Urological Science 27 (2016) 31–34

Contents lists available at ScienceDirect

Urological Science

journal homepage: www.urol-sci.com

Original article

Management of prostate enlargement with acute urinary retention: Diode laser vaporization in combination with bipolar transurethral resection of the prostate

Kai-Yi Tzou [a], Wei-Tang Kao [a], Chi-Yun Lan [a], Chen-Hsun Ho [a, b], Yi-Te Chiang [a], Kuan-Chou Chen [a, b, *]

[a] Department of Urology, Shuang Ho Hospital, Taipei Medical University, New Taipei City, Taiwan
[b] Department of Urology, School of Medicine, College of Medicine, Taipei Medical University, Taipei, Taiwan

ARTICLE INFO

Article history:
Received 5 April 2014
Received in revised form
28 November 2015
Accepted 9 December 2015
Available online 15 February 2016

Keywords:
acute urinary retention
benign prostate enlargement
diode laser vaporization
transurethral resection of prostate

ABSTRACT

Objective: Transurethral resection of prostate (TURP) has long been the gold standard for the management of benign prostate enlargement (BPE). Over the years, laser techniques have been developed as major alternative treatment for BPE. Retrospectively, we compared the preoperative status and surgical outcomes of conventional TURP with those of high-intensity diode laser vaporization in combination with bipolar TURP (DV + bTURP) in patients with BPE who are suffering from refractory acute urinary retention.

Materials and methods: This is a retrospective chart review study. A total of 60 patients with BPE who were suffering from refractory acute urinary retention were enrolled between July 2011 and July 2013. Thirty-four patients were included in the TURP group and 26 in the DV + bTURP group. Perioperative parameters, including operation time, hemoglobin decrease, length of hospital stay, and time for catheter removal, were all recorded. Patients were followed postoperatively with peak flow rate measurement, international prostate symptom scores, and postvoid residual volume, and all adverse events were also recorded.

Results: DV + bTURP was superior to TURP in terms of hospital stay (3.1 d vs. 4.2 d), catheter removal time (1.3 d vs. 3.2 d), hemoglobin reduction (0.8 g/dL vs. 2.5 g/dL), and fewer adverse events. However, it was inferior to TURP in terms of operation time (93.2 min vs. 68.5 min). Complications are also comparable. No significant differences were observed in peak flow rates, international prostate symptom score, and postvoid residual volume between the two procedures.

Conclusion: DV + bTURP is comparable with monopolar TURP for relieving acute urinary retention in men with BPE in terms of complications and functional outcomes. The combined technique can provide better intraoperative hemostasis and shorter catheterization time, with no significant postoperative irritative symptoms.

1. Introduction

Acute urinary retention (AUR) commonly occurs in the elderly aged >70 years, and more than 10% of men in their 70s experience AUR within the next 5 years.[1] It is a urologic emergency. Urethral catheterization or suprapubic cystostomy drainage is needed to treat this condition. The most common cause of AUR is benign prostate enlargement (BPE), and a large prostate will increase the risk. Transurethral resection of prostate (TURP) has long been the most commonly performed surgical procedure and also a gold standard for the management of BPE. Surgical complications of TURP are more for a prostate volume of >50 mL than for a smaller volume. In a recent study, BPE patients with AUR who underwent TURP have been found to be associated with a higher risk of complications than those without AUR.[2]

Over the years, laser prostate ablation techniques have been developed as the major alternative treatment for BPE. Chen et al[3] introduced a combined technique of high-intensity diode laser

* Corresponding author.
E-mail address: kuanchou@s.tmu.edu.tw (K.-C. Chen).

http://dx.doi.org/10.1016/j.urols.2015.12.002

(980 nm) and bipolar transurethral resection of prostate (DV+ bTURP), which could provide better intraoperative hemostasis. We assume that DV + bTURP can reduce the surgical morbidity and mortality in BPE patients with AUR. The aim of this study was therefore to examine whether this combined technique could reduce mortality and morbidity, by comparing it with TURP among patients with AUR, and to evaluate functional outcomes.

2. Materials and methods

We retrospectively reviewed the data of our patients who were treated surgically for BPE by diode laser or TURP between July 2011 and July 2013. Patients with a prostate volume of >50 mL who suffered from refractory AUR prior to surgery were included in this study. We excluded patients who had prostate cancer proved by surgical specimens, received prostate or urethral surgery previously, or suffered from neurogenic bladder dysfunction. Detailed medical histories, physical findings, and data of laboratory tests, including hemogram, test for prostate-specific antigen (PSA), and urinalysis, were all collected from medical charts. Prostate volumes were measured by preoperative transabdominal ultrasound.

2.1. Intervention and technique

All procedures were performed or supervised by a single surgeon who is highly experienced in laser surgery of prostate. The laser surgery was performed using a combination of a side-fire 980 nm high-intensity diode laser (Limmer Laser, Berlin, Germany) and bipolar TURP. Laser power could be set at either a continuous wave mode or a pulsed mode with a maximum power of 200 W. After diode laser vaporization, bipolar TURP, with power settings of 320 W for cutting and 200 W for coagulation, was used only to remove residual coagulated tissue, as cutting at the depth beyond this zone could result in further hemorrhage. The TURP surgery was performed by a monopolar cutting loop with a 26F continuous irrigation resectoscope. The generator was set at 100 W for coagulation and 130 W for cutting. After both surgeries, a 22F triple-lumen urethral catheter was indwelled with continuous saline irrigation. After hematuria subsided, the urethral catheter was removed and saline irrigation was discontinued.

2.2. Effectiveness and complication measures

In addition to baseline demographic data and perioperative data, we also evaluated the pre-existing comorbidity using the Charlson comorbidity index.[4] The peri- or post-operative complications were recorded, including blood transfusions, severe bleeding requiring reoperation, urinary retention requiring recatheterization, or TUR syndrome. All surgical complications of two groups were graded according to the modified Clavien system.[5] For measuring the effectiveness, several functional outcomes were assessed in this study, including the international prostate symptom score (IPSS), the rate of urine flow (Q_{max}), and postvoid residual volume (PVR) at baseline and at 6 months of follow-up.

2.3. Statistical analyses

Data are expressed as the mean ± standard deviation and were analyzed by IBM SPSS Statistics for Windows, version 20.0 (IBM Corp., Armonk, NY). Parameters were compared between the two groups by Chi-square test (categorical variables) and the independent t test (continuous variables), considering $p < 0.05$ as a significant difference.

3. Results

During the study period, a total of 60 patients were enrolled according to the inclusion and exclusion criteria. Thirty-four patients were treated with TURP and 26 with DV + bTURP. All patients were already catheterized due to previous AUR in the outpatient clinic or emergency department. Table 1 lists the demographic data of the two groups. There was no significant difference between the two groups with regard to patients' age, prostate volume, serum prostate-specific antigen value, baseline serum hemoglobin value, and Charlson comorbidity indexes.

3.1. Perioperative findings

Perioperative results are shown in Table 2. Compared with the TURP group, in the DV + bTURP group, significantly more time was required to perform surgery ($p < 0.005$), but catheterization time was significantly shorter ($p = 0.007$) and the decrease in hemoglobin level was less ($p < 0.001$).

3.2. Postoperative complications

Table 3 summarizes surgical complications of the two groups, which were graded according to the modified Clavien system. This suggests that the TURP group has a higher number of surgical complications than the laser group. However, in the absence of statistically significant results, no definite conclusion can be drawn. The immediate postoperative sepsis developed in four patients in the TURP group (11.8%) within 3 days of surgery, but in none of the patients in the laser group. Three patients (8.8%) in the TURP group and two (7.1%) in the DV + bTURP group developed acute epididymitis within 3 months of follow-up, even after receiving oral antibiotic prophylaxis. Three patients in the TURP group (8.8%) who had difficulty in voiding and bladder clot tamponade needed further blood evacuation in the operating room, whereas it occurred in only one patient in the laser group (3.8%). One patient in the TURP group had severe water intoxication (TUR syndrome) with acute renal failure. The patient was transferred to the intensive care unit (ICU) for further care, and it took more than 15 days for recovery.

3.3. Postoperative follow-up parameters

Table 4 shows that, compared with the baseline data, there were significant improvements in IPSS, Q_{max}, and PVR in both groups ($p < 0.01$ for each). At the 6-month follow-up, postoperative IPSS, Q_{max}, and PVR were comparable between the two groups.

Table 1
Demographic data.

Mean (SD)	Monopolar ($n = 34$)	DV + bTURP ($n = 26$)	p
Age (y)	72.19 (8.73)	72.81 (9.12)	0.796
AUR episodes	1.68 (0.79)	1.77 (0.82)	0.669
CCI score	0.52 (0.68)	0.73 (0.78)	0.270
Prostate size (mL)	62.45 (16.4)	71.64 (26.69)	0.215
PSA	7.07 (2.95)	5.72 (2.29)	0.312
Baseline Hb (g/L)	13.1 (1.41)	13.2 (1.85)	0.762
IPSS	24.2 (3.2)	25.2 (4.1)	0.307
Q_{max} (mL/s)	6.4 (1.9)	7.1 (2.3)	0.229
PVR (mL)	177.1 (47.0)	172.5 (66.4)	0.762

AUR = acute urinary retention; CCI = Charlson comorbidity index; DV + bTURP = high-intensity diode laser vaporization in combination with bipolar transurethral prostate resection; Hb = hemoglobin; IPSS = international prostate symptom score; PSA = prostate-specific antigen; PVR = postvoid residual volume; Q_{max} = peak flow rate; SD = standard deviation.