

180-W XPS GreenLight laser vaporization for benign prostate hyperplasia: 12-month safety and efficacy results for glands larger than 80 mL

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Abstract The purpose of the current study was to evaluate the efficacy and safety of laser prostatectomy by using the latest 180-W XPS GreenLight laser with the new MoXy fiber in the surgical treatment of glands larger than 80 mL in a prospective study. From December 2011 to May 2013, 68 consecutive patients with a mean age of 71.1 ± 9.8 years (range 49 to 85) underwent 180-W XPS laser prostatectomy at our institution. The baseline characteristics, perioperative data, and complications were recorded. Evaluation of outcomes was assessed at 3, 6, and 12 months postoperatively comparing subjective (International Prostate Symptom Score [IPSS], International Index of Erectile Function-5 [IIEF-5]) and objective (Maximal flow rate [Q_{\max}], postvoid residual urine [PVR], transrectal ultrasound [TRUS] volume) parameters to the preoperative data. Mean preoperative prostate volume was 104.3 ± 29.7 mL (range 81 to 185). Mean operation time was 65.5 ± 29.6 min (range 38 to 124), with a mean energy delivery of 398 ± 169 kJ (range 39 to 523). The catheterization time was 20.8 ± 1.9 h (range 6 to 92) and the hospital stay was 27.3 ± 8.7 h (range 12 to 80). No major intraoperative complications were observed. Improvement in IPSS, Q_{\max} , and PVR was statistically significant ($p < 0.001$) at 3, 6, and 12 months. Urethral strictures were observed in two patients (2.9 %). No patients required reintervention due to residual adenoma. The average volume reduction was 40.5 % at 12 months. Photoselective vaporization of the prostate (PVP) using the new 180-W XPS GreenLight laser system seems to be a safe and effective procedure and could play an important role in the surgical treatment of symptomatic benign prostatic hyperplasia (BPH) patients with larger prostate volumes.

Keywords Photoselective vaporization of prostate · Benign prostatic hyperplasia · GreenLight · Nd:YAG laser

Introduction

Lower urinary tract symptoms (LUTS) due to benign prostatic hyperplasia (BPH) affect a significant proportion of men with a prevalence that increases with age [1]. After 50 years of age, 25 to 40 % of men need to be treated for this disease [2]. Transurethral resection of the prostate (TURP) for small to mid-size prostates and simple open prostatectomy (OP) for larger glands are currently the gold standard surgical therapies. Although Holmium Laser Enucleation of the Prostate (HoLEP) provides favorable outcomes in treating large glands comparable to that of open prostatectomy [3], it is limited by the long learning curve and the procedure has been slow to gain widespread acceptance. The TURP-like technique of photoselective vaporization of the prostate (PVP) with the GreenLight (GL) laser is relatively easy to learn.

Many recent studies demonstrated that PVP using different GL laser generators (60-W KTP, 80-W KTP, and 120-W LBO) may be equivalent to TURP for small to mid-size prostates and has gained wide acceptance among urologists [4, 5]. However, for larger prostate glands, only a few studies on the surgical treatment by PVP have been published and promising midterm results were demonstrated [6–9]. Failure of the treatment over time, the need for reintervention due to residual adenoma, and the need for using the TURP loop due to difficulties in achieving hemostasis are still some of the main concerns of PVP in patients with prostates larger than 80–100 mL [4, 10, 11]. The novel 180-W XPS™ GreenLight laser involving the new MoXy fiber has offered a 50 % increase in the laser beam area (from 0.28 to 0.44 mm²) while maintaining the same actual depth (1–2 mm) of vaporization

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and coagulation of the former generator. The MoXy side-firing fiber is used to vaporize and coagulate tissue at a 70-degree forward deflection angle to the fiber axis. The new pulsed coagulation feature (pulse modulated at 12 Hz 25 % duty cycle, 5 to 40 W) has offered an improved hemostasis control. Additional improvements include an automatic safety system that detects conditions when the fiber cap may over-heat and briefly disables the laser beam (FiberLife™) and a continuous saline flow around the fiber to cool the fiber tip (Active Cooling Cap™ Technology) in order to increase the life of the fiber [12]. The 180-W GL laser currently represents one of the most promising new technologies applied to the treatment of men who are candidates for OP.

The purpose of the current study was to evaluate the clinical efficacy and short-term outcome of the 180-W XPS™ GreenLight laser in men with LUTS due to enlarged prostatic adenomas larger than 80 mL.

Patients and methods

Between December 2011 and May 2013, 68 consecutive patients with LUTS due to BPH were prospectively treated with 180-W XPS GL laser at our institution. Prostate size was measured by transrectal ultrasound (TRUS), and patients with a prostate volume of greater than 80 mL were included in this study. By using 10 MHz transrectal probe, the transverse dimension and the anteroposterior dimension at the estimated point of the widest transverse dimension were measured in the axial plane first. Then the longitudinal dimension was measured in the sagittal plane. The ellipsoid volume formula is then applied as follows: $\text{height} \times \text{length} \times \text{width} \times \pi/6$. The patients with maximal flow rate (Q_{\max}) less than 15 mL/s and/or postvoid residual volume (PVR) greater than 150 mL in conjunction with the International Prostate Symptom Score (IPSS) greater than seven were included. Patients with known neurogenic bladder disorders, bladder stones, urethral strictures, history of prostate cancer, PVR larger than 400 mL or any previous prostate, bladder neck or urethral surgery, and those using anticoagulants were excluded. Patients diagnosed with adenocarcinoma of the prostate during 12-month follow-up interval were also excluded from analysis. Indwelling urinary catheters for acute urinary retention was not a criterion for exclusion. All patients were counseled, and written consents were received from them all. The ethics committee of our university hospital approved the protocol.

Patients were preoperatively evaluated by physical examination, including digital rectal examination, urine analysis, urine culture, total serum prostate-specific antigen (PSA) levels, IPSS, uroflowmetry for Q_{\max} , transabdominal measurement of PVR, TRUS measurement of prostate volume, and International Index of Erectile Function (IIEF-5) for the assessment of sexual function. TRUS-guided biopsy was

performed in case of an abnormal DRE or elevated serum PSA level.

Transurethral PVP was performed using the 180-W XPS GL laser with the MoXy fiber under general or spinal anesthesia. Prophylactic antibiotic premedication with a broad-spectrum antibiotic was provided. All operations were performed by three surgeons experienced with the former GL laser generators (80-W KTP and 120-W HPS) for the treatment of BPH. The 532-nm laser energy set at 180 W for vaporization and 40 W for coagulation was delivered by a 750- μm side-firing MoXy liquid-cooled fiber through a 22F continuous-flow cystoscope. Room temperature isotonic saline was used as the irrigation fluid. The procedure was performed in a TURP-like manner. An automatic suction-irrigation pump system was not used in any procedures. Median lobe, bladder neck, lateral lobes, and apical portion of the adenoma were vaporized consecutively in order to achieve a good intra-prostatic cavity with good hemostasis. Energy was applied by using a non-contact, sweeping motion technique. A 3-way 18F urethral catheter with a 20–30-mL balloon without any traction (with saline irrigation if necessary) was placed at the conclusion of the procedure. The catheter was removed when the urine was clear without bladder irrigation after 6 h postoperatively. Recatheterization was performed for 24 h due to the failure of initial voiding trial. Because most of the procedures were performed under spinal anesthesia, we determined the shortest time for catheter removal as 6 h in our study protocol. The catheter was left in place in case of persisting hematuria, fever, or problems in early mobilization. Operations were performed on outpatients in case of successful initial voiding trial at 6 h postoperatively. The inpatient criteria were considered as failure of initial voiding trial, hematuria requiring bladder irrigation, fever, or intolerance of oral feeding early postoperatively. A second-generation oral cephalosporin was given to all patients postoperatively for 1 week.

Length of operation (time during which the cystoscope was within the urethra), delivered energy, hospital stay, and catheter removal time as well as intraoperative and early postoperative complications were recorded as perioperative parameters. Dysuria was assessed by self-report and defined as discomfort, sensation of burning or pain during micturition requiring medication in the absence of a urinary tract infection. Urethral stricture or bladder neck contracture was suspected in patients with poor urinary stream, and flexible cystoscopy was performed for diagnosis. Patients were evaluated postoperatively at 3, 6, and 12 months. Both subjective (IPSS, IIEF-5) and objective (Q_{\max} , PVR, prostate volume, PSA) clinical outcomes were postoperatively assessed for changes from preoperative values at the follow-up dates.

All data are presented as mean \pm standard deviation (SD) or the number of available cases (percentage). Statistical analysis of the patients' baseline characteristics was performed using

the Student *t* test. To compare preoperative and postoperative clinical parameters, paired *t* test or analysis of variance was used. Statistical analysis was performed using the SPSS 15.0 (SPSS Inc., Chicago, IL) statistical software package. A *p* value of less than 0.05 was considered statistically significant.

Results

Considering exclusion criteria, 68 of 83 patients remained for analysis. One patient was diagnosed with adenocarcinoma of the prostate at 6 months postoperatively with TRUS biopsy and radical retropubic prostatectomy was performed. One patient was lost to follow-up after 3 months because of moving abroad. One patient died from flu complications at 6 months, and three patients discontinued intervention after 6 months due to unknown reasons. A total of 63 patients (92.6 %) completed 12-month follow-up, and data were available and analyzed.

Baseline data are presented in Table 1. The mean age was 71.1±9.8 years (range 49 to 85). The mean baseline prostate volume was 104.3±29.7 mL (range 81 to 185). The mean operating time was 65.5±29.6 min (range 38 to 124), mean lasing time was 44.7±39.2 min (29 to 109), and mean energy delivery was 398±169 kJ (range 39 to 523), while the mean catheter removal time and mean hospital stay were 20.8±1.9 h (range 6 to 92) and 27.3±8.7 h (range 12 to 80), respectively. The mean number of fibers used per patient was 1.1±0.2 (1 to 2) (Table 2). Seven of 68 patients (10.2 %) required a second fiber in order to obtain adequate tissue vaporization. No fiber damage was experienced during PVP. Acute urinary retention was the reason for surgery in 8 patients (11.7 %).

Twelve-month follow-up data are shown in Table 3. Both subjective and objective voiding parameters (IPSS, Q_{max} , PVR) showed a statistically significant improvement at 3, 6, and 12-month follow-up (*p*<0.001). Sexual function was

Table 1 Preoperative baseline patient characteristics

Variable	Mean±SD (range) or no. (%)
No. of patients	68
Mean age (year)	71.1±9.8 (49–85)
Total PSA (ng/mL)	7.4±8.1 (0.4–33)
Prostate volume (mL)	104.3±29.7 (81–185)
PVR (mL)	165±182 (32–388)
Q_{max} (mL/s)	7.6±5.4 (2.1–14.3)
IPSS	19.9±9.5 (8–32)
IIEF-5	14.8±8.1 (6–28)

Q_{max} maximal urinary flow rate, PVR postvoid residual volume, IPSS International Prostate Symptom Score, IIEF-5 International Index of Erectile Function-5, PSA prostate-specific antigen

Table 2 Perioperative data

Parameter	Mean±SD (range)
Total operative time (min)	65.5±29.6 (38–124)
Lasing time (min)	44.7±39.2 (29–109)
Applied energy (kJ)	398±169 (39–523)
Catheter removal (h)	20.8±1.9 (6–92)
Hospital stay (h)	27.3±8.7 (12–80)
Fiber usage (n)	1.1±0.2 (1–2)

assessed by administering the IIEF-5, and no significant change was noted during the follow-up period from baseline. The reported incidence of retrograde ejaculation was 23 of 55 sexually active patients (41.8 %). A statistically significant reduction in postoperative prostate volume and serum PSA values were measured at 3, 6, and 12 months after surgery. The percentage of reduction in prostate volume and serum PSA levels were 40.5 and 43.2 %, respectively, at 12-month follow-up.

Based on the Clavien-Dindo classification of adverse events, 11 patients (16.1 %) had grade I complications, while 6 patients (8.8 %) had grade II, 9 patients (13.2 %) had grade III-a and 2 patients (2.9 %) had grade III-b complications. Intraoperative, early postoperative (<15 days), and long-term specific complications up to 12 months of follow-up are presented in Table 4. The TURP syndrome was not experienced in any patients. Capsule perforation with bleeding occurred in 3 patients (4.4 %). No blood transfusions were required. The TURP loop was used for coagulation in 5 patients (7.3 %) with impaired visibility due to uncontrolled bleeding during PVP, whereas the need for conversion to TURP due to persistent bleeding, prostate size, or fiber defect was not experienced in any patients. Unilateral slight ureteral orifice injury occurred intraoperatively in 2 patients (2.9 %) with considerably large median lobes protruding into the bladder. Both injuries were noticed peroperatively and treated with ureteral stenting for 2 weeks at the end of the procedure. Neither uretero-vesical stricture nor vesico-ureteral reflux was observed within the follow-up period.

Failure of initial voiding trial after the removal of catheter occurred in 9 patients (13.2 %), and all were managed with subsequent temporary re-catheterization. The second voiding trial was successful in 8 of these 9 patients (88.8 %) and 1 patient (11.1 %) needed a second re-catheterization. Bladder irrigation with saline was required in 5 patients (7.3 %) due to mild hematuria. High fever with positive blood culture was noted postoperatively in 1 patient (1.4 %), and a third generation intravenous cephalosporin was administered for 3 days. Acute urinary retention or the need for surgical re-intervention (repeat PVP or TURP) to improve voiding symptoms due to residual adenoma was not experienced in any patients within the follow-up period. Stress urinary incontinence was not

Table 3 Outcome at 3, 6, and 12 months

	3 months	6 months	12 months
No. of patients available	68 (100 %)	67 (98.5 %)	63 (92.6 %)
Q_{max} (mL/s)	17.1±6.3* (11–32)	16.7±5.5* (8–27)	16.0±4.8* (7–21)
PVR (mL)	55.6±43.8* (0–210)	47.0±39.9* (15–180)	61.7±51.4* (0–135)
IPSS	11.0±6.6* (5–30)	8.4±7.2* (3–18)	9.3±4.7* (5–16)
IIEF-5	13.9±7.8 (5–29)	14.2±8.0 (7–24)	13.8±9.5 (4–21)
Total PSA (ng/mL)	3.5±2.8* (0.1–18)	4.0±3.7* (0.3–12)	4.2±5.1* (0.8–14)
Prostate volume (mL)	58.4±33.7* (31–99)	60.9±45.6* (28–107)	62.0±43.9* (35–110)

Q_{max} maximal urinary flow rate, *PVR* postvoid residual volume, *IPSS* International Prostate Symptom Score, *IIEF-5* International Index of Erectile Function-5, *PSA* prostate-specific antigen

* $p < 0.01$

reported, whereas transient urge incontinence was noted in 5 patients (7.3 %) early postoperatively, and treatment with anticholinergics for a few weeks was performed with favorable results. The reported incidence of dysuria was 8.8 % ($n=6$). Nonsteroidal anti-inflammatory drugs and antibiotics were used for symptomatic relief. Persistent and prolonged dysuria

was noted only in 1 patient (1.4 %). Urinary tract infections (UTIs) were seen in 4.4, 7.3, and 5.8 % of patients at 3, 6, and 12-month follow-up dates, respectively. Bladder neck contraction was not observed in any patient, while 2 patients (2.9 %) underwent internal urethrotomy due to severe bulbar urethral stricture within the follow-up period.

Table 4 Complications observed after PVP

Complication	No. of patients
Intraoperative	
TUR syndrome	–
Capsule perforation	3 (4.4 %)
Bleeding ^a	5 (7.3 %)
Fiber defect	–
Conversion to TURP	–
Ureteral orifice injury	2 (2.9 %)
Early postoperative (<15 days)	
Blood transfusion	–
Hematuria ^b	5 (7.3 %)
Urosepsis	1 (1.4 %)
Failure of initial voiding trial	9 (13.2 %)
Failure of second voiding trial	1 (1.4 %)
Stress incontinence	–
Urge incontinence	5 (7.3 %)
Dysuria	6 (8.8 %)
Reintervention	–
Long term (<12 months)	
Urethral stricture	2 (2.9 %)
Bladder neck stricture	–
Reintervention	–
Dysuria	1 (1.4 %)
Retrograde ejaculation	23 (41.8 %)

TUR Transurethral resection

^a Leads to the need for using the TURP loop for coagulation

^b Leads to need bladder irrigation with saline

Discussion

Malek et al. were the first who reported the results of the first generation 60-W high power 532-nm KTP/Nd:YAG GL laser for the treatment of men with BPH in 1998 [13]. The GL laser technology was initially commercialized as an 80-W KTP/532 nm laser. The laser generator was subsequently improved to the 120-W LBO/532 nm HPS with 600- μ m side-firing Mojo fiber and then to the current laser at 180-W LBO/532 nm XPS with the 750- μ m side-firing MoXy liquid-cooled fiber. The former generator has claimed to improve the rate of vaporization which offers a shorter lasing time. The new pulsed coagulation feature of 180-W GL laser, adjustable up to 40 W, has offered a rapid suppression of bleeding and an improved hemostasis.

In our study, we aimed to evaluate the early efficacy and safety of the new laser generator in the treatment of prostates larger than 80 mL. Our early results revealed that adequate volume reduction of the prostate and significant improvement in voiding parameters (IPSS, Q_{max} , and PVR) can be achieved rapidly and sustained up to 12 months in a large majority of the patients with a mean prostate volume of 104 mL (range 81 to 185).

Short-term results of 180-W GL laser prostatectomy using the MoXy fiber were recently reported in a few studies, and similar to our findings, the preliminary results are promising [7, 14–16]. Bachmann et al. were the first who reported the excellent 6-month functional outcome of 180-W GL laser for the treatment of BPH in a publication of a large multicentre series of patients [7]. The GOLIATH study, which is the

largest prospective randomized trial to date, comparing 180-W GL laser prostatectomy with the TURP has shown that PVP with 180-W GL laser is comparable to TURP in terms of IPSS, Q_{\max} , complication-free rate and prostatic tissue removal. Shorter catheterization time, shorter hospital stay, and three times lower early postoperative reintervention rate in favor of PVP were also reported. The upper TRUS measurement of prostate volume limit for inclusion into this study was 100 mL. Mean baseline prostate volume and mean follow-up were reported as 48.6 mL and 12.3 months, respectively, in this study [14]. In contrast to the GOLIATH study, we included only the patients with larger glands.

In the present study, improvement in both subjective (IPSS) and objective (Q_{\max} , PVR) voiding parameters, as well as the percentage reduction of both PSA and prostate volume at 12 months are comparable with those recently reported with the 180-W GL laser prostatectomy [14–17]. Furthermore, our early results suggest that 180-W XPS GL laser prostatectomy for the treatment of prostates larger than 80 mL is similar to OP and HoLEP in patients with similar prostate sizes with regard to the short term improvement in IPSS, Q_{\max} , and PVR with improved complication rates [6, 18].

The mean length of operation obtained in our study was significantly lower when compared with the previously published data with the use of both 80-W KTP and 120-W HPS GL systems in patients with prostates larger than 70–80 mL [8, 19], whereas the mean catheterization time and the mean hospital stay were similar. The 180-W GL laser generator seems to provide faster vaporization and shorter operation times with similar urethral stricture rates. A recent meta-analysis findings of nine randomized trials utilizing the 80-W KTP or 120-W HPS laser that compared PVP with the TURP revealed that catheterization time and hospital stay were shorter with PVP. However, the reported operative time was shorter with the TURP [5].

Particularly in patients with larger prostates, the need for surgical re-intervention due to the inadequate volume reduction of the prostate and increased incidence of urethral strictures associated with the prolonged lasing time were still some of the main concerns about PVP among the urologists. Our results have shown that the 180-W XPS GL laser generator provides a quicker vaporization of adenoma with a small diameter cystoscope which reduces the risk of urethral stricture development. The urethral stricture rate in our series was significantly lower (2.9 vs. 5.1 %) compared with the published results of the series using the 80-W KTP GL generator for the treatment of similar-sized prostates [9].

Our findings, in terms of improved mean operative and lasing time, are similar to the recently published trial by Hueber et al. evaluating the efficacy of the 180-W XPS GL system and the effect of prostate volume, in comparison with the former 120-W HPS GL laser [15]. Their findings also

suggest that preoperative TRUS volume is an independent factor predicting operative parameters, such as energy use and lasing time. Our experience in the present study also confirmed this finding. Both increased energy delivery and prolonged operative time were also highly associated with the increased TRUS volume in our patients. The lasing time per 1 mL tissue vaporization and the amount of vaporized tissue per joule can vary across surgeons and patients as well. Surgical technique and tissue conditions can affect the efficiency of the procedure. The technical factors influencing vaporization efficiency include working distance, energy settings, sweep speed, and sweeping angle. The rate of efficiency of laser treatment declines after 3 mm. We prefer titrating the laser power until the desired tissue effect is achieved. Once the mucosal surface, which is highly vascular, has been treated with 80 W initially, the vapor setting is increased by increments of 10 W up to 180 W. In addition, faster sweeping with larger sweeping angles generated wider but more superficial vaporization defects, leading to smaller vaporized tissue volumes per joule.

In the present study, a significant decrease in the mean number of fibers used by the 180-W XPS GL system (mean 1.1 fibers per case) was observed compared with the reported results of a series with 120-W HPS GL system (mean 3.3 fibers per case) for the treatment of prostates larger than 80 mL [15].

In our study, sexual function was assessed with the IIEF-5 questionnaire at each office visit during the follow-up period. Compared with baseline, the median IIEF-5 remained unchanged through the 12-month follow-up. Our results suggest that PVP with 180-W GL laser is not associated with increased postoperative erectile dysfunction. Because the mean age of our study population was 71.1, preservation of antegrade ejaculation was not of interest and bladder neck-preserving approach was not performed in any procedures. Our results revealed a slightly higher incidence of new-onset retrograde ejaculation after PVP (41.8 %) when compared with the data reported in large series on PVP with the former GL generators (80-W KTP and 120-W LBO) (30–36 %) [20, 21]. However, a significantly higher retrograde ejaculation rate (64.7 %) was reported after PVP with 180-W XPS GL laser in the GOLIATH study [14]. The incidence of retrograde ejaculation seems to be higher in relatively small-sized prostates.

In our study, use of the TURP loop was required in 5 patients (7.3 %) to control bleeding resulting in poor vision. Capsule perforation was the reason of bleeding in 3 of these 5 patients (60 %). Uncontrolled high blood pressure was noted as another reason of difficulty in achieving hemostasis in the other two patients. After the achievement of hemostasis, the procedures were completed with PVP and no conversion to TURP was experienced in this series. TUR biopsy was not performed in any procedures. The reported incidence of the need for using the TURP loop for hemostasis was 0 to 16 % in

large series of PVP with 180-W GL laser [7, 17]. Favorable results of using the bugbee electrode as an alternative tool, which can be used through the same laser port, to control bleeding was reported in 7 of 131 patients (5.3%) underwent PVP with 180-W GL laser by Emara et al. [16]. Bleeding causing visual impairment has shown to be highly associated with capsule perforation in previous large series, which is similar to our findings [19].

Conversion from PVP with the former generators to TURP or HoLEP due to persistent bleeding causing serious visual impairment and inadequate vaporization was reported 0 to 22 % for prostates greater than 60 mL [17, 19, 22]. In our study, no conversion to TURP or OP was experienced which is similar to the results of the recent series of 180-W GL laser system [7, 14–17]. The new generator seems to be superior in terms of improved hemostasis and increased efficacy in vaporization in patients with large-size prostates when compared with the reports of the former generators.

To the best of our knowledge, no reported ureteral orifice injury related to PVP using the MoXy or Mojo fiber exists, whereas in our study, slight unilateral orifice injury was observed in 2 patients (2.9 %). Therefore, we have questioned the surgical technique. In both patients, ureteral orifices were very close to the bladder neck, and the injury occurred in the course of vaporization of very large median lobes protruding into the bladder prior to vaporization of lateral lobes. Wong et al. described a safer technique to minimize the risk of ureteral orifice injury as vaporization of lateral lobes firstly after creating a groove along the lateral-median lobe junction from the bladder neck to the verumontanum and vaporization of median lobe finally from lateral to medial [23]. Thus, avoidance of firing fiber down might help minimize the incidence of this adverse event.

Our study also revealed a reduced incidence of dysuria (8.8 %) compared with the reported results of different generators of PVP series with small to mid-size prostates. Transient dysuria after PVP was reported 13.5 to 24.3 % in large series with a mean prostate volume of smaller than 70 mL [8, 19]. However, for patients with prostates larger than 80 mL, dysuria as an early postoperative complication was reported in 7 of 87 patients (8 %) underwent PVP with 80-W GL laser by Ruszat et al. [8] which is similar to our findings. Although relatively small prostate volumes seem to be associated with increased incidence of dysuria after PVP, a superiority of 180-W XPS GL laser was not observed in terms of decreased incidence of dysuria.

We found the incidence of urethral stricture 2.9 % ($n=2$) which is similar to the previously reported studies with the 120-W generator using the same size cystoscope. Significant high bladder neck on cystoscopy was noted in both patients. Ischemia of the membranous urethra during the procedure due to the pressure of the cystoscope in these patients with high bladder neck was conjectured as the main etiological factor.

The major limitations of the present study are short follow-up time and lack of a control group in the study design. A randomized controlled trial with a long-term follow-up should provide better evidence in this regard. Since the 180-W XPS GL laser generator was introduced a few years ago, to the best of our knowledge, no data exist in the mid- to long-term outcome after PVP with the latest generator up to date. However, because most procedure-related specific surgical complications occur within 12 months, the follow-up time seems to be acceptable for the safety assessment of the procedure. The surgeon technique variation and inconsistent power settings (starting with 80 W and incremental increase to 180 W) instead of constant power settings are the other major limitations of our study. Another limitation of this study is the relatively small number of available patients. Particularly for patients with prostates larger than 80–100 mL, simple open prostatectomy and TURP are still the most preferred surgical options among the urologists in our country due to the concerns about the inadequacy of PVP in large adenomas. Most of our patients also have the same concerns which affect their choice of treatment option. Limitations also include heterogeneity in the skill levels and experience of the surgeons, which may explain the ureteral orifice injuries.

Conclusions

Our initial results suggest that PVP with the new 180-W GL laser involving the MoXy fiber is safe and able to provide efficient tissue removal in a relatively shorter operative time. Rapid improvement of both subjective and objective voiding parameters with adequate volume reduction of the prostate were obtained in patients with a mean prostate volume of 104 mL, while maintaining the previously reported shorter catheter removal time, hospital stay, and safety profile of the former GL laser systems. Our early results suggest that patients with larger adenomas, even the candidates for OP can be treated successfully with PVP using the 180-W XPS GL laser. However, further studies with longer follow-up and larger number of patients are warranted to assess the use of the 180-W GL laser generator in the treatment of men with large-size prostates.

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