

## Visual Laser Ablation of the Prostate (VILAP): Experience of the First One Hundred Cases in Jakarta

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### Abstrak

*Transurethral resection of the prostate (TUR P) masih merupakan cara baku penanganan penderita dengan Pembesaran Prostat Jinak (PPJ), meskipun masih banyak komplikasi yang dapat terjadi. Visual laser ablation of the prostate (VILAP) menggunakan Neodymium Yttrium Aluminum Garnet (Nd-YAG) laser mulai diperkenalkan sebagai alternatif penanggulangan PPJ pada manusia pada tahun 1992. Sejak April 1993 sampai Mei 1994 di RS Sumber Waras, Jakarta, dilakukan VILAP pada 100 penderita dengan PPJ. Rata-rata umur penderita 67.8 tahun dengan kisaran 41 - 91 tahun. Dari 100 penderita pada 85 penderita dapat diperoleh data yang lengkap untuk evaluasi. Rata-rata skor Madsen Iversen membaik dari 18.3 menjadi 8.4 dan 6.0 masing-masing setelah 1 dan 2 bulan ( $p < 0.05$ ), sedang rata-rata pancaran maksimal naik dari 6.7 ml/detik menjadi 10.8 ml/detik dan 13 ml/detik ( $p < 0.05$ ) dan sisa kencing turun dari 107.8 ml menjadi 34.4 dan 11.2 ml 1 bulan dan 2 bulan setelah operasi ( $p < 0.05$ ). Terjadi komplikasi perdarahan pada 2 penderita yang tidak memerlukan transfusi darah dan nyeri pada 3 penderita. Retensi lebih dari 1 minggu pada 19 penderita dan pada 2 penderita terpaksa dilakukan TUR P. Ejakulasi retrograd ditemukan pada 2 penderita dari 74 penderita yang masih peduli terhadap kehidupan seks. Impotensi pada 1 penderita dan kegagalan mencapai kekakuan (rigiditas) pada waktu ereksi pada 3 penderita.*

### Abstract

*Transurethral resection of the prostate (TUR P) is still regarded as a standard treatment for BPH, but still have complication. Visual laser ablation of the prostate (VILAP) using Neodymium Yttrium Aluminum Garnet laser has been introduced as an alternative treatment for BPH since 1992. We have treated 100 cases of BPH by VILAP since April 1993 till May 1994 in Sumber Waras Hospital. Mean age of the patients is 67.8 years range 41-91 years. From the 100 patients, only in 85 patients was the data obtained enough for analysis. There were improvement of mean symptom score (Madsen Iversen) from 18.3 initially to 8.4 and 6.0 after 1 month and 2 months respectively ( $p < 0.05$ ) and mean maximal flow rate increased from 6.7 ml/second to 10.8 ml/second and 13 ml/second after 1 month and 2 months respectively ( $p < 0.05$ ) while rest urine dropped from 107.8 ml initially to 34.4 ml and 11.2 ml 1 month and 2 months respectively ( $p < 0.05$ ). Complications: Post operative bleeding occurred in 2 patients but no blood transfusion was required, post operative pain were found in 3 cases and prolonged retention (more than one week) in 19 cases and in two cases TUR P were done. From 74 cases who are still concern with sex, retrograde ejaculation were found in 2 cases, impotence in one case and in 3 cases failure to have full rigidity were noticed.*

**Keywords:** Visual laser ablation of the prostate, benign prostatic hyperplasia, efficacy, complication.

## INTRODUCTION

Benign Prostate Hyperplasia (BPH) is the second most frequent disease in urological clinic in Indonesia.<sup>1</sup> Nearly 60% of the time of practicing urologist is focused on this disease.<sup>2</sup> The incidence of BPH is related to age, where at the age of 60 years the incidence is about 50% and around one third of it needs treatment.<sup>3-7</sup>

Transurethral Resection of the Prostate (TUR P) is still regarded as a standard of treatment with its advantages as a fast relieve from obstructive symptoms, giving tissue for pathological specimen, but at the same time it also has many disadvantages such as time consuming operation, bleeding which may need blood transfusion, clot retention, possible hiponatremia, retrograde ejaculation, impotence in about 4-40%.<sup>3,6,8-10</sup>

Therefore in these last 10 years many other alternative methods of treatment for BPH have been proposed. Medical treatment has been tried, and 5 reductase inhibitor to prevent further enlargement of the gland is still under investigation,<sup>11,12</sup> and 1 adrenergic block-

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ing agent to release bladder neck functional obstruction in useful only for temporary treatment.<sup>13-15</sup>

Less invasive treatment such as balloon dilatation, and urethral stenting, the results are only temporary relief of obstruction.<sup>16,17</sup> Hyperthermia and thermotherapy gives only improvement of the obstruction in 50-60% of the cases.<sup>18</sup>

Neodymium Yttrium Aluminum Garnet (Nd YAG) laser was tried to ablate prostate gland for the first time in 1991. It was Roth and Aretz<sup>19</sup> who tried prostate ablation in dog using Nd YAG laser with ultrasound guiding. Costello et al.,<sup>8,9</sup> reported their first experience with good result, using side firing laser fiber introduced through ordinary cystoscope to deliver laser beam which will enable to bent the laser beam by 90°, to ablate human prostate more accurately. Since laser beam gives coagulation necrosis and not opening blood vessels, visual laser ablation of the prostate (VILAP) gives only minimal bleeding.<sup>20</sup> Because no tissue for pathological specimen can be obtained by VILAP, preoperative assessment to exclude malignancy is becoming very important.<sup>21,22</sup>

To our knowledge, until now there was no report yet on the experience in using VILAP in Indonesia, our first experience in treating 100 cases of BPH by VILAP will be reported.

**MATERIALS AND METHODS**

From April 1993 until May 1994, 100 patients with the diagnosis of BPH have been treated by VILAP in

Sumber Waras Hospital, Jakarta, using Nd YAG laser from TRIMEDYNE generator, with Myriad side firing laser fiber, with a diameter of 600 micron.

The inclusion criteria were patients with the diagnosis of BPH, signing informed consent for laser treatment, with Madsen Iversen symptom score more than 10, maximal flow rate less than 10 ml/second measured by Dantec Flowmeter, or residual urine volume of more than 50 ml measured by post voiding catheterization, no suspicion of malignancy on digital rectal examination (DRE) and on suprapubic ultrasonography, serum prostate specific antigen (PSA) level less than 4 ng/ml, negative urine culture and no bladder stone detected by intravenous urography (IVU) and cystoscopy.

Exclusion criteria were urinary tract infection, signs and clinical symptoms of neurological bladder disorders, urethral stricture, bladder stone and bladder diverticulum.

Treatment was performed by using GU cystoscope™ 22 Charrier sheath to introduce the laser fiber, with distilled water as an irrigating fluid. Lasing was done at 10, 2, 4, and 8 of endoscopic view, 60 seconds at 60 watts at each point of lateral lobes, and if the prostatic urethra is more than 2.5 cm in length, two rows of lasing points with the same method were done respectively, and for median lobe two or three lasing points, depend on the size of the median lobe, 30 seconds at 60 watts were done (see Figure 1).

Suprapubic tube using Cystofix 12 Charrier and indwelling catheter using 20 Ch. Foley catheter were

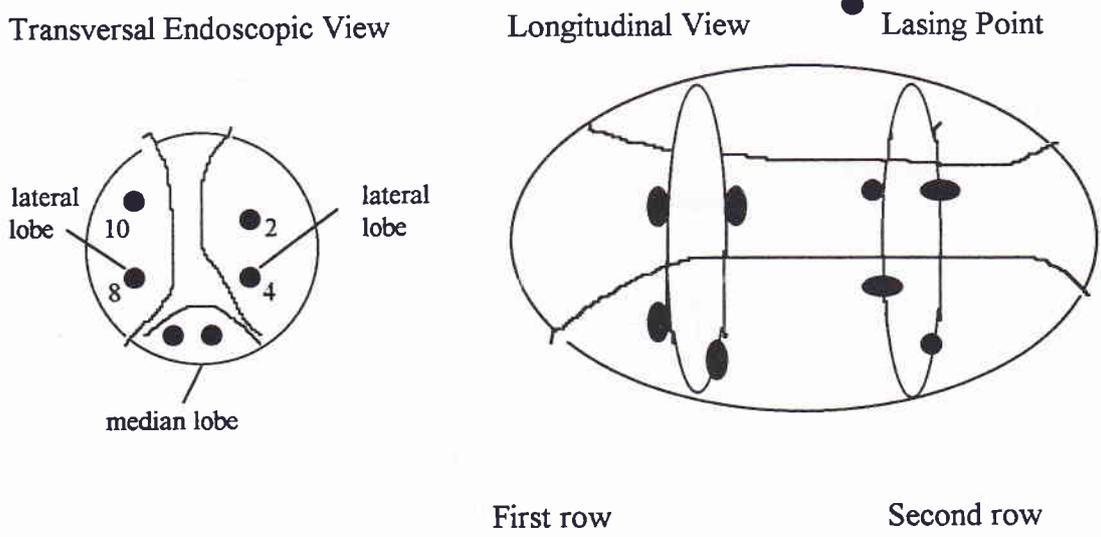


Figure 1. Diagrammatic of lasing points to the prostate.

introduced post operatively. Indwelling catheter was removed three days post operatively, and suprapubic tube was removed after spontaneous micturition occurs.

Preoperative assesment consists of physical examination, including DRE, measurement of Madsen Iversen Symptom score, maximal flow rate, post voiding residual urine, serum prostate specific antigen (PSA), intravenous urography (IVU), and suprapubic ultrasonography.

Postoperative assesment was done one month and two monts postoperatively, measurement of symptom score, maximal flow rate, post voiding residual urine were performed, and complications were noted.

Improvement of symptom score, maximal flow rate, and residual urine volume were analyzed by comparing their mean values, preoperative and postoperatively, using student t test, and  $p < 0.05$  is considered as significant.

## RESULTS

From 100 patients treated by VILAP, the mean age was 67.8 years (range 41 to 91 years). The laser energy applied between 14.4 to 32.6 kilo joules. The energy was calculated by multiplying the number of seconds to the number of watt used during the treatment.

Table 1. Age distribution of patients treated by VILAP.

Age (Years)	No of patients
41 - 51	2
51 - 60	22
61 - 70	38
71 - 80	29
81 - 90	8
91	1
n	100

The preoperative mean of symptom score was 18.35 with standard deviation of 4.37, the mean of maximal flow rate was 6.62 ml/sec. with standard deviation of 2.16 ml/sec, and the mean of residual urine volume was 107.8 ml with standard deviation of 83.09 ml.

After one month and two months follow-up, only in 85 cases the data of symptom score, maximal flow rate

and residual urine volume could be obtained. In 10 cases they refused catheterization to measure residual urine, and in 5 cases we lost of follow-up. Only in those cases with complete data the improvement of symptom score, maximal flow rate, and residual urine volume were analyzed.

From the 85 cases, the mean of symptom score that was initially 18.3 with standard deviation of 4.37 preoperatively, decreased to 8.4 with standard deviation of 3.75 after one month follow-up ( $p < 0.05$ ) and 6.0 with standard deviation of 3.03 after two months ( $p < 0.05$ ). The score after two months follow-up consists mostly of irritable symptoms. Mean maximal flow rate increased from 6.7 ml/sec with standard deviation of 2.16 ml/sec initially to 10.8 with standard deviation of 2.50 ml/sec after one month ( $p < 0.05$ ) and 13 ml/sec with standard deviation of 1.63 ml/sec after two months ( $p < 0.05$ ), while mean residual urine volume decreased from 107.8 ml with standard deviation of 83.09ml initially to 34.4 ml with standard deviation of 53.63 ml after one month ( $p < 0.05$ ) and 11.2 ml with standard deviation of 24.01 ml after two months ( $p < 0.05$ ).

Table 2. Results of VILAP using Nd YAG for BPH in 85 evaluable cases.

Parameter	Before treatment	1 month after treatment	2 months after treatment
	mean $\pm$ SD	mean $\pm$ SD	mean $\pm$ SD
MI Score	18.35 $\pm$ 4.37	8.40 $\pm$ 3.75	6.00 $\pm$ 3.03
Max.Flow Rate (ml/sec)	6.70 $\pm$ 2.16	10.8 $\pm$ 2.50	13.0 $\pm$ 1.63
Residual Urine Vol. (ml)	107.8 $\pm$ 83.09	34.4 $\pm$ 53.63	11.2 $\pm$ 24.01

For all the three parameters, the improvement of one month and two month after treatment were all significant ( $p < 0.05$ ).

## Complications

Bleeding was observed in two cases, in one of the cases we had to coagulate the bleeding point using cutting loop, and in the other one the bleeding was overcome by putting traction to the balloon inflated Folley catheter. No blood transfusion was needed in both cases.

Postoperative pain was observed in three cases, and ketoprofen 100 mg Suppository tdd for two days were given.

Prolonged urinary retention (more than seven days) were observed in 19 cases, and the longest was until 11 days. Diversion to TUR P occurs in 2 cases, in one it was because of the median lobe was not intendedly chopped during the lasing process, and the free floating of median lobe obstructed, and TUR was performed. In the second case, TUR P was done because the patient came from a remote area, and he wanted to be free from suprapubic tube as soon as possible.

No postoperative true incontinence was observed.

Only in 74 cases in our series who still had concern with sexual life, from which retrograde ejaculation was observed in 2 cases with the age of 65 and 51 years old, total impotence in 1 case (patient had been suffering from diabetes since 10 years) with 74 years of age, and failure in having full rigidity during erection in 3 cases, which preoperatively they never had that problem.

Table 3. Adverse effects of VILAP in 100 patients with BPH

Complication	
No complication	74
Bleeding	2
Postoperative pain	3
Prolonged retention	19
Diversion to TUR P	2
Retrograde ejaculation	2*
Total impotence	1*
Failure in getting rigid erection	3*

\* amongst 74 patients who still have concerns on sexual life

## DISCUSSION

VILAP is still relatively a new method of treatment of BPH. As far as we know, no single study on this new techniques has been reported in Indonesia. Therefore we think it is necessary to report our results in using VILAP for the treatment of BPH as a first experience in Indonesia.

We were still using Madsen Iversen scoring system for symptoms, since most of our cases consists of elderly people with not so high educational level, which make it very difficult to make self judgement if we are using the International Prostate Scoring Systems (IPSS).

From those 85 cases with evaluable data, we observed significant improvements in the mean of symptom score, which decrease from 18.3 initially to 8.4 and 6.0, one month and two month respectively; mean maximal flow rate which increased from 6.7 ml/sec initially to 10.8 ml/sec and 13.0 ml/sec, and mean residual urine volume decreased from 107.8 ml initially to 34.4 ml and 11.2 ml one and two months respectively. This findings are comparable with the result of Costello et al.<sup>8,9</sup> The improvements of all parameters were observed very clearly during the first one month, but still continuing until two months after treatment ( $p < 0.05$ ), this findings are consistent with the finding of histological changes as reported by Costello<sup>23</sup> that the process of coagulation necrosis and tissue sloughing still occur after one month or more.

In our series, gross hematuria was found in 2 cases (2%) which is much less than the result of Cowles et al.<sup>24</sup> (16.1%), but higher if compared to the result of Kabalin et al.<sup>25</sup> which claiming no changes in hematocrit pre- and postoperatively and no requirement of blood transfusion as reported by Kabalin et al.<sup>26</sup> and Narajan et al.<sup>27</sup> Postoperative pain was observed in three cases (3%) which also less than the series of Cowles (17.7%)<sup>24</sup> and in those three cases they need keto-profen 100mg suppository.

Prolonged retention (more than seven days) was observed in 19 cases (19%) which in two cases were lasting until 11 days, and in two cases (2%) diversion to TUR P should be done because in one case, part of median lobe was chopped and the free floating median lobe obstructed the bladder neck, and removed by TUR after resected in to smaller pieces, and in the other one case because of practical reason to free the patient from cystostomy as soon as possible since the patient come from remote area. This number of diversion to TUR P is smaller than the series of Cowles et al.<sup>24</sup> Which he found four cases out of 56.

The prolonged retention rate in our series (19%) is lower compared to the laser coagulation therapy group (25%) but higher than the evaporation therapy group (6.25%) reported by Narajan et al.<sup>27</sup> in his comparative study.

Retrograde ejaculation was noted in two cases out of 74 who still have concern on sexual life, and unfortunately those two cases belongs to the younger age group, 55 and 59 years old, this finding is better than

the result reported by Cowles et al.<sup>24</sup> and Kabalin et al.<sup>25,26</sup> which is 16% at twelve months of follow-up, and 27% after three years of follow-up.

Total impotence after VILAP was noted in one 74 years old patient who has been suffering from diabetes mellitus since the last 10 years. In this case, we think that the cause of total impotence is not only by the VILAP.

In three cases, failure in having full rigidity during erection was observed two months after VILAP and the age of the patients were 55,56 and 77 years respectively. It is very difficult to correlate the failure of erection to the age of the patient. This failure of erection rate is higher than the series of Kabalin et al.<sup>26</sup> and Narajan et al.<sup>25</sup> which they claim no impotence in his series, but lower than the result of Cowles et al.<sup>24</sup>

## CONCLUSIONS

In our experience, the treatment by VILAP for BPH patients in our first 100 cases, using Nd YAG laser resulted significant improvement in mean Madsen Iversen symptom score, mean maximal flow rate and mean residual urine volume, one month and two months after the procedure.

Two months post-treatment, the mean symptom score is still 6.0, but mostly consists of irritative symptoms. The adverse effects of VILAP in our series is comparable with other investigators.

Base on our first experience, further study on long term result of VILAP should be done to know the durability of the result which it is very important if we will offer VILAP as an alternative to TUR P.

From the previous different investigators, we found that TUR P gives more morbidity and mortality<sup>3,6,8-10</sup> compared to our short-term follow-up of VILAP.

## REFERENCES

1. Iskandar S, Rinald, Subagja IG, Rahardjo D. Populasi kasus bedah urologi di RSCM (Paper). Jakarta : University of Indonesia, 1990.
2. Vanden Bossche M, Noel JC, Schulman CC. Transurethral hyperthermia for benign prostatic hypertrophy. *World J. Urol.* 1991;9:2-6.
3. Christensen MM, Bruskewitz RC. Clinical manifestation of BPH and indication of therapeutic intervention. *Urol.Clin.North Am.*1990; 17:509.
4. Ekman. BPH epidemiology and risk factors. The prostate supplement. Alan R., Liss Inc.1989; 2:23-31.
5. Mc Neal J. Pathology of BPH. Insight into etiology. *Urol.Clin.North.Am.* 1990; 17:477.
6. Rahardjo D. Pembesaran Prostat Jinak (Beberapa perkembangan cara pengobatan). *Ropanasuri.* 1993; 12: 71-7
7. Schroder FH, Blow JHM. Natural history of BPH. The prostate supplement. Alan R.Liss Inc. 1989; 2:17-22.
8. Costello AJ, Johnson DE, Bolton DM. Nd YAG laser ablation of the prostate as a treatment for BPH. *Laser in surgery and medicine.* 1992; 12: 121-4.
9. Costello AJ, Bosker WG, Bolton DM, Brasklis KG, Bent J. Laser ablation of the prostate in patients with BPH. *Br.J.Urol.* 1992; 69:603-8.
10. Orandi A. TUR P vs Transurethral incision of the prostate. *Urol.Clin.North Am.* 1990; 17: 601.
11. De Voogt HJ, Soloway MS. Prostate cancer. Emphasis on new treatment modalities. *Hoechst medical update,* 1985; 9:39-41.
12. Isaac JT, Coffey S. Etiology and disease process of BPH. The prostate supplement. Alan R. Liss Inc. 1989; 2:33-50.
13. Caine M. Alpha adrenergic blocker for the treatment of BPH. *Urol.Clin.North Am.* 1990; 17:641.
14. Kawabe K, Moriyana N, Hamada K, Ishima T. Density and localization of alpha adreno receptors in hypertrophy prostate. *J.Urol.* 1990; 143:592-5
15. Lepor H, Sphiro E. Characterization of alpha 1 adrenergic receptors in human benign prostate hyperplasia. *J.Urol.* 1984; 132:1226-9.
16. Dowd JB, Smith JJ. Balloon dilatation of the prostate. *Urol.Clin.North Am.* 1990; 17:671.
17. Nordling J, Poulsen AL. Prostatic stents; indications techniques and clinical result of prostatic coil. In : Fitzpatrick JM, editor. *Societe Internationale D'Urologie Reports.* Non surgical treatment of BPH. New York: Churchill Livingstone. 1991; 15:145-53.
18. Lidner A, Braf Z, Lev A, Golumb J, Lerg Z, Srege IY, et al. Local hyperthermia of the prostate gland for the treatment of benign prostatic hypertrophy and urinary retention. *Br.J.Urol.* 1990; 65:201-3.
19. Roth RA, Aretz TH. TULIP, Transurethral laser induced prostatectomy under laser guidance. *J Urol.* 1990; 143:285A.
20. Johnson EE, Price RE, Crommens DM. Pathologic changes accruing in the prostate following transurethral laser prostatectomy. *Laser in surgery and medicine.* 1992; 12:254-63.
21. Fehr JL, Knonagel H. Important of prostatic sonography in evaluation of conservative therapy of prostatic hyperplasia. *Urol.Int.* 1990;45:231-3.
22. Paelang BV. Diagnostic assessment of BPH. The prostate supplement. Alan R.Liss, Inc. 1989; 2:51-68.
23. Costello AJ, Bolton DM, Ellis D, Crowe H. Histopathological changes in human prostatic adenoma following Nd YAG laser ablation therapy. *J.Urol.* 1994; 152:1526-9.
24. Cowles RS, Kabalin JN, Childs S. A prospective randomized comparison of TUR to visual laser ablation of the prostate for the treatment of BPH. *Urol.*1995; 46:155-60.
25. Kabalin JN. Gill HS. Bite G. Laser prostatectomy performed with a right-angle firing neodymium: YAG laser fiber at 60 watts power setting. *J Urol.* 1995; 153:1502-5.

26. Kabalin JN, Bite G, Doll S. Neodymium: YAG laser coagulation prostatectomy: 3 years of experience with 277 patients. *J Urol.* 1996; 155: 181-5.
27. Narayan P, Tewari A, Aboseif S, Evans C. A randomized study comparing visual laser ablation and transurethral evaporation of prostate in the management of benign prostatic hyperplasia. *J Urol.* 1995;154:2083-8.