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Original Article

Transurethral Resection (TURP) Versus Transurethral Incision (TUIP) of the Prostate for Small Sized Benign Prostatic Hyperplasia: A Prospective Randomized Study

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Abstract

In a prospective, randomized study, 80 patients with lower urinary tract symptoms (LUTS) caused by small prostate gland (estimated weight <30gm) had either transurethral resection (TURP, n=40) or transurethral incision (TUIP, n=40) of prostate. The study was conducted in the Department of Urology, BSMMU, Dhaka and Rajshahi Medical College Hospital, Rajshahi. Aims of the study were to evaluate the efficacy of TUIP as a treatment modality for small size obstructive BPH and to compare its outcome with that of TURP. A relative advantage of TUIP over conventional TURP was also observed in this study. Preoperative variables (symptom scores, PVR, uroflowmetry parameters) were well matched in between TURP and TUIP group.

TURPs were done in conventional technique. For TUIP, two deep incisions were made at 5- and 7-0'clock positions of the bladder neck using Colling's knife. Operative variables (operating time, amount of irrigation fluid and blood transfusion required) were observed and recorded. Postoperative catheterization period and hospital stay (in days) were noted.

All patients were followed up at 3 to 4 months postoperatively. Changes of preoperative variables following surgery were assessed. Sexual functions were also questioned and noted pre- and postoperatively.

The study clearly indicated that TUIP is as effective as TURP for the treatment of small sized obstructive BPH. Alterations of sexual functions are similar in both the procedures. On the other hand, operating time, requirement of irrigation fluid and blood transfusion, postoperative catheterization period and hospital stay are significantly (P>0.001) less in TUIP group than that of TURP.

In conclusion, we recommend TUIP for the treatment of LUTS caused by small size obstructing benign prostatic hyperplasia.

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Introduction

Benign prostatic hyperplasia (BPH) is one of the common conditions affecting men. BPH is a pathological process which contributes to lower urinary tract symptoms (LUTS) in aging men [1].It is a major clinical problem facing the urologists in their day-to-day practice.

Treatment of BPH is classically by TURP. Although the results of this treatment modality is excellent, during the last 10-15 years , there has been increasing interest in other operative and

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non-operative treatment of BPH[1], such as transurethral incision of the prostate (TUIP). Despite many recent innovations, TURP, as a treatment modality gained popularity throughout the world and remains the gold standard [2]. Transurethral incision of the prostate (TUIP) is seemed to be an effective and useful alternative to TURP in those patients who has a small prostate with obstructive bladder outflow symptoms [2]. There is a consensus that a patient, whose estimated prostate gland size is 30gm or less, is an ideal candidate for TUIP[3].

The surgical technique of TUIP is relatively simple. Using a Colling's knife, incisions are made at 5- and 7 0' clock positions. Incision starts just distal to the urethral orifice and ends just proximal to the verumontanum. Incisions are deepened until the prostatic capsule is divided [4].

In several reports, incision of the prostate has been proposed to be as effective as TURP in relieving symptoms for small sized obstructing prostate. Though BPH is classically treated by TURP, it is a major operative procedure [5], requires more operating time, irrigation fluid, hospital stay and having more complications rate compared to TUIP

Many reports have already been published comparing results of TURP and TUIP for the management of small sized obstructing benign prostatic hyperplasia [4, 7, 8]. They found that both the operations have significantly improved symptom score and maximum urinary flow rate. Operating time, intra-operative blood loss, postoperative catheterization period, hospital stay and complications were significantly less in the group that underwent TUIP.

Material and Methods

This was a prospective clinical study, carried out in the department of urology, BSMMU, and Rajshahi Medical College Hospital during the period of January-2001 to December-2005. Eighty patients with lower urinary tract symptoms (LUTS) due to benign prostatic hyperplasia with clear urodynamic evidence of bladder outflow obstruction were included, randomly, in the study. Estimated prostate size were 30gm or less, which was determined by digital rectal examination (DRE) and ultrasonography using prolate ellipsoid formula (Prostate size in gm= $\pi/6 \times$ anteroposterior $\times$ transverse $\times$ sagittal diameter)[9]. Prostate size more than 30gm; suspected malignancy on DRE, ultrasound scan and PSA value; presence of neurogenic bladder dysfunction and urethral stricture or other diseases were excluded in the study. The patients were randomized into two groups: 40 patients underwent conventional TURP and the other 40 underwent TUIP. They are termed as TURP and TUIP group respectively. Informed written consent was taken from all patients and permission from ethical committee taken.

All patients have had LUTS for more than three months and some had received medical treatment for BPH. Voiding symptoms were taken carefully and graded according to American Urological Association (AUA) scoring system. Histories of sexual function, especially, of retrograde ejaculation, and quality of life score were evaluated and recorded. All patients were evaluated ultrasonographically and necessary other investigations, as urinalysis, CBC, blood urea and serum creatinine level estimations. Uroflowmetry was done pre- and postoperatively in all cases. PSA level estimated only in suspected patients. Cardiac, respiratory, metabolic functions were worked up.

Patients with AUA score more than 7; prostate size less than 30gm, post-void residual (PVR) volume of urine of more than 70ml, and maximum urinary flow rate less than 10ml/sec, with good general health were included in this study.

In TURP group, resection was done circumferentially up to anatomic capsule of the prostate, using conventional technique. In TUIP group, two deep incisions, at 5- and 7-0'clock positions were made using Colling's knife. Incisions were made from the trigon just below the urethral orifices, cutting the bladder neck and prostate to the sides of proximal end of verumontanum. Preliminary urethrocystoscopic evaluations were made in every case. A 26-Fr continuous flow Karl Storz resectoscope was used

in all procedures. Spinal regional anaesthesia was applied. 1.5% glycin solution was used as irrigation fluid. At the end of procedures, a 22-Fr three way Foley catheter was passed, balloon inflated to 30 -50ml of boiled water and connected to a closed drainage system .Postoperatively, continuous bladder wash with normal saline continued as long as washout was blood stained. In every patient, total operating time, amount of irrigation fluid used in liters and the amount of blood (in bag) transfusion required were observed and recorded. Postoperative catheterization period noted.

Every patient was followed up at three to four months postoperatively. Follow up studies included patients subjective evaluation of outcome of operation, and detailed symptoms score (AUA score). Sexual histories especially, of ejaculation, were taken. Dry coitus was considered as retrograde ejaculation. Uroflowmetry and ultrasonography were done for each patient to find out maximum and average flow rate and post void residual volume of urine respectively. All the collected data were recorded in the predesigned data collection sheets and subjected to statistical analysis. Comparison of efficiency of both the procedures in relieving symptoms and advantages of TUIP over TURP were observed.

Results

Forty patients had TURP and 40 had TUIP operation in this prospective randomized study. Results are shown in Table-I through III. Preoperative data of both the groups are compared in Table-I.

Table-I. Pre-operative characteristics (variables) of the TURP and TUIP group.

Pre-operative variables	TURP Group (n=30)	TUIP/BNI Group (n=30)	Unpaired 't' test (Between group)
Age (Mean±SD) in years	62.64±7.89	61.06±7.72	P>0.1
(Range)	(49-75)	(40-75)	
Prostate size (gm)			
Mean (range)	23.5 (18-30)	23.23 (18-28)	P>0.1
Total symptoms score (AUA)			
Mean (range)	17.5 (12-24)	17.3 (12-23)	P>0.1
Irritative symptom score			
Mean (range)	5.73 (3-9)	6.13 (3-9)	P>0.1
Obstructive symptom score			
Mean (range)	11.76 (8-16)	11.16 (7-16)	P>0.1
Uroflowmetry :			
Q max ml/sec, Mean (range)	6.9 (4-10)	6.93 (4-11)	P>0.1
Qave ml/sec, Mean (range)	3.66 (2-6)	3.9 (2-6)	P>0.1
PVR (ml), Mean (range)	120 (70-170)	124.66 (80-170)	P>0.1
Ejaculation			No difference
Antegrade	30	30	
(no. of patient)			
Dry	0	0	No difference
Potent (no. of patient)	30	30	No difference

Table-I shows that there is no statistically significant difference in different variables between TURP and TUIP group preoperatively and the randomization had generated a very well matched groups (P>0.1) for the study.

Table-II: Comparison of different variables between TURP and TUIP group pre- and 3-months postoperatively.

Variables	Pre-operative		Post-operative	
	TURP (n=40)	TUIP (n=40)	TURP (n=40)	TUIP (n=40)
Total symptom score				
Mean (range)	17.5 (12-24)	17.3 (12-23)	1.96 (0-5)	2.13 (0-6)
Irrative symptom score				
Mean (range)	5.73 (3-9)	6.13 (3-9)	1.3 (0-3)	1.3 (0-3)
Obstructive symptom score				
Mean (range)	11.76 (8-16)	11.16 (7-16)	0.66 (0-3)	0.83 (0-3)
Uroflometry parameter				
Qmax (ml/s)Mean(range)	6.9 (4-10)	6.93 (4-11)	20.7 (17-25)	21.63 (17-24)
Qave(ml/s)Mean(range)	3.66 (2-6)	3.9 (2-6)	12 (9-16)	11.83 (9-15)
PVR (ml)				
Mean (range)	120 (70-170)	124.66 (80-170)	16 (0-40)	15.16 (0-30)
Sexual parameters				
Potent (no. of patient)	40(100%)	40(100%)	40	40
Ejaculation	40(100%)	40(100%)	20(50%)	30(75%)
Antegrade (no. of pts)	0 (0%)	0 (0%)	20(50%)	10(25%)
Dry (no. of pts) (%)				

Table-II shows that total, irritative and obstructive symptoms score; PVR have reduced significantly (P<0.001) after both TURP and TUIP. But comparison of changes in between the groups are insignificant (P>0.1). Maximum and average flow rates also have improved significantly after both the procedures (P<0.001) but there are insignificant difference between the groups (P>0.1). These results clearly indicate that TURP and TUIP, both are equally effective in relieving symptoms and improving urinary flow rates.

Table-III: Comparison of operative and postoperative parameters of TURP and TUIP.

Procedure	Operative duration (min)	Amount of irrigation fluid (in liter)	Duration of post OP catheter (days)	Postoperative hospital stay (day)	Blood transfusion required (no. of pts)
TURP (n=400)					
Mean	56.43	16.06	3.86	5.46	20(50%)
Range	(30-100)	(9-28)	(3-6)	(4-8)	
TUIP (n=40)					
Mean	20.23	5.76	2.13	3.3	2(5%)
Range	(10-35)	(3-10)	(2-4)	(3-5)	

Table-III shows that operating time, amount of irrigation fluid required, postoperative catheterization period, postoperative hospital stay and amount of blood transfusion needed are less in TUIP group than that of TURP group and the difference is statistically highly significant (P<0.001).

Discussion

Transurethral resection (TURP) and incision (TUIP) of the prostate, both are accepted treatment modality for small size obstructing BPH [2]. This randomized prospective study compares the subjective and objective improvement resulting from TUIP with that of TURP. Different preoperative variables of both the groups are shown in Table-I. Statistical analysis were done on the collected data and found that there were no statistically significant difference in subjective and objective parameters in between two groups preoperatively.

The preliminary results reported herein confirm the impression that the efficacy of TUIP is comparable to that of the TURP in cases of small

sized obstructing BPH. In addition to alleviating the symptoms, TUIP requires less operative time, less amount of irrigation fluid and less postoperative hospital stay than that of TURP, and clearly demonstrates its superiority over TURP.

The mean age of the patients in the TURP group was 62.64 years (49 - 75) and that of the TUIP group it was 61.06 years (40-75). Mean prostate size was 23.5 g (18-30) and 23.23 g (18-28) in TURP and TUIP group respectably with insignificant difference between the groups ($P>0.1$).

Preoperatively, there were no statistically significant differences in total, irritative, and obstructive symptom scores between TURP and TUIP group ($P>0.1$). At 3-months postoperative follow-up visits there were very significant improvement of symptoms in both the groups with no significant difference between the groups. These indicate that both the procedures are equally effective in reducing symptom score. These confirm the experience of Riehmann et al (1995)[2], Kelly et al (1989)[6] and Sirls et al (1993)[7]. Jahnson et al (1998)[1] found no significant difference in symptom score improvement between the groups.

Concerning uroflowmetry, preoperative mean Qmax were 6.90 ml/sec (4-10) in TURP and 6.93 ml/sec (4-11) in TUIP group. These were 20.7 ml/sec (17-25) and 21.63 ml/sec (17-24) in TURP and TUIP group respectively at follow-up postoperative visit. Preoperative Qave were 3.66 ml/sec (2-6) and 3.9 ml/sec (2-6) in TURP and TUIP group respectively, which were 12 ml/sec (9-16) and 11.83 ml/sec (9-15) postoperatively. These improvements of flow rates are highly significant following TURP as well as TUIP ($P<0.001$) and there is insignificant difference between the groups ($P>0.1$). These results agree with those of Christensen et al (1990)[10], EL-Baz et al (1995)[11] and Kelly et al (1989)[6].Christensen et al (1990)[10] reported change of mean Qmax from 9.7 ml/sec and 7.8 ml/sec preoperatively to 16.6 ml/sec and 12.7 ml/sec 3-months postoperatively in TURP and TUIP group respectively. Dorflinger et al (1987)[12] found the change from 10.1 ml/sec and 9.2 ml/sec preoperatively to 15 ml/sec and 19 ml/sec postoperatively in TURP and TUIP group respectively. In Larsen et al (1987) series these change were 7.4 ml/sec and 8.6 ml/sec to 18.5 ml/sec and 20.6 ml/sec.

Mean preoperative PVR was 120 ml (70-170) in TURP and 124.66 ml (80-170) in TUIP group. These were 16 ml (0-40) and 15.16 ml (0-30) postoperatively in the TURP and TUIP group respectively and there were no significant difference between the groups both preoperatively and postoperatively. But there are highly significant differences pre- to postoperative intragroup values. These changes of PVR agree with Kelly et al (1989)[6] and EL-Baz et al (1995)[11] series and others.

All the patients in both the group were sexually potent before surgery and they are potent after the procedure. Dry ejaculation is more in TURP group. Riehmann et al (1995)[2] found higher incidence of retrograde ejaculation after TURP than after TUIP. Sonawalla et al (1992)[5] series found no case to loss erectile function after surgery.

Twenty patients (50%) out of 40 and 2 patients (5%) out of 40 required blood transfusion in TURP and TUIP group respectively. TUIP group required less amount of per-operative blood transfusion in comparison to TURP which is statistically significant ($P<0.001$). Soonawalla et al (1992)[5] series shows that 38 patient (34.5%) out of 110 in TURP group and no patient (0%) in TUIP group required blood transfusion. Jahnson et al (1998)[1] series required peroperative transfusion in one patient out of 42 in TURP group and no patient out of 43 in TUIP group. In this series, more blood transfusion was required for TURP group in comparison to other series.

Mean operative time was 56.43 mins (30-100) in TURP and it was 20.23 mins (10-35) in TUIP group. Operating time is significantly ($P<0.001$) less in TUIP group. In Riehmann et al (1995)[2] series it was 55 mins (5-135) and 23 mins (7-95); in Jahnson et al (1998)[1] series it was 32 mins (15-60) and 15 mins (5-40); in Soonawalla et al (1992)[5] series it was 59.2 mins (30-95) and 20.4 mins (10-40) for TURP and TUIP group

respectively. This series stands comparison with other series.

Mean amount of irrigation fluid required was 16.06 liters (2-28) and 5.76 liters (3-10) in TURP and TUIP group respectively. Difference is statistically significant in favour of TUIP. Soonawalla et al (1992)[5] required 4.7 liters (2-12) and 15.9 liters (7-28); Riehmann et al (1995)[2] required 5.2 liters (3-10) and 22 liters (6-28) of irrigation fluid for TUIP and TURP group respectively. This series is comparable to other series.

In this study mean duration of post operative catheterization was 3.86 days (3-6) in TURP and 2.13 days (2-4) in TUIP group. Difference is statistically significant and is in favour of TUIP. In Riehmann et al (1995)[2] series it was 2.5 days (1-12) for TURP and 1.4 days (1-3) for TUIP. Soonawalla et al (1992)[5] found 3.01 days (mean) and 2.62 days (mean) postoperative catheterization required for TURP and TUIP group respectively. Dorflinger et al (1992)[12] series shows 2 days (median) with postoperative catheterization in both the groups. Duration of postoperative catheterization in this series is comparable to other series.

Mean postoperative hospital stay in this study was 5.46 days (4-8) and 3.3 days (3-5) for TURP and TUIP group respectively. The difference is statistically significant ($P<0.001$) and is in favour of TUIP. Soonawalla et al (1992)[5] found 7.16 days (mean) and 6.03 days (mean) postoperative hospitalization in TURP and TUIP group respectively. In Riehmann et al (1995)[2] series it was 4.3 days (2-14) for TURP and 3 days (1-8) for TUIP group. In Dorffinger et al (1992)[12] series, median postoperative hospital stay was 3 days in both the groups. Irani et al (1995)[13] reported mean 4.9 days and 3.4 days postoperative hospital stay in TURP and TUIP group respectively. This series is well comparable with the other published series.

Efficacy of TUIP is reflected by the patient subjective assessment, specifically by the decrease in symptom score and patient satisfaction with the surgical out come. Evaluation of sexual capability in this study was purely subjective. In no case was there loss of erectile function who was sexually active before surgery. Every one had antegrade ejaculation preoperatively. 50 % of patients in TURP and 25% of patients in TUIP group have experienced dry ejaculation after the procedure.

To be an attractive alternative to TURP, TUIP must have advantages, apart from being able to relieve bladder outlet obstruction. Many reports comparing transurethral incision to transurethral resection of the prostate have documented decreased operative time, irrigation fluid requirement, blood loss and requirement for blood transfusion, postoperative catheterization period, and hospital stay with transurethral incision of the prostate. In this series, operative duration, requirement of per-operative irrigation fluid, blood loss and need for blood transfusion, postoperative catheterization period, and hospital stay are significantly less in TUI group than that of TUR group.

Therefore, TUIP is as effective as TURP in relieving symptoms, achieving quality of life and patient satisfaction and with little sexual disturbance. On the other hand TUIP is advantageous and superior to TURP in terms of operative and immediate postoperative parameters.

Conclusion

TUIP has been shown to be an effective method of relieving urinary outflow obstruction caused by BPH when prostate size is 30g or less. It is an easier technique to master than TURP[14]. In addition, TUIP has a reduced operative time, little intraoperative haemorrhage, less irrigation fluid requirement, and decreased length of postoperative hospital stay. As cost containment becomes a key factor for health care system, it is quite likely that TUIP will have expanded indications. TUIP is a less invasive, more cost effective treatment that has fewer associated side effects than TURP. Without question, TUIP is a grossly underutilized procedure.

However, its future appears bright as more urologists are becoming aware of its many advantages and excellent results. An objection to TUI is that incidental prostatic cancer will not be

diagnosed. This could be dealt with by a needle biopsy of the prostate.

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