

Visual Laser Ablation of the Prostate (VLAP)

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The first Visual Laser Ablation of the Prostate (VLAP) to be carried out in Canada was performed on September 23, 1992 at the Hamilton Civic Hospitals - Henderson Division, Hamilton, Ontario. Dr. Ian Davis, representing the Hamilton Civic Hospitals carried out the procedure as part of a study set up in association with Dr. Sullivan of the Vancouver General Hospital, Vancouver, B.C.; and Dr. Belitsky of the Victoria Hospital, Halifax, N.S.

The prostate is a walnut-sized gland that forms part of the male reproductive system. It is comprised of two lateral lobes, an anterior lobe, posterior lobe and median lobe, and is enclosed by an outer layer of tissue called the prostatic capsule. The gland is located just in front of the rectum and below the bladder and surrounds the urethra.

Benign Prostatic Hyperplasia (BPH) is a condition which occurs commonly in men as they age. It involves enlargement of the prostate gland which impedes the flow of urine from the bladder. The degree

of impedance may vary from a slight slowing of the stream to complete urinary retention. Symptoms may include frequency, nocturia, urgency, incontinence, intermittency, hesitancy, terminal dribbling and decreased urinary flow.

In the past Transurethral Resection of the Prostate (TURP) has been the most common treatment of this condition. This procedure involves carving away the enlarged portion of the prostate through a resectoscope inserted through the urethra. A loop or knife electrode is used. A 10 - 18% morbidity rate, possible extensive blood loss, impotency, retrograde ejaculation, urethral stricture and incontinence have led to a constant search for a more effective way of treating BPH.

Alternative treatments for BPH include Balloon Dilatation, Transurethral Thermal Therapy, Focussed Ultrasound, medical treatment and Radio Frequency Ablation. Prostate glands that are very large must be treated with surgical intervention - open prostatectomy.

Lasers have been used in many areas of surgery over the past decade. In the early 1990's Britain and the United States began to study the effects of Neodymium:YAG laser on prostate tissue. It was discovered that laser prostate therapy achieved com-

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Abstract

Benign Prostatic Hyperplasia is a condition which occurs commonly in men as they age. The degree of impedance of the flow of urine from the bladder due to prostate gland enlargement varies from a slight slowing of the stream to complete urinary retention. Transurethral Resection of the Prostate (TURP) has historically been the most common treatment of this condition. While other alternative treatments are available, the use of lasers to perform Visual Laser Ablation of the Prostate (VLAP) is moving to the forefront as a treatment of choice for many Urologists.

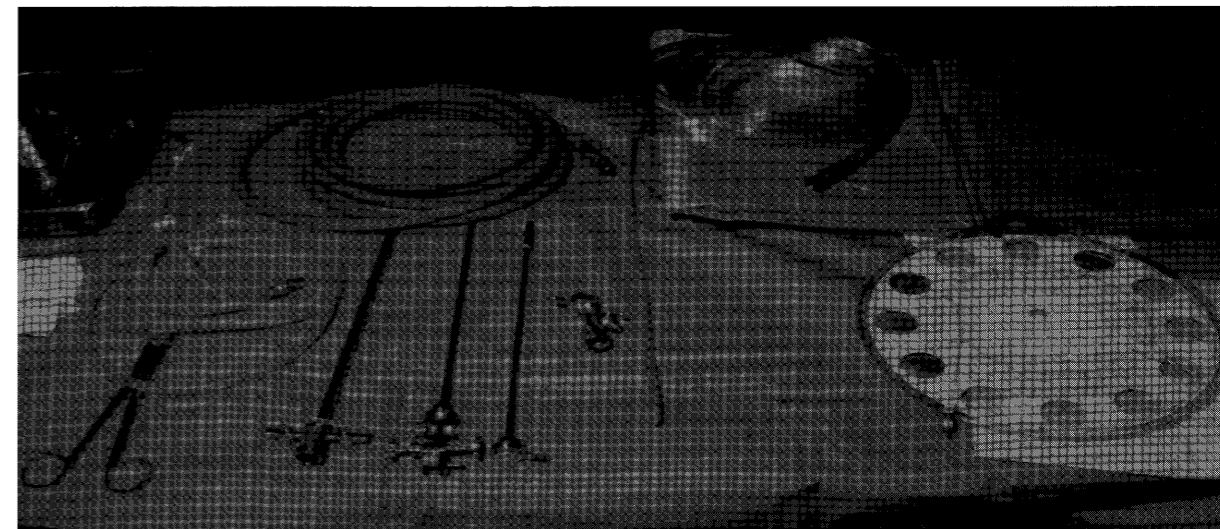


Figure 1 - VLAP Table Set-Up

parable results to TURP's but with a decreased morbidity rate. Laser fibers used to treat prostate obstruction include interstitial fibers to reduce prostate bulk, side-firing fibers for ablation and contact (bare) fibers for the cutting or ablation of the bladder neck.

Lasers convert light energy into thermal energy to produce tissue effect through continuous wave energy. Vaporization of tissue beneath the epithelial layer will cause a "popcorn" effect - when this happens formation of a cavity will occur. The ND:YAG causes coagulation necrosis of the prostatic tissue.

Pre-Op Evaluation

The standard pre-op evaluation includes physical examination with digital rectal examination, urinalysis, ultrasound evaluation of upper tracts and prostatic specific antigen levels. An outpatient cystoscopy is performed prior to surgery to eliminate the question of pathology involving the urethra and bladder. If the PSA level or rectal examination are abnormal a transrectal ultrasound guided biopsy to rule out cancer is done prior to surgery because no tissue will be available for pathological evaluation postoperatively.

Procedure

The following equipment is used for VLAP procedures:

- #23 continuous flow cystoscope with a
- #19 catheter deflector
- light and water cord
- 3000cc Sterile Water
- 30 degree telescope

- hydrogen peroxide
- stainless steelware
- 2 applicators
- camera cover
- urinary leg bag
- suction tubing
- 2-way #18 foley catheter
- Stopwatch
- Catheter introducer
- Bard Urolase Fiber
- N.D. YAG laser machine
- Bare fiber (may be added for incision of bladder neck)
- Video monitor, light source and camera.

Figure 2 - Monitor Set-Up



The cysto suite is set up in compliance with laser safety standards to include appropriate eyewear for both the patient and the staff, masks, window coverings and laser warning lights and signs outside the room. A basin of water and a Type B/C fire extinguisher should be available in the room.

The patient is usually given a general anaesthetic unless physical condition warrants a spinal anaesthetic. The patient is placed in medium lithotomy position and the penis, scrotum and perineum are prepped. Draping is in a routine fashion.

The cystoscope with camera attachment is inserted into the urethra by the surgeon. Sterile water irrigation, suction, light and water cords are put into place. A visual assessment of the lateral and medial lobes including the bladder neck is carried out prior to the laser procedure. The Urolase-Bard 90 degree sidefiring reflective fiber is positioned into the Laserscope and should protrude about 5mm beyond the end of the instrument. It is important to position the fiber proximal to the verumontanum above the external urethral sphincter. The lasing is done at the 2, 4, 8 and 10 o'clock positions on the prostate gland. Continuous sterile water irrigation cools the gold-plated fiber tip throughout the procedure.

See Figure 2 for Monitor Set-Up, and Figure 3 for view of prostate before lasing.

Settings for the YAG laser may vary according to the laser manufacturer. Our early VLAP's were carried out using a Medilas II laser set at 60 watts with 60 second firings to each of four positions. Since the spring of 1993 we have used the laser set at 40 watts with 90 second firings. Additional firings and firing time depends upon prostate size and surgeon's preference. *See Figure 3 for view of Post Lasing.*

Bladder neck incision may be carried out with the bare fiber set at Fibertom 3 and 40 watts. The laser nurse is responsible for the operation of the laser and footpedal under the direction of the surgeon.

The laser fiber tip is directed by the surgeon and should be cleaned after each firing, using hydrogen peroxide and a wooden applicator.

After removal of the cystoscope and fiber, a two-way foley catheter is inserted into the urethra and attached to a leg bag. There is no need to hook up irrigation. The patient is transferred to PARR and discharged from the hospital later in the day with post-VLAP instructions. Prescription for antibiotic and anti-inflammatory medications are given to each patient.

Home Care

The catheter remains in the patient for 5 days after which the patient will remove his own catheter. Voiding may be slow for the first 2 - 3 weeks until the necrosed tissue begins to slough away. Approximately ten percent of patients may find it necessary to return to Emergency for re-catheterization due to urinary retention.

Comparison TURP to VLAP

1. Hospitalization / Operative Time

A TURP requires 4 - 5 days hospital stay whereas the VLAP is booked as a same day surgery. This is not only attractive to the patient but also helps reduce hospital stay costs.

2. Anaesthetic

The preference for this procedure seems to be general anaesthesia, however this procedure may be carried out under spinal anaesthesia and is the anaesthetic of choice for TURP's. There is potential to use local anaesthetics.

3. Blood Loss / Fluid absorption

There is no blood loss or fluid absorption with VLAP as tissue ablation is by means of vaporization necrosis with no disruption of prostatic venous sinuses as there are during TURP's.

4. Catheterization

Post-TURP patients have an indwelling with irrigation for 1 - 4 days. Patients having VLAP are sent home with a catheter draining to a leg bag. Irrigation is not necessary and the catheter is removed by the patient after 5 days.

5. Bladder Irritability

Results of the study conducted showed that in a one month post-op period TURP patients indicated 30 - 50% irritability while VLAP patients experienced 10 - 50% irritability. Since the time of this study, slight technical adjustments during lasing can reduce this percentage of irritability significantly for VLAP patients.

6. Retrograde Ejaculation

Retrograde ejaculation involves the backward movement of semen into the bladder. This occurs in 50% of post-TURP cases while post-VLAP cases show an incidence of 10 - 40%.

7. Incontinence

TURP's show a 1 - 2% incidence of urinary incontinence compared to an occurrence of less than 1% in VLAP patients.

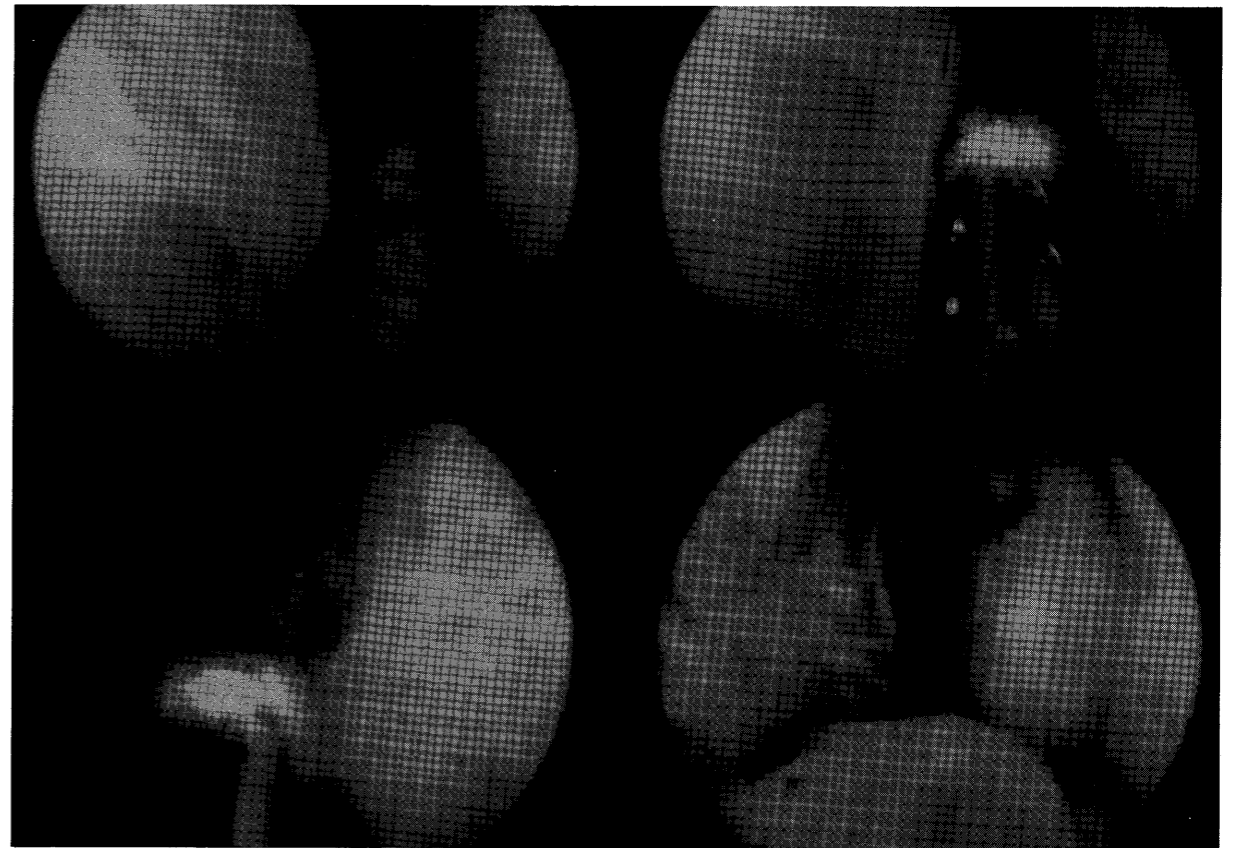


Figure 3 - Four Views - **Upper Left Quadrant** shows prostate before lasing. **Upper Right:** Laser Fiber in place (8 o'clock position). **Lower Right Quadrant** shows prostate after lasing.

8. Return to Normal Activity

The expected recovery to normal activity for the TURP patient is 28 to 42 days, whereas VLAP patients are able to return to normal activities after seven days.

Conclusion

If a patient meets all criteria, results have shown that VLAP is a safer procedure with decreased morbidity and blood loss. The hospital stay is significantly reduced decreasing costs to the hospital while at the same time offering additional benefit to the patient. Return to work within a one week period is a point of further encouragement for many people in this economic climate.

As the procedure has only been in existence worldwide since the early 1990's long term results are unobtainable. It is clear that further study with this exciting new alternative will be necessary.

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