



RANDOMIZED CONTROLLED STUDY COMPARING TURP (TRANSURETHRAL RESECTION OF PROSTATE) AND TUIP (TRANSURETHRAL INCISION OF PROSTATE) IN THE MANAGEMENT OF LOW VOLUME BENIGN PROSTATIC HYPERPLASIA

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ABSTRACT

INTRODUCTION: Bladder outlet obstruction in benign prostatic hyperplasia (BPH) is due to static and dynamic factors. In low volume BPH, prostatic smooth muscle tension plays a more important role than the prostatic hyperplasia as such. Transurethral incision of prostate (TUIP) relieves the outlet obstruction without resecting prostatic tissue and hence can be a viable alternative to transurethral resection of prostate (TURP) in these patients. This study was done to compare these two surgical techniques of low volume BPH.

METHODS: This was a randomized prospective study done in 40 patients with lower urinary tract symptoms due to low volume BPH (prostatic volume of 20-40cc). Patients were randomized to receive either TURP or TUIP. Subjective and objective improvement post-surgery was compared using IPSS questionnaire and uroflowmetry respectively. Intraoperative parameters between the two groups were compared.

RESULTS: Preoperative parameters like Age, IPSS, Prostate volume, Post void residual urine volume and peak urine flow rate were comparable between the groups. Intraoperative parameters like mean operative time, amount of irrigation fluid used and blood loss were significantly less in TUIP group than TURP group ($p < 0.001$). Postoperative IPSS and Qmax improved significantly in both the groups with no significant difference among the two groups.

CONCLUSION: TUIP is an effective method for the treatment of low volume BPH with equivalent results to that of TURP. It has a reduced operative time, little intra operative haemorrhage and less irrigation fluid requirement than TURP. It can be safely applied for prostates of up to 40 grams with minimal complications and good short term results.

KEYWORDS : Benign prostatic hyperplasia, Transurethral Resection of prostate, Transurethral Incision of prostate, IPSS, Uroflowmetry

INTRODUCTION

Benign prostatic hyperplasia (BPH) is one of the common conditions affecting elderly men. Transurethral resection of the prostate (TURP) has been the gold standard surgical treatment of obstructive BPH for several decades. Despite its high success rate, TURP is associated with a prolonged operative time and number of complications like risk of bleeding with subsequent transfusion, TURP syndrome, bladder neck contracture, retrograde ejaculation and urinary incontinence. These complications as well as high costs associated with prolonged hospitalization have led to the emergence of many less invasive surgical procedures. Transurethral incision of prostate (TUIP) relieves the outlet obstruction without resecting prostatic tissue and hence can be a viable alternative to transurethral resection of prostate (TURP) in patients with small volume prostatomegaly and bothersome LUTS. The objectives of our study were to evaluate the efficacy of TUIP in the treatment of low volume BPH (20-40 grams) and to compare it with TURP in terms of subjective and objective improvement postoperatively.

METHODS

Trial design

This was a randomized prospective study done from November 2015 to November 2018 at department of Urology of Government General Hospital, Guntur. 40 patients with moderate to severe bothersome LUTS due to bladder outlet obstruction caused by BPH with prostate size of less than 40 gm on preoperative ultrasound were included in the study. Patients who had indications for surgery like failure of medical management, refractory urinary retention, recurrent urinary tract infection and renal insufficiency were studied. Institutional ethical committee clearance was taken for the study.

Participants

Preoperative assessment included a detailed history and physical examination. IPSS questionnaire was used preoperatively. Patients with elevated PSA or suspicious nodule on digital rectal examination were excluded from the study. Prostate size or volume was determined on ultrasonography using prolate ellipsoid formula (Prostate size in gm = $\pi/6 \times \text{anteroposterior} \times \text{transverse} \times \text{sagittal diameter}$). Post void residual urine volume was measured preoperatively. Urine culture was

done to rule out urinary tract infection and treated accordingly. Uroflowmetry was done preoperatively and patients with Qmax of less than 10 ml/sec were included in the study. Urethrocystoscopy was done in all the patients included in the study preoperatively. Patients with large median lobe, bladder pathologies like calculi or mass were excluded from the study.

Randomization and allocation concealment

40 patients were analysed in the study after considering inclusion and exclusion criteria. The patients were randomized into two groups by computer generated randomization tables. Allocation to the groups was done by a sealed envelope technique which was opened on the day of surgery. 20 patients underwent conventional TURP and 20 underwent TUIP. They are termed as TURP and TUIP groups respectively.

Intervention

In TURP group, conventional resection was done from bladder neck to verumontanum circumferentially up to anatomic capsule of the prostate. In TUIP group, two deep incisions were made at 5- and 7-0'clock positions from the trigone just below the ureteral orifices through the bladder neck and prostate till the verumontanum using Collings knife. In every patient, total operative time, amount of irrigation fluid used in litres and the fall in hematocrit level at 24 hours postoperatively were observed and recorded. Catheter was removed on third postoperative day and voiding trial was given. Patients were discharged on 4th postoperative day and when patient was comfortable. Follow up was done at 1 month and 3 months postoperatively.

Outcomes

The primary outcomes measured were subjective and objective improvement post-surgery using IPSS questionnaire and peak flow rate (Qmax) respectively, measured at 3 month follow up visit. Post void residual urine volume measurements were done by ultrasound before and after surgery and compared. Intraoperative parameters like surgical time, amount of irrigation fluid used and blood loss were compared between the two groups.

Statistical analysis

All the collected data was recorded in predesigned data collection

sheets and subjected to statistical analysis. Data were processed and analysed using SPSS 20.0 (Statistical Package for Social Sciences) software. The test statistics used to analyse the data were descriptive statistics, and Student's unpaired and paired t-Test as the data was normally distributed. For all analytical tests, the level of significance was set at 0.05 and $p < 0.05$ was considered significant.

RESULTS

40 patients were included in the study after considering the inclusion and exclusion criteria. Randomization into two groups was done depending on the type of surgery performed - TURP group and TUIP group.

Both the groups were comparable before surgery with no significant difference in terms of preoperative parameters like Age, IPSS score, Prostate size, Post void residual urine volume and Peak urine flow rate.

Table 1: Comparison of intraoperative parameters between TURP and TUIP group

Parameter	TURP	TUIP	P value
Mean operative time	48.5 minutes	23 minutes	<0.001
Mean Irrigation fluid	17.5 litres	7 litres	<0.001
Mean fall in hematocrit	6.6 (Range 4-10)	3.2 (Range2-6)	<0.001

The mean operative time in TURP group was 48.5 minutes (Range 30-80 mins) and in TUIP group was 23 minutes (Range 15-35 mins). Thus surgery time was significantly less in patients undergoing TUIP when compared to TURP (p value <0.001 using independent t test). The amount of irrigation fluid (1.5% glycine) used in TURP group was 17.5 litres (Range 12-22) whereas in TUIP group, it was 7 litres (Range 4-10). Hence, there was a significantly less fluid requirement in TUIP group than in TURP (p value <0.001 using independent t test). Intraoperative blood loss was assessed by measuring fall in hematocrit level postoperatively at 24 hours after surgery. The mean decrease in hematocrit in TURP group was 6.6 % (Range 4-10). The mean decrease in hematocrit in TUIP group was 3.2% (Range2-6). There was a significant fall in hematocrit level in TURP group when compared to TUIP (p value <0.001). Thus, surgical parameters like operative time, amount of irrigation fluid used and mean fall in hematocrit were significantly in favour of TUIP group than TURP group.

Table 2: Comparison of IPSS score, Qmax and PVR volumes before and after surgery

IPSS score	TURP group		TUIP group	
	Pre op	Post op	Pre op	Post op
	22.8 (17-31).	3.75 (0-8)	21.9 (12-30)	4.05 (1-9)
	P value <0.001		P value <0.001	
Qmax (ml/sec)	Pre op	Post op	Pre op	Post op
	7.18 (3.8-9.2)	18.5(15.5-22.4)	6.89(3.4-9.1)	18.06(14.8-20.6)
	P value <0.001		P value <0.001	
PVR	Pre op	Post op	Pre op	Post op
	128.5ml(80-240)	13.75ml (0-30)	134ml (70-250)	12.5ml (0-25)
	P value <0.001	P value <0.001		

Postoperative follow up was at 1 month, 3 months and whenever patient experienced symptoms of poor flow or any other complications. IPSS questionnaire was used to assess subjective improvement in patient's symptoms at 3 months. Uroflowmetry was also done at 3 months follow up and the Qmax was compared to preoperative value. Post void residual urine volumes were compared between the two groups before and after surgery. Compared to preoperative value there was a significant improvement in IPSS, Q max and PVR urine volumes postoperatively in both the groups which was statistically significant (p value <0.001 using paired t test). However there was no difference between the two groups in terms of mean improvement of these parameters postoperatively (p value 0.46, 0.37, 0.61 respectively for IPSS, Qmax and PVR using independent t test). Hence, both the surgeries were comparable and equally effective in terms of subjective improvement of symptoms and objective improvement in urinary flow rate postoperatively.

DISCUSSION

Both TURP and TUIP are accepted treatment modalities for small volume BPH causing bladder outlet obstruction. This randomized

study was done to evaluate the efficacy of TUIP in small prostates and to compare it with TURP.

The mean prostate size in our study was 29.85 gm (Range 24-36). Maximum prostate size which was considered for inclusion in our study was 40 grams. The studies done previously vary with regard to the upper prostate size limit for consideration in the study. The upper limit for TUIP was 20 grams in studies by Riehmman et al [1] and Chirstensen et al [3]. 30 grams was used as cut off by Soonawalla et al [4], Kelly MJ [5] and Kletscher BA [11]. Jahnson et al [2] used 40 grams as the maximum limit in their study of TUIP and TURP similar to our study.

IPSS questionnaire was used in our study similar to studies by Christensen et al and Kelly et al. Both the groups were statistically comparable preoperatively in terms of IPSS scores. There was a statistically significant improvement in IPSS scores postoperatively in both the groups ($p < 0.001$). However there was no difference between the two groups in terms of mean improvement of score post-surgery. Thus both the surgical techniques were similar in improving patients' symptoms and satisfaction.

Uroflowmetry was done in all the patients before inclusion in the study to objectively quantify severity of patient's lower urinary tract symptoms. Compared to preoperative value there was a statistically significant improvement in maximum flow rate in both the groups post-surgery. However, there was no difference between the two groups in terms of mean improvement of Qmax after surgery. Hence, both the surgeries resulted in similar improvement in flow rates postoperatively at least till 3 months follow up visits. Similarly studies by Soonawalla et al and Kelly et al mention that results with TUIP were similar to TURP in terms of mean improvement of maximum urinary flow rates. However, Jahnson et al, Riehmman et al and Dorflinger et al [12] found that though TUIP significantly improved flow rate postoperatively, the mean improvement was significantly better with TURP than TUIP.

Intraoperative parameters were compared between TURP and TUIP in several studies. In our study the mean operative time and amount of irrigation fluid requirement were significantly less for TUIP when compared to TURP. This can in turn translate into making TUIP a cost effective technique. Similar results were seen in all other previous studies comparing TUIP with TURP. Since quantification of volume of blood lost is difficult during resection with continuous fluid irrigation, we used fall in hematocrit levels postoperatively at 24 hours as an indirect measure of blood loss. The mean decrease in hematocrit in TURP group was more when compared to TUIP. 3 patients in TURP group needed blood transfusion because of tachycardia and hematocrit decrease of 8-10. No patient in TUIP group required blood transfusion. A systematic review and meta-analysis of randomized controlled trials by Yang et al [13] found that in the first 12 months after surgery TUIP had effectiveness that was equivalent to TURP for treating patients with a relatively small prostate. In our study at least till the 3 month follow-up visit TUIP had efficacy similar to TURP which was subjectively and objectively quantified. There were no cases with recurrence of symptoms of LUTS in the follow-up period in either group. Minor complications like dysuria, urgency, urge incontinence occurred equally in both the groups which could be managed conservatively.

CONCLUSION

Transurethral Incision of Prostate is an effective method for the treatment of low volume BPH. The results are equivalent to that of TURP in terms of subjective improvement of symptoms as assessed by IPSS questionnaire and objective improvement in urine flow by uroflowmetry. TUIP has a reduced operative time, little intra operative haemorrhage and less irrigation fluid requirement as compared to TURP. It is a cost effective technique with an easy learning curve and can be safely applied for prostates of up to 40 grams with minimal complications and good short term results.

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