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The impact of water vapor thermal therapy of the prostate (rezūm) on sexual functions: a narrative review

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Abstract

Background: Senile prostate enlargement is an age-related condition. Many sexually active patients fear formal prostate surgeries owing to their negative impact on sexual performance. Minimally invasive procedures, including prostate water vapor thermal therapy (Rezūm®), were devised to make ends meet. This study aims to present a comprehensive narrative synthesis about the impact of prostate water vapor therapy on sexual functions.

Methods: A narrative literature review was performed in May 2023, using MEDLINE, Cochrane Library, Ovid-Embase, Scopus, Science Direct, and Google Scholar; for the MeSH term “rezum AND sexual functions”. Selected reports were published articles from 2018 to date (the last 5 years). Only open-access journals in English were analyzed. Efforts were made to focus on the 2 main domains of sexual functions; erection and ejaculation.

Results: As per the concise MeSH term “rezum AND sexual functions”, a score of 207 hits appeared on the initial search. After eliminating duplicate and irrelevant papers, only 7 articles fulfilled the inclusion criteria and were subjected to analysis. The analyzed articles were critically appraised to point out the studies` strengths and limitations. The gathered data were found to be consistent with one another as no outliers were detected.

Conclusion: Water vapor thermal therapy of the prostate showed satisfying preservation of erectile function with minimal ejaculatory dysfunction.

Keywords: Rezum, Water Vapor Therapy, Steam Prostate, Sexual Functions, Benign Prostatic Hyperplasia

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Background

The prostatic gland plays a pivotal role in men's urinary, sexual, and fertility functions. Benign prostatic hyperplasia (BPH) is a common urologic condition affecting aging men and responsible for lower urinary tract symptoms (LUTS) in nearly 80% of men aged 50 or over [1]. Along with LUTS, worsening of sexual function is a common occurrence in men with BPH [2,3,4].

LUTS is an independent risk factor for sexual dysfunction, as about 50–60% of men with LUTS/BPH have coexisting erectile dysfunction (ED) [5,6]. Moreover, men who seek treatment for LUTS/BPH are often prescribed α-blockers and 5-α reductase inhibitors as a first-line treatment. These medications might pose a negative impact on erectile and ejaculatory functions; as well as on the quality of the patient`s life [7,8]. Alternatively, surgical modalities, although considered the definitive treatment of BPH, are coined by considerable harm to sexual functions at both erectile and ejaculatory domains. Pain at ejaculation, low volume of ejaculates, retrograde ejaculation (RE), and anejaculation are not uncommon after transurethral resection of the prostate (TUPR) and Laser prostatectomy [9,10]. Various medicinal and surgical modalities are available to treat the senile prostate; however, only a few are sex friendly. Sexually active BPH patients are eager to find a bespoke approach that treats the gland and reserves sexual functions. Advancement in technology is a speeding train in virtually all life aspects, and prostate surgeries are no exception. New research cascaded under the umbrella of minimally invasive procedures to relieve LUTS, save sexual functions, and provide durable outcomes [11]. Convective radiofrequency thermal therapy of the prostate, or prostate steam treatment (Rezūm®); also called water vapor thermal therapy (WVTT), is a minimally invasive surgical procedure that entails endoscopic injection of water vapor (steam) deep into prostate tissues at predefined locations to ablate obstructive prostatic tissue including the median lobe [12,13]. This treatment was devised to provide rapid and durable relief of LUTS as well as preservation of sexual functions [14,15]. The Rezūm® system was introduced by NxThera (Maple Grove, Minnesota, US). It was approved by the United States Food and Drug Administration (FDA) in 2015, and the National Institute for

Health and Care Excellence (NICE) of the UK in 2018. Shortly after, the procedure spread out across the globe [16].

Evidence Acquisition

A comprehensive bibliographic search on the MEDLINE, Cochrane Library, Ovid-Embase, Scopus, Science Direct, and Google Scholar databases was conducted in May 2023. The MeSH term “rezum AND sexual functions” was used. Only open-access journals in English were tracked for information relevant to WVTT and its probable sexual consequences. Selected reports were published articles from 2018 up to date. Letters to the editor, editorial comments, and case reports were excluded. The two major domains of sexual dysfunctions, namely, erectile and ejaculatory were focused on. Relevant contents were critically appraised to point out the studies` strengths and limitations.

Evidence Synthesis

This narrative review provides an overview of the current literature revolving around WVTT and its probable sexual drawbacks. Furthermore, the included studies were subjected to critical appraisal. Precise keywords of "rezum and sexual functions”, were used to ensure a deep search with no confounders. A score of 207 hits appeared on the initial search. After eliminating duplicate and irrelevant papers, only 7 full-text articles fulfilled the inclusion criteria and were subjected to analysis (Figure 1). Owing to the nature of the erection and ejaculation functions; coupled with the research instrument being a questionnaire; the study outcomes were utterly subjective. Most of the evaluation questionnaires are self-administered. Misunderstanding is likely as participants could find it hard to differentiate retrograde ejaculation (RE) from anejaculation. These two terms are often pooled in the literature, especially when the evaluation method is not detailed [14,17,18]. However, the pooled data in this research were found to be consistent with one another as no eccentric outcomes were detected (Table 1). In 2018, Kevin and associates targeted the Medical Therapy of Prostatic Symptoms (MTOPS) trial`s participants. They used sexual function data from sexually active cohorts in the MTOPS study; where 1,209 were randomized to doxazosin, finasteride, combination drugs, and placebo, and 86 sexually active men who received thermal therapy [23]. MTOPS study participants completed the Brief Male Sexual Function Inventory (BMSFI), whereas men in the WVTT arm completed the International Index of Erectile Function (IIEF) and the Male Sexual Health Questionnaire (MSHQ) [19]. Researchers found that the drug cohort suffered from worsening sexual desire, erection, and ejaculation functions. On the other hand, the WVTT cohort had no significant impact on sexual functions throughout the 3 years after the procedure. This article has the advantage of including high-quality data from 2 large randomized controlled trials (RCTs) in subjects with similar baseline inclusion criteria for LUTS severity and prostate size. In fact, it is the first longitudinal assessment of sexual function domains restricted to sexually active men treated with drugs or a single minimally invasive surgical treatment. A pivotal limitation of the study is the use of 2 different, although validated, sexual function inventories: the BMSFI and the IIEF [19]. An ethical point to consider in interpreting this study is that it is funded by the same body that introduced the Rezum system.

In 2019, Leong and associates reviewed the literature for articles about sexual functions after various BPH procedures. They reported that current surgical therapies available for the treatment of BPH are associated with a substantial risk of both ejaculatory and erectile functions. However, many of the novel minimally invasive treatment alternatives such as the UroLift®, Rezūm®, and Aquablation®, have demonstrated the ability to preserve postoperative sexual function to a better degree. In addition, they reported these procedures having comparable safety, durability, and efficacy to current gold standard therapies [20]. In 2021, Kevin and associates published a multicenter RCT where 15 centers randomized 197 participants to WVTT (treatment arm) and sham procedure (control arm); and followed them for 5 years. The prostate size included was 30–80 cc. Participants were allowed to cross over if they qualified after 3 months of the study outset. Erectile and ejaculatory functions were quantitatively assessed at baseline and yearly thereafter. Results of the per-protocol analysis were reported previously. The current post-hoc analysis was performed on all treated subjects who were sexually active at baseline with no other surgical or medical management for BPH during the 5-year study period. One hundred thirty-six participants ended up in the treatment group while 61 remained in the control. At the end of the study participants completed the IIEF-EF and the MSHQ ejaculatory dysfunction (EjD) forms. A post-hoc analysis was performed. Subjects with normal sexual functions at baseline had little change in functions over 5 years. Subjects with baseline medical history of ED and EjD showed a slight decline over time that was not clinically significant [21]. The results of this work are limited by the post-hoc nature of the analysis and attrition over the 5-year follow-up; yet provide long-term evidence of durable outcomes after treatment with WVTT without impact on sexual function scores. Notably, the results represent a wide range of prostate volumes that could influence sexual outcomes. Moreover, observing 53 controls crossing over, optionally, to receive WVTT treatment while none reported crossing the other way around goes in favor of the treatment arm. The ethical controversies surrounding sham procedures cannot be deflected. In 2021, a narrative review was conducted by Couteau and associates for publications between 1990-2020 about the impact of medical and surgical treatments of the enlarged prostate on ejaculatory functions. They compared various BPH drug classes and surgical procedures as to what could be sex friendly. Out of the 65 articles in the final analysis, they reported that minimally invasive procedures including WVTT were devised to preserve antegrade ejaculation with promising short-term outcomes. They accomplish the mission by preserving 7.5mm of tissue lateral, and 10mm proximal to the verumontanum. In this work, the large number of articles included in the final analysis could be a point of strength. Moreover, the anatomical detail of tissue preservation surrounding the verumontanum is unique to this paper [22]. In 2021, Shing and associates reviewed various minimally invasive treatments for BPH focusing on their impact on erection and ejaculation. They included systematic reviews & meta-analysis articles published on the PubMed platform up to Jul. 2020. Researchers stated that while there was no reported incidence of de novo ED; 2.9% of patients reported reduced ejaculatory volume which subsequently decreased to 1.5% at 3 months while

the initial 4.0% risk of immediate postoperative anejaculation disappeared 3 months later [23].

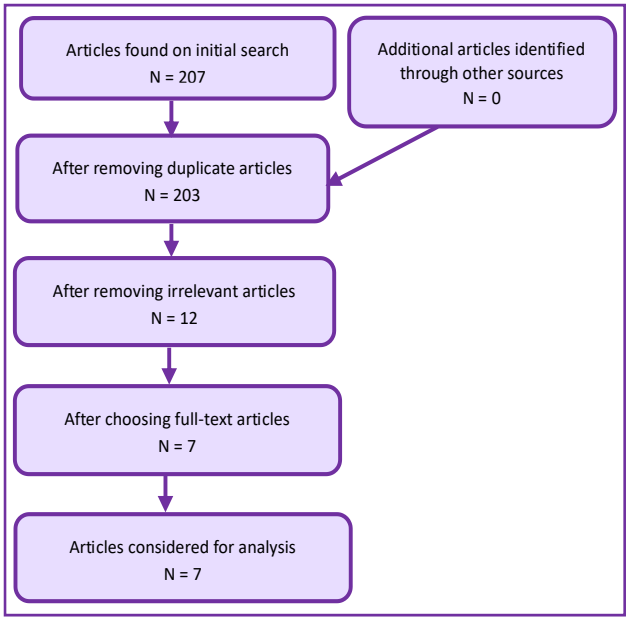

Figure 1: Articles selection flow-chart

The sexual impact of the WVTT across the IIEF scores (based on the minimal clinically important difference) was 11.5±3.5 for severe, 11.2±4.4 for moderate, and 5.3±2.8 for mild groups at 12 months [23,24]. Another corroborating retrospective study, with a shorter follow-up, involving similar patient demographics reported similar improvement in IPSS (International Prostate Symptom Score) and Q-MA without significant change in sexual function scores. An exciting point in this study is that the post-WVTT ejaculation issues could be temporary as they disappeared within 3 months of follow-up. Surfing PubMed exclusively for the search is a limitation [25].

In 2022, Manfredi and associates conducted a systematic review & meta-analysis to discuss the effect of different BPH procedures on erection and ejaculation functions. A total of 151 studies investigating 20,531 patients were included. Forty-eight RCTs evaluating 5,045 individuals were eligible for the meta-analysis. The pooled analysis showed no statistically significant changes in ejaculation functions and the IIEF-5 score compared with the baseline for the TURP procedure. Researchers concluded that erectile function appears to be unaffected by most surgical procedures for BPH. RE is a very common adverse event of BPH surgery, although emerging minimally invasive surgical procedures could be associated with a lower risk [26]. The large number of articles reviewed is a major strength of this study. On the other hand, a substantial number of articles (67, 44.4%) used non-validated tools to evaluate erectile and ejaculatory functions. In 2023, Cindolo and associates published a large multicenter cohort study. For 5 years, they followed all patients with symptomatic BPH who underwent WVTT at 8 institutions and analyzed the urinary and sexual outcomes. A total of 426 patients were eligible for the study; 232 in Group A, and 194 in Group B. Patients in Group B had a higher American Society of Anesthesiologists (ASA) score, prostate volume, and postvoid residues. On using the IPSS and the IIEF, researchers found no differences in urinary and sexual outcomes [27]. In addition to the intriguing large number of participants involved, the study revealed information relevant to patients with different risk factors. Noteworthy, the prime objective of the study was to compare the sexual and urinary outcomes of WVTT patients meeting the inclusion criteria of the RCT with unselected patients.

Conclusion

Water vapor thermal therapy of the prostate showed satisfying preservation of erectile function with a low risk of ejaculatory dysfunction.

Table 1: Synopsis of the narrative review

Study	Year of publication	The conclusion verbatim	Remarks
McVary et al. [23]	2018	WVTT has no significant impact on sexual functions	(S) data analyzed from 2 large RCTs (L) the use of 2 different sexual function inventories (L) the study is industry-sponsored
Leong et al. [20]	2019	WVTT preserves sexual functions	---
McVary et al. [19]	2021	WVTT causes sexual functions to decline over time, yet not statistically significant	(S) large multicenter RCT (S) optional cross-over (L) the nature of the post hoc analysis
Couteau et al. [22]	2021	WVTT preserves antegrade ejaculation with promising short-term outcomes	(S) large No. of articles reviewed (S) the anatomical detail of tissues maintaining antegrade ejaculation
Shin Ng and, Chung [24]	2021	WVTT has no reported incidence of ED; while a few patients reported reduced ejaculatory volume	(S) systematic reviews & meta-analysis study (L) only articles on PubMed studied
Manfredi et al. [26]	2022	WVTT doesn`t affect erection but could have a low risk of RE	(S) large RCT (L) considerable No. of articles used non-validated tools
Cindolo et al. [27]	2023	researchers found no differences between the 2 cohorts in urinary and sexual outcomes	(S) large multicenter cohort study (L) has additional unrelated study objective

N.B. (WVTT) water vapor thermal therapy, (S) strength of the study, (L) limitation of the study, (RE) retrograde ejaculation

Abbreviation

BPH: Benign Prostatic Hyperplasia; LUTS: Lower Urinary Tract Symptoms; ED: Erectile Dysfunction; RE: Retrograde Ejaculation; TUPR: Transurethral Resection of The Prostate; WVTT: Water Vapor Thermal Therapy; FDA: Food and Drug Administration; NICE: National Institute for Health and Care Excellence; MTOPS: Medical Therapy of Prostatic Symptoms; BMSFI: Brief Male Sexual Function Inventory; IIEF: International Index of Erectile Function; MSHQ: Male Sexual Health Questionnaire; RCTs: Randomized Controlled Trials; IPSS: International Prostate Symptom Score; ASA: American Society of Anesthesiologists

Declaration

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Availability of data and materials

Data will be available by emailing atifkatib@gmail.com

Authors' contributions

Atif Katib (AK) is the lead author who wrote the first draft, drew the chart, designed the table, and the research idea is his. Khalid Al-Easily (KA-E) did data mining and shared his patient's data and his own experience. All authors read and approved the final manuscript.

Ethics approval and consent to participate

We conducted the research following the declaration of Helsinki; however, the review articles need no ethical approval.

Consent for publication

Not applicable

Competing interest

The authors declare that they have no competing interests.

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