groups, and neither was penile duplex significantly changed.

Conclusion There was no significant difference in erectile function between both groups; there was also no difference between before and after each operation.

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Introduction

Benign prostatic hyperplasia (BPH) is the most common urological disease among aging men worldwide [1]. Surgery is an appropriate treatment for BPH with bladder calculi, acute urinary retention or other related complications. Prostatic volume was an important factor, which impacts the choice of surgical treatment [2].

Patients with BPH frequently encounter weak or no erection at all [3]. In many of these patients, at this age, the testosterone secretion is reduced and a decrease in sexual function occurs. In these patients, the sexual dysfunctions occur more frequently [4].

However, apart from the age, sexual dysfunctions in patients with BPH are caused by urine retention, lower urinary tract symptoms, bad general health, and a fear of disease [5].

Surgical therapy is the optional treatment for patients with bothersome LUTS/BPH unwilling to try medical therapies, cases wherein oral drugs were not effective, and in cases of complicated LUTS. However, all accepted therapy regimens for LUTS/BPH can impact some aspects of sexual health, leaving the prostate surgery a complicated problem on erectile function. It is suggested that improvement of LUTS can also improve erectile function [6]. Others assumed that operation technique or heating effect will damage the corpus cavernosum nerve outside the prostate capsule and harm erectile function [7].

Transvesical prostatectomy may cause erectile dysfunction (ED) if there is perforation of the capsule, which leads to disruption of blood supply to the penis [8].

Ultrasound is a well-established imaging technique in the investigation of penile pathology [9]. Gray scale ultrasound allows evaluation of penile normal and pathological structures, and, when combined with color and spectral Doppler, it provides objective and reliable evaluation of penile vasculature [10] and hemodynamics, especially with the addition of a

pharmacological stimulant to produce an erection (penile dynamic Doppler ultrasound) [11].

The current study aimed at contributing in taking a decision about one of the surgical techniques [open (OP) or transurethral resection of prostate (TURP)] that has fewer side effects on erectile function.

Patients and methods

sixty patients were consented about study and we search for and categorized into two equal groups.

BPH status was assessed preoperatively by digital rectal examination, prostatic specific antigen (PSA), and uroflowmetry, and ultrasound was used to assess prostate size and postvoiding residual urine.

The severity of BPH symptoms were evaluated with American Urological Association symptom scores. American Urological Association symptom scoring includes seven questions, each scored from 0 (not at all) to 5 (almost always), providing a range for the total symptom score of 0 to 35. Lower scores indicate less severe symptoms.

Indications that we considered for surgical intervention were refractory urine retention, dilated upper urinary system or elevated serum creatinine level above 2 mg/dl.

International index erectile function questionnaire-5 (IIEF-5) was used to evaluate the patients' sexual functions. The patients were asked to answer this questionnaire before treatment and 6 months after the surgery.

In our study, we used prostaglandin E1 (alprostadil) 10 μg (vasoactive agent) to induce erection to assess erection by dynamic penile duplex.

Peak systolic velocity (PSV) and end-diastolic velocity (EDV) are the parameters used for diagnosing ED.

The data were analyzed by *t* tests using SPSS software (SPSS (Hong Kong) Ltd, Rm 1804, Quarry Bay, Hong Kong, 2015).

Results

Preoperative data

Table 1 displays the mean values of baseline clinical data of patients of both group A (OP) and group B (TURP). The results indicate that the age in the open group ranged from 57 to 69 years with a mean±SD of 62.40±2.76, while, in the TURP group, it ranged from 55 to 68 years with a mean±SD of 61.73±3.20. Urine analysis showed no significant difference in both groups, while there was a high significant difference with regard to PSA value, as OP patients had higher PSA value (2.5 ng/dl) ranging from 0.5 to 5.8 ng/dl, while TURP patients had lower PSA value (0.85 ng/dl) ranging from 0.1 to 4.8 ng/dl.

Table 2 shows the results of IIEF-5 in the OP group, mean±SD being 21.63±1.16 (range, 20–24) and, in the TURP group, mean±SD being 21.87 ±1.43(range, 20–25). Prostate size (g) ranged between 110 and 215 g in the OP group, and 40–156 g in the TURP group. international prostatic symptom score (IPPS) in the OP group and the TURP group ranged from 23 to 30. Q_{MAX} ranged from 6 to 12 in the OP group and from 7 to 12 in the TURP group.

Table 3 shows the results of hormonal assay preoperatively for both groups.

The hormonal assay of both groups showed no significant difference in both groups, as testosterone

Table 1 Preoperative analysis

Preoperative	Operation		Test value	*P* value	Significance
	Open (*N*=30)	TURP (*N*=30)			
Age (years)					
Mean±SD	62.40±2.76	61.73±3.20	–0.863	0.392	NS
Range	57–69	55–68			
Urine analysis [*n* (%)]					
Free	28 (93.3)	28 (93.3)	4.000	0.261	NS
Microscopic hematuria	0 (0.0)	2 (6.7)			
Urate	1 (3.3)	0 (0.0)			
Oxalate	1 (3.3)	0 (0.0)			
PSA (ng/dl)					
Median	2.5 (2–3)	0.85 (0.5–1.6)	–4.352	0.000	HS
Range	0.5–5.8	0.1–4.8			

HS, highly significant; PSA, prostatic specific antigen; TURP, transurethral resection of prostate.

Table 2 Preoperative results of prostate size and international index erectile function questionnaire-5, IPPS, Q_{MAX} for OP and transurethral resection of prostate groups

Preoperative	Operation		Test value	*P* value	Significance
	Open (*N*=30)	TURP (*N*=30)			
Prostate size (g)					
Mean±SD	155.27±27.17	68.53±22.22	–13.532	0.000	HS
Range	110–215	40–156			
IPPS					
Mean±SD	27.17±2.12	25.43±2.06	–3.211	0.002	HS
Range	23–30	23–30			
IIEF					
Mean±SD	21.63±1.16	21.87±1.43	0.694	0.491	NS
Range	20–24	20–25			
Q_{MAX} (ml/s)					
Mean±SD	7.37±2.37	10.03±1.33	5.371	0.000	HS
Range	6–12	7–12			

HS, highly significant; IIEF, international index erectile function; TURP, transurethral resection of prostate.

Table 3 Preoperative sexual hormnal profile

Preoperative	Operation		Test value•	*P* value	Significance
	Open (*N*=30)	TURP (*N*=30)			
Testosterone, total	193–600	200–740	4.35	0.048	NS
DHEA-S	0.8–4.0	0.9–4.1	2.45	0.08	NS
SHBG levels	8.0–40	9.5–44	25.37	0.235	NS
Estradiol levels	20.8–50	30–50	38.9	0.090	NS

DHEA-S, dehydroepiandrostenedione sulphate; SHBG, serum human-binding globulin; TURP, transurethral resection of prostate.

Table 4 Penile duplex for transurethral resection of prostate preoperatively and postoperatively

Penile duplex for TURP	Operation		*P* value•	Significance
	Preoperatively (*N*=30)	Postoperatively (*N*=30)		
PSV (cm/s)				
Mean±SD	31.65±1.27	31.64±1.28	0.975	NS
Range	30–33	30–33		
EDV (cm/s)				
Mean±SD	1.88±0.39	1.89±0.38	0.9202	NS
Range	0.8–2.7	0.5–2.9		

EDV, end-diastolic velocity; PSV, peak systolic velocity; TURP, transurethral resection of prostate.

level in the open group ranged from 193 to 600 ng/dl, and, in the TURP group, it ranged from 200 to 740 ng/dl. dehydroepiandrostenedione sulphate ranged from 0.8 to 4 μg/dl in the open group, and, in the TURP group, it ranged from 0.9 to 4.1 μg/dl. Serum human-binding globulin levels ranged from 8 to 40 nmol/dl in the open group, and, in the TURP group, it ranged from 9.5 to 44 nmol/dl. Estradiol levels ranged from 20.8 to 50 pg/ml in the open group, and, in the TURP group, it ranged from 30 to 50 pg/ml.

Results 6 months postoperatively

The two groups of patients, group (OP) and group (TURP), were followed-up 6 months postoperatively, and the following results were obtained.

Table 4 shows no significant changes before TURP and after TURP, which indicates that no vascular affection has occurred during operation, as PSV ranged from 30 to 33 cm/s, which was the same result postoperatively. EDV ranged from 0.8 to 2.7 preoperatively, while it ranged from 0.5 to 2.9 postoperatively.

Table 5 shows no significant changes before open prostatectomy and after open prostatectomy, which confirms that no vascular affection occurred, as PSV ranged from 30 to 33 cm/s preoperatively and from 30 to 32 ml/s postoperatively, while EDV ranged from 0.8 to 2.9 cm/s preoperatively and from 0.5 to 2.7 cm/s postoperatively.

Table 6 shows that IIEF-5 in the OP group had a mean ±SD of 21.87±0.97 (range, 20–24), and, in the TURP group, the mean±SD was 22.00±1.31 (range, 20–25), with no significant difference.

Table 5 Penile duplex for open prostatectomy preoperatively and postoperatively

Penile duplex for open prostatectomy	Operation		*P* value•	Significance
	Preoperatively (*N*=30)	Postoperatively (*N*=30)		
PSV (cm/s)				
Mean±SD	31.65±1.29	31.64±1.28	0.9761	NS
Range	30–33	30–32		
EDV (cm/s)				
Mean±SD	1.89±0.38	1.70±0.39	0.0609	NS
Range	0.8–2.9	0.5–2.7		

EDV, end-diastolic velocity; PSV, peak systolic velocity.

Table 6 Postoperative international index erectile function in OP and transurethral resection of prostate

Postoperative	Operation		*P* value	Significance
	OP (*N*=30)	TURP (*N*=30)		
IIFF-5				
Mean±SD	21.87±0.97	22.00±1.31	0.657	NS
Range	20–24	20–25		

IIEF, international index erectile function; TURP, transurethral resection of prostate.

Table 7 Comparing international index erectile function preoperatively and postoperatively of OP

	Open prostatectomy		*P* value	Significance
	Preoperatively (*N*=30)	Postoperatively (*N*=30)		
IIEF-5				
Mean±SD	21.63±1.16	21.87±0.97	0.199	NS
Range	20–24	20–24		

IIEF-5, international index erectile function questionnaire-5.

Table 8 Comparing international index erectile function preoperatively and postoperatively of transurethral resection of prostate

	TURP		*P* value	Significance
	Preoperatively (*N*=30)	Postoperatively (*N*=30)		
IIEF				
Mean±SD	21.87±1.43	22.00±1.31	0.502	NS
Range	20–25	20–25		

IIEF, international index erectile function; TURP, transurethral resection of prostate.

Table 7 shows that IIEF-5 in the OP group preoperatively had a mean±SD of 21.63±1.16 (range, 20–24) and postoperatively a mean±SD of 21.87±0.97 (range, 20–24), with no significant difference.

Table 8 shows that IIEF-5 in TURP group preoperatively had a mean±SD of 21.87±1.43 (range, 20–25) and postoperatively a mean±SD of 22.00±1.31 (range, 20–25), with no significant difference.

Discussion

There is no direct influence between ED and BPH; there are other risk factors, according to research, which identify potential risk factors for ED. At baseline, 522 (83%) patients answered the IIEF-5 questionnaire. The ED rate was 65%. After 6 months, 459 (88%) of the 522 patients returned the IIEF questionnaire. Statistical analysis revealed that the only important factors associated with newly reported ED after TURP were diabetes mellitus (P=0.003, r=3.67) and observed intraoperative capsular perforation (P=0.02, r=1.12). The incidence of postoperative, newly reported ED after TURP was 12%. Risk factors for its occurrence were diabetes mellitus and intraoperative capsular perforation [12].

In this study, patients with diabetes mellitus were already excluded from the study, as it was one of our exclusion criteria, so that erectile function did not undergo any change after surgery.

According to research, there are other risk factors for ED; the study concluded that the incidence rate of postoperative ED after prostatectomy was 12.5%. Risk factors for its appearance included hypertension,

diabetes mellitus, higher transfusion rates, higher cardiac risk index, and older age [13].

TURP can cause ED by a variety of mechanisms primarily through a thermal injury that has spread to the cavernous nerves during surgery. Other potential mechanisms include the psychological effect of surgery and the cessation of sexual activity in the postoperative period [14].

In this study, no effect was detected; this may be due to the short time of operation, which shortens the exposure to thermal effect.In another study, the patients from both groups showed statistically and clinically insignificant change in IIEF from baseline to 6 months of follow-up (18.8 vs. 17.8, P=5.79) [15].

On using objective measures of erectile function, such as nocturnal penile tumescence, the investigator found no loss of function with TURP, and even a small increase in penile rigidity [16].

Another study revealed a decrease in intercourse satisfaction but increases in sexual desire and overall sexual satisfaction [17].

Another study showed that there was a significant decrease in erectile function 3 months after TURP. However, no significant change in erectile function was observed 6 months after TURP [7].

In addition, another study by Pavone *et al*. [18] found that, in 22 (16.2%) of 136 patients with low/mild ED before TURP, marginal improvements of the frequency of dysfunctional episodes were detected.

Conclusions

There was no significant difference in ED between the patients who underwent TURP and the ones who underwent transvesical prostatectomy. There was no significant difference in patients before and after the surgery

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Conflicts of interest
None declared.

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