

Early experience of “*En bloc*” holmium laser enucleation of the prostate in Saudi Arabia

Mohannad Alharbi^{1,2}, Bader Alshamsan³, Mohammed Almansour², Abdullah Alharbi², Adel Algaadi², Mohamed F. Abdelhafez^{2,4}

Departments of ¹Surgery and ³Medicine, College of Medicine, Qassim University, ²Department of Urology, King Fahad Specialist Hospital, Buraidah, Qassim, Saudi Arabia, ⁴Urology and Nephrology Center, Assiut University Hospital, Assiut, Egypt

Abstract

Purpose: Holmium laser enucleation of the prostate (HoLEP) showed higher efficacy than transurethral resection for treating benign prostatic hyperplasia (BPH). The present study aims to report the outcome of BPH treatment by HoLEP in a tertiary center.

Patients and Methods: An observational prospectively collected data for consecutive symptomatic BPH patients undergoing HoLEP between January 2020 and December 2021. Demographic and perioperative data were collected with the International Prostate Symptom Score (IPSS), quality of life, peak flow rate (Q_{max}), residual urine postvoid residual (PVR), and prostate-specific antigen (PSA) changes, in addition to perioperative and late adverse events.

Results: One hundred patients were included with a median age of 73 years (range 65–80). The IPSS improved by 80% postoperatively (25 vs. 5, $P < 0.001$). Similarly, Q_{max} significantly improved. Seven patients were found to have incidental prostate cancer. No patient needed a perioperative blood transfusion. Compared to its preoperative values, follow-up PSA has been reduced by 75% ($P < 0.001$). Urethral stricture and bladder neck contracture were noted in $< 2\%$ of the patients.

Conclusions: HoLEP is feasible for all prostate sizes and a safe and effective treatment for BPH patients; our results are consistent with the reported data in the literature regarding functional outcomes, complication rates, and urinary incontinence rates.

Keywords: Benign prostatic hypertrophy, *en bloc* holmium laser enucleation of the prostate, holmium laser enucleation of the prostate, Saudi Arabia

Address for correspondence: Dr. Mohannad Alharbi, Department of Surgery, College of Medicine, Qassim University, P. O. Box: 6655, Airport Mail 51432, Buraidah, Qassim, Saudi Arabia.
E-mail: 2133@qu.edu.sa

Received: 23.07.2023, **Accepted:** 04.12.2023, **Published:** 18.04.2024.

INTRODUCTION

Benign prostatic hyperplasia (BPH) is a disease associated with increasing age, as approximately 80% of males are affected by 70 years of age.^[1] The prevalence of enlarged prostate was reported to be 20% of men attending clinics.^[2]

However, life expectancy significantly improved in Saudi Arabia in the last decades; the median age increased from 49 years old in 1960 to 1970 years old in 2020.^[3] As the aging population increases, the prevalence of symptomatic BPH is increasing, as well as complications from advanced BPH.^[4,5]

Access this article online	
Quick Response Code:	Website: www.urologyannals.com
	DOI: 10.4103/ua.ua_74_23

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Alharbi M, Alshamsan B, Almansour M, Alharbi A, Algaadi A, Abdelhafez MF. Early experience of “*En bloc*” holmium laser enucleation of the prostate in Saudi Arabia. *Urol Ann* 2024;16:150-4.

Since Gilling and Fraundorfer first described holmium laser enucleation of the prostate (HoLEP), other cohorts continued to support the efficacy and safety of HoLEP.^[6,7] HoLEP is a safe and effective surgical procedure with comparable outcomes to transurethral resection of the prostate (TURP) and open prostatectomy with low morbidity and short hospital stay. Moreover, it is equally suitable for small, medium, and larger prostate glands, with clinical outcomes independent of prostate size. The improvement in outcome parameters is durable, and the late complications and reoperation rate are very low.^[8,9] It offers patients who traditionally required open prostatectomy the alternative of being treated endoscopically with minimal blood loss, short catheterization time, and hospital stay.^[10]

Despite all the great advantages of the technique, rates of HoLEP in the United States remained extremely low at just 4% of all BPH procedures in 2014.^[11] This may be in part due to the technical difficulty of HoLEP as was demonstrated by a recent study which showed that a learning curve of 40–60 cases is required for stability of performance, another analysis showed that only 25–50 is enough.^[12,13] In addition, there may be some financial issues in the form of the unavailability of a morcellator or laser energy source as well as this option may not be adequately reimbursed.^[14,15]

The *en bloc* technique for performing HoLEP has been recently described by Scoffone and Cracco, this technique offers potential benefits to the traditional HoLEP procedure, including decreasing the complexity of the surgery, reducing the learning curve, and potentially improving continence.^[16]

The main objective of our study is to present the first Saudi experience (to the best of our knowledge) for HoLEP and to show its efficacy and safety for different prostate sizes with all types of patients through examining functional and biochemical outcomes as our primary endpoints. Moreover, studying variables associated with postoperative urinary incontinence (UI) was deemed to be our secondary endpoint.

PATIENTS AND METHODS

Following approval from the institutional review board, a total number of 100 consecutive patients were included in the study with a short-term follow-up of 6 months. All patients with prostatic enlargement requiring surgery from January 2020 to December 2021 were included in the study.

All patients who underwent a HOLEP were operated on by a single surgeon using an *en bloc* technique described

by Scoffone and Cracco.^[16] A 100 w Holmium laser source (lumenis) was delivered through a 550-um fiber into a 26 Fr. continuous flow resectoscope sheath. The emasculated adenoma was morcellated utilizing either morcellator (VersaCut or DrillCut) through a 26 Fr. nephroscope. Unless clinically indicated otherwise, the Foley catheter was removed on the first postoperative day. Age, PSA, comorbidities, ASA score, current medications, quality of life (QoL), International Prostate Symptom Score (IPSS), Q_{max} , and hemoglobin (Hb) clinical information were gathered. Continence was defined according to the International Continence Society.^[17]

We used IBM Statistical Package for the Social Sciences (SPSS, version 20; SPSS Inc., IBM Corp., Armonk, NY, USA) to analyze our data. Descriptive statistics are presented as the percent, median, and range. Differences between groups were compared with the Fisher's exact test for categorical variables and the Mann–Whitney *U* for continuous variables. Multivariate logistic regression analysis was done to assess predictors of postoperative UI. $P < 0.05$ was considered statistically significant.

RESULTS

A total of 100 patients were included in the study. Of all, 57 patients (57%) were diabetics, 35 patients (35%) were in retention at the time of surgery [Table 1]. Furthermore, three patients (3%) were on CIC with confirmed detrusor underactivity by urodynamic. The median age was 73 years (range 65–80), including 41 patients were older than 75 years. Median detected preoperative prostate

Table 1: Baseline characteristics (n=100)

Characteristics	
Age (years), median (IQR), n (%)	73 (65–80)
<65	18 (18)
65–75	41 (41)
>75	41 (41)
Diabetic, n (%)	57 (57)
ASA score	2 (1–3)
Medications	
Alpha blocker	83
5 alpha reductase inhibitor	1
Combination	16
PSA (ng/mL)	4.4 (1.8–8)
Preoperative PV (mL)	77 (52–111)
IPSS	25 (24–27)
QoL	4 (4–5)
Q_{max} (mL/s)	3 (3–4)
PVR (mL)	70 (22–262)
Antiplatelet therapy	16
Retention	35
Previous prostate surgery	5

Data interpreted with median and IQR. IQR: Interquartile range, ASA: American Society of Anesthesiologists, PSA: Prostate-specific antigen, IPSS: International Prostate Symptoms Score, QoL: Quality of life, PVR: Postvoid residual, Q_{max} : Peak flow rate, PV: Prostate volume

volume (PV) and PSA were 77 g (53–111) and 4.4 ng/mL (1.8–8), respectively [Table 1]. The median IPSS was 25 (24–27). Furthermore, five patients (5%) required a cystolitholapaxy for associated bladder stones.

At a 6 months’ follow-up, PSA, IPSS, QoL, and Q_{max} were significantly improved as shown in Table 2. The median dry specimen weight as reported by the pathologist was 50 g (27–71).

No intraoperative complications were recorded. Postoperatively, all patients voided spontaneously except two patients (2%) who failed the first voiding trial, one patient had clot retention that required catheter fixation and irrigation for 24 h [Table 3]. Pathology of postoperative specimens showed 83% with benign prostatic enlargement, 11% associated with prostatitis, and 7% with prostatic cancer. At short-term follow-up, bladder neck contracture, urethral stricture, and urosepsis were noted in 3% of patients. At 3 months, six patients (6%) were complaining of UI, however, at 6 months, only one patient reported UI.

The association between numerous variables and UI was examined [Table 4]. Only PV was significantly associated with UI in univariate and multivariate regression analysis. While IPSS < 8 was not significantly correlated with UI in univariate analysis, it showed a significant correlation in multivariate analysis. However, age, diabetes, and PSA were not correlated with the occurrence of UI.

DISCUSSION

Although TURP is the historical gold standard to which other surgical modalities for BPH are compared, HoLep since its introduction in the late 90s has gained popularity and it is now having similar short- and long-term results comparable to TURP. Moreover, HoLep has a more favorable perioperative profile and is endorsed for all prostate sizes by both the American Urological Association and the European Association of Urology.^[18,19] However, the technique is still to be more applied around the world and locally in the Middle East. In a study published in 2021 in Saudi Arabia, only 3% of urologists are familiar and doing HoLep.^[20] To the best of our knowledge, this is the first study in Saudi Arabia presenting a series of hundred cases underwent HoLep.

Our data showed that there was a significant difference between preoperative and postoperative PSA (2, range 1–3 and 0.5, range 0.3–0.7), respectively. Becker *et al.* and Ibrahim *et al.* also found similar results with significant changes of PSA level pre- and postoperative at short- and long-term follow-up.^[7,21] Q_{max} levels postoperatively significantly improved from 3 to 21 in our patients, other studies also showed significant improvement.^[7,21,22] Zell *et al.* also experienced significant changes between pre- and postoperative PSA and Q_{max} at 6 and 12 months’ follow-up, they had special types of patients with prostate sizes larger than 200 cc.^[23]

QoL improvement as well as IPSS values after HoLep have been established by many researchers,^[7,21,22] this also was in agreement with our results that showed significant improvement in QoL and IPSS. There was no significant difference between pre- and postoperative Hb levels in our patients and no single patient who required a blood transfusion, even in patients who were on antiplatelet therapy (16%). Many studies proved the safety profile of HoLep in patients on anticoagulants and antiplatelets therapy.^[24,25]

In the early postoperative period, the complications rate was 12%, only 3% of patients had complications higher than grade II modified Clavien grading. The results from Yalçın *et al.* and Becker *et al.* were in accordance with our study as the complications rate was 10% and 13% respectively.^[7,22]

UI occurred in 6% of our patients at 3 months’ follow-up which reduced to only 1% after 6 months’ follow-up. PV above 100 mL and IPSS < 8 were independent risk factors of UI occurrence in multivariate regression analysis. Large PV can increase operative time, stretching of the sphincter and resection is near the sphincter area. Low IPSS may be accompanied by more overactivity bladder which may affect continence state postoperative. Ibrahim *et al.* had similar results regarding PV as an independent risk factor of UI occurrence, other factors were age and operative time.^[21]

There are some limitations of our study. First, the small sample size, in part being the first study in our country and

Table 2: Pre- and post-operative data for prostate-specific antigen, hemoglobin, and functional results

	Preoperative	Postoperative	Percentage of change	P
PSA (ng/mL)	2 (1–3)	0.5 (0.3–0.7)	75	<0.001
IPSS	25 (24–27)	5 (4–8)	80	<0.001
QoL	4 (4–5)	1 (1–1)	75	<0.001
Q _{max} (mL/s)	3 (3–4)	21 (18–25)	85	<0.001
Hb	13 (12–14)	12 (11–14)	7	0.3

Hb: Hemoglobin, PSA: Prostate-specific antigen, IPSS: International Prostate Symptoms Score, QoL: Quality of life, Q_{max}: Peak flow rate

Table 3: Intra- and post-operative complications

Complications	Modified-Clavien grading	n (%)
Intraoperative		
Bleeding	I	0
Bladder injury urethral injury	I	0
Capsular violation anesthesia related	I	0
Blood transfusion	II	0
Postoperative		
Failed first voiding trial	II	2 (2)
Clot retention	II	1
UI at 3 months	II	6 (6)
UI at 6 months	II	1 (1)
Bladder neck contracture	IIIb	1 (1)
Urethral stricture	IIIb	1 (1)
Urosepsis	IV	1

UI: Urinary incontinence

Table 4: Variables associated with urinary incontinence at 3 months' follow-up

	Univariate analysis			Multivariate		
	OR	95% CI	P	OR	95% CI	P
Age				-	-	-
65	1					
>65-75	1.4	0.13-15.3	0.7			
>75	4.6	0.5-42.9	0.1			
Diabetic	0.85	0.2-3.2	0.8	-	-	-
PSA	0.66	0.06-6.6	0.7	-	-	-
PV (<100 vs. >100 mL)	5.8	1.3-24	0.01	12.2	1.9-76	0.007
IPSS (<8 vs. ≥8)	3.4	0.9-13	0.07	7.8	1.3-46	0.02

PSA: Prostate-specific antigen, IPSS: International Prostate Symptoms Score, PV: Prostate volume, OR: Odds ratio, CI: Confidence interval

part all cases were done by the same surgeon. Second, the retrospective nature of the research, in fact, the data were collected in a prospective manner, and data were analyzed retrospectively.

CONCLUSIONS

HoLEP is a safe and effective treatment for BPH patients, it is feasible for all prostate sizes. Our results showed similarity with the literature on functional outcomes, complication rates, and UI rates.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Egan KB. The epidemiology of benign prostatic hyperplasia associated with lower urinary tract symptoms: Prevalence and incident rates. *Urol Clin North Am* 2016;43:289-97.
- World Development Indicators. Life Expectancy at Birth, Total, Saudi Arabia. United Nations Population Division. World Bank Indicators; 2021. Available from: <https://data.worldbank.org/indicator/SP.DYN.LE00.IN>. [Last accessed on 2023 Mar 14].

- Alanazi AB, Alshalan AM, Alanazi OA, Alanazi MS, Alanazi AI, Alanazi AH, et al. Epidemiology of senile prostatic enlargement among elderly men in Arar, Kingdom of Saudi Arabia. *Electron Physician* 2017;9:5349-53.
- Filson CP, Wei JT, Hollingsworth JM. Trends in medical management of men with lower urinary tract symptoms suggestive of benign prostatic hyperplasia. *Urology* 2013;82:1386-92.
- Groves HK, Chang D, Palazzi K, Cohen S, Parsons JK. The incidence of acute urinary retention secondary to BPH is increasing among California men. *Prostate Cancer Prostatic Dis* 2013;16:260-5.
- Gilling PJ, Fraundorfer MR. Holmium laser prostatectomy: A technique in evolution. *Curr Opin Urol* 1998;8:11-5.
- Becker B, Gross AJ, Netsch C. Safety and efficacy using a low-powered holmium laser for enucleation of the prostate (HoLEP): 12-month results from a prospective low-power HoLEP series. *World J Urol* 2018;36:441-7.
- Kuntz RM, Ahyai S, Lehrich K, Fayad A. Transurethral holmium laser enucleation of the prostate versus transurethral electrocautery resection of the prostate: A randomized prospective trial in 200 patients. *J Urol* 2004;172:1012-6.
- Elzayat EA, Habib EI, Elhilali MM. Holmium laser enucleation of the prostate: A size-independent new "gold standard". *Urology* 2005;66:108-13.
- Elzayat E, Habib E, Elhilali M. Holmium laser enucleation of the prostate in patients on anticoagulant therapy or with bleeding disorders. *J Urol* 2006;175:1428-32.
- Robles J, Pais V, Miller N. Mind the gaps: Adoption and underutilization of holmium laser enucleation of the prostate in the United States from 2008 to 2014. *J Endourol* 2020;34:770-6.
- Brunckhorst O, Ahmed K, Nehikhare O, Marra G, Challacombe B, Popert R. Evaluation of the learning curve for holmium laser enucleation of the prostate using multiple outcome measures. *Urology* 2015;86:824-9.
- Gürten G, Karkin K. Does holmium laser enucleation of the prostate (HoLEP) still have a steep learning curve? Our experience of 100 consecutive cases from Turkey. *Arch Ital Urol Androl* 2021;93:412-7.
- Gudaru K, Gonzalez Padilla DA, Castellani D, Tortolero Blanco L, Tanidir Y, Ka Lun L, et al. A global knowledge, attitudes and practices survey on anatomical endoscopic enucleation of prostate for benign prostatic hyperplasia among urologists. *Andrologia* 2020;52:e13717.
- Narang G, Kellner D, Krambeck A, Humphreys M. Reimbursement of surgical procedures for benign prostatic hyperplasia: Are we disincentivizing complex care? *Curr Opin Urol* 2022;32:318-23.
- Scoffone CM, Cracco CM. The en-bloc no-touch holmium laser enucleation of the prostate (HoLEP) technique. *World J Urol* 2016;34:1175-81.
- Abrams P, Cardozo L, Fall M, Griffiths D, Rosier P, Ulmsten U, et al. The standardisation of terminology of lower urinary tract function: Report from the standardisation sub-committee of the international continence society. *Neurourol Urodyn* 2002;21:167-78.
- Gravas S, Cornu JN, Gacci M, Gratzke C, Herrmann TRW, Mamoulakis C, et al. Management of non-neurogenic male lower urinary tract symptoms (LUTS), incl. benign prostatic obstruction (BPO). European Association of Urology, 2019. (European Association of Urology. Guidelines).
- Parsons JK, Dahm P, Köhler TS, Lerner LB, Wilt TJ. Surgical management of lower urinary tract symptoms attributed to benign prostatic hyperplasia: AUA guideline amendment 2020. *J Urol* 2020;204:799-804.
- Al Khayal AM, Balaraj FK, Alferayan TA, Alrabeah KA, Abumelha SM. Current surgical procedures for benign prostatic hyperplasia and impression of new surgical modalities. *Urol Ann* 2021;13:95-100.
- Ibrahim A, Alharbi M, Elhilali MM, Aubé M, Carrier S. 18 Years of

- holmium laser enucleation of the prostate: A single center experience. *J Urol* 2019;202:795-800.
22. Yalçın S, Yılmaz S, Gazel E, Kaya E, Aydoğan TB, Aybal HÇ, *et al.* Holmium laser enucleation of the prostate for the treatment of size-independent BPH: A single-center experience of 600 cases. *Turk J Urol* 2020;46:219-25.
 23. Zell MA, Abdul-Muhsin H, Navaratnam A, Cumsky J, Girardo M, Cornella J, *et al.* Holmium laser enucleation of the prostate for very large benign prostatic hyperplasia (≥ 200 cc). *World J Urol* 2021;39:129-34.
 24. Agarwal DK, Large T, Stoughton CL, Heiman JM, Nottingham CU, Rivera ME, *et al.* Real-world experience of holmium laser enucleation of the prostate with patients on anticoagulation therapy. *J Endourol* 2021;35:1036-41.
 25. Deuker M, Rührup J, Karakiewicz PI, Welte M, Kluth LA, Banek S, *et al.* Holmium laser enucleation of the prostate: Efficacy, safety and preoperative management in patients presenting with anticoagulation therapy. *World J Urol* 2021;39:1219-26.