



Re-thinking the “Catheter-for-life” Mentality: Holmium Laser Enucleation of The Prostate (HoLEP) in Men \geq 90-years-old

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Abstract

Purpose: Patients \geq 90-years-old with symptomatic BPH are often not offered intervention based on concerns regarding their age. For many, catheterization is the recommended treatment. The objective of our study was to examine the safety and efficacy of HoLEP in \geq 90-year-old patients. **Methods:** We retrospectively identified men aged \geq 90 who underwent HoLEP and compared them to controls. HoLEP was performed with MOSES2.0 laser technology. Statistics were performed with SPSS. **Results:** We identified 16 men age \geq 90 years who underwent HoLEP between March 2021 to February 2023. Mean patient age was 92.4 years (range: 90-97). Mean pre-operative prostate volume was 127.9mL. 13/16 (81.3%) required pre-operative catheterization for and 8/16 (50%) had a history of recurrent UTI's. 7/16 (43.8%) were therapeutically anti-coagulated (AC). Only 2/16 (12.5%) were candidates for same-day trial of void and were discharged on the same-day of their operation. Mean length of stay was 27.7 hours and mean catheter duration was 1.25 days. When comparing the \geq 90 baseline characteristics to controls (n=781), the \geq 90 cohort had a higher rate of cognitive-impairment, history of UTI's, AC, ASA, and lower BMI (p<0.05). There were no 90-day mortalities in the aged \geq 90 cohort, but at a mean follow-up of 9.6 months, 3/16 (18.8%) patients have died from unrelated causes. All living patients aged \geq 90 years-old are currently catheter-free. **Conclusions:** HoLEP can be a safe and effective surgical treatment option for motivated patients \geq 90-years-old deemed fit to undergo anesthesia. Patient functional and safety outcomes after HoLEP were maintained regardless of age.

Keywords: Benign Prostatic Hyperplasia, Elderly, HOLEP

Abbreviations

BPH: Benign Prostatic Hyperplasia; HoLEP: Holmium Laser Enucleation of the Prostate; UTI's: Urinary Tract Infections; AC: Anticoagulation; ASA: American Society of Anesthesiologists; AUASS: American Urologic Association Symptom Score; MISI: Michigan Incontinence Symptom Index; BMI: Body-mass index

Introduction

By age ninety, 90% of men will develop benign prostatic hyperplasia (BPH) as an age-related comorbidity [1]. Management of symptomatic BPH for men aged $>$ 90 then requires a nuanced patient-provider discussion. Urologists must weigh the risks surrounding advanced age and the benefits of various treatment options. Often, based on safety concerns and age-related comorbidities, men age $>$ 90 years old with symptomatic significant prostatomegaly may be recommended either indwelling or intermittent catheterization, rather than surgical intervention such as Holmium Laser Enucleation of the Prostate (HoLEP) [2,3].

HoLEP is an established size-independent durable treatment option for BPH [4]. In the literature, HoLEP has been shown to be safe and efficacious for the elderly [5-7]. However, in men aged $>$ 90, there is a dearth of literature.

With most nonagenarians projected to live at least another 4-5 years, we sought to reflect on our experience and examine the safety and efficacy of HoLEP in men aged $>$ 90 [8].

Methods

Under institutional review board approval, we retrospectively identified men age greater than or equal to ninety years who underwent HoLEP between March 2021 to February 2023 at our institution. We compared these men to men less than ninety (controls) who underwent HoLEP during the same timeframe. All HoLEP procedures were performed by a single surgeon using MOSES 2.0 laser technology. Baseline characteristics, including age, BMI, ASA score, preoperative prostate sizing, presence of indwelling catheter, anticoagulation status, history of prior UTI's, prostate cancer, cognitive impairment, prior BPH surgery, and preoperative AUASS were collected. Intraoperative outcomes including procedure time, enucleation time, morcellation time, resection weight, and intraoperative complications were collected. Postoperative outcomes including same-day discharge rate, failed same day trial of void, ER presentations, re-admissions, AUASS and MISI scores, and 90-day complications and mortality rate were also collected. Descriptive statistics and two-tailed T-Tests were performed with SPSS with p<0.05 defining statistical significance.

Results

We identified 16 men > 90 who underwent HoLEP between March 2021 to February 2023 at our single institution. The mean patient age was 92.4 years old (range: 90-97). In this same timeframe, as controls, HoLEP was performed in 781 patients aged less than 90 with the average age of 72 years. Regarding baseline characteristics, the nonagenarian patients had an average pre-operative prostate volume of 127.9ml which was not statistically different from the controls with an average preoperative prostate volume of 123.5ml (p=0.797). The nonagenarians had an average BMI of 23.6 which was significantly lower than the controls (BMI

27.8, p=0.001). Nonagenarians also had a higher average ASA score (3.0) compared to controls (2.5, p<0.001). Preoperatively, 13/16 > 90 patients (81.3%) had an indwelling catheter as compared to 333/781 controls (42.6%, p=0.01). Nonagenarians were more likely to be anticoagulated (43.8%) compared to controls (16.5%, p=0.004) and have cognitive impairment (12.5%) compared to controls (1.7%, p<0001). In the > 90 cohort 8/16 (50%) had a history of UTIs compared to 178/781 (22.3%) of controls (p<0.011). There was no significant difference with regards to history of prostate cancer. Preoperative AUASS was not significantly different between nonagenarians and controls.

		HoLEP patients ≥ 90+ (n=16)	HoLEP controls (n=781)	p-value
Baseline Characteristics	Age (Years)	92.4 (Range 90-97)	72.0	<0.001
	BMI (kg/m ²)	23.6	27.8	0.001
	American Society of Anesthesiologists Score (ASA)	3.0	2.5	<0.001
	Pre-operative prostate volume (ml)	127.9	123.5	0.797
	Indwelling foley (%)	13 (81.3)	333 (42.6)	0.010
	Anticoagulation (%)	7 (43.8)	120 (16.5)	0.004
	Prior BPH surgery (%)	3 (18.8)	141 (18.0)	0.943
	Pre-operative cognitive impairment	2 (12.5)	13 (1.7)	0.001
	History of UTI's	8 (50.0)	178 (22.3)	0.011
	History of prostate cancer	3 (18.8)	52 (14.0)	0.597
	Pre-operative AUASS (Total)	24.7	18.9	0.116
Intra-operative Outcomes	Mean Total Procedure Time (min)	76.5	66.9	0.218
	Mean Enucleation Time (min)	37.9	34.1	0.372
	Mean Morcellation Time (min)	9.7	9.8	0.964
	Mean Specimen Weight (g)	92.0	74.9	0.229
	Intra-operative complications (%)	0 (0)	35 (4.6)	0.382
Post-operative Outcomes	Same-Day Discharge (SDD) (%)	2 (12.5)	454 (87.8)	0.001
	Failed SDTOV (%)	2 (40.0)	61 (11.8)	0.053
	ER presentations 90-day (%)	5 (31.3)	81 (15.4)	0.088
	Re-admission 90-day (%)	2 (12.5)	22 (4.5)	0.138
	AUASS post-op (Total)	11.6	7.9	0.094
	MISI post-op	8.0	6.0	0.576
	90-day Complications (%)	3 (18.8)	86 (16.2)	0.783
	90-day Mortality (%)	0 (0)	2 (0.3)	0.841
Deceased (%)	3 (18.5)	6 (0.8)	<0.001	

Table 1: Baseline Characteristics and Outcomes.

Intraoperative outcomes between nonagenarians and controls were not significantly different. Mean procedure time was 76.5 minutes for nonagenarians and mean resected specimen weight was 92 grams. Enucleation and morcellation time were separately timed as well with no significant

difference. None of the nonagenarian patients experienced an intraoperative complication.

Postoperatively, only a minority of nonagenarian patients were candidates for same-day trial of void and discharged on the same day as their surgery (2/16, 12.5%).

This was significantly different compared to same-day discharge for the controls (87.8%, $p < 0.001$). There was no significant difference between nonagenarians and controls for ER visits, 90-day complications, and re-admission within 90-days of surgery. 3/16 (18.8%) of nonagenarians had a complication within 90 days of surgery. Two of these complications were Clavien-Dindo grade 1, while the third complication was Clavien-Dindo grade IVa (sustained a cerebral vascular accident). There were no nonagenarian mortalities within the 90-day postoperative period. With a mean follow-up of 9.6 months, 3/16 (18.8%) of patients passed away from unrelated causes. All living nonagenarians are currently free from catheterization.

Discussion

HoLEP has been shown to be safe and efficacious in elderly men [5-7]. Our current study adds that men aged > 90 years old are no exception. From our retrospective experience, despite having statistically higher rates of comorbidities such as cognitive impairment, history of pre-op UTI's, anticoagulated status, and higher ASA scores, men aged > 90 had equivalent outcomes compared to controls. There were no differences in complication rates or postoperative outcomes, suggesting that men aged > 90 years can safely undergo and experience the benefits of HoLEP.

Past literature has suggested that age itself can be an independent predictor for surgical morbidity for BPH procedures [9-11]. As such, providers may be hesitant to offer surgical treatment for BPH such as HoLEP to elderly men, especially men aged > 90 years, instead favoring management with catheterization [2, 3]. Indeed, in our current cohort, 81% of nonagenarians with symptomatic BPH were originally managed with catheterization. Our results, however, challenge the treatment paradigm. Following HoLEP, our nonagenarians are not only all catheter-free, but also did not have any significant differences in complication rates compared to controls. Contemporary studies also appear to suggest that age itself is not an independent predictor of morbidity for BPH procedures [5, 6]. Our study asserts that despite advanced age, for men age > 90 years, HoLEP can be safely provided and result in tangible improvements in quality of life.

It is important to consider the average life expectancy for preoperative counseling in this patient population. According to most geriatric research, nonagenarians, particularly in contemporary times, have an average life expectancy of around 4-5 years [8]. More specifically, for men age > 90 years, depending on exact age, there is an approximately 16-33% chance of dying within the next year from all-causes [12]. Our current results are consistent with this mortality rate. During a mean follow-up of 9.6 months, three of our patients (18.8%) died from unrelated causes outside of the 90-day perioperative window. The discussion of advanced age and mortality with patients should be included in preoperative counseling, but not necessarily prohibit surgical intervention.

This study does have several limitations. We are limited by the retrospective nature of the study and the limited sample size. We identified 16 men age > 90 years who ultimately underwent HoLEP within our timeframe. This sample only captures a select population who were particularly motivated for surgical intervention and were

cleared for anesthesia. Therefore, our results are likely skewed to reflect more functional men age > 90 years than the average nonagenarian. While our patients did have higher comorbidity rates compared to their controls, we did not measure any metrics to assess fragility and functionality, which have been shown to be better predictors of surgical morbidity than age or chronic conditions [13-15]. Future studies should include metrics to better capture and represent the condition of elderly undergoing HoLEP.

Conclusion

HoLEP can be a safe and effective surgical treatment option for motivated patients ≥ 90 -years-old that are deemed fit to undergo a general or spinal anesthetic. Patient functional and safety outcomes after HoLEP were maintained regardless of patient age.

Declaration of conflicting interests

The authors declare that there is no conflict of interest.

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None

Disclosures

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