World Journal of Urology (2022) 40:1751–1754
https://doi.org/10.1007/s00345-022-04053-9

ORIGINAL ARTICLE

Outcomes of octogenarians undergoing holmium laser enucleation of prostate

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Received: 23 January 2022 / Accepted: 6 May 2022 / Published online: 28 May 2022

Abstract

Purpose Holmium laser enucleation of prostate (HoLEP) is an effective surgical procedure in men with BPH. Due to the increase in the use of medical therapy for BPH related lower urinary symptoms more octogenarians are presenting in a delayed fashion with significant symptoms and urinary retention. We evaluate the feasibility and safety of octogenarians undergoing HoLEP.

Methods We performed a retrospective review of HoLEPs at our institution from July 2018 to December 2019. Patients were stratified into two groups based on age: <80 and ≥ 80.

Results A total of 458 patients were identified, with 74 (16.2%) ≥ 80. In patients ≥ 80, prostate volume was higher ($p<0.0005$), there was a higher rate of antiplatelet/anticoagulation ($p=0.029$) use, and a lower rate of alpha-blocker use ($p=0.0016$). As expected, ASA scores which correlate with increasing number of concomitant diseases were greater in the ≥ 80 cohort ($p=0.016$). There was no significant difference in intraoperative complications ($p=0.14$), 90 day complication ($p=0.34$), readmission rates ($p=0.425$) or emergency room visits between groups ($p=0.15$).

Conclusions Despite higher medical comorbidities and increased rates of anticoagulation in octogenarians, there is no increase in operative or postoperative complication rates. Age alone should not be used as exclusion criteria for HoLEP.

Keywords BPH · HoLEP · Octogenarian · Surgery

Introduction

Benign prostatic hyperplasia (BPH) requiring medical or surgical intervention is directly related to age [1]. The prevalence of significant lower urinary tract symptoms (LUTS) rises to approximately 88–90% by 81 years of age[2]. With the advancement of medical therapy for LUTS, older patients are presenting for BPH surgery with higher rates of comorbidities. As a result of our aging population, the older population requiring surgery for BPH/LUTS will continue to increase going forward [3]. This suggests that many patients will present in the later decades of life requiring surgical interventions for BPH. LUTS greatly impacts the quality of life and can progress to acute urinary retention, bladder stones and recurrent infections. Management decisions can be complicated due to advanced age-related comorbidities leading urologists to be conflicted with offering elective BPH surgery to elderly patients [4].

There are many surgical treatments for LUTS related to BPH but transurethral resection of the prostate (TURP) has been the gold standard of care for many years. However, TURP has a higher rate of morbidity and mortality in elderly patients, especially octogenarians [4]. Over the last two decades, holmium laser enucleation of the prostate (HoLEP) has demonstrated similar if not superior outcomes when compared to traditional BPH treatment [5]. HoLEP has been underutilized due to the learning curve and limited prevalence, but evidence continues to emerge that indicates better outcomes for patients undergoing HoLEP. With the aging population, urologist are faced with elderly patients needing their BPH to be surgically managed. Octogenarians in the past, tend to have high morbidities and worse outcomes while undergoing any surgical procedure but there is a paucity of literature surrounding outcomes in elderly

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populations, specifically octogenarians undergoing HoLEP. As a result, the purpose of this study is to evaluate the feasibility and safety of octogenarians undergoing HoLEP.

Methods

After Institutional Review Board approval, we conducted a retrospective study of patients undergoing HoLEP from July 2018-December 2019 at our institution performed by three surgeons (AEK, TL, MER). All patients were examined preoperatively for age, medical comorbidities, prostate size based on CT or TRUS imaging, BMI, ASA score and medical treatments. If a patient had a CT prior to being seen the calculation was done by cross sectional for convenience to the patient. Patients underwent HoLEP the standard of practice that has been previously reported by our institution [6]. Patients were stratified into two groups based on age: <80 and ≥ 80. This age stratification was set because we wanted to tease out the difference in outcomes between octogenarians and the rest of the population. Data were analyzed using the JMP statistical software. Descriptive statistics and frequencies such as mean and standard deviations were reported. Continuous variables were analyzed by paired *t* test. Categorical variables were evaluated using Chi-Square and Fisher's exact test.

Results

We identified 458 patients who met inclusion criteria. The baseline characteristics of the 458 patients are depicted in Table 1. In this cohort, 74 (16%) were 80 years of age or older. The mean age of the octogenarian group was 84.8 ± 3.5 years, while the average age of the younger cohort was 68.8 ± 7.4 years. The mean BMI of the younger group was higher (28.74 ± 5.7 vs. 26.37 ± 4.03, $p < 0.001$) while the ASA was higher in the older group with 84% having scores of III and IV compared to 67% in the younger group ($p < 0.027$). Prostate size was significantly larger in the older cohort with a mean calculated preoperative volume of 130.3 ml vs 97.8 ml in the younger cohort ($p < 0.004$). At the time of surgery, 62% of older men vs 79% of younger men were taking an alpha-blocker ($p < 0.0023$), while there was no significant difference in the use of 5 alpha-reductase inhibitors between groups. The greater than 80 cohort (23.4%) was more likely to be on antiplatelet or anticoagulant (not including 81 mg aspirin) at the time of surgery compared to younger men (11.8%) ($p = 0.0116$). About 50% of the older cohort were catheter dependent at the time of surgery vs 30% of the younger group ($p = 0.0029$).

As seen in Table 2, there was no difference in intraoperative complication rates between groups (3.9 vs 3.1%, $p = 0.7$). Only three octogenarians had an intraoperative complication, all of which were capsular perforations. No patient in the older cohort had a bladder perforation or ureteral orifice injury. There was no difference in readmission rates ($p = 0.43$) or emergency room visits between groups ($p = 0.15$). At 90 day follow-up, 5.4% of the older patients had a complication vs 4.6% of the younger patients ($p = 0.30$). All octogenarian complications were Clavien-Dindo Class II. The most common complication was urinary retention due to either clot retention or secondary urinary tract infection (UTI). All complications resolved with foley catheter placement or antibiotic treatment and no further procedures were required. At 3 months follow up, both groups showed improvement in LUTS symptoms when compared to preoperative results (Table 2). While

Table 1 Baseline demographics

	<80 ($n=384$)	$80+$ ($n=74$)	*p* value
Age (Mean ± SD)	68.8 ± 7.4	84.8 ± 3.5	
BMI	28.7 ± 5.7	26.4 ± 4.0	0.0001
Prostate size	97.8 ± 62.7	130.3 ± 88.4	0.0041
Diabetes mellitus			0.1030
Yes	70 (18%)	13 (18%)	
No	314 (82%)	61 (82%)	
ASA score			0.0270
I and II	130 (34%)	14 (19%)	
III and IV	254 (66%)	60 (81%)	
Catheter dependent			0.0029
Yes	112 (29%)	37 (50%)	
No	272 (71%)	37 (50%)	
Alpha-blocker			0.0023
Yes	300 (78%)	44 (59%)	
No	84 (22%)	30 (41%)	
Anticoagulants			0.0291
Yes	72 (10%)	23 (32%)	
No	312 (90%)	51(68%)	

Table 2 Outcome of octogenarians undergoing HoLEP

	<80 ($n=384$)	$80+$ ($n=74$)	*p* value
IntraOP complication	3.5%	3.9%	0.7070
ER visit	6.3%	14%	0.1303
90 day complication	8.0%	10.8%	0.2950
Readmission	3.9%	5.7%	0.4250
AUA symptom score (mean)			
PreOp	20.62	19.7	0.2047
PostOp (3 month)	8.5	10.3	
QoL (mean)			
PreOp	4.20	4.5	0.5575
PostOp (3 month)	2.30	2.61	

both groups showed improvement in symptoms, there was no difference between groups with regards to AUA symptom scores ($p = 0.20$) and QoL ($p = 0.56$).

Discussion

In this study, we evaluated a surgical cohort of patients > 80 undergoing HoLEP and identified that the procedure is safe in elderly patients with BPH requiring surgical management. With our aging population more octogenarians are presenting with severe LUTS requiring surgery. Based on our cohort, patients over the age of 80 are more likely to present with catheter dependent urinary retention, unable to tolerate alpha-blockers, and with larger prostates. As expected, in our older cohort a higher percentage of patients were on anticoagulation at the time of surgery, meaning that they underwent HoLEP while actively taking anticoagulation. There was no significant difference in intraoperative and postoperative complication rates and functional outcomes at 3 months for older patients undergoing HoLEP when compared to younger patients.

Urologists are faced with the dilemma of offering surgery to the aging population, which tends to have more significant comorbidities and increased risks of complications. HoLEP continues to be regarded as the new gold standard treatment for patients with LUTS secondary to BPH because of its safety, durable outcomes independent of prostate size, detrusor function, anticoagulation status, or prior transurethral procedures [7]. BPH has been characterized as a progressive disease, as men age there is a correlation with deterioration of both symptoms and quality of life [8]. There have been many studies assessing the outcomes and safety of BPH in elderly patients. Nandu et al. compared octogenarians to younger men undergoing TURP and suprapubic prostatectomy (SPP) [4]. Overall, they found that morbidity and mortality rates were significantly higher in elderly men and that age is an independent risk factor for complications in patients over 80 undergoing TURP or SPP. In contrast, Elshal et al. studied the morbidity and perioperative outcomes of different laser prostate techniques including HoLEP (64.7%), holmium laser ablation of the prostate (6%), holmium laser transurethral incision of the prostate (5%) and photoselective vaporization of the prostate (24.3%) among patients over 80 [3]. They conclude that laser prostate surgeries can achieve good functional outcomes and are safe in older patients with a high morbidity index. Similarly, Piao et al. evaluated the effect of age on the efficacy and safety of HoLEP in patients above 80 years old. This study only had a total of 38 patients above the age of 80 compared to our 74 patient cohort. Their octogenarian cohort did have longer hospital stay time when compared to the younger group. They found that the patients aged 80 years and older had similar overall morbidity and stated that HoLEP is a safe and effective treatment among the elderly [9]. Tamalunas et al. assessed the clinical value of HoLEP in the octogenarian population. They found that HoLEP offered acceptable perioperative complication rates and that it is a safe and efficient option, even in the oldest patients [10]. Our study similarly shows that there is no increase in complication rates in octogenarians undergoing HoLEP, but an overall longer hospitalization time.

Patients over 80 years of age tend to be on anticoagulation at higher rates compared to their younger cohort. There is strong evidence that anticoagulation use negatively affects morbidity and mortality during TURP. One study looked at the impact of oral anticoagulation on the morbidity of patients undergoing TURP and discovered that patients on anticoagulation had higher rates of bleeding complications, longer hospital stays and more thromboembolic events [11]. The 2018 AUA Guideline for Surgical Management of LUTS recommends that HoLEP and other laser therapies be considered for patients with higher bleeding risk, such as those on anticoagulation, due to higher rates of bleeding complications with TURP [12]. El Tayeb et al. studied the effects of anticoagulation during HoLEP [13]. They found that the use of anticoagulation did not adversely affect outcomes of HoLEP. These findings were supported by Rivera et al. who state that HoLEP can be safely performed on patients who require continuous anticoagulation during surgery [14]. It is important to establish that HoLEP is safe for elderly patients on anticoagulation as elderly patients often present on anticoagulation which cannot be held.

At 3 months follow up there were no differences in functional outcomes in octogenarians undergoing HoLEP in our cohort. While follow up is limited, there is strong evidence to suggest that age has no effect on long term functional outcomes. Mmeje et al. stratified patients undergoing HoLEP by decade. They found that at 1 year there were no significant differences in urinary continence, IPSS, Qmax or PVR among all age groups [15]. Piao et al. report similar results noting that at 6 months there were no differences in IPSS, quality of life, Qmax and PVR when patients undergoing HoLEP were compared by age [9]. Elshal et al. also found no difference in functional outcomes in octogenarians undergoing laser prostate surgery when compared to younger men [3].

Our study should be viewed in the context of certain limitations. Inherently, a retrospective study does not have the ability to randomize and control its subjects and is subject to recall bias. We also did not incorporate a geriatric assessment into our cohort while accruing the data which could help to generalize this data to a broader population. We are a tertiary referral center for BPH, and thus these outcomes may not be generalizable to the entire patient population undergoing HoLEPs. All HoLEPs procedures were

performed by high volume fellowship-trained endourologists. As stated previously, our study does not follow all patients beyond 90 days. This study follows patients up to 3 months and unfortunately, we do not have PVR or flow studies. Despite these limitations, this is one of the largest reports on surgical outcomes studying patients over the age of 80 undergoing HoLEP.

Conclusion

Holmium laser enucleation of the prostate is feasible and safe in patients 80 years of age and older. Our results show that despite higher medical comorbidities and increased rates of anticoagulation in men over 80, there is no increase in operative or postoperative complication rates. We determine that age alone should not be used as exclusion criteria for HoLEP.

Author contributions JH: project development, data collection, manuscript writing. DA: data collection, manuscript writing/editing, protocol/project development. SK: manuscript writing. CN: protocol/project development, data collection/management. TL: protocol/project development, data collection/management. AK: protocol/project development, data analysis, manuscript writing/editing. MR: protocol/project development, data analysis, manuscript writing/editing.

Declarations

Conflict of interest AEK—paid consultant for Lumenis and Boston Scientific. No other authors have disclosures.

Ethical approval Appropriate Institutional Review Board approval was obtained for this retrospective review.

Informed consent An informed consent waiver was approved due to the retrospective nature of this research.

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