Effect of Detrusor Overactivity on Functional Outcomes After Holmium Laser Enucleation of the Prostate in Patients With Benign Prostatic Obstruction

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OBJECTIVE To investigate the effect of detrusor overactivity (DO) on functional outcomes after holmium laser enucleation of the prostate (HoLEP).

MATERIALS AND METHODS One hundred ten men with benign prostatic obstruction were evaluated retrospectively. International Prostate Symptom Score, International Continence Society male questionnaire short form, 3-day voiding diary, and uroflowmetry with postvoid residual were evaluated preoperatively and at 3 and 6 months postoperatively. The patients underwent urodynamic study preoperatively and were divided into the DO group (58 of 110, 52.7%) and the non-DO group (52 of 100, 47.3%).

RESULTS Patients in the DO group were older than those in the non-DO group (71.4 vs 66.4 years), although prostate volume and degree of obstruction were not significantly different between the 2 groups. All International Prostate Symptom Score and uroflowmetry parameters improved significantly at the 3- and 6-month follow-ups. Storage symptoms in both groups were comparable preoperatively (9.7 vs 8.6); these improved similarly in both groups during follow-up (5.0 vs 4.0, 6-month follow-up). The number of patients taking anticholinergics increased significantly after HoLEP, from a baseline of 17 patients to 49 patients at the 3-month follow-up and 39 at the 6-month follow-up. More patients in the DO group were taking anticholinergics at the end of the follow-up period (48.3% vs 21.2%).

CONCLUSION Although the storage symptoms improved significantly in both groups, a significant number of patients with DO group took anticholinergics after HoLEP. We recommend that surgeons should counsel the possibility of taking anticholinergics in the early postoperative period to the patients with DO at baseline. UROLOGY 86: 133–138, 2015. © 2015 Elsevier Inc.

Transurethral resection of prostate (TURP) has been the standard surgical treatment for patients with benign prostatic obstruction (BPO) for >30 years. Holmium laser enucleation of the prostate (HoLEP) is an attractive alternative treatment and is one among many recently developed minimally invasive surgical procedures. By adapting the holmium laser to perform complete enucleation of the prostate, HoLEP has provided effective and safe surgical treatment for BPO without any size limitation.[1-3]

Detrusor overactivity (DO) is often associated with BPO and causes storage symptoms that adversely affect quality of life.[4] There have been many studies on the incidence of DO before and after TURP, and it is recognized that persistent DO after prostatectomy results in symptomatic failure and unfavorable outcomes in many patients.[5] Urodynamic studies revealed DO in 62% of men with BPO undergoing TURP.[6] The incidence of DO after TURP is around 30%, and the rate of de novo DO after surgical treatment is at most 10%.[4] Persistent DO after TURP results in symptomatic failure with

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Table 1. Preoperative and perioperative patient characteristics

Characteristic	DO Group (n = 58), Mean ± SD	Non-DO Group (n = 52), Mean ± SD	Total (n = 110), Mean ± SD	P*
Patient age (y)	71.4 ± 6.9	66.4 ± 6.2	69.0 ± 7.0	≤.001
BMI (kg/m^2)	23.8 ± 2.9	24.6 ± 2.7	24.2 ± 2.8	.385
IPSS total	21.9 ± 7.3	22.4 ± 6.7	22.1 ± 7.0	1.000
Voiding symptoms	12.3 ± 5.1	13.8 ± 4.8	13.0 ± 5.0	.479
Storage symptoms	9.7 ± 3.8	8.6 ± 2.9	9.2 ± 3.4	.409
PSA level (ng/mL)	6.35 ± 7.82	4.39 ± 4.99	5.39 ± 6.63	.235
Total prostate volume (mL)	72.5 ± 36.6	66.1 ± 41.3	69.4 ± 38.9	.351
Transitional zone volume (mL)	41.9 ± 25.9	36.2 ± 25.9	39.2 ± 25.9	.419
BOOI	60.3 ± 27.9	52.2 ± 28.2	56.7 ± 28.2	.157
MCC (mL)	318 ± 86	409 ± 76	361 ± 93	≤.001
Total operative time (min)	70.6 ± 34.8	70.3 ± 42.9	70.5 ± 38.6	.213
Enucleation time (min)	44.4 ± 21.7	42.6 ± 21.6	43.5 ± 21.6	.328
Morcellation time (min)	12.3 ± 14.7	10.6 ± 10.8	11.5 ± 13.0	.375
Weight of resected tissue (g)	30.3 ± 24.3	27.7 ± 31.5	29.1 ± 27.8	.153
Estimated weight of resected tissue (g)†	41.0 ± 34.5	40.7 ± 45.6	40.9 ± 39.9	.532
Retrieval rate (g/min)	0.9 ± 0.6	0.9 ± 0.6	0.9 ± 0.6	.531
Duration of catheterization (d)	2.4 ± 0.8	2.3 ± 1.0	2.4 ± 0.9	.687
Hospital stay (d)	2.7 ± 1.1	2.9 ± 1.9	2.8 ± 1.5	.651

BMI, body mass index; BOOI, bladder outlet obstruction index; DO, detrusor overactivity on preoperative urodynamics; IPSS, International Prostate Symptom Score; MCC, maximum cystometric capacity; PSA, prostate-specific antigen; SD, standard deviation.
* Paired *t* test between the 2 groups.
† Estimated weight of resected tissue was drawn from weight of resected tissue plus estimated 30% lost to vaporization during the holmium laser enucleation of the prostate.

various degrees of storage symptoms in many patients.[7-9] Persistent storage symptoms including frequency, nocturia, urgency, and urinary incontinence (urgency, stress or mixed incontinence) were reported more frequently after HoLEP than after TURP.[2,10] However, studies on the incidence of DO before and after HoLEP and the effect of DO on functional outcomes are sparse. We investigated the influence of preoperative DO on many aspects of functional outcomes after HoLEP in our hospital.

MATERIALS AND METHODS

Patient Selection and Assessment

One hundred fifty-three men with urodynamically proven BPO underwent HoLEP at our hospital between November 2008 and October 2011. We retrospectively reviewed their records using our prospectively maintained database after acquiring institutional review board approval of our institution. We excluded 43 patients because of inadequate quality of data: 32 because of follow-up loss, 7 because of a postoperative diagnosis of prostate cancer, and 4 because of a previous history of prostate surgery. Finally, we analyzed 110 patients with >6-months of follow-up data. To investigate the influence of preoperative DO on the functional outcomes after HoLEP was the main end point of our study.

All patients were evaluated with a history, physical examination with digital rectal examination, urinalysis, and blood tests for serum creatinine and prostate-specific antigen (PSA) at baseline. Patients were scored with the International Prostate Symptom Score (IPSS) and the International Continence Society male questionnaire short form at baseline and at 3 and 6 months postoperatively. We also obtained a voiding diary, transrectal ultrasonography, and uroflowmetry with postvoid residual urine volume. The voiding diary included patient-described urgency sensations associated with each micturition using the urinary sensation scale (1, no urgency to 5, urgency incontinence).[11] Urgency episodes were defined as the number of micturition-associated urgency episodes rated a USS score ≥3.

As a baseline evaluation, urodynamic studies were performed in each patient using the Aquarius TT UDS system (Laborie Medical Technologies, Toronto, Ontario, Canada). The bladder outlet obstruction index (BOOI) was calculated by the equation PdetQmax − 2(Qmax), which is derived from the pressure-flow study (Pdet; detrusor pressure, Qmax; maximum flow rate). Patients were considered obstructed if BOOI was >40, unobstructed if BOOI was <20, and equivocal if BOOI was 20-40.[12] We divided patients into 2 groups according to the results of the urodynamic study: the DO group (n = 58) and the non-DO group (n = 52). DO was defined as a urodynamic observation characterized by spontaneous or provoked involuntary detrusor contractions during the bladder-filling phase.[13]

Postoperatively, if patients complained of storage symptoms such as urgency, frequency, and urgency incontinence 1 month after HoLEP, anticholinergics were prescribed to reduce these symptoms.

Operative Technique

One surgeon (KL) performed all procedures described by Gilling[14] with some modifications.[15] After dividing the prostate into 3 anatomic lobes, enucleation of each lobe was performed in a retrograde fashion using a high-powered holmium laser (80-100 W) delivered by a SlimLine 550-μm fiber (Lumenis, Yokneam, Israel) through the 26F continuous flow resectoscope system (Storz, Tuttlingen, Germany). For tissue morcellation of the 3 enucleated lobes, we used a 26F nephroscope with the VersaCut morcellator (Lumenis, Inc.). After retrieval of all prostatic tissue, a 24F urethral Foley catheter was inserted overnight, and bladder irrigation was started if necessary.