

Current surgical procedures for benign prostatic hyperplasia and impression of new surgical modalities

Abdullah M Al Khayal^{1,2,3}, Faisal K Balaraj^{1,2,3}, Turki A Alferayan⁴, Khalid A Alrabeeah^{1,2,3}, Saad M Abumelha^{1,2,3}

¹King Abdullah International Medical Research Center, ²Department of Urology, King Saud Bin Abdulaziz University for Health Sciences, ³Ministry of the National Guard- Health Affairs, ⁴Department of Urology, College of Medicine, King Saud bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia

Abstract

Background: Surgery is considered the most effective treatment for Benign prostatic hyperplasia (BPH) and Transurethral resection of prostatic (TURP) is considered the gold standard. The goal of this study is to assess the surgical interventions used in Saudi Arabia, the difference in surgical procedures done depending on age and years of experience and the participant's impression on the new modalities in the management of BPH.

Methodology: An online survey using Google Forms was sent to the participants. The data were collected during Saudi Urological Association Annual Meeting February 2019. Additional data were gathered 2 months later. The study was closed in May 2019. No incentives were provided to participants.

Results: A total of 65 (54.1% response rate) urologist participated in the survey, of whom 41.5% of respondents were aged <40 years, while 40% of them aged between 40 and 60 years. Forty-seven (72.3%) out of 65 were consultants. The essential investigations used by most participants prior to surgical interventions are prostate specific antigen, urine culture, urinalysis, and abdominal ultrasound. The most used surgical interventions are unipolar transurethral resection (TURP), Bipolar TURP, and open prostatectomy. About 50% of respondents preferred open prostatectomy for prostate size above 100 g. In general, 40%–50% of participants believe that urethral lift, Rezum, Aquablation, prostate artery embolization, and robotic simple prostatectomy are useful options.

Conclusion: TURP continues to be the main intervention for prostate sizes <100 g. Open prostatectomy is widely used intervention for prostate sizes more than 100 g. New modalities gained little acceptance among urologist practicing in Saudi Arabia. Hands on workshops may help in educating urologists and introduce these new modalities for the future use.

Keywords: Aquablation, BPH, prostate artery, prostatectomy, rezum, robotic simple prostatectomy, TURP, urethral lift

Address for correspondence: Dr. Abdullah M Al Khayal, King Abdulaziz Medical City, MNGHA, P.O Box 22490, Riyadh 11426, Saudi Arabia.

E-mail: dralkhayal@hotmail.com

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INTRODUCTION

Benign prostatic hyperplasia (BPH) is a histological diagnosis associated with unregulated proliferation of

connective tissue, smooth muscle, and glandular epithelium within the prostatic transition zone. It is estimated that 10% of men in their 50s and almost 90% of men over 80

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have BPH.^[1] There are several treatment options for BPH, including watchful waiting, behavioral therapy, medical, and surgical treatment.

Transurethral resection of prostate (TURP) is still suggested as the gold-standard surgery for BPH/lower urinary tract symptoms (LUTS); however, the risks including ejaculatory and erectile dysfunction following a TURP.^[2]

Several new modalities procedures such as prostatic urethral lift (UroLift), or water vapor thermal therapy (Rezum), and aquablation have shown acceptable safety profile.^[3] These new modalities aim to reduce recovery time hospitalization, minimize the necessity for general anesthesia during treatment, and improve postoperative pain control.^[3]

There is paucity of information available in Saudi Arabia, regarding demonstrating the currently used surgical procedures for benign prostatic hyperplasia. In this study, we did a survey to evaluate the practice and use of the current surgical procedures for BPH and impression of new surgical modalities.

METHODOLOGY

An online survey using Google Forms was used. The data were collected during Saudi Urological Association Annual Meeting February 2019. Additional data were gathered electronically in March and April 2019 and were sent to respondents. The study was closed in May 2019. No incentives were provided to respondents.

Survey

The survey consists of 11 questions, including demographics and clinical practice. Demographics included age, year of graduation, practice duration, position as per Saudi Commission for Health Specialties. Clinical practice questions included number of surgical interventions done for BPH in the past 1 year, investigations considered before surgical intervention for BPH, the procedures commonly used during the practice for BPH, number of open prostatectomy done over the past 5 years, procedure used if prostate <100 g, 100–200 g, and >200 g, and participants were asked about the believe of how useful is new surgical modalities in the management of BPH. The survey was validated using a focus group validation.

Statistical methods

Two methods of analysis were conducted in the present study. Descriptive statistics in terms of frequency and percentages distributions and means were used to describe study variables. Second, inferential statistics were carried out to test for significance of associations

between age and graduation years of respondents with the outcome variables. Two nonparametric tests were used; the Fisher-Halton-Freeman exact test was used to test for associations between two categorical variables. The second test used was the Kruskal–Wallis test, which was conducted to examine significant differences in ranking variable (modality usefulness) versus multi categorical variables.

RESULTS

A total of 65 (54.1%) of 120 urologists studied, participated in the survey by returning completed survey forms, of them 41.5% were <40-year-old, while 40% were between than 40 and 50 years old, and 18.1% were more than 60 years old. A number of 47 (72.3%) were consultants and 8 (12.3%) were residents as they are the future consultants. Furthermore, the majority of the participants were graduated from medical college more than 20 years ago. In addition, 41% of the participants have performed 10–20 surgical interventions during the past 1 year. Further, two-third of them have done 5 or less open simple prostatectomy in the past 5 years [Table 1].

Most of the participants consider ordering prostate-specific antigen (PSA), urine culture, urinalysis and abdominal US before surgical intervention 89.2%, 81.5%, 76.9%, and 80% respectively. Furthermore, 20% will consider cystoscopy, and 15.4% will consider urodynamic study [Table 2].

Table 1: Respondent bio data, clinical status and practice pattern (n=65)

Variable	n (%)
Age	
<40	27 (41.5)
40-60	26 (40.0)
>60	12 (18.5)
Year of graduation from medical school	
<10	10 (15.5)
10-20	39 (60.0)
21-30	8 (12.3)
>30	8 (12.3)
Current status as per SCFHS	
Consultant	47 (72.3)
Senior registrar	6 (9.6)
Registrar	4 (6.2)
Resident	8 (12.3)
Surgical intervention for BPH in the last year	
<10	14 (21.5)
10-20	27 (41.5)
21-40	14 (21.5)
>40	10 (15.4)
Number of open simple prostatectomy done in the past 5 years	
None	21 (32.3)
1-5	28 (43.1)
>5	16 (24.6)

BPH: Benign Prostatic Hyperplasia, SCFHS: Saudi Commission for Health Specialties

Table 2: Essential investigations before surgical intervention for benign prostatic hyperplasia

Investigation	Yes, n (%)	No, n (%)
Urinalysis	50 (76.9)	15 (23.1)
Urine culture	53 (81.5)	12 (18.5)
Uroflow	40 (61.5)	25 (38.5)
Abdominal US	50 (80.0)	13 (20.0)
Trans-rectal US	6 (9.2)	59 (90.8)
PSA	58 (89.2)	7 (10.8)
Cystoscopy	13 (20.0)	52 (80.0)
Urodynamics	10 (15.4)	55 (84.6)

PSA: Prostate-specific antigen, US: Ultrasound

There is significance association ($P = 0.008$) between performing urodynamic and age of the participants, as those who are <40 years old consider urodynamic as an essential investigation preoperatively. No significant association was found between essential investigations and years since graduation [Table 3].

Most of the participants 70.8% prefer monopolar transurethral resection of the prostate (TURP), followed by bipolar transurethral resection of the prostate (BiTURP) 60% then open prostatectomy 49.2%. While <10% will prefer using photo selective vaporization of the prostate (photosensitive vaporization of the prostate potassium-titanyl-phosphate [PVP, KTP]), transurethral enucleation of the prostate with bipolar (TUEB), and holmium laser enucleation of the prostate (HoLEP) [Table 4].

The only preferred procedure based on age and year of graduation is transurethral vaporization of the prostate (TUVP) ($P < 0.05$) in favor of other procedures. There is no significant difference between the other procedures [Table 5].

About half of the respondents 49.22% preferred BiTURP when the size of the prostate is <100 g, while most of them preferred prostatectomy as intervention procedure when the size of the prostate more 100 g [Figure 1a-c].

Regarding the usefulness of new surgical modalities, respondents considered robotic simple prostatectomy as the most useful modality. It appears that almost 50% of respondents believe in the usefulness of new approaches such as UroLift, rezum, aquablation, and embolization [Table 6].

Transurethral new techniques (Urolift, Rezum, and Aquablation) shows no difference between the age groups or the graduation years however, there is significant difference in belief of usefulness of the nontransurethral new techniques (embolization and

robotic simple prostatectomy) among urologist <40 years old [Table 7].

DISCUSSION

The initial evaluation of BPH, including laboratory and imaging investigations are of importance for the diagnosis, treatment, and prognosis of BPH. Therefore, the American Urological Association guidelines recommends considering urinalysis, uroflow, PSA, post void residual, and abdominal US or transrectal US. This recommendation was followed by most of the Saudi urologists [Table 2]. The initial evaluation may be influenced by age and graduation years of urologist [Table 3]. For example, there is significant difference between urologists under and above the age of 40 years in ordering urodynamic study as initial evaluation [Table 3]. Therefore, the experience might play a major role in minimizing the preoperative or initial investigation. In addition, we observed there are many controversies between guidelines and there is no appropriate or agreed guideline for the local practice.

Monopolar and bipolar TURP remains the dominant procedure for BPH in Saudi Arabia [Table 4]. Similarly, Masumori *et al.* conducted a survey, investigated the trend in surgical procedures for BPH during the past 10 years in Japan, showing that most of the participants agreed on preferring Bipolar TURP as the most frequent procedure used as a management of BPH compared to other modalities.^[4] Furthermore, In Canada, TURP in general (they did not specify wither it is Bipolar or Monopolar) showed to be the primary surgical treatment for BPH, representing more than 90% of all procedures in 2011.^[5] According to the European guidelines, both monopolar and bipolar TURP are strongly recommended to treat moderate to severe LUTs in men with prostate size 30–80 ml. Furthermore, in this current study, <10% of urologists prefer using photo selective vaporization of the prostate (PVP, KTP), TUEB and HoLEP. Therefore, TURP gained widespread use among urologists, which might be due to technical difficulty with high cost, less experience, and steep learning curve of other procedures.^[6] Moreover, urologists more than 60-year-old or graduated for more than 30 year significantly prefer TUVP [Table 5]. Takamori *et al.* show that there is a decrease in number of TUVP from 132 in 1999 to 52 in 2014.^[7] Therefore, the exposure of TUVP is decreased among new urologists. This is probably one of the explanations for the observed difference of preference for TUVP in terms of age and graduation year. In addition, the availability and experience of transurethral laser enucleation and laser vaporization may significantly influence this result.

Table 3: Relationships between essential investigations and age and years of graduation

Investigation	Age				Graduation				
	<40	40-60	>60	P	<10	10-20	21-30	>30	P
Urinalysis	46.0	34.0	20.0	0.213	14.0	58.0	14.0	14.0	0.795
Urine culture	43.3	39.6	17.0	0.708	18.9	54.7	13.2	13.2	0.307
Uroflow	35.0	47.5	15.5	0.284	15.4	60.0	12.3	12.3	0.058
Abdominal US	42.3	36.5	21.2	0.399	17.3	55.8	11.5	15.4	0.393
Transrectal US	50.0	16.7	33.3	0.347	0	66.7	16.7	16.7	0.700
PSA	39.7	39.7	20.7	0.504	12.1	62.1	12.1	13.8	0.164
Cystoscopy	30.8	38.5	30.8	0.434	7.7	53.8	15.4	23.1	0.541
Urodynamics	80.0	0	20.0	0.008**	20.0	70.0	10.0	0	0.746

Fisher’s exact test (Halton freeman) values represent parentages of yes. **Significant at 1% level. PSA: Prostate-specific antigen, US: Ultrasound

Table 4: Procedures commonly use among urologist

Procedure	Yes, n (%)	No, n (%)
Open simple prostatectomy	32 (49.2)	33 (50.8)
TUEB	5 (7.7)	60 (92.3)
HoLEP	2 (3.1)	63 (96.9)
TURP	46 (70.8)	19 (29.2)
BiTURP	39 (60.0)	26 (40.0)
TUVP	11 (16.9)	54 (83.1)
PVP, KTP	6 (9.2)	59 (90.8)
Other	1 (1.5)	64 (98.5)

TUEB: Transurethral enucleation of the prostate with bipolar, HoLEP: Holmium laser enucleation of the prostate, TURP: Monopolar transurethral resection of the prostate, BiTURP: Bipolar transurethral resection of the prostate, TUVP: Transurethral vaporization of the prostate, PVP, KTP: Photoselective vaporization of the prostate potassium-titanyl-phosphate

One of the strong indicators for selection of BPH-related surgery is prostate size. It is also important for outcome in term of changes in symptoms, quality-of-life, and flow rate.^[8] This study shows that when the prostate size is more than 100 g, most urologists prefer performing open prostatectomy, while if it is <100 g they prefer Bipolar TURP [Figure 1]. European Association of Urology (EAU) guidelines on the management of nonneurogenic male LUTS, including benign prostatic obstruction (BPO) recommends TURP as standard procedure for men with prostate sizes of 30–80 mL and bothersome moderate-to-severe LUTS secondary of BPO.^[9] However, Mamoulakis *et al.* reported that Monopolar TURP can be replaced by BiTURP in patients with moderate-to-severe LUTS secondary to BPO, with same efficacy but decreased in perioperative morbidity.^[10] The choice of BiTURP over TURP should be mainly centered on patient’s preference, surgeon’s experience and equipment availability. EAU also recommends open prostatectomy or HoLEP for BPH when the size of prostate is more than 80 ml. However, three randomized controlled trials concluded that there is no difference between open prostatectomy and HoLEP in the outcomes in large prostate (>70 ml).^[11-13] In this study, however, almost <2% of urologists use HoLEP. It may be explained by less experience and exposure to this procedure.

TURP and open prostatectomy have been the historical reference-standard procedures for LUTS due to BPH for decades.^[14] However, a number of new modalities have been introduced. Examples of these modalities are Urolift, Rezum, Aquablation, embolization, and robotic simple prostatectomy. The usefulness of each one of these modalities is reported in this study [Table 6]. Robotic prostatectomy is considered the most useful new modality among urologists. Nevertheless, the difference between modalities in term of usefulness is not significant. In addition, there is no study that compares the advantages of all aforementioned surgical options. However, some studies compare two or three of these surgical options. For example, Chung and Woo evaluates novel minimally invasive surgical options with special reference to the literature published in the past 5 years.^[15] They reported that Urolift has demonstrated the favorable advantage of improving LUTS due to BPH with preserving erectile and ejaculatory function.^[15] In additions, some studies only performed a systemic review in one surgical option. For instance, Westwood *et al.* assess the usefulness of Rezum only.^[2] They report that one advantage of the Rezum is predominantly performed under sedation as a day case procedure in an outpatient.^[2] However, Rezum is performed with rigid cystoscope, which in the United Kingdom is planed under general anesthesia. Moreover, prostatic artery embolization has been reported to have less complication, but it is not as effective as other surgical options. Therefore, each of new surgical modalities for BPH has its own advantages and disadvantages. Because of that, there is a lack of consensus among urologist for most useful new surgical modalities for BPH. This may be attributed to a lack of study which can discuss thoroughly the benefits of each new surgical modalities and with one standardized criteria. In addition, new educational workshops may help in educating these new modalities for the future use. However, by investigating the relationship between the new modalities and the age as well as graduation year, we found that younger urologist (<40-year-old) are significantly favoring the new nontransurethral modalities [Table 7]. This result might

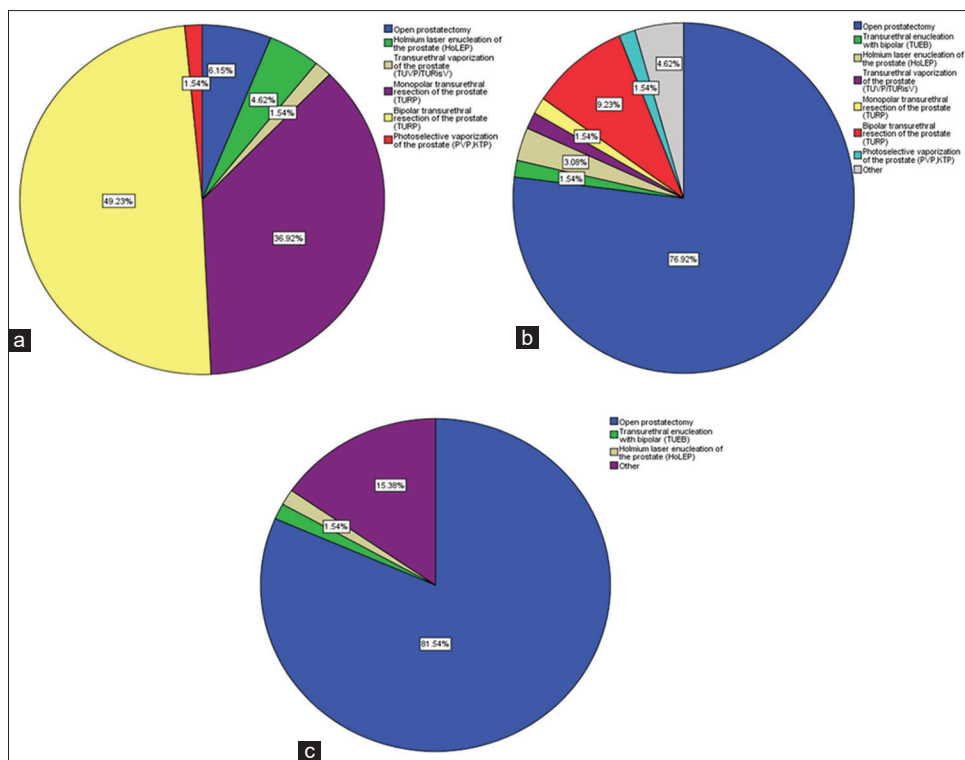


Figure 1: Preferable procedure related to prostate size (a) If prostate size <100 g (b) If prostate size 100–200g (c) If prostate size >200 g

Table 5: Procedures by age and years of graduation

Procedure	Age				Graduation				P
	<40	40-60	>60	P	<10	10-20	21-30	>30	
Open simple prostatectomy	34.4	46.9	18.8	0.495	12.5	65.6	12.5	9.4	0.774
TUEB	20.0	60.0	20.0	0.498	0	100	0	0	0.493
HoLEP	0	50.0	50.0	0.350	0	100	0	0	0.812
TURP	45.7	41.3	13.0	0.222	15.2	65.2	13.0	6.5	0.199
BiTURP	38.5	43.6	17.9	0.798	17.9	53.8	17.9	10.3	0.296
TUVP	9.1	36.4	54.5	0.003**	9.1	36.4	9.1	45.5	0.010*
PVP, KTP	33.3	66.7	0	0.411	0	83.3	0	16.7	0.636

Fisher Exact test (Halton freeman) Values represent Parentages of Yes. **Significant at 1% level, *significant at 5% level. TUEB: Transurethral enucleation of the prostate with bipolar, HoLEP: Holmium laser enucleation of the prostate, TURP: Monopolar transurethral resection of the prostate, BiTURP: Bipolar transurethral resection of the prostate, TUVP: Transurethral vaporization of the prostate, PVP, KTP: Photoselective vaporization of the prostate potassium-titanyl-phosphate

Table 6: Usefulness of new surgical modalities in the management of benign hyperplasia of prostate

Modality	Percentage of usefulness
Urolift	48.6
Rezum	35.7
Aquablation	40.9
Embolization	45.2
Robotic simple prostatectomy	61.5

be due to more enthusiasm of younger urologist to be involved in procedures other than transurethral access, which is common in urological practice.

Despite the fact this study has shown the trend of practice and surgical options with new modalities for BPH, it is subjected to limitations. For example, most of the questions in our survey have multiple choice options as a user-friendly

survey. This actually might influence the accuracy of our results.

CONCLUSION

This study presents the trend of surgical options as a treatment for BPH in our environment. Urodynamic is significantly not considered as an important initial investigation for BPH among urologists above the age of 60-year-old. Despite the merging of new modalities, TURP remains the dominant and most useful surgical option for BPH. However, urologists who are under the age of 40-year-old preferred nontransurethral modalities. The prostate size has an influence on the selecting of the appropriate surgical options for BPH management. For example, most of the urologists performed BiTURP for

Table 7: Usefulness of new modalities based on age and years of graduation

Modality	Age				Graduation				
	<40	40-60	>60	P	<10	10-20	21-30	>30	P
New transurethral	3.0	2.0	2.0	0.191	2.5	3.0	1.0	0	0.236
Nontransurethral	4.0	3.0	2.0	0.002**	4.0	3.0	3.5	0	0.001**

Kruskal-Wallis Test. Values represent medians of scale. **Significant at 1% level

prostate size <100 g and open prostatectomy if it is more than 100 g. For the future direction, the link between the preferable guidelines and the influence of that in selecting any of the surgical options for BPH should be investigated. This will give more insight in the trend of practice in treating BPH.

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Conflicts of interest

There are no conflicts of interest.

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