Journal of the Formosan Medical Association (2015) 114, 268–273

Available online at www.sciencedirect.com

SciVerse ScienceDirect

journal homepage: www.jfma-online.com

ORIGINAL ARTICLE

Body mass index and age are predictors for symptom improvement after high-power laser vaporization for benign prostatic hyperplasia

Teng-Kai Yang [a,c], Po-Jen Hsiao [b,c], Hung-Ju Yang [a], Chun-Hou Liao [b,c], Han-Sun Chiang [b,c], Kuo-Liong Chien [d,*]

[a] *Department of Surgery, Yong He Branch, Cardinal Tien Hospital, New Taipei City, Taiwan*
[b] *Division of Urology, Department of Surgery, Cardinal Tien Hospital, Taipei, Taiwan*
[c] *College of Medicine, Fu-Jen Catholic University, Taipei, Taiwan*
[d] *Institute of Preventive Medicine, College of Public Health, National Taiwan University, Taipei, Taiwan*

Received 5 August 2011; received in revised form 30 October 2012; accepted 16 November 2012

KEYWORDS
benign prostatic hyperplasia;
international prostatic symptoms score;
laser vaporization;
predictor;
subgroup

Background/Purpose: To evaluate the effectiveness and safety of high-power 120W Greenlight HPS laser (HPS) and compare the results to transurethral resection of the prostate (TURP), and define a subgroup of patients who had better symptom score improvement after HPS.

Methods: One hundred and twenty-five patients who underwent surgery for benign prostatic hyperplasia (BPH) (61 HPS and 64 TURP) were retrospectively followed. Improvements of International Prostate Symptom Score (IPSS), quality of life score (QoL), maximum flow rate (Qmax) and post-void residual (PVR) were assessed at 4 weeks after the procedures. Potential covariates including age, body mass index (BMI), prostate volume (PV) and serum prostate-specific antigen (PSA) were defined and further subgroup analyses were utilized.

Results: The HPS group had a significantly higher education level, annual household income and larger prostate size. Compared with TURP, HPS resulted in comparable IPSS, QoL, Qmax and PVR improvements, but shorter hospitalization duration, serum hemoglobin loss and blood transfusion rate. Subgroup analyses showed that men in the HPS group were younger (age < 76 years), had higher BMI ($\geq 24\ kg/m^2$) and greater adjusted IPSS and QoL improvements than men in the TURP group.

* Corresponding author. Institute of Preventive Medicine, College of Public Health, National Taiwan University, Taipei, Taiwan.
E-mail address: klchien@ntu.edu.tw (K.-L. Chien).

http://dx.doi.org/10.1016/j.jfma.2012.11.012

Conclusion: HPS offered adequate effectiveness for symptomatic BPH versus TURP and was advantageous with regard to operative safety. Patients who are younger and have higher BMI may achieve better improvements with HPS than with TURP. Further long-term follow-up study is warranted.

Introduction

Transurethral resection of the prostate (TURP) has been the most commonly used procedure for benign prostatic hyperplasia (BPH) with apparently subjective and objective improvements,[1] but the associated bleeding and high complication rates restrict the applications to a selected population.[2,3]

The photoselective vaporization (PVP) with potassium-titanyl-phosphate (KTP) laser was established as a useful and safe alternative for symptomatic BPH.[4–7] The more powerful 120W Greenlight HPS laser (HPS) was developed recently to utilize a higher rate of energy and improve efficacy,[8–10] but the evidence for which subgroup will benefit more from HPS is scarce.[11]

In this study, we assessed the outcomes of men with symptomatic BPH after utilization of the HPS, compared the results to TURP, and defined a potential subgroup of patients that would have more symptom score improvement after HPS.

Materials and methods

Participants

From January 2007 to December 2009, 125 men with symptomatic BPH who underwent either HPS or TURP were retrospectively followed. The protocol was approved by the hospital ethics committee and informed consent was obtained from all patients. Inclusion criteria for the study were International Prostate Symptom Score (IPSS) greater than 7, Qmax less than 15 mL/s or acute urinary retention. Patients who had prostate cancer, prior prostatic or urethral surgery, or bladder tumor were excluded from the study. Men taking anticoagulants maintained medication before and after HPS during hospitalization, while TURP patients stopped taking the drugs for at least 1 week. There were 61 men enrolled in the HPS group and 64 in the TURP group. Most procedures were performed under spinal anesthesia.

Basic data such as age, height and weight were collected. The education level of the patients and annual household income were recorded by special nurses at admission. Validated IPSS and quality of life score (QoL) questionnaires were completed. Uroflowmetry was performed and baseline maximum flow rate (Qmax) and post-void residual urine (PVR) were also evaluated. Biochemical assessments were done as follows: urine analysis, serum sodium, hemoglobin and prostate-specific antigen (PSA) level. Prostate volume (PV) was evaluated using transrectal ultrasound (TRUS) measurement. The American Society of Anesthesiologists (ASA) score for each patient was calculated by an experienced anesthesiologist. High operation risk was defined as patients with an ASA score greater than 2 and/or taking anticoagulants or with a bleeding tendency. In patients with elevated PSA level or abnormal digital rectal examination TRUS-guided biopsies were performed.

Standard TURP was performed by using the 26F continuous-flow monopolar resectoscope. A 22F three-way Foley urethral catheter was left in place postoperatively. HPS was performed with a 120W (The Greenlight HPS) laser generator with the laser energy delivered by a side-firing fiber through a 24F continuous-flow cystoscope. The energy was absorbed by hemoglobin in the prostate tissue, and it vaporized the prostate tissue and ended with a wide-opened TURP-like cavity.

Serum sodium and hemoglobin level were collected again within 4 hours postoperation. Hospitalization duration was defined as between the time between admission day (1 day before operation) and the discharge day and was recorded by a special nurse. Four functional outcomes including IPSS, QoL, Qmax and PVR improvements were evaluated 4 weeks later in urology clinics.

Statistics

Continuous variables were analyzed with the Student *t* test and are presented as mean $\pm$ standard deviation (SD). Categorical variables were analyzed with the Chi-square test and are recorded as frequency or percentage. The two-sided alpha level was 0.05. A p value of less than 0.05 was considered to be statistically significant. A general linear model was used for detailed clinical covariate adjustments and four covariates including age, BMI, PV, and PSA were presented for subgroup analysis, with the median value as the cut-off point for each group. All statistical calculation was performed using SAS Version 9.1 (SAS Institute, Cary, NC) and STATA Version 10.0 (Stata Corporation, College Station, Texas) was used for figures of box plots.

As for sample size determination, according to previous studies, IPSS improvement greater than 4.9 was considered significantly different.[12] We set IPSS improvement as 5, within group standard deviation as 7, alpha level 0.05 and power value of 0.8, and the estimated sample size as 43 in each group.

Results

The baseline characteristics for both groups are listed in Table 1. Compared with the TURP group, HPS patients had a significantly higher education level, household income and larger prostate size. Twenty-one HPS patients (34%)