

## VISUAL LASER ABLATION PROSTATECTOMY IN PATIENTS WITH BENIGN PROSTATIC HYPERPLASIA

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### SUMMARY

Results and efficacy of visual laser ablation prostatectomy (VLAP) in twenty patients with benign prostatic hyperplasia (BPH) were evaluated by means of parameters including symptom scores, urinary peak flow rates, post-void residual urine volumes and prostatic weights.

The mean operation time was 18 minutes and the mean energy applied to the prostatic tissue was 13.120 Joules.

When we compared all parameters mentioned above, there was a significant difference between preoperative values and values at 3rd. and 6th. months.

These early results indicate that VLAP is an effective treatment modality for BPH. However longer follow-up is mandatory to make a certain definition.

**Key Words :** Benign Prostatic Hyperplasia, Nd:YAG Laser In Surgery

### INTRODUCTION

Currently, transurethral resection of the prostate (TUR-P) as a treatment for benign prostatic hyperplasia (BPH) is accepted as the gold standard by urologists. The mortality of the procedure has been reduced to 0.2 % by time but the incidence of immediate postoperative morbidity has remained unchanged at about 18 % (1, 2). The high cost of the TUR-P in physician time, medical expense and patient morbidity has caused urologists to search for other treatment modalities.

Recently new systems using side-firing laser technology which allows better delivery of the Neodymium yttrium aluminium garnet (Nd:YAG) laser energy to the prostatic tissue have been developed.

In the canine model, it has been shown that the tissue temperature can be raised to the point of coagulation and evaporation and their combined effect is termed "ablation".

In our clinic we have begun to perform transurethral visual laser ablation prostatectomy (VLAP) in November 1993 and the results of our first 20 patients is reported in this paper.

### MATERIALS AND METHODS

Twenty patients with a mean age of 66 (range 52-85) who attended the urology clinic with proven symptoms of BPH were treated. Prior to the laser therapy, patients were assessed with a AUA-6 symptom score (3). Preoperative investigations included IVP, urine culture and routine blood studies, urinary flow rate, digital rectal examination of the prostate (DRE), serum prostatic specific antigen (PSA) determination, Measurements of the prostatic weight and bladder residual volume were done with transabdominal ultrasound. Although, transrectal ultrasound examination is more convenient for this purpose, it was not used since we do not have a rectal probe. The prostatic weights were calculated with a computerized mini calculator, which was specifically designed for prostatic volume and weight measurements in grams, by giving the US-measured 3-dimensions of the prostate in millimeters (Prostameter, SRL-Milano). Cystourethroscopy was performed to evaluate lateral and median lobe prostatic enlargement prior to the procedure. Incontinence, retrograde ejaculation and impotence were questioned to the patients before the procedure and no pathologic symptom was found.

Patients with disproportionately enlarged median lobe and neurogenic bladder dysfunction were excluded from the study. A preoperative PSA level > 4 ng/ml. and a suspicious nodule on DRE are also accepted as exclusion criteria because of the potential risk of prostatic cancer.

We used a Zeiss Opmilase YAG-M generator as Nd:YAG laser energy source, and two different side-firing probes, (UltraLine = 600 micron, energy transmission angle: 80° and ProLase II = 1000 micron, energy transmission angle: 90°) to lase the prostate.

The VLAP procedure was done under spinal or epidural anaesthesia. Prior to the procedure, the limits of laser ablation at the bladder neck and verumontanum were marked in 4 quadrants at 2, 4, 8 and 10 o'clock. Resectisole was used for irrigation at flow rates between 100-200 ml/min. The laser was set at 60 W. power setting on continuous wave. Using standard laser safety precautions, the fibre was positioned in the posterior urethra, protruding 6-7 mm. beyond the end of a 21 F cystoscope with a 12° viewing telescope. Lateral lobe enlargement is treated by lasing 1 minute each quadrant, and moving the probe in the posterior urethra by using the landmarks previously identified. For patients with median lobe enlargement, we used 40 W. power for approximately 30-40 seconds at 6 o'clock to achieve satisfactory ablation.

There was no significant bleeding during the VLAP procedure. All patients were discharged home the day following surgery with a 2-way, non-irrigating 20 F. Foley catheter. We removed the catheters on the 4th. day following the procedure.

The results and efficacy of treatment were evaluated at 3rd and 6th months postoperatively with AUA symptom scores, peak flow rates, postvoid residual urine volumes and prostatic weights. We did not measure the prostatic weight at postoperative 3rd month since we thought that patients might still be passing necrotic tissue during this period.

Data were analysed for differences using the unpaired Student's t-test. Statistical significance was assumed for  $p < 0.05$ .

## RESULTS

The complications are outlined in table I. No serious adverse effects were seen during the procedure. Prolonged irritative symptoms lasting approximately 3-4 weeks were commonly seen in the postoperative period. Two patients developed urinary retention after the catheter removal, and they were treated by recatheterisation for three days.

Our mean operation time was 18 min. (range 15-25) and the average total energy (Watt x Time = Joules) delivered to tissue was 13 120 J. (9000- 19 200).

The mean preoperative symptom score was  $17 \pm 4.5$ , peak flow rate was  $9.2 \pm 3.9$  ml/sec., and residual urine volume  $81.5 \pm 39.5$  ml. The mean preoperative prostatic weight was  $34 \pm 13.9$  gr.

3 months postoperatively, the mean symptom score fell to  $8.3 \pm 4.9$  (- 51%), residual urine volume to  $43 \pm 31.2$  ml. (- 47%). The mean peak flow rate was  $15.4 \pm 5$  ml/sec. (+ 67 %).

6 months after treatment the mean symptom score was  $5.3 \pm 4$  (- 68 %), residual urine volume  $25.5 \pm 27.6$  ml. (-69 %) and the mean peak flow rise to  $17.7 \pm 4.7$  ml/sec. (+ 92%). The mean prostatic weight fell to  $26 \pm 9.7$  gr. (- 23 %) in this month.

None of the patients had incontinence, retrograde ejaculation or impotence at 3rd. or 6th. months postoperatively.

When we compared the preoperative parameters with the postoperative therapy results at the 3rd. month, significant differences were found between symptom scores, residual urine volumes and peak flow rates ( $p < 0.05$ ). In postoperative 6th. month, significant differences were also found between preoperative and postoperative prostatic weights and in other 3 parameters mentioned above ( $p < 0.05$ ).

**Table I:** Complications of VLAP procedure.

1 Intraoperative:		None
2 Early postoperative:	Dysuria	16 (80%)
	Frequency	14 (70%)
	Bleeding	2 (10%)
	Recatheterisation	2 (10 %)
3 Postoperative 6th month:	Incontinence	None
	Retr. ejaculation	None
	Impotence	None

## DISCUSSION

In recent studies, BPH showed a prevalence of about 100% in 70-year-old or older men (4). Transurethral resection of the prostate is generally accepted as the method of choice in modern BPH treatment. Mebust (2) and Holtgrewe (1) noted an 18% morbidity rate associated with TUR- P due to complications such as bleeding during and after surgery, fluid absorption, postoperative urinary retention, urinary infection and bladder neck contracture. Also a small but significant occurrence of impotence and incontinence should be expected.

Hannapel et al. (5) and Chute et al. (6) showed that the results after TUR-P appeared to be inferior to results after suprapubic prostatectomy in patient's subjective symptomatology after a postoperative period of approximately 2 years.

During the last decade, many forms of alternative therapies for BPH have been evaluated including medical management using alpha blockers, 5-alpha-reductase inhibitors or androgen suppression, insertion of prostatic stents and coils, transurethral incision of the prostate, balloon dilatation, microwave thermotherapy and low-level radiofrequency. One another alternative to the traditional transurethral resection is the use of Nd:YAG laser energy combined with a side-firing fiber.

This new technique has many advantages to TUR-P including reduced operation time, elimination of fluid overload, troublesome operative and postoperative bleeding and continuous bladder irrigation for cloths, elimination of retrograde ejaculation and bladder neck contracture, reduced hospital stay and postoperative nursing care.

Roth et al (7) and Assimos et al. (8) studied the transurethral ultrasound-guided laser induced prostatectomy (TULIP) system to treat the canine prostate for bladder outlet obstruction and showed significant tissue ablation. Johnson et al. (9) first reported the VLAP therapy in the canine model and described the use of the fibre with conventional urological instruments. Costello et al. (10) have begun treating BPH patients with VLAP in 1990.

Dixon et al. (11) reported in a randomized prospective study, that symptom improvements following VLAP and TUR-P are equivalent. Shaffer et al. (12) concluded in their study, that laser ablation of the prostate compares favorably with the "gold standard" TUR-P. Kabalin et al. (13) evaluated the efficacy of VLAP treatment with symptom score, peak flow rate and post-void residual urine volumes at three months and found significant improvements in all parameters.

A number of VLAP studies were presented at the 13th. Turkish National Urology Congress with similar results that showed significant improvements in symptom scores, peak urinary flow and residual urine volumes.

Sert et al. (14) and Küpeli et al. (15) reported that electroresection of necrotic tissue resulting from VLAP procedure has lessened the severity of irritative voiding symptoms in the early postoperative period. But the cost effectivity of this adjunct is needed to be discussed.

In our study preliminary postoperative results at the 3rd. and the 6th. months revealed that selected patients with symptomatic BPH have significantly benefited from this less morbid therapy. However longer follow-up periods and larger number of patients are required to make certain conclusions.

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