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Residual Lower Urinary Tract Symptoms (LUTS) after Transurethral Resection of Prostate (TURP): The Urodynamic Studies in Chiangmai University Hospital

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Abstract

Background: **TURP has been the gold standard in the treatment of BPH since the beginning of the endoscopic era. However, many patients are unable to urinate and the same symptoms persist after this operation. Identifying the causes of symptoms after TURP in BPH patients are necessary for planning and proper management.**

Materials and Methods: **The retrospective data of 77 post-TURP patients (age 72.66 ± 9.68) having BPH and Lower Urinary Tract Symptoms (LUTS) persisting for at least 2 months were collected from 1988-2004. The number of TURP of each patient was 1-4 times. The underlying causes of LUTS detected by us were interstitial cystitis (IC) in 2 cases, eosinophilic cystitis (EOC) in 1 case, spinal stenosis (Neurogenic Lower Urinary Tract Dysfunction / NLUTD) in 10 cases, and 65 cases only had BPH with LUTS. All were referred to our urodynamic unit for searching for the causes of residual lower urinary tract symptoms. The Cysto-Pressure-Flow studies with fluoroscopy or video-urodynamics were performed in at least 2 successive micturition cycles of each patient in upright position. Male voiding dysfunction classified by Blaivas' criteria was used for interpretation. For statistical analysis of urodynamic variables, SPSS v.2 was used.**

Results: **There were 32 (41.56%) cases of impaired detrusor contractility (ImC) and of these 7 had NLUTD and 1 had EOC. Sixteen (20.78%) cases had detrusor overactivity (DO) and of these one had IC. Two (2.6%) cases had only bladder outlet obstruction (BOO). Eighteen (23.38%) cases had two conditions, 9 (11.67%) of these had DO + ImC (4 had sphincter weakness incontinence (SWI) due to TURP and 2 of these had NLUTD), and other 9 (11.67%) cases had DO + BOO. Six (7.79%) cases had normal study. Two of these had sphincter weakness (damage) due to TURP. Two (2.6%) cases had incomplete study because they could not urinate during studies. One (1.3%) case was in equivocal group.**

Conclusions: **All cases of BPH are not necessary causing LUTS. Most post-TURP patients with residual or persistent LUTS have impaired detrusor contractility (ImC). The second cause of the symptoms is DO. The third is the combination of DO and BOO or ImC. Only 2.6% have BOO alone. Obviously, repeated TURP should not be considered if meticulous physical examination and investigations are not performed because many patients do not have BOO.**

Keywords: **persistent or residual symptoms, post TURP, urodynamic studies**

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TURP which aims to relieve bladder outlet obstruction (BOO) is still the gold standard for treating Benign Prostatic Obstruction (BPO), new terminology recommended by International Continence Society (ICS) or BPH[1] but not all patients with BPH will get benefit of this operation. There have been several previous reports showing that BPH was not the sole cause of lower urinary tract symptoms (LUTS). Enlargement of prostate can gradually stretch the prostatic urethra and increase the A-P diameter as human urethra is a distensible muscular tube. The same symptoms can occur in women. The bladder factors, such as impaired detrusor contractility (ImC), detrusor overactivity (DO) or combination from various etiologies can also cause severe LUTS.

The incidence of residual symptoms after TURP has been reported to be 5-35%.[2-4] The most common cause of persistent symptom is detrusor overactivity (DO).[2,5,6] The retrospective analysis of the urodynamic data will provide information on the causes of persistent lower urinary tract symptoms (LUTS).

Materials and Methods

All urodynamic data of 77 patients (age ranged from 45-93 years, mean 72.66 ± 9.68 years) with residual or persistent LUTS post TURP for at least 2 months (2 mo. - 20 yr.) were collected for retrospective analysis. The number of TURP ranged from 1 to 4 with time interval of the procedure ranged from 2 months to 10 years (average 28.32 ± 42.11 mo). All patients with no previous urodynamic studies underwent a complete history and physical examination, including neurological and endoscopic examination, before urodynamic studies. Of these 77 patients, 66 were neurologically normal. Nine cases were diagnosed as Neurogenic Lower Urinary Tract Dysfunction (NLUTD) by the history of neuroclaudication, signs of nerve root compression from myelography or MRI, residual neurological deficit after laminectomy decompression. One case of interstitial cystitis (IC) and one case of eosinophilic cystitis (EOC) proving by pathological examination were included. The urodynamic study was performed by the use of 7 Fr. double-lumen catheter for intravesical pressure recording and infusion ports and 9 Fr. rectal balloon catheter for intraabdominal pressure measuring. All catheters were connected to DANTEC Urodyn 5000 or Janus V 3.7 Life Tech Inc. with the infusion rate of about 10% of cystometric capacity. The cysto-pressure-flow studies with fluoroscopy or videourodynamics were performed in at least two successive micturition cycles in each patient in an upright position.[7]

The Blaivas' criteria[8] was used to assess male voiding dysfunction, i.e. obstructed group: Pdet.Qmax. >40 cm.H_2O, Qmax. <12 ml/s, intermediate group: Pdet.Qmax. = 30-40 cm.H_2O, Qmax. <12 ml/s, unobstructed (or ImC) group: Pdet.Qmax.<30 cm.H_2O, Qmax.<12ml/s. For Pdet.Qmax. value, the lowest Pdet.Qmax. recorded at the measured Qmax. was brought for evaluation.

Sphincter weakness (deficiency)[6,9,10] was defined as the leakage of urine with increase in intraabdominal pressure during filling phase without detrusor contraction or low compliance (C=dV/dP : <10 ml/cmH_2O). Urodynamic units and terminology conform to the standards proposed by the International Continence Society (ICS).[11]

For statistical analysis of urodynamic variables, SPSS v.2 was used.

Results

Mean age, number of the patients and TURP and interval from the last TURP in each group were shown in Table 1. Patients' presenting symptoms included storage, voiding and mixed symptoms in 39 (50.65%), 25 (32.47%) and 13 (16.89%) cases respectively (Table 2). Urodynamic abnormalities were demonstrated in 68 (88.31%) of 77 patients. Thirty-two (41.56%) of these had impaired detrusor contractility (ImC. PdetQmax = 8.47 ± 11.24, Qmax = 3.91 ± 4.29), of which 7 had NLUTD and 1 had eosinophilic cystitis (EOC). Sixteen (20.78%) had detrusor overactivity (DO: PdetQmax = 27.31 ± 8.02, Qmax = 11.81 ± 6.16), one of these had interstitial cystitis (IC). Two (2.6%) had bladder outlet obstruction (BOO. 57.5 ± 16.26, Qmax = 6 ± 5.65).

Of the 18 (23.38%) cases who had two conditions, 9 (11.67%) had DO + BOO, detrusor overactivity in storage phase, outlet obstruction in voiding phase (PdetQmax = 75.33 ± 21.61, Qmax = 5.22 ± 3.73) (Figure 1), 9 (11.67%) had DO + ImC, detrusor overactivity in storage phase, impaired contractility in voiding phase (PdetQmax = 16.22 ± 7.87, Qmax = 6.11 ± 3.69) (Figure 2), of these 2 had NLUTD and 4 had sphincter weakness

Table 1 Urodynamic findings of the causes of LUTS, number of patients and TURP and time interval of last TURP

Urodyn. Dx.	Age	No. Patients	No. of TURP	Interval of last TURP (mo.)
ImC (NLUTD) [EOC]	73.06 ± 9.38	32 = 41.56% (7) [1]	1.34 ± 0.75	28.59 ± 36.14
DO [IC*]	71.75 ± 10.29	16 = 20.78% [1*]	1.44 ± 0.62	38.75 ± 62.70
BOO	71	2 = 2.6%	1.5 ± 0.71	72 ± 33.94
DO + BOO	76.75 ± 6.32	9 = 11.67%	1.78 ± 0.67	31.11 ± 49.65
DO + ImC (NLUTD) {SWI#}	73.78 ± 12.29	9 = 11.67% (2) {4#}	1.44 ± 1.01	10.44 ± 11.89
Normal {SWI#}	66.67 ± 12.89	6 = 7.79% {2#}	1	12.5 ± 17.84
Incomplete Study	69 ± 4.24	2 = 2.6%	1.5 ± 0.71	25 ± 32.52
Equivocal	70	1 = 1.3%	1	3

Table 2 Persistent or residual symptoms after TURP

LUTS	No. of Patients (77)
Storage	39 (50.65%)
Voiding	25 (32.47%)
Mixed	13 (16.89%)

incontinence (SWI). Six (7.78%) had normal studies (PdetQmax = 20.17 ± 3.66, Qmax = 16.83 ± 4.96) of which 2 had SWI. An overall SWI was 7.79%. Two (2.6%) cases had incomplete studies due to the inability to urinate while the catheter was in place. One (1.3%) was in equivocal group (PdetQmax = 36, Qmax = 7).

Details of urodynamic variables were shown in Table 3.

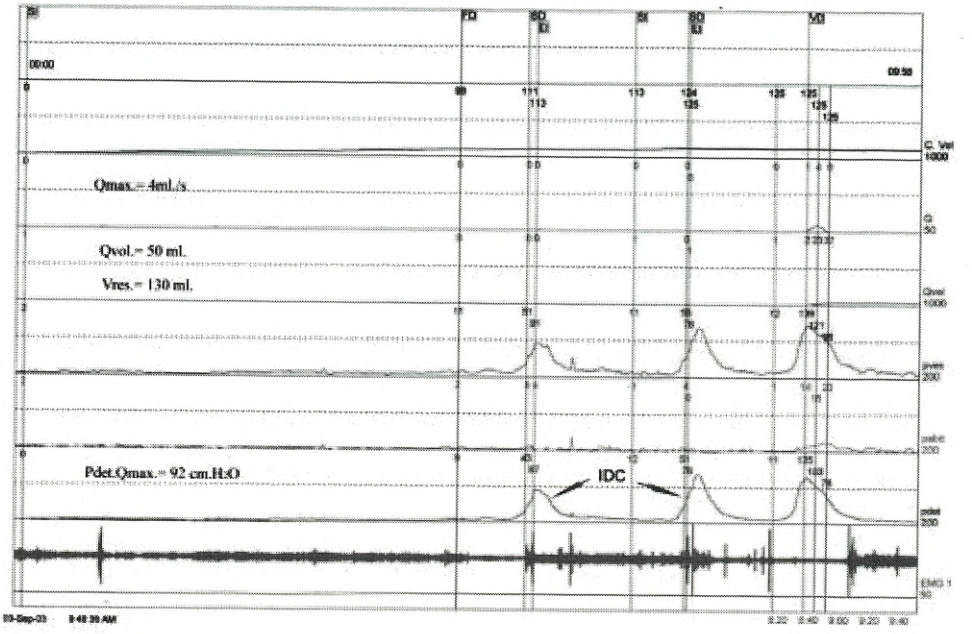
Discussion

Lower Urinary Tract Symptoms and BPH are common in ageing male, affecting up to 78%.[12] In addition to BOO, the symptoms of lower urinary tract dysfunction still have 2 common causes; detrusor overactivity (DO) and detrusor underactivity (impaired contractility, ImC). Many patients have 2 or 3 causes in combination (BOO, DO, ImC). For many years the diagnosis and treatment of LUTS in elderly men aimed at removing the obstructive prostatic tissue and bothersome symptoms because several urologists traditionally believed that BPH was the sole cause. However, previous research has led to the understanding of the pathophysiology of the disease which varies in the degree, type of obstruction and the detrusor response.[6,7,13]

Most reports of the causes of persistent symptoms after TURP included detrusor overactivity (up to 54%), residual BOO (up to 16%)[2,3,6], SWI (up to 8%), detrusor hypocontractility/ImC (up to 4%). In this study, impaired detrusor contractility was present in the majority of patients (41.56%), seven cases of these had NLUTD and one case had eosinophilic cystitis.

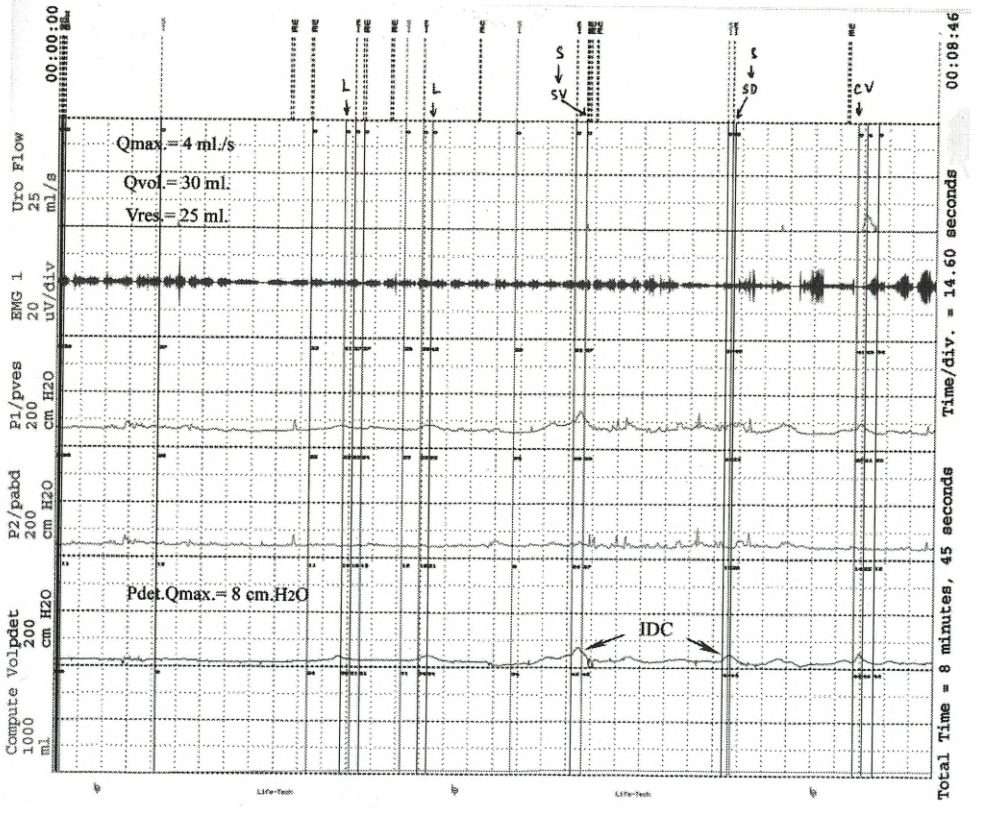
TURP can be prevented if patients received meticulous pre-operative evaluation[7]. DO alone was found in 20.78%, one of these had IC. Abram found 62% reversal of DO after TURP[14] but Gormley et al found in only 9%.[13] In the previous study by Anutrakulchai of an immediate results of detrusor response after TURP, the same result (8% reversal) was obtained[7]. It is probable that there is a real difference in reversal rate between younger and elderly patients with prostatic obstruction. This suggests that DO in elderly is not secondary to BOO.[13] It may be caused by brain lesion due to senile change. Kageyama et al performed pre-operative SPECT in 14 patients and reported that persistent DO after TURP was shown in 8 patients who had low cerebral blood flow in the frontal region.[15]

Even if DO is inadequately improved after relieving



FD = first desire to void; SD = strong desire to void; VD = void; SI = start infusion; EI = end;
IDC = involuntary detrusor contraction; Vres. = residual urine volume; Qvol. = voided volume

Figure 1 Tracing showed involuntary detrusor contraction (IDC) in storage phase, DO and BOO in voiding phase.



L = leak; S = suppress; SV = small void; CV = command to void
IDC = involuntary detrusor contraction

Figure 2 Showing IDC in storage phase, DO and impaired detrusor contractility (ImC) in voiding phase.

Table 3 Urodynamic results of each group

Urodyn. Dx.	PdetQmax ($cm.H_2O$)	Qmax. (ml.)	Qvol. (ml.)	Vres. (ml.)
ImC	8.47 ± 11.24	3.91 ± 4.29	93.81 ± 98.33	238.84 ± 166.07
DO	27.31 ± 8.02	11.81 ± 6.16	194.81 ± 92.68	34.81 ± 46.42
BOO	57.50 ± 16.26	6 ± 5.65	140 ± 14.14	210 ± 70.71
DO + BOO	75.33 ± 21.61	5.22 ± 3.73	106.89 ± 81.91	126.67 ± 84.37
DO + ImC	16.22 ± 7.87	6.11 ± 3.69	143.11 ± 116.13	103.89 ± 132.96
Normal	20.17 ± 3.66	16.83 ± 4.96	334.83 ± 68.88	8.83 ± 20.20
Incomplete Study	-	23 ± 4.24	400.5 ± 176.01	7.50 ± 3.54
Equivocal	36	7	101	150

obstruction, anticholinergics can be used to improve symptoms and quality of life. Only 2.6% had BOO owing to irregularity of the residual prostatic tissue and needed re-TURP. In case of 2 combinations, 9 (11.67%) had DO with BOO which could be treated by re-TURP in combination with anticholinergics that could alleviate urgency symptom if they had adequate bladder capacity (usually >150 ml). Otherwise, they might have uncontrollable urgency incontinence owing to DO, especially in those with small bladder. Other 9 (11.67%) patients had DO with ImC, 2 of these had NLUTD. The treatment for this group should include anticholinergics plus CISC. Re-TURP is not appropriate because there was no BOO, so it will not improve flow rate[7], but it may cause severe urinary incontinence.

There were 6 (7.79%) cases of SWI (sphincter damage due to TURP), 4 were in DO+ImC category, 2 of these had NLUTD, and 2 were in normal studied group. Winters et al studied postprostatectomy incontinence and found SWI in 25/27 (92.6%) of TURP compared to DO in 15/27 (55.6%).[16] It was concluded that sphincter weakness was the predominant cause of urinary incontinence after TURP. In contrast, Kahn et al and Goluboff et al found DO to be a more predominant cause of incontinence than SWI[17,18].

Conclusions

The findings of impaired detrusor contractility as the most common cause of residual/persistent LUTS after TURP may be different from other reports where DO was found to be in the majority. It may depend on population received. The third is the combination of DO with BOO or ImC. Only 2.6% had BOO alone. However, it is an absolute indication for conventional or video-urodynamic assessment to identify whether persistent DO, BOO, ImC or in combination is the cause before considering re-TURP.

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