Treatment of benign prostatic hyperplasia using diode laser vaporization of the prostate – Fundeni Clinical Institute clinical experience

B. Hăineală[1,2,3], C. Codoiu[1], C. Dudu[1], S. Margaritis[1,3], B. Bădescu[1], A. Nastas[1], R. Tipa[3], C. Baston[1,3], I. Sinescu[1,3]

[1] *Center of Uronephrology and Renal Transplantation, Fundeni Clinical Institute, Bucharest*

[2] *National Institute of Research – Development in the Pathology Domain and Biomedical Sciences Victor Babeş Bucharest*

[3] *University of Medicine and Pharmacy "Carol Davila" Bucharest*

Abstract

Introduction. Benign Prostatic Hyperplasia (BPH) is one of the most frequent disease in adult advanced age male population. Besides the gold standard for the treatment of BPH – trans-urethral resection of the prostate (TURP) – lasers are also used, at various light wavelengths. In Fundeni Clinical Institute we started using a high power diode laser and our aim in this article is to report our clinical experience in 38 patients and the follow up results which were achieved at 3 month after surgery.

Patients and methods. Since December 2014, we treated in our hospital 38 patients with benign prostatic hyperplasia and important cardiovascular comorbidities, with high risk for surgery or on anticoagulant medication. We used a diode laser operating at 940 nanometers and emitting a maximum power of 250 Watt in continuous wave. The most common comorbidities present in patients who received laser vaporization were: Hodgkin's disease 1 patient, ischemic heart disease 14 patients, atrial fibrillation 5 patients, vascular prosthesis - 5, stroke - 2, high blood pressure - 7, chronic renal insufficiency - 1 patient. The average age of the 38 operated patients was 72,9 (59 to 81) years; preoperative prostate volume: 80,68 (35 to 220) cmc. 7 out of 38 patients (18,42%) had urinary catheter before procedure; 17 patients (44,73%) were on anticoagulant treatment.

Results and Discussion. During laser vaporizations an average total energy of 109,71 (30,32 to 188,60) kJ was used. In three patients (7,89%) we had perioperative bleeding, but none of this patients required blood transfusions. We removed the catheter after 4,5 (3 to 12) days and average hospitalization time was 7,2 (4 to 14) days. Compared with preoperative, postoperative data recorded at three months showed: the average maximum flow rate increased from 8,9 ml/min to 20,4 ml/min; average postvoid volume urine dropped from 180,4 ml to 18,6 ml.

Conclusion. For patients with prostate adenoma and important comorbidities, diode laser vaporization proved an effective treatment that does not put at risk the patient's general condition. Even though we evaluated the patients for a short perioud of time, the results show a significant improvement of lower urinary tract symptoms and make us consider this procedure as highly effective.

Key words: anticoagulant treatment, benign prostatic hyperplasia, clinical experience, diode, laser vaporization.

Correspondence to: Dr. Hăineală Bogdan Constantin
Fundeni Clinical Institute,
258 Fundeni Avenue, Bucharest, 2nd District, Bucharest, Romania
Tel.: 0040.766.532.566
E-mail: bhaineala@gmail.com

Introduction

Benign Prostatic Hyperplasia (BPH) is one of the most frequent disease in adult male population, especially in men of advanced age. The symptomatology of prostatic adenoma, as it is commonly known, is causing significant decrease in quality of life in men who suffer from it [1]. Treatment of BPH ranges from medical to surgical and the choice of the therapeutic conduct is usually determined by the severity of symptoms and the health condition of the patient [2]. The number and quality of treatment methods have been continously progressing in the past few years. Besides the gold standard – trans-urethral resection of the prostate (TURP) – lasers are also used, at various light wavelengths [3]. The different biological effects of the lasers in the tissue and the surgical technique determine the advantages and disadvantages of the several procedures [4]. In Fundeni Clinical Institute we started using a high power diode laser Dornier Medilas D UroBeam and our aim in this article is to report our clinical experience in 38 patients and the follow up results which were achieved at 3 months after surgery.

Patients and methods

Since December 2014, we treated in our hospital 38 patients with benign prostatic hyperplasia and important cardiovascular comorbidities, with high risk for surgery or on anticoagulant medication. We used a diode laser operating at 940 nanometers and emitting a maximum power of 250 Watt in continuous wave (Dornier Medilas D UroBeam).

Before surgery, we evaluated our patients, both in terms of prostatic disease and of anesthetic and cardiological risk. Patients with prior surgical treatment on the prostate were treated only if they had had cronic anticoagulant treatment.

Based on their general condition as assessed by the anesthesiologist, the medication could remain the same for laser procedure or was amended upon the anesthesiologist advice.

The most common comorbidities present in patients who received laser vaporization are presented in Table no.1.

Table no. 1. *Comorbidities associated with prostate adenoma*

Comorbidities associated with prostate adenoma	**Number of patients**
Hodgkin's disease	1
Ischemic heart disease	14
Atrial fibrillation	5
Vascular prosthesis	5
Stroke	2
High blood pressure	7
Chronic renal insufficiency	1

In terms of lower urinary tract symptoms (LUTS), we evaluated the maximum flow rate (Qmax), if the patient had not had complete urinary retention and urinary catheter had been not mounted. We also assessed prostate specific antigen (PSA) levels, urine culture, digital rectal examination, abdominal and transrectal ultrasound imaging (TRUS), in order to evaluate the size of the prostate and the presence of post-void residual urine.

The average age of the 38 operated patients was 72,9 (59 to 81) years; preoperative prostate volume: 80,68 (35 to 220) cmc. 7 out of 38 patients (18,42%) had urinary catheter before procedure; 17 patients (44,73%) were on anticoagulant treatment.

If the urine culture was positive, antibiotic medication was started before laser procedure. Patients displaying indications for prostate cancer were evaluated by needle biopsy in order to exclude the presence of prostate carcinoma. In the few cases of suspected urethral stricture, the patients underwent retrograde urethrocystography just before the laser vaporization.

We began all the procedures with uretrocistoscopy. Vaporization has been made using a 26 Fr. continuous flow resectoscope with a working element for the side-firing laser fiber. As irrigation fluid we used saline at room temperature, the fluid inflow bag was situated at a height of 80-100 cm over the patient, resulting in a high irrigant flow rate of about 500 mililitre per minute (ml/min) [5].

At the begining of the maneuver, we used 175 Watt in most of the cases. During the procedure, the laser power was increased up to the maximum laser power of 250 Watt. The treatment started at the bladder neck, with the fiber moved in a sweeping manner. The apical areas or the para-collicular zone was treated with the maximum power setting of 250 Watt in order to avoid damages to the sphincter. For the same reason, a safety margin of 5-8 millimeters was left between the endpoint of vaporization with respect to the capsule and the sphincter [6]. The treatment was considered to be complete if it was possible to see the inside of the bladder from the para-collicular area. After the procedure

we registered the total energy applied, the duration of the procedure and the number of fibers we used. After laser procedure, for 33 out of 38 patients (86,94%) we performed TURP of necrotic tissue in the prostatic cavity.

Results and Discussion

During laser vaporizations an average total energy of 109,71 (30,32 to 188,60) kJ was used. After learning curve period, the amount of energy applied decreased. In three patients (7,89%) we had perioperative bleeding, but none of this patients required blood transfusions. We removed the catheter after 4,5 (3 to 12) days and average hospitalization time was 7,2 (4 to 14) days.

Compared with preoperative, postoperative data recorded at three months showed: the average maximum flow rate increased from 8,9 ml/min to 20,4 ml/min (Chart No.1); average postvoid volume urine dropped from 180,4 ml to 18,6 ml (Chart No 2).

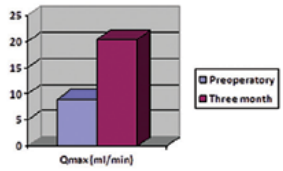


Chart No.1 Differences between preoperative and postoperative avarage maximum flow rate in patients without urinary catheter preoperatory

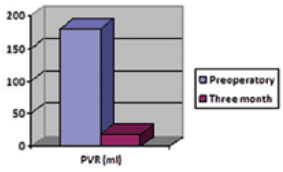


Chart No. 2 Differences between preoperative and postoperative average postvoid volume in patients without urinary catheter preoperatory

We had no patients with incontinence postoperatory. Eight patients (21,05%) had urinary tract infection immediately after catheter removal. After three months only two patients had positive urine culture. We had no patient with stricture of the urethra, probably due to the short time of follow up.

For one patient we had to reTURP the necrotic tissue from the prostatic cavity that was too bulky for spontaneous removal.

Conclusions

For patients with prostate adenoma and important comorbidities, diode laser vaporization proved an effective treatment that does not put at risk the patient's general condition.

Even though we evaluated the patients for a short perioud of time, the results show a significant improvement of lower urinary tract symptoms and make us consider this procedure as highly effective.

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