Efficacy of Holmium Laser Enucleation of the Prostate in Patients With Non-neurogenic Impaired Bladder Contractility: Results of a Prospective Trial

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OBJECTIVE To examine the outcomes of men with detrusor underactivity or acontractility undergoing holmium laser enucleation of the prostate (HoLEP).

METHODS A prospective case series between 2009 and 2012 was performed to examine short-term outcomes of men with urodynamic evidence of detrusor hypocontractility or acontractility because of a non-neurogenic etiology and concurrent benign prostatic obstruction (BPO), undergoing HoLEP.

RESULTS Fourteen patients with detrusor hypocontractility and 19 patients with acontractility and evidence of BPO underwent HoLEP during the study period. Median age was 71.5 and 75 years, respectively. Preoperatively, 5 (35.7%) men with hypocontractility and 19 (100%) men with acontractility had catheter-dependent urinary retention for a median of 3 and 9 months, respectively. At a median follow-up of 24.7 months, all 5 (100%) men with hypocontractility and 18 of 19 (94.7%) men with acontractility were voiding spontaneously without the need for intermittent catheterization. Individuals with hypocontratile bladders had statistically significant improvements in American Urological Association Symptom Index (21.5 vs 3; $P = .014$), maximum urine flow (Qmax, 10 vs 21 mL/s; $P = .001$), and postvoid residual (250 vs 53 mL; $P = .007$) from baseline to postoperative assessments. In patients with an acontractile bladder, 15 of 19 (78.9%) displayed significant return of detrusor contractility, whereas 4 of 19 (21.1%) were voiding exclusively by Valsalva effort on follow-up urodynamic study. Postoperatively, patient satisfaction, as ascertained by American Urological Association Symptom Index, was high for both groups.

CONCLUSION Intermediate follow-up results indicate that HoLEP is a viable management option for men with BPO and detrusor hypocontractility. Furthermore, detrusor acontractility does not appear to adversely affect postoperative results, with return of spontaneous urination and demonstration of detrusor contractility allowing for efficient voiding, in over 95% of patients. UROLOGY 83: 428–432, 2014. © 2014 Elsevier Inc.

Over the past decade, a shift toward medical management of patients with benign prostatic obstruction (BPO) has occurred.[1,2] Thus, patients wait longer before ultimately presenting for surgery, often with larger prostates. By prolonging definitive treatment, there is the potential to develop bladder decompensation, poorer flow rates, larger glands, and worse surgical outcomes. The shift in approach has transformed the management of BPO from an acute surgical condition (ie symptomatic disease requiring prompt surgery), to that of a chronic disease.[3] It is estimated that in men undergoing surgical treatment for BPO, urinary retention is the primary indication in 24%-42%.[4] This group of men in retention presents a particular challenge to urologists, as they often experience inferior treatment outcomes and increased complication rates from transurethral resection of the prostate (TURP).[4,5] It is likely that many of these men have an underlying component of detrusor failure. This fact might account for the inferior postoperative outcomes observed compared with those voiding spontaneously before surgery. Although detrusor underactivity (DUA) is likely

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responsible for lower urinary tract symptoms in a minority of men presenting for treatment, it creates a dilemma for the treating urologist.[6] Whether surgical therapy should be pursued in patients with DUA remains controversial, as conflicting evidence exists in the published data regarding the efficacy of benign prostatic hyperplasia (BPH) surgery for this group of men.[6-10]

TURP remains the reference standard for treatment of BPH; however recent evidence has shown that the holmium laser enucleation of the prostate (HoLEP) is at least as effective as TURP, with less perioperative morbidity.[11] HoLEP does have a potential therapeutic advantage for treatment of BPH, as it allows for true anatomic enucleation of prostatic adenomas of any size.[12] This ability to obtain near complete deobstruction also has potential advantages for treating men with BPO and concomitant DUA. However, no study to date has examined outcomes with men of urodynamic evidence of DUA or detrusor acontractility undergoing HoLEP. We performed a study to examine a group of men with impaired detrusor contractility treated with HoLEP.

MATERIALS AND METHODS

An institutional review board—approved prospective study was performed from 2009 to 2012 on men with prostatic enlargement consistent with BPO and urodynamic evidence of impaired or absent detrusor contractility undergoing HoLEP. The study was funded by a Mayo Clinic departmental grant, with institutional review board approval. Men were identified as having impaired detrusor function on preoperative urodynamic study (UDS), obtained at the discretion of the treating physician in the work-up of urinary symptomatology. These studies were performed using the Laborie System (Ontario, Canada) with a 7F catheter, at fill rate of 50 mL/min. Studies were terminated at maximum fill volume of 500 mL, unless instructed otherwise by the supervising physician. Urodynamic studies were blind reviewed by 2 neurourologists. Additional preoperative work-up included a thorough medical history, physical examination, urinalysis, serum prostate-specific antigen, cystourethroscopy, transrectal ultrasonography, and American Urological Association Symptom Index (AUASI). In addition to standard parameters to evaluate bladder function with pressure/flow studies, a bladder contractility index (BCI) was calculated to better stratify patients according to the standardized definition (BCI = pdetQmax + 5Qmax), with impaired contractility defined as BCI <100.[13] For the purpose of this study, we define chronic urinary retention as requiring intermittent catheterization or indwelling Foley catheter for a duration >1 month.

Patients identified as having DUA or acontractility with evidence of BPE consistent with BPO were offered enrollment into the study. Patients electing not to participate in the prospective trial were offered medical and surgical options for treatment. All medications with known ability to impair detrussor function (ie anticholinergics, benzodiazepines, and so forth) were discontinued, to assess any change in voiding before any therapeutic intervention. Enrolled patients were placed in 1 of 2 groups on the basis of UDS findings. Group A consisted of patients with DUA on UDS and BCI <100. Group B consisted of men in chronic urinary retention with detrusor acontractility. All patients had cystoscopic evidence of BPE consistent with BPO. Patients with a known previous history of neurogenic bladder or neurologic condition predisposing to neurogenic bladder (ie previous spinal surgery or pelvic surgery), diabetes mellitus with evidence of end organ dysfunction, previous surgery for BPO, or a previous diagnosis of prostate cancer were excluded from the study.

All HoLEP procedures were performed by a single surgeon (A.E.K.). Enucleation of the prostate was conducted with a 100-W Ho:Yag laser source, configured with a 550-nm laser fiber (Lumenis, Santa Clara, CA) inserted into a 28F continuous flow resectoscope (Karl Storz Endoscopy, Culver City, CA) with a laser bridge housing a 7F stabilizer catheter (Cook Urologic, Spencer, IN). Normal saline was used as irrigant in all cases. The enucleation was performed at laser settings of 2 J and 40 Hz for the lateral lobes, 2 J and 20 Hz for the apical dissection, and 2 J and 20 Hz to divide the apical mucosal bridges. Bleeding points were fulgurated by defocusing the laser several millimeters from the open vessel. The enucleated tissue was removed from the bladder with a VersaCut morcellator (Lumenis, Santa Clara, CA). After enucleation and morcellation, a 20F 3-way catheter was placed and continuous bladder irrigations used if necessary. The catheter was then removed the next day morning.

Postoperatively, all patients returned at 3 months for an office visit, uroflow with postvoid residual (PVR), and AUASI. In addition, patients with an acontractile bladder returned at 6 months for uroflow with PVR, UDS, and AUASI. All patients completed a quality of life questionnaire and were asked, "if you were to spend the rest of your life with your urinary condition just the way it is now, how would you feel about that" (delighted, pleased, most satisfied, mixed, most dissatisfied, unhappy, terrible). Patients in both the groups were advised to return at 12 months and annually thereafter. Patients who were unable to return to clinical assessments were contacted through telephone to assess voiding status. Statistical analyses were performed with the *t* test for normally distributed data and the Mann-Whitney test for skewed data, with a value of $P < .05$ being considered statistically significant.

RESULTS

Table 1 shows the preoperative characteristics of the study patients. Fourteen men were identified to have preoperative DUA with a median BCI of 92.3 (interquartile range, IQR: 82.6-96.4). Five of these men were in urinary retention preoperatively performing intermittent catheterization for a median of 3 months (IQR: 3-6). The acontractile patient population comprised 19 men with acontractility on UDS, with catheter-dependent urinary retention for a median of 9 months (IQR: 3.5-21.5). Median follow-up for study was 24.7 months (IQR: 12.6-36.2), with 24 of 33 (72.7%) having complete long-term follow-up available. Four patients from the hypocontractile group and 5 patients from the acontractile group did not return after the 1-year assessment, and long-term follow-up was obtained over the phone.

Table 1 also shows the operative characteristics of both the groups. Median enucleation and morcellation times for the hypocontractile group were 35 (IQR: 26-44.5) and 5 (IQR: 4-16) minutes and for the acontractile group 32 (IQR: 24-58.5) and 8.5 (IQR: 4-15) minutes, respectively. The median length of indwelling catheter