

Head-to-head comparison of Rezum vs Urolift for patient with benign prostatic hyperplasia: A systematic review

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World Journal of Advanced Research and Reviews, 2025, 25(01), 1391-1398

Publication history: Received on 07 December 2024; revised on 13 January 2025; accepted on 16 January 2025

Article DOI: <https://doi.org/10.30574/wjarr.2025.25.1.0166>

Abstract

Introduction: Minimally invasive surgical therapies (MISTs) have been developed to treat Benign Prostatic hyperplasia (BPH) while minimizing adverse surgical effect. Most recent developed MIST, Rezum and Urolift, showed effective efficacy in improving, but head-to-head comparison still lacking. This study aims to compare the efficacy and safety of Urolift and Rezum in managing BPH-related LUTS.

Methods: A systematic search was conducted in Cochrane, PubMed, EMBASE, SCOPUS and EBSCOhost, identifying observational studies comparing rezum and urolift in BPH patient. Data extraction included demographics, intervention protocols, follow-up duration, and outcomes International Prostate Symptom Score (IPSS) score, IPSS-QoL, sexual function, and reintervention rate. The quality of studies was assessed using the Newcastle-Ottawa Scale.

Results: Two cohort with a total of 101 patients with BPH were included. At 12 months, Rezum tends to be superior in improving symptoms severity, while at 2 months of follow-up, Urolift outperformed Rezum. Both intervention preserved patient's sexual function and does not differ significantly. Reintervention rate significantly higher in Urolift compared to Rezum group.

Conclusion: Rezum offers a more effective alternative to Urolift for managing BPH in long term setting, with lower reintervention rate and preserved sexual function. In early setting, Urolift showed higher efficacy and rapid improvement compared to Rezum.

Keywords: Rezum; Urolift; Benign Prostatic Hyperplasia; Minimally invasive surgical therapies

1. Introduction

Benign prostatic hyperplasia (BPH) is one of the most common urological condition among older men with a prevalence of 50% in men aged 70 years and 90% in men aged 81–90 years [1]. BPH is primarily associated with LUTS (Lower urinary tract syndrome, including residual urine, frequent or intermittent urination) due to the proliferation of smooth muscle and epithelial cells within the prostatic transition zone. BPH significantly affects patient quality of life negatively and can alter patient sexual function [2, 3]. Current guidelines recommends Transurethral Resection of the Prostate (TURP) as the “gold standard” treatment, suggesting it should be offered as an option for patients experiencing LUTS associated with BPH [4]. However, like other any surgical intervention, TURP was associated with a range of surgical complications and morbidity including urethral stricture, urinary incontinence, to altered sexual function [5–7]. To avoid this, several minimally invasive surgical therapies have been emerged aimed to prevent the risk of complications

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while achieving the same efficacy [8]. Two most recent developed MIST are Urolift (prostatic urethral lift) and Rezum (water vapor thermal therapy)

Prostatic urethral lift (PUL) is performed in the lithotomy with the support of a local or general anaesthetic. Recent meta-analysis of randomized controlled trial evaluating the outcome of Urolift, reported that PUL significantly improve in the International Prostate Symptom Score (IPSS), maximum flow rate, and IPSS-QoL without significant increase in adverse events [9]. Compared to TURP, clinical trials reported that Urolift resulted in significant improvement in LUTS [10]. Urolift was also associated with rapid symptom relief, increased quality of life score that remain stable over 24 months, with low morbidity and preserved sexual function [11]. However, recent study reported the incidence of surgical reintervention following Urolift remains high, with the rate of 16.1% at 4 year after Urolift, that is twice the rate of TURP [12].

The other new minimally invasive surgical techniques, Rezum, or water vapor thermal therapy uses thermal energy by generating convective water vapor that passes through prostatic tissue, damaging the cell membranes leading to cell death and necrosis [13]. Rezum can be done in office setting under intravenous sedation or prostate block. As PUL, Rezum demonstrated significant improvement in LUTS symptoms compared to TURP without serious adverse effect [14]. Moreover, Rezum also preserved long-term patient’s sexual function [15]. The reintervention of Rezum is considered lower than other therapy with 4,4% rate over 4 years after Rezum [16]. Although evidence suggests that the two modalities could be considered a viable treatment option for BPH, the effectiveness of Rezum and Urolift in head-to-head fashion remains controversial. Therefore, this study aims to evaluate Rezum vs Urolift in treating patient with BPH.

2. Methods

2.1. Search Strategy

This systematic review and meta-analysis were conducted based on the Preferred Reporting Item for Systematic Review and Meta-analysis (PRISMA) 2020 Guideline [17]. Database searching was conducted in several databases including Cochrane, PubMed, EMBASE, SCOPUS and EBSCOhost with no study published time limitation. The PICO used in this study were as follows.

- Patients: Patient with benign prostate hyperplasia
- Intervention: Rezum
- Comparison: Urolift
- Outcome: IPSS score, IPSS-QoL, retreatment rate, peak flow velocity (Qmax), Men's Sexual Health Questionnaire- Ejaculatory Dysfunction (MSHQ-EjD),

The search keyword terms are made based on a predetermined PICO. No study publication date limitation was applied. This following key term used for each database were shown in table 1.

Table 1 Keywords used to search journals

Database	Keyword
Cochrane	((("rezum") OR ("convective water vapor ablation"))):ti,ab,kw AND ((("urolift") OR ("prostatic urethral lift")):ti,ab,kw AND ((("prostate enlargement") OR ("benign prostatic hyperplasia") OR ("bph") OR ("prostatic hyperplasia") OR ("benign prostatic enlargement"))):ti,ab,kw
PUBMED	(("rezum") OR ("convective water vapor ablation") OR ("water vapor thermal therapy")) AND (("urolift") OR ("prostatic urethral lift")) AND (("prostate enlargement") OR ("benign prostatic hyperplasia") OR ("bph") OR ("prostatic hyperplasia") OR ("benign prostatic enlargement"))
SCOPUS	(("rezum") OR ("convective water vapor ablation") OR ("water vapor thermal therapy")) AND (("urolift") OR ("prostatic urethral lift")) AND (("prostate enlargement") OR ("benign prostatic hyperplasia") OR ("bph") OR ("prostatic hyperplasia") OR ("benign prostatic enlargement")) AND (LIMIT-TO (DOCTYPE , "ar"))
EBSCOHost	("rezum" OR "convective water vapor ablation") AND ("urolift" OR "prostatic urethral lift") AND ("benign prostatic hyperplasia" or "bph" or "prostatic hyperplasia" or "benign prostatic enlargement" or "prostate enlargement")

ScienceDirect	(("rezum") OR ("convective water vapor ablation") OR ("water vapor thermal therapy")) AND (("urolift") OR ("prostatic urethral lift")) AND (("prostate enlargement") OR ("benign prostatic hyperplasia") OR ("bph"))
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2.2. Eligibility Criteria

This study includes randomized controlled trial and observational studies evaluating the efficacy of Rezum or water vapor thermal therapy compared to Urolift or prostatic urethral Lift for BPH treatment. Data regarding the treatment, baseline characteristics, and details of outcome from current evidence available were obtained and collected systematically. We excluded reviews, case reports, and studies that did not provide sufficient data on our specified outcomes.

2.3. Study Selection Process

Relevant studies will be imported and managed with the Zotero reference manager. Duplicate studies were removed and articles were screened for eligibility based on title, abstract, and predetermined inclusion-exclusion criteria.

2.4. Outcomes

The authors independently completed the data extraction from all included studies. Discrepancy when comparing both data extraction results was resolved through discussion of all authors. The following data were extracted: (1) first author, (2) year of publication, (3) study design, (4) sample size, (5) subjects characteristics, (6) treatment given and (7) duration of the follow up. The endpoint of this study was to assess the efficacy of Rezum compared to Urolift in terms of decreasing LUTS in BPH. The primary outcome of this study is the severity of lower urinary tract syndrome measured by International Prostate Symptom Score (IPSS) and the patients quality of life related to BPH measured by IPSS-QoL score. Secondary output include patient's sexual function, measured by MSHQ-EjD (Male Sexual Health Questionnaire for Ejaculatory Dysfunction), and the rate of reintervention, defined as any invasive procedure performed to manage symptoms associated with BPH.

2.5. Study Risk of Bias Assessment

RCT studies were assessed regarding risk of bias using the revised Cochrane risk-of-bias assessment tool for RCTs articles by 4 reviewers independently blinded to each other. Cohort studies assessed using Newcastle Ottawa scale.

3. Results

3.1. Studies Selection

Initially, 386 articles were identified from our search strategy. 313 titles and abstracts were then screened after duplicates were removed, resulted in 28 for full-text review. Finally, two studies included in this systematic review. Detailed selection process were presented in a PRISMA 2020 flow diagram in Figure 1.

3.2. Study characteristics

Table 2 Characteristics of included studies

Author (year)	Study design	Place	Study arm	Total samples	age (years)	Follow up duration	Baseline IPSS score	Outcome measured
Tutrone 2020	Cohort	United States	Rezum	23	69 ± 7,8	2 month	18 ± 6.6	IPSS
								IPSS-Qol
			Urolift	30	68 ± 9,4		16 ± 7.0	MSHQ-EjD IIEF-5
Baboudjian 2021	Cohort	France	Rezum	24	67 (57–72)	1 month, 6 month, and 12 month	20 (16–22)	IPSS
			Urolift	24	66 (55–73)		20 (18–23)	MSHQ-EjD
								SHIM

IPSS: International Prostate Symptom Score, QoL: Quality of Life, MSHQ-EjD: Male Sexual Health Questionnaire for Ejaculatory Dysfunction, SHIM: Sexual Health Inventory for Men

Two cohort studies yielding 101 patients, with 47 patients in Rezum group and 54 patients in Urolift group were included in this systematic review [18,19]. The detailed study characteristics which include first author, year of publication, total samples of each groups, follow-up duration, and outcome measured in each study shown in table 2. All of the study analysis are focused upon identifying the outcome of Rezum and Urolift towards BPH symptoms severity, patient's quality of life, and patient's sexual function measured by parametric outcome. One study [19] obtained the outcome at 3 point of follow-up time (1,6, and 12 months) while other study focused on early outcome at 2 months after procedure [18].

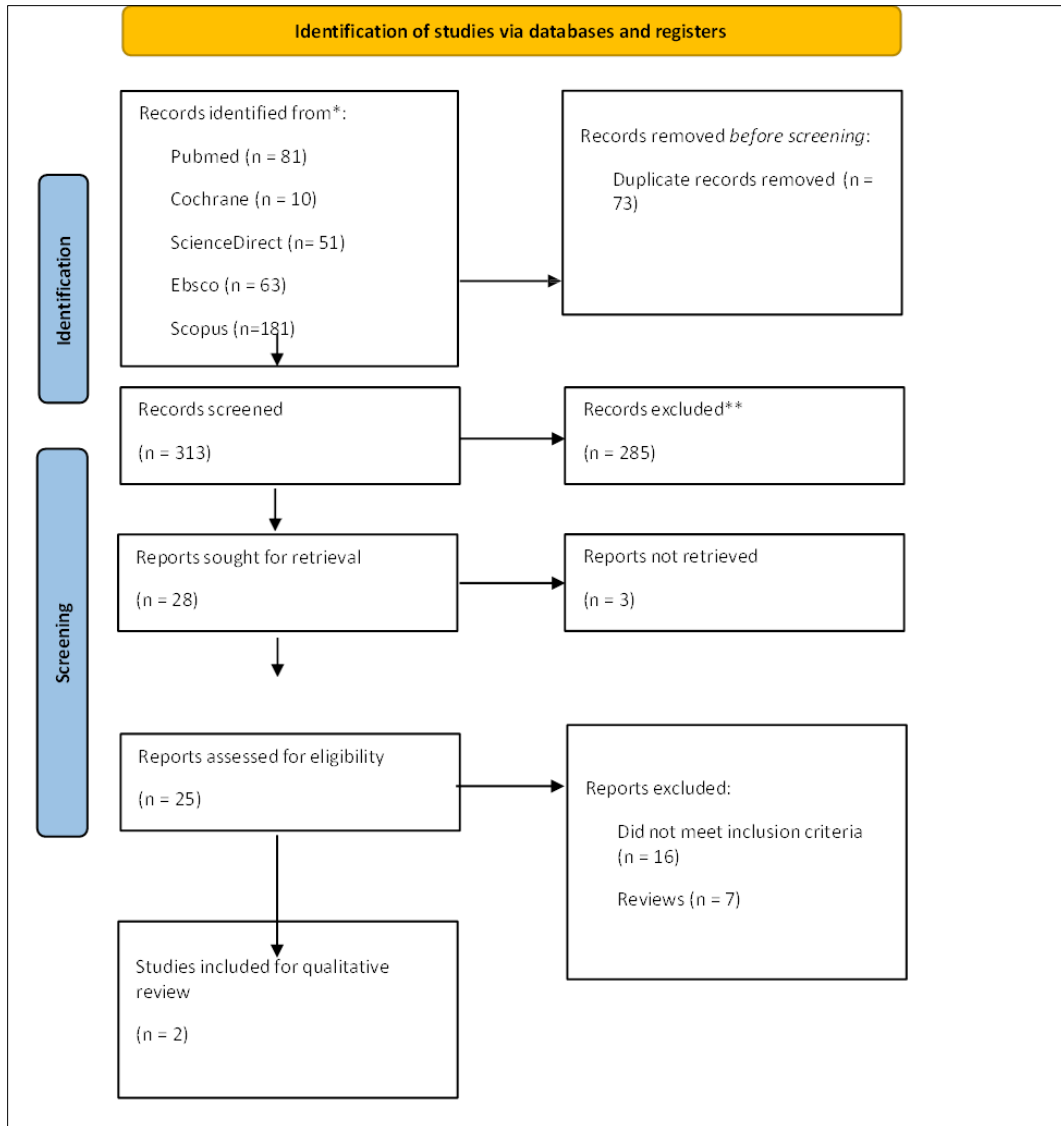


Figure 1 PRISMA Flowchart

3.3. Quality and Risk of Bias

All studies were assessed using Newcastle Ottawa scale, consists of three domain including selection, comparability, and outcome bias. The result was also discussed after the independent assessment has finished for final scoring good, fair, and poor quality as shown in table 3.

Table 3 Risk of Bias Quality Assessment for Included Studies

Author		Baboudjian (2021)	Tutrone (2020)
Selection	(1) Representativeness of the exposed cohort	*	*
	(2) Selection of the non-exposed cohort	*	*
	(3) Ascertainment of exposure	*	*
	(4) Demonstration that outcome of interest was not present at start of study	*	*
Comparability	(5) Comparability of cohorts on the basis of the design or analysis controlled for confounders	*	
Outcome	(6) Assessment of outcome		
	(7) Was follow-up long enough for outcomes to occur	*	*
	(8) Adequacy of follow-up of cohorts	*	*
Total score		7	6

3.4. Effect on IPSS score

Two studies measured the effect of two intervention on the severity of LUTS using IPSS score. IPSS score is a short questionnaire consisting of seven questions related to voiding symptoms aimed to assess the severity of LUTS in patient with BPH. A score of 7 or less is considered mild symptom, 8 to 19 is moderately symptomatic, and 20 to 35 is severely symptomatic. Baboudjian et al. reported that in unpaired cohort, at 12 month after procedure, Rezum tends to give significantly greater improvements than Urolift for IPSS ($p < 0.001$). At 1, 6, and 12 month of follow up, Rezum appeared to give greater change in IPSS score compared to Urolift, although not statistically significant. Tutrone et al. showed that at 2 month, patients treated with Urolift had IPSS score of 8.6 ± 5.0 , significantly lower than the Rezum group with 15.6 ± 9.2 IPSS score as shown in table 4.

Table 4 Effect of rezum vs urolift on IPSS score

Study	IPSS score		p value
	Rezum	Urolift	
Baboudjian (2021)	4 (1–7)	8 (6–13)	<0.0001
Tutrone (2020)	15.6 ± 9.2	8.6 ± 5.0	0,001

3.5. Patients Quality of Life

All of the studies assessed the effect of Rezum and Urolift on the subjects' quality of life impacted by BPH. Quality of life in patient with BPH quantitatively measured by IPSS-QoL, an extend version of IPSS score focused on the aspect of how LUTS affect patient's function and life. Baboudjian et al showed that at 12 month, both Rezum and Urolift showed a significant improvements in the IPSS-QoL score with Rezum showed a significant superior effect compared to urolift ($P=0.006$). On the other hand, at 2 month follow up, Tutrone et al. reported that Urolift have a statistically significant lower IPSS-QoL score compared to Rezum ($p=0.04$), although two of them showed an improvement from baseline score. The effect of two interventions on patient IPSS-QoL score can be seen in table 5.

Table 5 Effect of rezum vs urolift on IPSS score

Study	IPSS-QoL score		p value
	Rezum	Urolift	
Baboudjian (2021)	1 (1–1)	2 (1–3)	0.006
Tutrone (2020)	2.5 ± 1.9	1.5 ± 1.5	0,04

3.6. Patients Sexual Function

Patient's sexual function was assessed by two study using MSHQ-EjD or Male Sexual Health Questionnaire for Ejaculatory Dysfunction, A four-item questionnaire that includes three items about ejaculatory function and one item about ejaculation bother. Baboudjian et al. reported that at 12 months, the MSHQ-EjD score was not statistically different between Rezum and Urolift group (12 [10–14] vs 13 [11–14]) ($p = 0.71$). At 2 months, Urolift showed a superiority in terms of MSHQ-EjD score compared to Rezum ($p = 0.04$). Baboudjian et al. also used IIEF- 5, International Index of Erectile Function, and showed that both group showed stable IIEF- score indicating erectile function is not affected by each procedures.

Table 6 Effect of rezum vs urolift on MSHQ-EjD score

Study	IPSS score		p value
	Rezum	Urolift	
Baboudjian (2021)	13 (10–14)	12 (11–14)	0.77
Tutrone (2020)	9.2 ± 5.1	12.2 ± 2.7	0.04

3.7. Rate of Reintervention

Both studies included reported number of reintervention, which defined by any procedure performed to ameliorate symptoms related to BPH or any use of BPH drug. The reintervention rate at 12 month was reported higher in the Urolift group (6/24; 25%) than in the Rezum group (2/24; 8.3%) but is not statistically significant ($p = 0.24$).

4. Discussion

For patients with BPH, MIST have been grown as an alternative treatment of choice due to its renown quality in minimal blood loss, fast post-operative recovery, and short hospital stay [20]. This systematic review overall indicates that rezum and urolift improve LUTS severity, quality of life, and preserved patient sexual function in patient with BPH compared to baseline preoperative value. Baboudjia et al. evaluated patient severity after 12 month follow up and showed that Rezum showed a median 15 points (–79%) improvement in IPSS score compared with 10 points (–59%) for Urolift, although not statistically significant. On the other hand, at 2 month of follow up, Tutrone et al. reported that Urolift tends to be superior in improving LUTS severity [18]. This findings could be explained by therapeutic mechanism underlying each intervention.

Rezum operates by administering sterile water vapor directly into prostate tissue. When the vapor contacts body-temperature tissues, it produces thermal energy. This transition from vapor to liquid releases focused energy onto the cell membranes of the prostate tissue, leading to immediate cell death (necrosis) and resulted in prostate shrinkage. Water vapor thermal therapy, or Rezum, operates by administering sterile water vapor directly into prostate tissue. When the vapor contacts body-temperature tissues, it produces thermal energy. This transition from vapor to liquid releases focused energy onto the cell membranes of the prostate tissue being targeted, leading to immediate cell death (necrosis) and subsequent prostate shrinkage [21, 22]. However, this mechanism took approximately 8 weeks to 6 months gradually to achieve significant prostate shrinkage. Thus, patient might not experience immediate improvement on the severity compared to Urolift, although it still give an improvement compared to preoperative IPSS score [23].

In contrast, the Urolift procedure, or prostatic urethral lift, uses small implants inserted into the prostate tissue with a specialized applicator. These implants function as anchors, retracting the obstructive prostate lobes away from the urethra thus widens the urethral passage without the need to cut or remove any prostate tissue [24]. This mechanism facilitates immediate release of obstruction resulted improving LUTS severity, earlier than Rezum system. In terms of quality of life, measured by IPSS-QoL, rezum and urolift showed a similar result.

In terms of sexual function, both intervention showed stable value of MSHQ-EjD, indicated that both preserved patient sexual function. Sexual function is a major concern regarding the use of traditional operative procedure with the incidence of Erectile Dysfunction post-TURP varies between 4% and 14%, and also associated with erectile dysfunction [25, 26]. This study revealed that at 2 month of follow up, urolift showed a superiority compared to rezum, while at 12 month, the efficacy was similar between two groups, indicating that both intervention were safe in terms of preserving patient's sexual function.

Our study found that the rate of re-intervention in the urolift group was significantly higher than in rezum group. This also confirmed previous study that reported that urolift reintervention rate was 5.1% within 1 year, 8,2% within 2 year, and 16.1% within year after therapy [27]. On the other hand, recent studies showed that rezum reintervention rate of 4.4% at 4 year [28]. This properties of low reintervention rate of rezum could be consideration for choosing MIST.

5. Conclusion

In conclusion, at 2 months, Urolift tends to give a significant superior improvement in patients severity compared to Rezum, thus might be beneficial for those who need rapid relieve of the symptoms. On the other hand, Rezum showed lower reintervention event for a long term fashion. Both intervention showed similar efficacy in maintaining sexual function thus considered safe for patient.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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