**นิพนธ์ต้นฉบับ**

# Can urodynamic parameters predict the outcome of TUR-P in BPH patients?

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**Objective** : *To correlate parameters derived from urodynamic studies with the outcomes of TURP in BPH patients.*

**Materials and Methods** : *Urodynamic parameters other than uroflowmetry, in patients suffering from LUTS were recorded prior to TURP and 3 months later postoperative IPSS and uroflow were compared to preoperative IPSS and uroflow to determine the outcome of TURP. The urodynamic parameters were correlated with the outcome of TURP.*

**Result** : *26 patients were included in this study. 69.23 % had detrusor instability. 42.31 % had first desire to void volume less than 150 ml. 58.44 % had maximal cystometric capacity (MCC) less than 300 ml, 30.78 % had MCC between 300 - 400 ml and 30.78 % had MCC more than 400 ml. 42.3 % of the patients had urinary obstruction on PQ - plot. After analysis, there were insignificant outcome in all parameter in predicting outcome after TRUP.*

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Conclusion : *TURP improves both symptoms and uroflow rate of patients suffering BPH. Urodynamic parameters cannot predict the outcome of TURP.*

Key words : *Urodynamic parameters, Outcome of TURP, Benign prostatic hyperplasia.*

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**วัตถุประสงค์** : *เพื่อหาความสัมพันธ์ระหว่างผลของยูโรไดนามิกส์กับผลการรักษาผู้ป่วยต่อมลูกหมากโตด้วยวิธีผ่าตัดผ่านทางท่อปัสสาวะ (TURP)*

**วิธีการศึกษา** : *บันทึกผลของยูโรไดนามิกส์ และอัตราการไหลของปัสสาวะ ก่อนและ (3 เดือน) หลังผ่าตัดด้วยกล้องผ่านทางท่อปัสสาวะ แล้วนำมาหาความสัมพันธ์ระหว่างผลของยูโรไดนามิกส์ และอัตราการไหลของปัสสาวะกับผลการผ่าตัด (TURP)*

**ผลการศึกษา** : *ได้ทำการศึกษาผู้ป่วย 26 คนพบว่า 69.23 % ของผู้ป่วยมี detrusor Instability 42.31 % พบมีความรู้สึกที่จะปัสสาวะในครั้งแรกที่ปริมาณปัสสาวะน้อยกว่า 150 ml 58.44 % พบมีความสามารถในการเก็บปัสสาวะได้น้อยกว่า 300 ml 30.78 % มีความสามารถในการเก็บปัสสาวะได้ระหว่าง 300 - 400 ml และ 30.78 % มีความสามารถในการเก็บปัสสาวะได้มากกว่า 400 ml และพบว่า 42.3 % มีการอุดตันของทางเดินปัสสาวะจากการทำ P-Q plot หลังจากการวิเคราะห์ค่าต่างทั้งก่อนทำและหลังทำผ่าตัดพบว่าค่าต่าง ๆ เหล่านี้ให้ผลทางสถิติอย่างไม่มีนัยสำคัญ*

**บทสรุป** : *การผ่าตัดต่อมลูกหมากด้วยกล้องผ่านทางท่อปัสสาวะ (TURP) สามารถลดอาการของผู้ป่วย และเพิ่มอัตราการไหลของปัสสาวะได้ผลของยูโรไดนามิกส์ไม่สามารถทำนายผลของการผ่าตัดต่อมลูกหมากด้วยกล้องผ่านทางท่อปัสสาวะ*

**คำสำคัญ** : *ยูโรไดนามิกส์ พารามิเตอร์, ผลการผ่าตัด TURP, ต่อมลูกหมากโตชนิดไม่ร้ายแรง*

Benign prostatic hypertrophy (BPH) describes a pathoanatomic condition whereas lower urinary tract symptoms (LUTS) denotes the constellation of voiding symptoms commonly associated with this condition. LUTS is a clinical syndrome consisting of irritative and obstructive voiding symptoms.[1,2]

The International Prostate Symptom Score (IPSS) has been recommended as an instrument for subjective assessment of symptom severity in patients presenting with LUTS.[2,3]

Uroflowmetry, which measures the interaction of detrusor contractility and outlet resistance, is probably the single best non-invasive test to evaluate the severity of obstructive voiding symptoms and has been widely used pre - and postoperatively as a standard for objective assessment of these patients.

Transurethral resection of prostate gland (TURP) is the established gold standard surgical treatment of BPH, but it has been shown that only 88 % of patients who undergo TURP have satisfactory relief of their problems. Other studies have shown *approximately 15% to 20 % of patients continue to have persistent or recurrent* voiding *symptoms requiring further therapy.*[4,5]

Aging and bladder outlet obstruction induce changes of the urinary bladder resulting in detrusor instability and/or decreased bladder compliance. Both are clinically associated with symptoms of frequency and urgency. The latter also cause impaired detrusor contractility, which are responsible for the decreasing force of urinary stream, hesitancy, intermittency and increased residual urine.[2]

Urodynamic studies other than uroflowmeter can assess urinary bladder function prior to the surgical treatment of BPH and we questioned whether these urodynamic parameters might be used to predict the outcome of TURP in patients with symptomatic BPH.

This is a study of preoperative urodynamic parameters (other than uroflowmeter) as they correlate to the outcome of TURP in the patients with symptomatic BPH.

## Materials and Methods[3,6-10]

Thirty-one patients who were to undergo TURP for LUTS were studied preoperatively from February 1998 to August 1998 at King Chulalongkorn Memorial Hospital.

Preoperative evaluation consisted of (1) International Prostate Symptom Score (IPSS) assessment, assisted by a physician, (2) digital rectal examination, (3) uroflow rate and (4) urodynamic studies. In addition, underlying diseases that may have an effect on voiding symptoms, as well as patient age were recorded.

Urodynamic studies were performed using a Menuet machine. Medium filling cystometry was undertaken with a filling catheter and a fine polyethylene pressure line passed per urethra. Voiding cystometry was performed after the filling catheter had been removed. In addition, a rectal pressure line was inserted to measure the intra-abdominal pressure. All measurements were done in the standing position. Transurethral resections of the prostate gland were performed soon after the completion of the above studies.

Three months postoperatively, all but five patients wer re-evaluated. The re-evaluation parameters included (1) urine analysis (2) IPSS and (3) uroflow rate. Five patients were excluded from postoperative evaluation because two had prostatic cancer, one died from an unrelated cause before 3 months and two

were lost to follow up.

The outcome of TURP was identified by subjective IPSS index and objective uroflow rate.

**Statistical analysis**

Data were analyzed by using the SPSS program (Statistical Package for the Social Science, version 6). Relevant variables included age, underlying diseases, pre/post operative IPSS index, pre/post operative uroflow rate and urodynamic study parameters, such as detrusor instability, FDV, MCC and P/Q plot.

The paired T-test and the ANOVA test were used to assess the correlation between outcomes and urodynamic parameters.

**Results**

*General data*:

The mean age of the 26 patients was 67.19 years (range 56-83 years). Six patients had underlying diseases that may have caused voiding symptoms (3 cases of DM,2 of CVA and HT and 1of spondylolisthesis) *Preoperative Urodynamic data* (Table 1).

Table 1. Preoperative Urodynamic study results.

| Parameters | Number | Percent |
|---|---|---|
| Detrusor instability (DI) | | |
| - Present | 18 | 69.23 |
| - Absent | 8 | 30.77 |
| First desired to void ( FDV ) | | |
| - <150 ml | 11 | 42.31 |
| - > or = 150 ml | 15 | 57.69 |
| Maximal Cystometric Capacity (MCC) | | |
| - <300 ml | 10 | 38.44 |
| - 300 - 400 ml | 8 | 30.78 |
| - >400 ml | 8 | 30.78 |
| P/Q plot | | |
| - obstructed zone | 11 | 42.30 |
| - equivocal zone | 14 | 53.85 |
| - non-obstructed zone | 1 | 3.85 |

Notes : DI = Detrusor instability
FDV = First Desire to Void
MCC = Maximal Cystometric Capacity
P/Q Plot = Pressure Flow Analysis

Table 2. Compare pre and postoperative results of mean IPSS and Uroflow rate (ml/sec).

| | Mean | SD | Range |
|---|---|---|---|
| IPSS : Before TURP | 25.73 | 6.35 | 8 to 34 |
| After TURP | 5.65 | 2.94 | 2 to 13 |
| *Reduction* | **19.65** | **7.27** | **1 TO 31** |
| Uroflow : Before TURP | 7.10 | 5.41 | 0 TO 17.20 |
| After TURP | 17.10 | 5.31 | 7 TO 27 |
| **Increased flow** | **10.04** | **7.75** | **-3.10 TO 24.20** |

Detrusor instability occurred in 18 patients (69.23%), 11 patients (42.31%) had a first desire to void volume of less than 150 ml. The maximal cystometric capacity (MCC) was less than 300ml in 10 patients (38.44 %), between 300 and 400 ml in 8 patients (30.78%) and more than 400ml in 8 patients (30.78 %).

Table 3. Correlation of the preoperative urodynamic parameters and the outcomes of TUR-P in each group evaluated by reduced IPSS or increased uroflow rate.

| Parameters | Mean IPSS Reduction | Significance (P = 0.05) | Mean increment Uroflow rate | Significance (P = 0.05) |
|---|---|---|---|---|
| DI | | No | | No |
| - Present | 20.78 | | 11.09 | |
| - Absent | 17.12 | | 7.68 | |
| FDV | | No | | No |
| - >/=150 | 21.73 | | 9.25 | |
| - < 150 | 18.13 | | 10.63 | |
| MCC | | No | | No |
| - <300 | 21.80 | | 10.89 | |
| - 300 - 400 | 18.88 | | 9.10 | |
| - >/=400 | 17.75 | | 9.92 | |
| P/Q plot | | No | | No |
| - obstructed | 17.27 | | 10.31 | |
| - equivocal | 21.50 | | 10.16 | |
| - non ovstructed | 20.00 | | 5.50 | |

Notes: DI = Detrusor Instability FDV = First Desired to Void (bladder volume)
MCC = Maximal Cystometric Capacity

Pressure flow analysis (P/Q Plot) using the Abrams – Griffith normogram classified 11 of the 26 patients (42.30 %) as obstruction, 14 (53.85 %) as equivocal and 1 (3.85 %) as non-obstruction.

All of the above data showed a normal distribution. AT – test used for paired samples of IPSS before and after operation revealed a significant reduction (p = 0.05) after TURP. Likewise, *uroflow rate* before and after TURP showed significant improvement (p = 0.05).

25 of 26 patients were satisfied with the operation because of improvement in their symptoms. There was no statistical significance in correlation between the outcomes defined by subjective reduction of IPSS or objective increment of uroflow rate to any of the preoperative urodynamic parameters. Interestingly, there were 8 patients whose postoperative IPSS were more than 7 and there were 5 patients whose postoperative uroflow less than 12 cc/second. Their urodynamic parameters are shown in table 4.

Of the 6 patients with underlying disease that may have effected TURP outcome, two had a postoperative IPSS of more than 7. None of them had a uroflow rate less than 12 cc/sec.

**Table 4.** The outcome of IPSS and Uorflow before TUR-P.

| Parameters | IPSS > 7<br>Number of patients (%) | Uroflow < 12cc/sec.<br>Number of patients (%) |
|---|---|---|
| DI | | |
| - Present | 6(75) | 3(60) |
| - Absent | 2(25) | 2(40) |
| FDV | | |
| - >/= 150 | 5(62.5) | 3(60) |
| - < 150 | 3(37.5) | 2(40) |
| MCC | | |
| - < 300 | 1(12.5) | 1(20) |
| - 300 – 400 | 4(50) | 3(60) |
| - >/=400 | 3(37.5) | 2(40) |
| P/Q plot | | |
| - obstructed | 5(62.5) | 3(60) |
| - equivocal | 3(37.5) | 2(40) |
| - non obstructed | 0 | 0 |

## Discussion

Defining outcome after prostatectomy is not easy, because the endpoint is still ill defined. [1,2] Subjective IPSS reduction and objective uroflow rate increment have been used as the index of successful outcome. ***This study showed a good outcome after TURP in BPH patients as shown by both IPSS reduction and uroflow rate increment.(Table 2)***

To the patients, of course, relief of symptoms is the single most important outcome. [11] 25 of 26 patients were satisfied with their operation due to the improvement of their symptoms and the lack of complications. Only one patient was not satisfied with the outcome, as most of his symptoms were irritative in nature and preoperative urodynamic parameters showed detrusor instability. However, his uroflow rate increased significantly following TURP.

A postoperative IPSS of more than 7, and/or a uroflow rate of less than 12 cc per second may be classified as a poor outcome. From table 4, most of the poor outcome group had detrusor instability, a bladder volume of first desire to void $\geq$ 150 and a maximal cystometric capacity of more than 300 cc. This may imply dysfunction of detrusor contractility.

Most patients in the poor outcome group had a P/Q plot in the equivocal or obstructed zones (Table 4), However, we can not make conclusions from these data as most of our patients had P/Q Plots in these Zones (from Table 1)

Patients aged 80 years or older are at high risk for treatment failure. [1,11,12] Two patients in this study were older than 80 years (83 years), both of them had poor outcomes following TURP which concurs with previous studies.

In this study, the underlying disease seems to have no correlation with the outcome of TURP.

## Conclusion

Our study shows (1) TURP does improve IPSS and Uroflow rate in patients with LUTS. (2) Preoperative urodynamic parameters other than uroflow rate had no relation with the postoperative IPSS index or Uroflow rate. Thus these parameters could not be used to predict the outcome of TURP in this study, although survey of a larger number of patients may be more conclusive.

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