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Management of Benign Prostatic Hypertrophy by Prostatic Photovaporization Using the XPS 180 W Laser in the Urology Service of the Nord Franche Comte Hospital

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Abstract

Surgery for benign prostatic hyperplasia (BPH) is very common in general urology departments in France, including the Nord Franche-Comté Hospital (HNFC). Several minimally invasive techniques have been developed in recent years to significantly reduce the morbidity associated with surgery and the length of hospital stays, including prostatic photovapourisation (PVP) using the GreenLight laser. In the absence of HoLEP in our facility, PVP is the only therapeutic alternative for patients at high risk of haemorrhage. This study was conducted to assess the outcomes of this technique in our department. The aim of this study was to analyze the management of symptomatic benign prostatic hyperplasia (BPH) using prostatic photovapourization with the GreenLight laser. **Methods:** This was a one-year retrospective descriptive monocentric study of 78 patients treated for BPH with GreenLight laser PVP by a single operator with significant experience of more than 200 cases. Functional results (IPSS, quality of life, debimetry), operating time, amount of energy used, length of hospitalisation, catheterisation duration, and complications were analysed. Follow-up was conducted one month post-operatively. **Results:** The mean weight of the prostate was 55.77 g. Preoperatively, the median IPSS score was 15, the mean quality of life score was 3.69, and the mean Qmax was 10.44 ml/s. The mean residual post-void volume (RPV) was 152.45 ml. The median duration of vaporization was 32.5 minutes, and the median energy used was 223.5 KJ. The surgical procedure was performed on an out-

patient basis in 56.41% of cases, and the mean catheterization duration was 1.53 days. Postoperatively, the mean IPSS score was 3.84, the mean quality of life score was 1.28, and the mean Qmax was 25.55 ml/s. A total of 21 postoperative complications were recorded, 18 of which were classified as grade 1 and 3 as grade 2 according to the Clavien-Dindo classification. **Conclusion:** Prostatic photovapourisation with the GreenLight XPS 180 W laser is a viable alternative to TURP in the management of benign prostatic hyperplasia, with shorter catheterisation times, similar functional outcomes, and lower morbidity. However, it does not allow histological analysis due to the absence of tissue samples.

Keywords

PVP, GreenLight, BPH, HNFC

1. Background

More than one million people over the age of 50 are affected by benign prostatic hyperplasia, which causes lower urinary tract symptoms [1].

Several minimally invasive surgical management techniques have been developed in recent years, including prostatic photovapourisation using the GreenLight laser, which has become increasingly widespread in France. Its use rose from 0.5% of adenoma surgeries in 2005 to 23% in 2014 [2]. This has resulted in a decline in both AVH and TURP procedures [2].

The results of prostatic photovapourisation appear to be comparable to those of TURP in terms of functional efficacy in most studies and superior to TURP in terms of morbidity, hospitalisation, and catheterisation duration [3]. It can be performed on patients at risk of bleeding, with a reduction in the likelihood of haemorrhage [4]. The TURP syndrome is virtually non-existent with photovapourisation compared to TURP [5].

The aim of this study was to analyse the management of symptomatic benign prostatic hyperplasia via prostatic photovapourisation in the urology department of Hospital Nord Franche-Comté.

2. Methods

This was a single-centre, descriptive, retrospective study of patients with symptomatic or complicated benign prostatic hyperplasia (BPH) treated by prostatic vapourisation with the GreenLight laser over a one-year period, from 1 January to 31 December 2021.

All cases of BPH operated on by GreenLight laser photovaporization of the prostate during the study period, with a follow-up check-up one month after the procedure, were included.

Patients operated on by prostatic photovapourisation who had any of the following were excluded: a neurogenic bladder associated with BPH, a history of prostate

surgery, an associated urethral stricture, prostate cancer, or bladder neck sclerosis.

A Wolf 26 resectoscope with 30˚ optics, including a specific laser fibre holder, continuous irrigation using isotonic saline, and free-flow return, was used for all procedures. The evacuated content was aspirated and quantified using a Tune aspirator with a capacity of 24 litres. The AMS GreenLight XPS-180 W laser generator was used in association with the MoXy laser fibre.

We conducted an exhaustive recruitment of patients who met the specified criteria. A total of 78 patients, managed by a single operator with a baseline experience of over 200 cases, were assessed preoperatively, intraoperatively, and postoperatively.

The preoperative assessment included:

- **Patient factors:** age, body mass index (BMI), ASA score, and use of anti-aggregant and/or anticoagulant treatment.
- **Disease factors:** total PSA, prostate weight, catheter use for retention, IPSS questionnaire (for patients without an indwelling urethral catheter at the initial consultation), debimetry with post-void residual measurement (for patients not in complete retention), medical treatment targeting the prostate, and urine cytobacteriological examination.

Patients with elevated PSA underwent prostate MRI and biopsy, if necessary, to confirm the benign nature of the hypertrophy.

The urine cytobacteriological examination (ECBU) was performed 10 days before the operation. Positive ECBUs were treated according to the antibiogram for at least seven cumulative days before and after the procedure, with no additional tests conducted. All patients received cefazolin as a prophylactic antibiotic, in line with AFU recommendations. Anticoagulation therapy was switched to enoxaparin at a preventive dose 72 hours before the operation and continued for 10 days afterward. Acetylsalicylic acid-based antiplatelet treatment was maintained throughout the perioperative period.

The evaluation focused on the type of anaesthesia, duration of energy emission, energy delivered, volume irrigated, and volume collected. Any intraoperative incidents—such as capsular perforation, massive haemorrhage requiring conversion to monopolar or bipolar transurethral resection, or vaporisation of the meatus—were recorded.

Postoperatively, the durations of catheterisation and hospitalisation, complications classified according to the Clavien classification modified by the GreenLight Users Group (GUGL), and functional results at one month (M1) were analysed. Functional outcomes were assessed using the IPSS-Quality of Life questionnaire and debimetry (Qmax), with measurement of residual post-void volume (RPM). There was no overall reassessment of patients beyond one month due to several patients failing to attend their 3-month and 6-month appointments.

2.1. Statistical Analysis

Statistical analyses were performed using SPSS® Statistics version 21.0 software.

Predictive factors for hospitalisation and complications were evaluated using statistical tests in R software, with a P-value of <0.05 considered statistically significant.

2.2. Ethics

The head of the Ethics and Medical Information Committee was consulted to authorize the use of patient data for scientific purposes. Approval was granted, and the referral was validated. All data were anonymized and made available for the study in compliance with ethical and legal standards.

3. Results

The distribution of patients according to age and preoperative characteristics is shown in Figure 1 and Table 1, respectively.

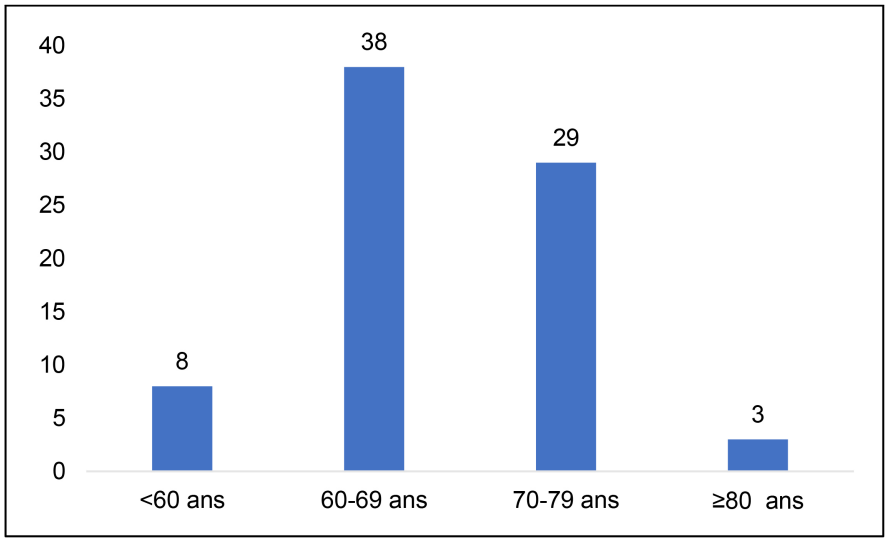

Figure 1. Patient distribution by age.

Table 1. Characteristics of the population.

Characteristics		Mean ± (DS)	Median (min-max)	Number (n) and Percentage (%)
Age (years)		67.99 ± 7.0536	68 (48 - 86)	
BMI (kg/m^2)		26.04 ± 3.96	24.98 (19.41 - 40.04)	
ASA	1			n = 29 (37.18%)
	2			n = 30 (38.46%)
	3			n = 18 (23.08%)
	4			n = 1 (1.28%)
Anticoagulant/Antiplatelet Agent		N = 20		n = 13 (65%)
Acetylsalicylic acid 75 mg				n = 7 (35%)

3.1. Preoperative Disease Characteristics

The mean prostate weight was 55.77 g ± 19.37, with a median of 50 g (extremes: 20 - 110 g). The median PSA was 3.1 ng/ml (extremes: 0.6 - 17 ng/ml). The preoperative IPSS score was assessed in 61 patients (78.21%), ranging from 0 to 27, with a median of 15. Twenty-one patients (21.79%) had a bladder catheter for retention. Quality of life ranged from 1 to 6, with a mean of 3.69. Flowmetry was interpretable in 50 patients without bladder catheters; Qmax ranged from 4 to 24, with a mean of 10.44 ± 3.17 and a median of 10. Post-void residual (n = 61) ranged from 70 to 248 ml, with a mean of 152.45 ± 52.40 and a median of 150.

Preoperative ECBU was positive in 5 patients (6.41%). The median time between diagnosis and management was 5 months (extremes: 1 - 60 months).

3.2. Intraoperative Characteristics

Intraoperatively, 78.21% of cases involved a stage 2 control bladder, and 17.95% involved a diverticular bladder. The median duration of vaporization was 32.5 minutes (extremes: 10 - 105 minutes). The amount of energy delivered ranged from 60 to 525 KJ, with a median of 223.5 KJ. The in-and-out irrigation balance was virtually zero for all patients. The surgical procedure was performed on an outpatient basis in 56.41% of cases. No intraoperative incidents were reported. The mean duration of catheter use was 1.53 ± 0.91 days (Figure 2).

Hospitalization did not depend on prostate weight (p-value = 0.5292) or the presence of anticoagulant or antiplatelet therapy (p-value = 0.08822).

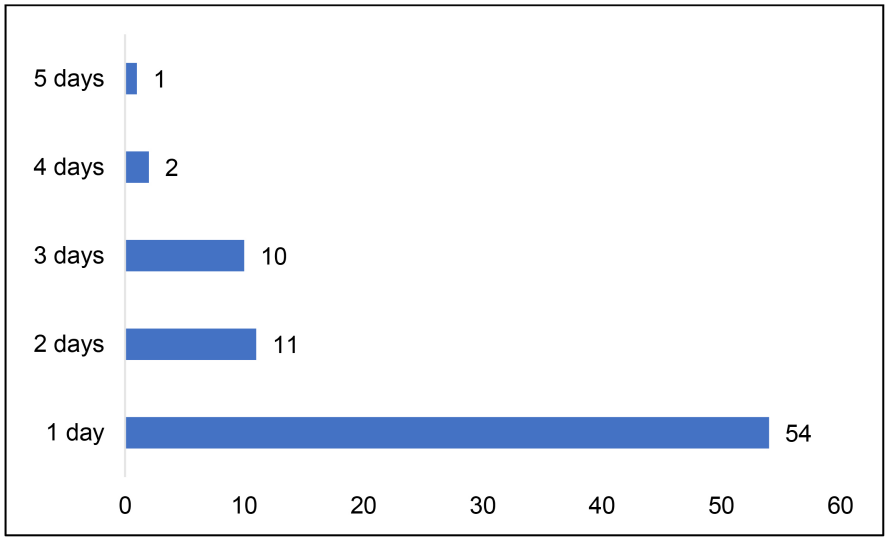

Figure 2. Distribution of patients by duration of catheter use.

3.3. Postoperative Outcomes

The functional results at M1 are detailed in Table 2. A total of 21 postoperative complications were recorded, of which 18 were classified as grade 1 and 3 as grade 2 (Table 3). There was no correlation between these complications and prostate

weight (p-value = 0.3519), complete preoperative retention (p-value = 0.114), or the presence of anticoagulation or antiplatelet therapy (p-value = 0.8249).

Table 2. Functional outcome.

Functional outcome	Mean ± (DS)	Median (min-max)
IPSS (N = 77)	3.84 ± (2.91)	3 (0 - 20)
Life quality (N = 78)	1.28 ± (0.56)	1 (1 - 4)
Qmax (ml/s) (N = 78)	25.55 ± (4.64)	25 (11 - 42)
post-void residue (N = 78)	None (n = 63; 80.77%) Under 50 ml (n = 11; 14.10%) 100 - 150 ml (n = 4; 5.13%)	

Table 3. Complications.

Clavien-dindo grade	Post-op complications and management	Number (n)	Percentage (%)
1	Isolated fever treated with antipyretics	2	9.52
	Post-op urgency treated with anticholinergics	9	42.85
	Post-op urine retention treated with self-catheterization	4	19.05
	Haematuria with bladder clot removal at the patient's bedside	3	14.29
2	Post-op urinary infection treated with antibiotics.	3	14.29

4. Discussion

Prostatic photovapourisation, like monopolar and bipolar resection, is a recognised option for the management of complicated prostatic hypertrophy. Because it can be performed in patients with comorbidities, it has emerged as a therapeutic alternative to TURP and upper adenomectomy (AVH) in our practice.

In this study, as in others [6]-[9], patient age, ASA score, and prostate weight did not present barriers to GreenLight laser PVP. Functional outcomes were comparable to those of other techniques, with a marked reduction in postoperative morbidity, hospitalisation, and catheterisation time. All procedures were performed by a single surgeon with experience exceeding 200 cases—more than the 50 to 100 cases often cited as the learning curve in the literature [10]-[13]. This may partly explain the absence of intraoperative incidents and the reduced procedure time made possible by delivering higher energy levels. All patients had incomplete or complete retention despite medical therapy, which contrasts with the

low IPSS scores observed in some cases.

The median energy delivered was 223.5 KJ, which in many studies [1] [2] [12] correlates with prostate weight or volume. This was not confirmed in our study, partly due to the lack of measurements of residual prostate weight or volume after PVP. The median vaporization time was 32.5 minutes with a median prostate weight of 50 g, closely aligning with the findings of Francesco Sessa *et al.* [12], who reported 42 minutes with a median weight of 56.5 g.

One goal of PVP is to enable outpatient surgery. In our series, 56.41% of cases were performed on an outpatient basis, somewhat lower than the 67% - 90% rates observed elsewhere [2] [14] [15]. Hospitalisation was often recommended by anaesthetists due to comorbidities, or because patients were scheduled late during the coronavirus pandemic, when urological emergencies were occasionally integrated into the official operative programme.

Like TURP and AVH, PVP yields similarly favourable postoperative functional outcomes, including a significant reduction in IPSS, improved quality of life, and increased Qmax [3] [7] [13] [16]-[18]. In our study, the mean IPSS was 3.84, the mean Qmax was 25.55 ml/s, and the mean quality of life score was 1.28 at one month, which we consider satisfactory. The retrospective nature of the study did not allow for the assessment of sexual function due to the absence of data in patient records. As with any surgical procedure, PVP can involve complications, classified according to the Clavien-Dindo system by the GreenLight Users Group (GUGL). These complications vary and may include irritative symptoms, urinary retention after catheter removal, haematuria, infection, or, rarely, mortality. In our series, 26.92% of patients experienced complications, all of which were graded ≤2 at one month, predominantly comprising irritative symptoms. These findings are consistent with the literature [3] [6] [13]. We found no statistical correlation between complications and ASA score, the presence of preoperative retention, or anticoagulant therapy.

5. Conclusion

Prostatic photovapourisation with the GreenLight XPS 180 W laser is now a standard treatment for BPH, regardless of prostate volume or patient comorbidities. It is associated with fewer postoperative complications and is frequently feasible on an outpatient basis. Hospital stay and catheterisation times are generally brief, and functional outcomes are favourable. However, it does not allow for histological analysis due to the absence of tissue. This means that rigorous screening for prostate cancer is required before the procedure can be recommended. Further research involving larger cohorts, sexual function parameters, and extended follow-up will help elucidate the impact of PVP on sexual outcomes and the long-term stability of its functional results.

Ethics Approval and Consent to Participate

The head of the Ethics and Medical Information Committee was asked to author-

ize the use of the data for scientific purposes. The referral was validated, and the data were made available for the study.

Consent for Publication

We consent to the publication of the data and hereby transfer, assign, or otherwise convey all copyright ownership, including all rights therein, exclusively to the journal, in the event that such work is published by the journal.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Salameh, M., Gerbaud, F., Daché, A., Hermieu, J.-F., Dominique, S., Hupertan, V., *et al.* (2016) Introduction de la photovaporisation de prostate en ambulatoire: Résultats sur les 100 premiers patients. *Progrès en Urologie*, **26**, 662-667. https://doi.org/10.1016/j.purol.2016.07.004

[2] Pradere, B., Peyronnet, B., Leonard, G., Misrai, V. and Bruyère, F. (2016) Photovaporisation prostatique au laser Greenlight: Évaluation des pratiques françaises en 2015. *Progrès en Urologie*, **26**, 168-175. https://doi.org/10.1016/j.purol.2016.01.003

[3] Vinceneux, F.-X., Tanchoux, C., Latteux, G., Galliot, I. and Bruyère, F. (2014) Étude des urgenturies postopératoires après photovaporisation prostatique par laser Greenlight. *Progrès en Urologie*, **24**, 191-195. https://doi.org/10.1016/j.purol.2013.10.003

[4] Descazeaud, A., Azzousi, A.R., Ballereau, C., Bruyere, F., Robert, G., Delongchamps, N.B., *et al.* (2010) Blood Loss during Transurethral Resection of the Prostate as Measured by the Chromium-51 Method. *Journal of Endourology*, **24**, 1813-1816. https://doi.org/10.1089/end.2010.0174

[5] Barber, N.J., Zhu, G., Donohue, J.F., Thompson, P.M., Walsh, K. and Muir, G.H. (2006) Use of Expired Breath Ethanol Measurements in Evaluation of Irrigant Absorption during High-Power Potassium Titanyl Phosphate Laser Vaporization of Prostate. *Urology*, **67**, 80-83. https://doi.org/10.1016/j.urology.2005.07.028

[6] Thoulouzan, M., Perrouin-Verbe, M.-A.., Calves, J., Deruelle, C., Joulin, V., Valeri, A., *et al.* (2017) Résultats de la photovaporisation prostatique par laser GreenLight XPS-180 W dans l'hyperplasie bénigne de prostate (HBP) de gros volume (≥80 mL). *Progrès en Urologie*, **27**, 489-496. https://doi.org/10.1016/j.purol.2017.04.001

[7] Gautier, B., Chaker, K., Schneider, M., Obringer, L. and Jung, J.L. (2021) Évaluation de l'effet de la densité d'énergie délivrée lors d'une photovaporisation prostatique laser: Étude rétrospective monocentrique. *Progrès en Urologie*, **31**, 584-590. https://doi.org/10.1016/j.purol.2020.10.010

[8] Rajih, E., Tholomier, C., Hueber, P., Alenizi, A.M., Valdivieso, R., Azizi, M., *et al.* (2017) Evaluation of Surgical Outcomes with Photoselective Greenlight XPS Laser Vaporization of the Prostate in High Medical Risk Men with Benign Prostatic Enlargement: A Multicenter Study. *Journal of Endourology*, **31**, 686-693. https://doi.org/10.1089/end.2016.0782

[9] Chung, D.E., Wysock, J.S., Lee, R.K., Melamed, S.R., Kaplan, S.A. and Te, A.E. (2011) Outcomes and Complications after 532 nm Laser Prostatectomy in Anticoagulated Patients with Benign Prostatic Hyperplasia. *Journal of Urology*, **186**, 977-981. https://doi.org/10.1016/j.juro.2011.04.068

[10] Ruszat, R., Wyler, S., Forster, T., Reich, O., Stief, C.G., Gasser, T.C., *et al.* (2007) Safety and Effectiveness of Photoselective Vaporization of the Prostate (PVP) in Patients on Ongoing Oral Anticoagulation. *European Urology*, **51**, 1031-1041. https://doi.org/10.1016/j.eururo.2006.08.006

[11] Bastard, C., Zorn, K., Peyronnet, B., Hueber, P.A., Pradère, B., Rouprêt, M., *et al.* (2019) Assessment of Learning Curves for 180-W Greenlight XPS Photoselective Vaporisation of the Prostate: A Multicentre Study. *European Urology Focus*, **5**, 266-272. https://doi.org/10.1016/j.euf.2017.09.011

[12] Sessa, F., Campi, R., Granieri, S., Tuccio, A., Polverino, P., Spatafora, P., *et al.* (2021) Proctored Step by Step Training Program for Greenlight Laser Anatomic Photovaporization of the Prostate: A Single Surgeon's Experience. *Frontiers in Surgery*, **8**, Article 705105. https://doi.org/10.3389/fsurg.2021.705105

[13] Misraï, V., Rouprêt, M., Guillotreau, J., Bordier, B. and Bruyère, F. (2013) Traitement de l'hyperplasie bénigne de prostate par photovaporisation au laser Greenlight: Analyse de la littérature. *Progrès en Urologie*, **23**, 77-87. https://doi.org/10.1016/j.purol.2012.10.013

[14] Corbel, L., Della Negra, E., Berquet, G., Codet, Y.P., Boulière, F., Braguet, R., *et al.* (2014) Vaporisation laser prostatique par GreenLight (180 W) en ambulatoire: Évaluation prospective sur 115 patients. *Progrès en Urologie*, **24**, 733-737. https://doi.org/10.1016/j.purol.2014.08.238

[15] Berquet, G., Corbel, L., Della Negra, E., Huet, R., Trifard, F., Codet, Y., *et al.* (2015) Prospective Evaluation of Ambulatory Laser Vaporization of the Prostate for Benign Prostatic Hyperplasia. *Lasers in Surgery and Medicine*, **47**, 396-402. https://doi.org/10.1002/lsm.22363

[16] Bachmann, A., Muir, G.H., Collins, E.J., Choi, B.B., Tabatabaei, S., Reich, O.M., *et al.* (2012) 180-W XPS Greenlight Laser Therapy for Benign Prostate Hyperplasia: Early Safety, Efficacy, and Perioperative Outcome after 201 Procedures. *European Urology*, **61**, 600-607. https://doi.org/10.1016/j.eururo.2011.11.041

[17] Chung, A.S.J., Chabert, C., Yap, H., Lam, J., Awad, N., Nuwayhid, F., *et al.* (2012) Photoselective Vaporization of the Prostate Using the 180W Lithium Triborate Laser. *ANZ Journal of Surgery*, **82**, 334-337. https://doi.org/10.1111/j.1445-2197.2012.06038.x

[18] Castellani, D., Pirola, G.M., Rubilotta, E., Gubbiotti, M., Scarcella, S., Maggi, M., *et al.* (2021) Greenlight Laser Photovaporization versus Transurethral Resection of the Prostate: A Systematic Review and Meta-Analysis. *Research and Reports in Urology*, **13**, 263-271. https://doi.org/10.2147/rru.s277482

List of Abbreviations

ASA: American Society of Anesthesiologists;
AVH: Upper Adenomectomy;
BMI: Body Mass Index;
BPH: Benign Prostatic Hyperplasia;
ECBU: Cytobacteriological Examination of Urine;
GUGL: GreenLight User Group;
IPSS: International Prostate Symptom Score;
MRI: Magnetic Resonance Imaging;
PSA: Prostate-Specific Antigen;
PVP: Prostatic Photovaporisation;
RPM: Residual Post-Void Volume;
TURP: Transurethral Resection of the Prostate;
W: Watt.