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FUNCTIONAL UROLOGY

The role of supramontanal preservation in ejaculation-sparing after transurethral resection of the prostate: A systematic review and meta-analysis

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Introduction Transurethral resection of the prostate (TURP) is widely recognized as the gold standard surgical treatment for benign prostatic enlargement (BPE). However, despite its effectiveness, TURP is associated with male sexual dysfunction, with up to 70% of patients developing retrograde ejaculation. Recent evidence suggests that preserving supramontanal tissue around the verumontanum may preserve sexual outcomes. This study aims to assess the efficacy of supramontanal-sparing TURP as an ejaculation sparing approach in sexually active males with BPE through a systematic review and meta-analysis.

Material and methods The present review was performed using a systematic search, registered in PROSPERO (CRD42024614954), and followed PRISMA guideline. Sexual function and voiding outcomes were measured, including symptom scores, maximum flow rate (Q_{max}), and post-void residual (PVR). The results were presented as risk ratios (RRs) and mean differences (MDs), with 95% confidence intervals (CIs).

Results Six studies involving 540 patients, supramontanal-sparing TURP was compared to conventional TURP. The supramontanal-sparing TURP significantly reduced retrograde ejaculation (RR = 0.26, 95% CI: 0.14–0.46, p <0.01) and preserved semen volume better (MD = 1.04 ml, 95% CI: 0.36–1.73, p <0.01). Both techniques showed comparable outcomes in voiding function, including postoperative maximum flow rate, IPSS scores, and post-void residual volume (p = 0.49, p = 0.97, and p = 0.82, respectively).

Conclusions The supramontanal-sparing TURP technique demonstrated lower rates of retrograde ejaculation, while achieving similar voiding outcomes compared to standard TURP. These findings highlight the potential for preserving antegrade ejaculation after TURP when using the supramontanal-sparing technique.

Key Words: transurethral resection of the prostate ‹› ejaculation ‹› ejaculation-sparing ‹› benign prostatic hyperplasia ‹› lower urinary tract symptoms ‹› reproductive health

INTRODUCTION

Benign prostatic hyperplasia (BPH) is regarded as one of the most common age-related conditions among older men. The dynamic, progressive characteristics of the disease are responsible for approximately half of the males between the ages of 50–60 and up to 90% of men over 80 [1, 2]. In clinical settings, BPH manifests as symptoms of the lower urinary tract caused by bladder outlet obstruction. If left untreated, these symptoms can progress dynamically and potentially impact the quality of life as well as cause several deliberating complications, including acute urine retention or renal impairment [2, 3].

BPH treatment generally follows a progressive approach, beginning with conservative strategies and

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pharmacological medications such as α-blockers and 5α-reductase inhibitors. If these measures are unsuccessful, surgical options are considered, with transurethral resection of the prostate (TURP) being the gold standard due to its high effectiveness and favorable safety profile [4–6]. Despite its effectiveness, the association of TURP with male sexual dysfunction is an important concern for patients. Previous research has shown that three-quarters of people who undergo prostatic surgery remain sexually active, and this procedure can have a major influence on male sexual function, which can be very bothersome for the patients [7].

Recently, researchers have found the supramontanal region's critical role as part of male reproductive and sexual physiology [8]. Based on these findings, research began to explore the impact of preserving the supramontanal during TURP to maintain its functional integrity, potentially reducing the risk of male sexual dysfunction, particularly ejaculatory dysfunction [8, 9]. However, the reported benefits of supramontanal preservation during TURP remain inconsistent [10–12]. Given these inconsistent findings, this review aims to objectively assess the effect of supramontanal tissue preservation TURP with a focus on key outcomes of male sexual dysfunction and voiding functions.

MATERIAL AND METHODS

Literature search and study selection criteria

This comprehensive review and meta-analysis were performed by following the standards established in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework [13]. The protocol was registered prospectively in the PROSPERO (CRD42024614954). A thorough and systematic literature search was carried out across electronic databases, including PubMed, Scopus, ScienceDirect, Google Scholar, and the Cochrane Library to discover relevant publications published up to November 2024. The search phrases used a combination of Medical Subject Headings (MeSH®) and related key words like "supramontanal preservation", "ejaculation", "sexual function", "TURP", and "benign prostatic hyperplasia." The specific search strategy is presented in the suppl. Table 1.

Data extraction and quality assessment

Two investigators independently extracted data using a standardized data collection instrument derived from a predefined template in accordance with the registered review protocol, implemented in a spreadsheet to ensure methodological consistency, transparency, and reproducibility. Disagreements were resolved by consulting with a senior author. The data extracted encompassed study characteristics, participant demographics, intervention details, outcome measures, and follow-up durations. Data were collected and organized using Microsoft Excel® 2021 (Microsoft Corporation, Redmond, WA, USA).

The Cochrane Risk of Bias tool was used to evaluate the quality of the included studies, which evaluated the domain of randomization, allocation concealment, blinding, and completeness of outcome reporting [14].

Eligibility criteria

The studies were considered eligible if they met the following inclusion criteria: 1) randomized controlled trials (RCTs), cohort studies, or case series; 2) male participants who underwent TURP for benign prostatic hyperplasia; 3) studies that compared supramontanal-preserving TURP with standard TURP; and 4) reported outcomes related to sexual function, including parameters such as ejaculatory function, erectile function using The International Index of Erectile Function (IIEF) score, and voiding functions such as voiding maximum flow rates (Qmax), International Prostate Symptom Score (IPSS), and post voiding residual (PVR). Studies were excluded if they reported different outcome data and utilized an intervention other than TURP. The screening procedure was thoroughly documented and represented in a PRISMA 2020 flow diagram [13].

Data analysis and presentation

Effect sizes were expressed as risk ratios (RR) with 95% confidence intervals (CI) for binary outcomes, and as mean differences (MD) with 95% CI for continuous outcomes. To assess heterogeneity across studies the Cochran's Q test were applied. A random-effects model was used when heterogeneity was statistically significant ($p < 0.05$). In cases of low heterogeneity, a fixed-effects model was applied [14]. Forest plots were used to display the pooled results, and publication bias was evaluated by examining the asymmetry of the funnel plot and conducting Harbord's regression test. Statistical significance was set at a p-value of <0.05. All analyses were performed using RevMan 5.4 software.

RESULTS

Baseline study characteristics

The initial database search identified 3,461 abstracts related to supramontanal-sparing TURP in patients with BPE. The majority of records were excluded during screening because they involved interventions other than supramontanal-sparing TURP, including vaporization, laser enucleation, and convective water vapor therapy. Sixteen studies underwent full-text review, and two studies were excluded because one included patients with prostate cancer and the other involved young men with bladder neck obstruction secondary to bilharziasis, reflecting different underlying pathologies. Finally, 6 studies met the inclusion criteria and were included in the qualitative and quantitative synthesis, as depicted in Figure 1. Table 1 outlines the baseline characteristics of participants across the included studies, 5 RCT and one retrospective cohorts were included in the final analysis involving 540 patients, supramontanal-sparing TURP was compared to conventional TURP. The mean participant age was 64.5 years, with prostate volumes ranging from 44–73 g. Resection margins varied across studies, with Al-Azzawi et al. [15] and Elshazly et al. [10] reported using 1 cm margin proximal to verumontanum, while other trials did not specify the margin of the resection. The follow-up period for the included studies ranged from 3 to 12 months.

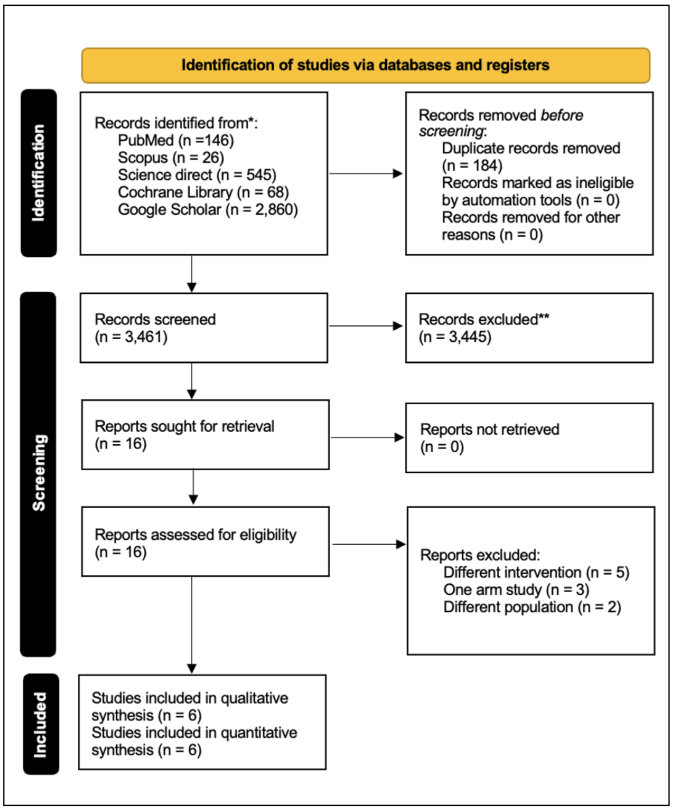

Figure 1. *PRISMA flow diagram from database search.*

Individual study outcomes

Postoperative complications were reported using varying methodologies. Ramachandran et al. [16] utilized the Clavien–Dindo classification system to categorize complications, whereas other studies did not employ standardized classification methods. None of the trials reported any serious complications. The prevalence of blood transfusion was comparable between the two groups, ranging from 0–10%. Urinary incontinence was marginally more common in the conventional TURP group, with a prevalence of 0–10%. Furthermore, a trial by Manasa et al. [11] reported a higher incidence of bladder neck contracture in the supramontanal-sparing TURP group compared to standard TURP (13% vs 0%). Sexual adverse effects were reported using several parameters including IIEF-5, Question-9, EPS, Retrograde ejaculation, and semen volume [10–12, 15]. The majority of study showed insignificant difference of IIEF-5 score between supramontanal-sparing TURP and conventional TURP [10–12, 15–17]. Elshazly et al. [10] reported improvement in IIEF-5 score both in supramontanal-sparing TURP and conventional TURP (12.9 to 18.6 and 11.6 to 16.4, respectively). The rate retrograde ejaculation was reported to be low in supramontanal-sparing TURP (10–36%) compared to traditional TURP (61–89%) [10–12, 15–17].

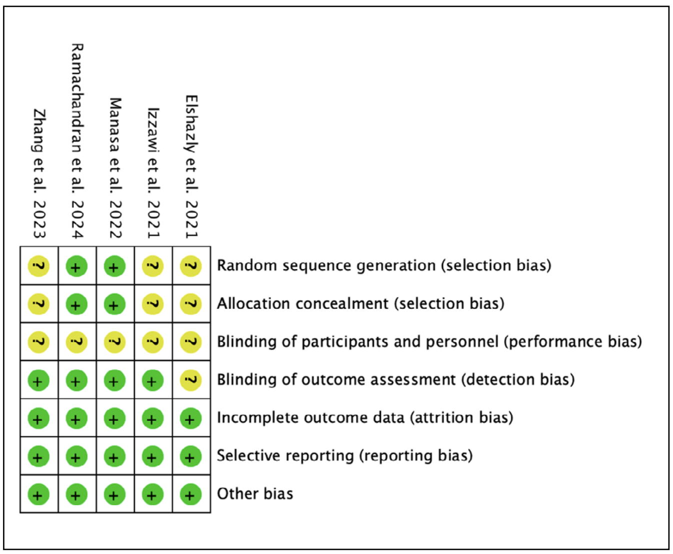

Figure 2. *Risk of bias assessment using Cochrane risk of bias tools.*

Table 1. *Baseline characteristics of the included studies*

Author	Design	Inluded patients	Exluded patients	Modality	Group		Margin	Total sample		Prostate Volume (gr)		Retrograde ejaculation		Final IPSS (ml/S)	
					Intervention	Comparison		I	C	I	C	I	C	I	C
Kalyenci et al. [17] (2024)	Retrospective cohort	BPE	Prostate cancer Previous urological Surgery Stricture Diabetes mellitus	Bipolar TURP	Supramontanal-sparing	Standard resection	0.5 cm proximal to veromontanum	106	120	53.9	54.9	38	89	9	9.2
Ramachandran et al. [16] (2024)	RCT	BPE	Patients using 5-ARI Neurogenic deficit Stricture Malignancies Previous TURP	Monopolar TURP	Supramontanal-sparing	Standard resection	Unspecified	30	30	48	45	NR	NR	8.77	8.6
Zhang et al. [12] (2023)	RCT	BPE	Prostate cancer Neurogenic bladder Stricture Bladder neck contracture	Unspecified TURP	Supramontanal-sparing	Standard resection	Unspecified	30	34	59	53	10.0%	61.8%	6.7	6.3
Manasa et al. [11] (2022)	RCT	BPE	Neurogenic bladder Stricture Severe UTI	Monopolar TURP	Supramontanal-sparing	Standard resection	Unspecified	45	45	44	43	11.1%	77.8%	4.4	4.7
Al-Azzawi et al. [15] (2021)	RCT	BPE	Prostate cancer Neurogenic bladder Stricture Psychotic disorders	Bipolar & monopolar TURP	Supramontanal-sparing	Standard resection	1 cm proximal to veromontanum	22	18	46		13.6%	83.3%	12.2	12.8
Elshazly et al. [10] (2021)	RCT	BPE	Prostate cancer Neurogenic bladder Stricture	Bipolar TURP	Supramontanal-sparing	Standard resection	1 cm proximal to veromontanum	30	30	73	71	26.7%	80.0%	8.5	7.5

BPE – benign prostatic enlargement; RCT – randomized controlled trial; TURP – transurethral resection of the prostate

Table 2. *Pooled analysis of supramontanal-sparing TURP vs standard resection TURP*

Parameters	Arm	MD	OR	95% CI	p-value	I^2 (%)	p
IIEF-5 (points)	2	–1.06	–	From –3.49 to 1.37	0.39	87	Random effects
Retrograde ejaculation	5	–	0.26	From 0.14 to 0.46	<0.01*	72	Random effects
Semen volume [ml]	2	1.04		From 0.36 to 1.73	<0.01*	75	Random effects
Maximum flow [ml/s]	5	0.08	–	From –1.85 to 1.7	0.93	95	Random effects
IPSS [points]	5	0.08	–	From –0.32 to 0.48	0.69	29	Fixed effects
Post-voiding residual [ml]	3	–0.74	–	From –3.29 to 1.81	0.57	66	Random effects
Length of hospitalization [hours]	3	0.88	–	From –0.95 to 2.72	0.35	19	Fixed effects
Operative time [min]	3	–4.47	–	From –11.28 to 2.34	0.2	88	Random effects
Urinary incontinence	3	–	0.15	From 0.02 to 1.32	0.09	0	Fixed effects
Blood transfusion	4	–	0.72	From 0.17 to 3.1	0.66	0	Fixed effects

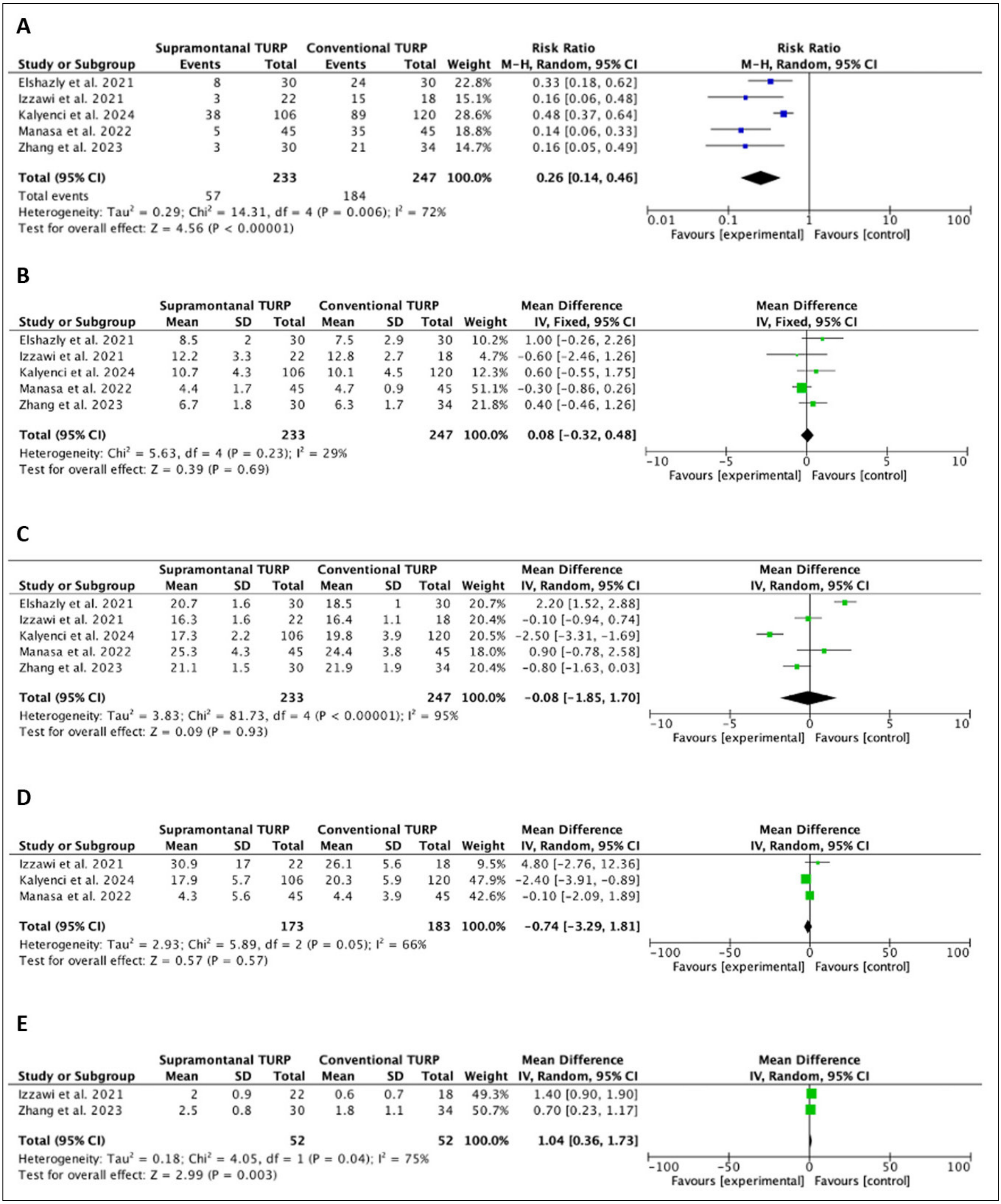

Figure 3. *Forest plot comparing Supramontanal-sparing vs conventional resection TURP on:* **A)** *retrograde ejaculation;* **B)** *post-operative IPSS score;* **C)** *post-operative Qmax (m/s);* **D)** *post-operative post-voiding residual volume (ml); and* **E)** *semen volume (ml).*

Quality assessment of the included studies

Figure 2 summarizes the risk of bias assessment across seven domains. The trials by Elshazly et al. [10], Al-Azzawi et al. [15], and Zhang et al. [12] showed some concerns due to insufficient details regarding their randomization methods and a lack of clear descriptions of allocation concealment procedures. However, all trials demonstrated a low risk of bias related to missing outcome data, as they reported minimal patient exclusions from the analysis, as well as a low risk of bias from selective reporting. Overall, the analysis indicates a moderate risk of bias among the included trials. The quality assessment of the study by Kalyenci et al. [17] was conducted using the Newcastle-Ottawa Scale, appropriate for its retrospective design. The study achieved a score of seven, indicating a good methodological quality.

Results from pooled analysis

Table 2 provides a comprehensive summary of the pooled analysis results. Meta-analyses were performed using data from six studies comparing patients with BPO undergoing TURP with the supramontanal-sparing technique to those undergoing standard resection. The pooled analysis sexual domain revealed different result. In terms of erectile function, based on data from two studies using IIEF-5, there was no significant difference between the supramontanal-sparing technique and standard resection (MD = –1.06, 95% CI: from –3.49 to 1.37, p = 0.39). However, the supramontanal-sparing technique demonstrated a significantly lower incidence of retrograde ejaculation compared to standard resection (RR = 0.26, 95% CI: 0.14–0.46, p <0.01). Furthermore, the supramontanal-sparing technique demonstrated superiority over standard resection in preserving semen volume, with a mean difference of 1.04 ml (95% CI: 0.36–1.73, p <0.01) as displayed in Figure 3. In terms of voiding function, no significant differences were observed between the two techniques in postoperative maximum flow rate, IPSS score, or post-void residual urine volume (p = 0.49, p = 0.97, and p = 0.82, respectively). Both techniques demonstrated comparable outcomes in terms of complications, showing

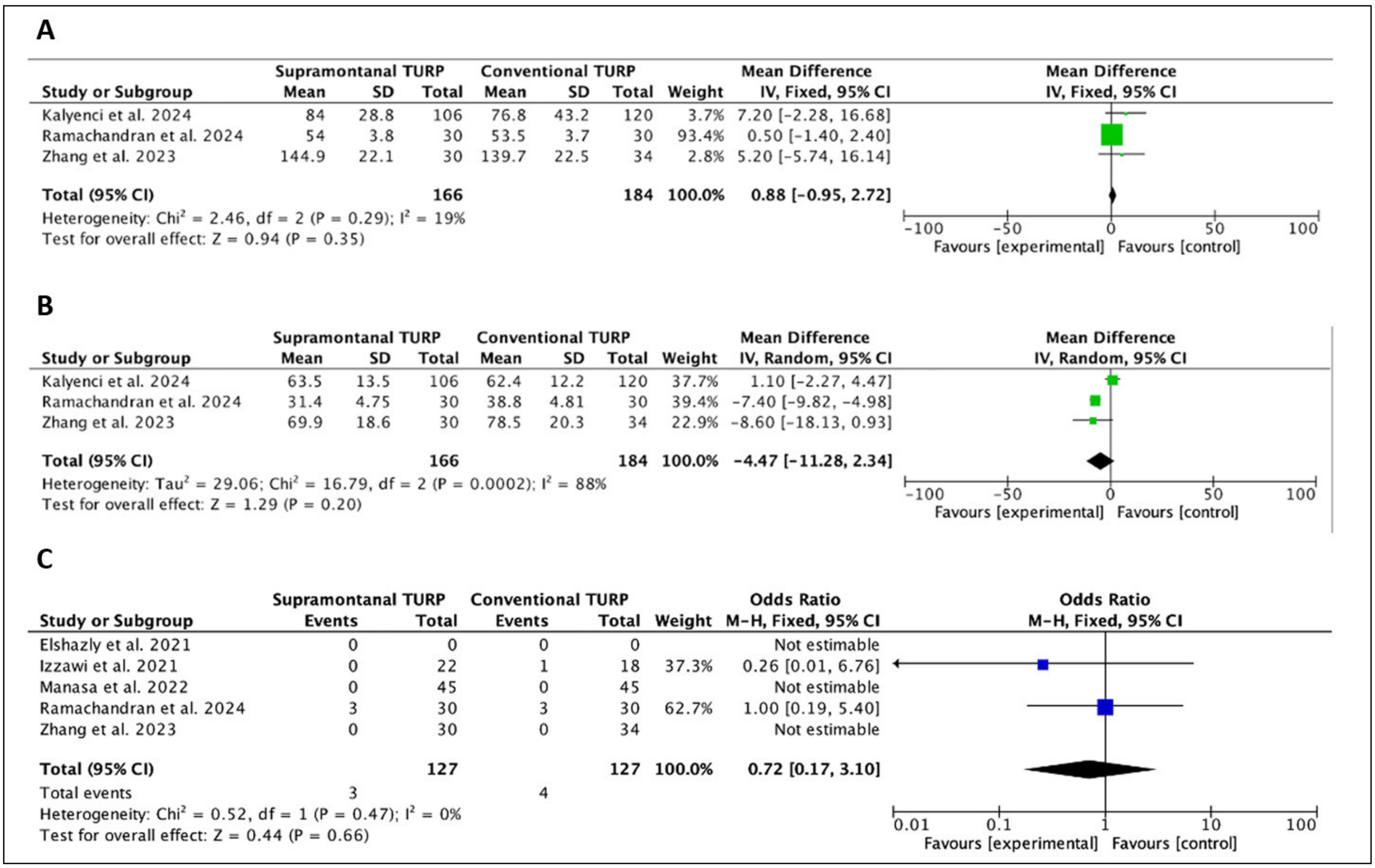

Figure 4. *Forest plot comparing Supramontanal-sparing vs conventional resection TURP on:* **A)** *length of stay;* **B)** *operative time, and* **C)** *blood transfusion.*

no significant differences in urinary incontinence, the need for blood transfusion, operative time, or length of hospitalization (p = 0.09, p = 0.66, p = 0.2, and p = 0.82, respectively), as illustrated in Figure 4.

DISCUSSION

The increasing life expectancy and high prevalence of sexually active men undergoing prostate surgery highlight the importance of managing LUTS while preserving male sexual function [17]. Taking these into consideration, state-of-the-art technologies have been developed in order to minimize the adverse sexual effects of prostatic surgical procedures, namely ablation, laser enucleation, prostatic urethral lift, intraprostatic stent, Thulium laser transurethral incision, and convective water vapor energy therapy [8, 18]. Even though new technologies have been introduced, TURP remains the cornerstone for the surgical management of BPH due to its proven efficacy and durability [19]. Compared to newer techniques like Aquablation and laser enucleation, TURP is widely available, cost-effective, and has a shorter learning curve. It also provides superior symptom relief and long-term outcomes compared to minimally invasive options such as prostatic urethral lift, intraprostatic stents, and convective water vapor energy therapy. Therefore, researchers are interested in investigating the possible modification of TURP to improve the sexual outcomes associated with the procedure. Previously described in the literature, supramontanal-sparing TURP is a modification of the TURP technique aimed at preserving the integrity of the tissue proximal to the verumontanum, which is hypothesized to reduce the risk of male sexual dysfunction [10, 11, 20]. In this meta-analysis, several interesting insights have emerged regarding the modified supramontanal-sparing TURP technique. To objectively evaluate the benefits of this procedure, several outcomes were assessed including voiding function, operative outcomes, and sexual function.

The evaluation of voiding function is the primary endpoint in all patients undergoing prostatic surgeries [21]. The most commonly used for measuring improvement in voiding outcome is IPSS, as a validated subjective measure of symptom severity and quality of life significantly decreases postoperatively, highlighting symptom relief and patient satisfaction [22]. Prior trials have shown consistent results of insignificant differences in IPSS among patients treated with supramontanal-sparing TURP and conventional TURP [10, 11, 15]. The result of this review is in line with prior trials, which showed insignificant differences in IPSS. We also evaluated Qmax, an objective indicator of bladder outlet obstruction (BOO), which typically improves post-TURP [23]. A prior trial by Elshazly et al. [10] demonstrated slightly lower Qmax in the supramontanal group compared to conventional TURP (18.47 vs 20.67 ml/s, respectively). This result was also followed by a later cohort by Kalyenci et al. [17], which reported less Qmax improvement in the supramontanal group (17.3 vs 19.8 ml/s, respectively). However, after the results were combined with other trials, the difference was insignificant (p = 0.06). Another objective parameter, PVR, is also evaluated. Reductions in PVR indicate improved bladder emptying, though persistent elevations may suggest complications such as incomplete resection or detrusor underactivity [21]. Combined analysis from three studies revealed an insignificant PVR difference between the supramontanal and standard TURP groups. In theory, unresected supramontanal remnants may cause outflow disturbances after resection. However, conclusive evidence from our combined analysis indicated that the preservation of supramontanal tissue did not adversely affect urine flow [4, 20].

Evaluating perioperative outcomes, such as length of hospital stay and operative time, is essential for assessing the efficiency and safety of TURP [10–12, 15, 17]. Prolonged operative times are associated with increased risks of complications, including bleeding and fluid absorption, which can increase the risk of developing transurethral resection syndrome [24]. Theoretically, the operative time will be lesser in the supramontanal group as there is less resected tissue in the supramontanal-sparing TURP than in the conventional resection. This hypothesis was supported by prior trials by Ramachandran et al. [16] and Zhang et al. [12], who reported that supramontanal TURP had less operative time compared to conventional methods (–7.4 min and –8.6 min, respectively). However, when the evidence was pooled, the result showed insignificant differences [17]. In addition to operating time, intraoperative and postoperative complications were also reported to be similar among the supramontanal-sparing and standard resection group. Individual studies showed no TUR syndrome in either group [11, 12]. Furthermore, several complications were also reported with insignificant differences, including clot retention and urinary tract infection [11]. Pooled analysis from available studies showed insignificant differences in blood transfusion and urinary incontinence. In terms of length of hospitalization, the pooled analysis on the length of stay demonstrated an insignificant difference between supramontanal-sparing TURP and conventional TURP.

Sexual function in patients undergoing TURP has become an important endpoint, as sexual health plays a pivotal role in the overall quality of life of patients as well as their partners [7, 25]. Previous research revealed that the majority of men who undergo TURP remain sexually active, and the procedure does not significantly reduce the frequency of sexual behaviours [7]. Therefore, a comprehensive assessment of sexual function is critical for this population. In the spectrum of male sexual dysfunction, several conditions are considered, such as erectile dysfunction, Ejaculatory dysfunction, low sexual desire, and penile curvature [26]. However, our comprehensive literature search revealed that domains that are primarily affected by the TURP procedure are erectile function and ejaculatory function [10–12, 15, 16]. Therefore, in this review, we are focusing on analysing these domains. Parameters related to erection and ejaculation are evaluated, one of them is IIEF, a validated tool that assesses erectile function, orgasmic function, sexual desire, and satisfaction [27]. Post-TURP changes in IIEF scores reflect the impact on erectile function, which, although generally preserved, may be affected in some cases [25, 28]. Individual studies by Elshazly et al. [10] and Zhang et al. [12] reported that the technique did not significantly influence erectile function as measured by IIEF. After combining the results from the available trials, we discovered that the supramontanal tissue preservation had no significant difference in IIEF compared to the traditional TURP ($p = 0.39$) [10, 12].

Another notable sexual complication after TURP is retrograde ejaculation, affecting more than two-thirds of the patients [29]. This complication can affect satisfaction in sexually active men and even cause male infertility. Several trials demonstrated that supramontanal tissue preservation might reduce the risk of retrograde ejaculation (52–86% reduction). The combined analysis showed that the supramontanal-sparing techniques could effectively reduce the risk of retrograde ejaculation by 74% ($p < 0.01$). Another method to evaluate ejaculatory function is ejaculation projection score (EPS), which was reported by a trial by Manasa et al. [11] and showed preserved levels pre-operative and postoperatively (3.49 to 3.36 points, respectively). However, meta-analysis cannot be performed due to the limited number of trials assessing this parameter. Furthermore, studies have reported that TURP can lead to a reduction in seminal fluid [12, 15]. This reduction may result from various factors, including damage to the ejaculatory ducts during the procedure, which can cause obstruction and prevent the release of seminal vesicle fluid [12]. Additionally, retrograde ejaculation contributes to a decreased semen volume as the ejaculate is redirected into the bladder [12]. However, this issue may be mitigated using a modified supramontanal-sparing TURP. In this review, the combined analysis of studies demonstrated that the supramontanal-sparing approach preserved semen volume compared to standard TURP, with a mean difference of 1.04 ml.

The underlying mechanism of the supramontanal-sparing technique for preserving sexual outcomes compared to traditional TURP is not completely understood. However, several theories have been described in the literature. The first theory was popularized by Gil-Vernet et al. [30] that the musculature surrounding the verumontanum is responsible for preventing retrograde ejaculation. Gil-Vernet et al. [30] observed in the ultrasound, a slight downward shift of the verumontanum, which temporarily made contact with the opposite urethral wall. Coordinated contractions of the bulbar urethra and external sphincter directed the seminal fluid discharged from the ejaculatory ducts in a downward direction.

In addition, Hermabessiere et al. [31] revealed that the ejaculate is expelled directly into the inframontanal urethra through a closure mechanism involving the paracollicular and supracollicular tissue, referred to as the ejaculatory hood, without causing ballooning of the prostatic urethra. Consequently, retrograde ejaculation was prevented by the preservation of this ejaculatory hood. Based on these theories, Alloussi et al. [20] proposed a modified TURP technique aimed at preserving the supramontanal tissue to help maintain ejaculatory function. The study showed excellent results, including effective voiding function, a 91% success rate in preserving antegrade ejaculation, and comparable perioperative and postoperative outcomes to standard TURP.

The rate of ejaculation preservation with supramontanal-sparing TURP in this review ranged from 65% to 90%, which is comparable to other ejaculation-preserving interventions such as modified vaporization (87–96%), prostatic urethral lift (100%), and aquablation (90–100%), and higher than prostatic artery embolization (32–57%) and laser enucleation (46%). However, direct head-to-head comparisons are currently lacking [32].

In general, the findings of the meta-analysis highlight the advantage of supramontanal-sparing techniques compared to standard TURP in terms of sexual function without compromising the voiding function. Another advantage lies in its practicality: the technique is simple to perform and does not require significant additional training or specialized equipment, making it accessible to urologists globally. Despite these benefits, it is important to interpret this result with caution due to the limited sample sizes, short follow-up durations, and the restricted population of medium-sized prostates. Supramontanal-sparing TURP may be technically challenging in men with larger prostates (>80 ml), and its efficacy in this subgroup remains uncertain. The studies included in this review primarily involved men under 70 years with severe baseline LUTS, in whom ejaculatory preservation is most relevant. Older men, who often experience naturally declining ejaculatory function, may derive less benefit [33]. Some heterogeneity across the included studies may arise from variations in resection margins, energy modalities, and surgeon experience, but further analysis is not feasible due to the paucity of available studies. Comparative analyses on the long-term durability of supramontanal-sparing TURP vs conventional TURP are currently lacking. Most studies reported follow-up of up to 12 months and did not provide data on retreatment rates over longer periods, leaving the long-term retreatment rate uncertain. However, a single-arm cohort study reported that the five-year retreatment rate for supramontanal-sparing TURP is similar to that of standard TURP, with rates of 12.75% compared to 3–14.5% [4, 20].

In order to determine the most optimal outcomes, it is necessary to conduct longer-term follow-up trials to establish the long-term efficacy and safety of supramontanal-sparing TURP. Additionally, a more detailed analysis of the different resection margins and larger prostate volume might enhance further information regarding the most optimal protocols of the procedure.

CONCLUSIONS

This review's findings emphasize the superiority of supramontanal-sparing TURP in preserving male sexual function, particularly ejaculatory function, while achieving comparable voiding outcomes as standard TURP. This technique might be offered to BPH patients who wish to maintain their sexual activities.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

FUNDING

This research received no external funding.

ETHICS APPROVAL STATEMENT

The ethical approval was not required.

SUPPLEMENTARY MATERIAL

Suppl. Table 1. *Specific search strategy*

No	Keywords
#1	"benign prostatic hyperplasia" OR "benign prostatic enlargement" OR „BPH" OR „Benign Prostatic Hypertrophy" OR "Prostatic Hypertrophies"
#2	"turp" OR "transurethral resection of the prostate" OR "prostatectomy" OR "transurethral prostatectomy" OR "transurethral resection"
#3	"supramontanal" OR "supramontanal preservation" OR "supramontanal preserving" OR "supramontanal-preservation" OR "supramontanal sparing" OR „supramontanal-sparing" OR „ejaculation sparing" OR "ejaculation-sparing" OR "ejaculation preserving" OR "ejaculation-preserving" OR "ejaculation preservation" OR "ejaculation-preservation" OR "ejaculatory preservation" OR "ejaculatory-preservation" OR "ejaculatory preserving" OR „ejaculatory-preserving" OR "organ sparing treatment" OR "preserving ejaculation" OR "ejaculatory hood" OR "ejaculatory hood sparing" OR "preservation of ejaculation" OR "preservation of sexual function"
#4	"sexual function" OR "sexual dysfunction" OR "ejaculation" OR "retrograde ejaculation" OR "male sexual dysfunction" OR "ejaculatory function" OR "ejaculatory"
#5	#1 AND #2 AND #3 AND #4

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