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Impact of COVID-19-related prolonged catheterization on bipolar TURP outcomes

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MAIN POINTS

- The COVID-19 pandemic led to prolonged catheterization in BPH patients awaiting B-TURP due to surgical delays.
- Prolonged catheterization was found to be an independent risk factor for impaired long-term voiding function after B-TURP.
- Despite similar total IPSS scores, catheterized patients showed increased voiding symptoms and higher IPSS voiding/storage ratios postoperatively.
- Structured catheter care protocols may reduce infection risk but do not mitigate functional deterioration caused by extended catheter use.

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ABSTRACT

Aim: To evaluate the early and long-term clinical outcomes of bipolar transurethral resection of the prostate (B-TURP) surgery in patients with prolonged preoperative urethral catheterization due to their operations being postponed during the COVID-19 pandemic.

Materials and Methods: Patients with benign prostatic hyperplasia (BPH) whose B-TURP procedures were delayed due to the COVID-19 pandemic were analyzed. The patients were divided into two groups: Patients awaiting surgery without a catheter were defined as Group A, while those who developed acute urinary retention (AUR) and were catheterized were defined as Group B. Preoperative and postoperative International Prostate Symptom Score (IPSS) values, IPSS subscores (voiding and storage), early and long-term clinical outcomes, and complications were compared.

Results: Group A included 53 patients who were operated on without a catheter, and Group B included 68 patients who waited for surgery with a catheter in place for an average of 89.6 days. No statistically significant differences were found between Group A and Group B in terms of age, body mass index, IPSS, American Society of Anesthesiologists score, length of hospital stay, or total follow-up duration ($p>0.05$). However, Group B had significantly higher prostate-specific antigen levels, prostate volume, operative time, specimen weight, and perioperative catheterization time compared to Group A ($p<0.01$). While total IPSS scores were similar between the groups, Group B exhibited significantly higher IPSS voiding scores, but significantly lower IPSS storage scores compared to Group A ($p<0.001$). When assessing the IPSS voiding-to-storage (V/S) ratio, both the 12-month and long-term values were significantly higher in Group B than in Group A ($p<0.001$).

Conclusion: Postponing the elective surgeries and the necessity of prolonged catheterization during the COVID-19 pandemic resulted in functional voiding impairments following B-TURP in patients who developed AUR due to BPH.

Keywords: Benign prostatic hyperplasia, Bipolar transurethral resection of the prostate, COVID-19, Lower urinary tract symptoms, Voiding symptoms, Storage symptoms

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INTRODUCTION

Benign prostatic hyperplasia (BPH) is a histological diagnosis characterized by the overgrowth of epithelial and stromal cells located in the transition zone of the prostate gland. BPH is the most common cause of benign prostatic enlargement, benign prostatic obstruction, and bladder outlet obstruction in older men [1]. The global outbreak of coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), was first identified in Wuhan, China, in late 2019. It was shortly thereafter declared a pandemic by the World Health Organization. Following the spread of the epidemic, national and international urology societies, as well as health authorities in various countries, issued recommendations to guide the prioritization of clinical and surgical activities during the pandemic. They advised deferring elective surgeries for BPH or BPH-related complications during the COVID-19 pandemic to reduce overcrowding in healthcare systems and minimize the risk of in-hospital

cross-infection [2]. Postponing these procedures during the COVID-19 pandemic led to challenges such as a high disease prevalence in the community, a backlog of elective surgeries, significant treatment delays, and a marked decline in the quality of life (QoL) for patients [3,4].

Patients who developed acute urinary retention (AUR) due to acute obstruction from BPH were required to remain catheterized for prolonged periods as a result of the pandemic [5]. Overcrowding in the healthcare system during the COVID-19 crisis further delayed surgeries, resulting in extended waiting periods for catheterized patients before surgical intervention [6,7].

In this study, we evaluated the clinical outcomes, complications, and functional results of bipolar transurethral resection of the prostate (B-TURP) in patients with BPH whose surgeries were delayed due to the COVID-19 pandemic. Our objective was to assess the surgical outcomes in patients subjected to prolonged catheterization and to determine whether extended catheter use affects postoperative voiding function and contributes to early or long-term complications.

MATERIALS AND METHODS

The clinical trials at Adıyaman University were approved by the local ethics committee (decision number 2022/1-7, dated January 18, 2022) and sanctioned by the Turkish Ministry of Health.

Medical records of patients indicated for benign prostatic hyperplasia (BPH) surgery, but whose procedures were postponed due to the COVID-19 pandemic, were retrospectively reviewed from March 2020 to December 2021. Exclusion criteria included prostate cancer, prior prostate or urethral surgery, and a diagnosis of neurogenic bladder disorder preceding the acute urinary retention (AUR) episode. Our BPH management algorithm during the pandemic was established in accordance with directives from the Turkish Ministry of Health and hospital administration. An overview of this algorithm is provided in Figure 1.

Catheter-free patients with an International Prostate Symptom Score (IPSS) of >24, who did not benefit from medical treatment and were indicated for B-TURP, were categorized into Group A. Group B included patients who experienced AUR, underwent catheterization, and were subsequently offered a B-TURP following a failed catheter-free trial. Preoperative prophylactic measures for catheterized patients awaiting surgery included catheter care training, regular intermittent catheter replacement, and the use of a silicone catheter along with methenamine hippurate for a recommended duration of 10 days. All patients underwent preoperative reverse transcription-polymerase chain reaction (PCR) testing via oropharyngeal and nasopharyngeal swabs. Surgeries for PCR-positive patients were postponed. Patients with positive urine cultures received appropriate antibiotic therapy for seven days, followed by repeat urine cultures.

All patients were administered prophylactic antibiotic therapy with ceftriaxone 1g during anesthesia. All surgeries were performed using a bipolar plasma kinetic system and a 26-Fr continuous flow resectoscope. We used the Gyrus plasma kinetic unit for the procedures, setting the cutting power at 120 W and coagulation power at 80 W. Saline solution was employed for bladder irrigation throughout. Each operation concluded with the placement of a 22-Fr Couvelaire catheter. Operative time was defined as the duration from insertion of the resectoscope to placement of the catheter. Continuous bladder irrigation was started with saline, and catheter removal was based on hematuria status. Patients who voided successfully twice after catheter removal were discharged the same day. Patients unable to void were recatheterized and discharged with instructions to attempt decatheterization one week later.

The following parameters were evaluated for both groups: age, body mass index (BMI), IPSS, American Society of Anesthesiologists (ASA) score, prostate volume, prostate-specific antigen (PSA), perioperative COVID-19 infection, operative time, hospital stay, resection rate (calculated as weight of resected specimen/prostate volume on urinary system ultrasound), presence of urinary system tract infection, hematuria and clot formation, catheterization time, need for recatheterization after postoperative catheter removal, and early postoperative secondary surgery rates, as well as IPSS voiding score/storage (V/S) ratio, maximum flow rate (Qmax), postvoid residual (PVR), QoL index, urethral stricture, urinary incontinence, bladder neck contracture, and reoperation requirements at 12-month and long-term follow-ups.

Statistical analysis

Statistical analysis was performed using IBM SPSS Statistics version 25 (IBM Corporation, Armonk, NY, US). The normality of the distribution of continuous variables was examined using the Kolmogorov-Smirnov test, and homogeneity of variances was tested with the Levene test. Descriptive statistics for categorical variables were expressed as frequency (n) and percentage (%), while continuous variables were presented as mean ± standard deviation, median (minimum–maximum), or median (25^{th}–75^{th}) percentile values, as appropriate. Based on the results of normality testing, Student's t-test was used to compare continuous variables that met parametric test assumptions. For those that did not meet these assumptions, the Mann-Whitney U test was employed. Categorical data were analyzed using the Fisher-Freeman-Halton test unless otherwise stated. In all 2x2 contingency tables, the continuity-corrected $\chi 2$ test was used when one or more cells had expected frequencies of 5 to 25. When one or more of the cells had expected frequencies of 5 or less, Fisher's exact test was applied. At the 12-month follow-up and in the long term, factors distinguishing patients with an IPSS V/S ratio of ≤ 1 from those with a ratio of >1 were examined using multivariate logistic regression analysis. Odds ratios (ORs) and

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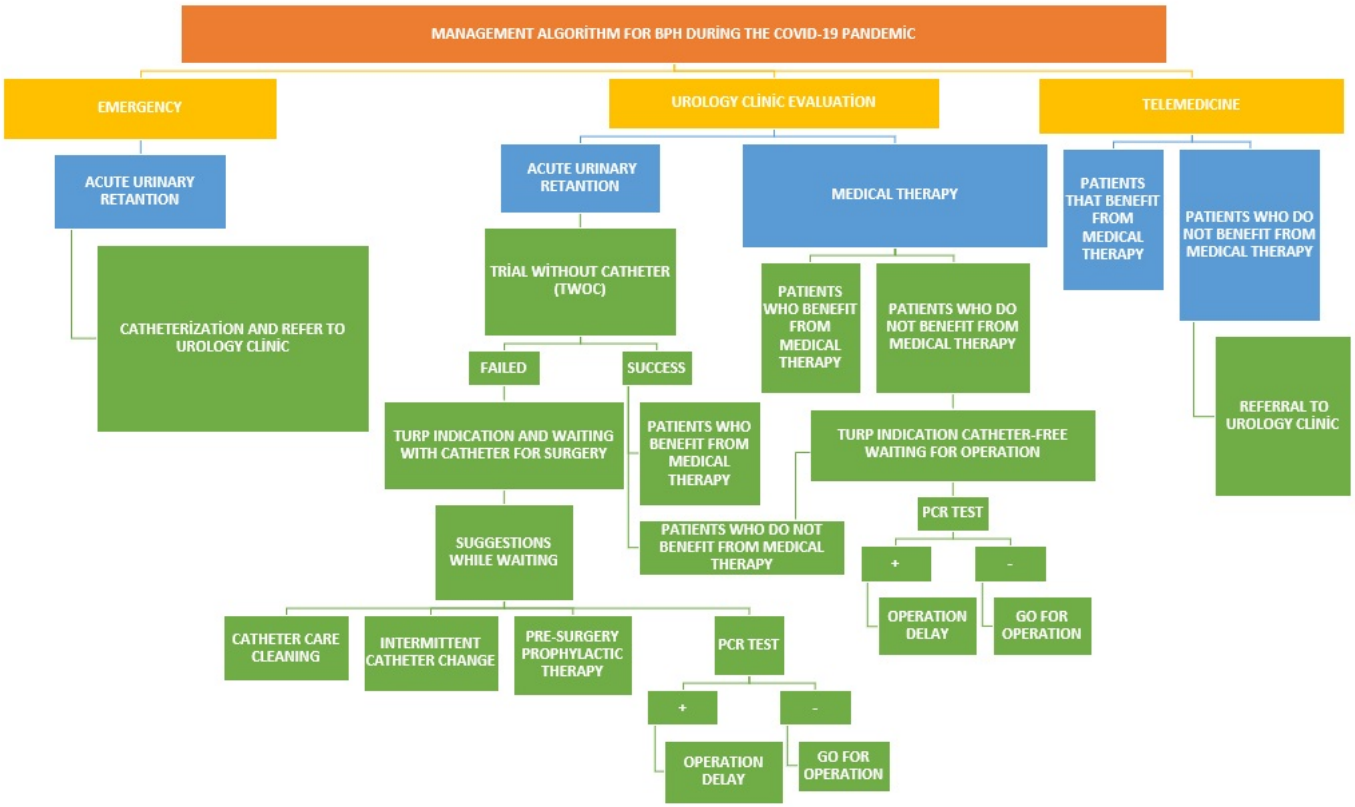

Figure 1. Benign prostatic hyperplasia algorithm used during the COVID-19 pandemic.

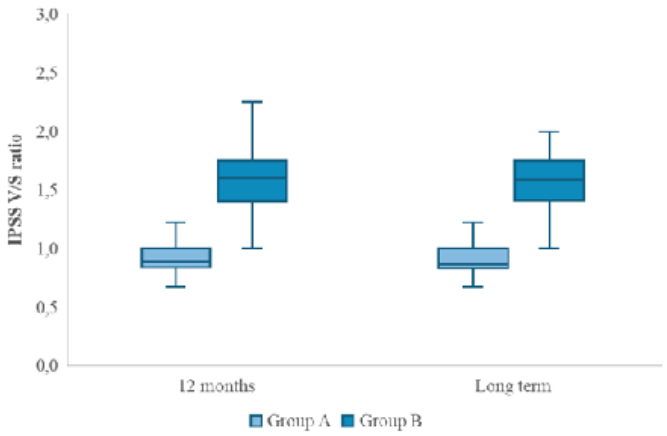

Figure 2. Box-plot graph of the International Prostate Symptom Score voiding/storage (IPSS V/S) ratio in Group A and Group B at 12-month and long-term follow-ups. The lines in the center of each box represent the median IPSS values, while the lower and upper edges of the boxes correspond to the 25th and 75th percentile values, respectively. The vertical lines extending from the edges of the boxes represent the minimum and maximum values, respectively.

95% confidence intervals (CIs) were calculated for each independent variable. A p-value of less than 0.05 was considered statistically significant.

RESULTS

During the pandemic, B-TURP was performed on a total of 162 patients, of whom 42 were excluded based on the exclusion criteria and 121 were included in the final analysis. No statistically significant differences were found between Group A and Group B in terms of age, BMI, IPSS, ASA classification, length of hospital stay, or total follow-up duration ($p > 0.05$). However, Group B had significantly higher PSA levels, prostate volume, operative time, specimen weight, and perioperative catheterization time compared to Group A ($p<0.01$). Additionally, the resection ratio was significantly lower in Group A ($p < 0.001$) (Table 1).

The comparison of perioperative complications between the two groups is shown in Table 2. Accordingly, only the rate of immediate AUR recatheterization statistically significantly differed between the groups ($p = 0.035$). The incidence of all other complications was similar in both groups.

Table 3 presents the comparisons of 12-month and long-term outcomes. While total IPSS scores were similar between the groups, Group B exhibited significantly higher IPSS voiding scores but significantly lower IPSS storage scores compared to Group A ($p<0.001$). Furthermore, when assessing the IPSS V/S ratio, both the 12-month and long-term values were significantly higher in Group B than in Group A ($p<0.001$) (Figure 2). The frequency of having an IPSS V/S ratio greater than 1 was also significantly higher in Group B at both 12 months and in the long term ($p<0.001$). Although Qmax levels were similar between the groups ($p>0.05$), Group B showed significantly higher PVR values ($p = 0.021$). No statistically significant difference was observed between the groups regarding

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Table 1. Baseline characteristics.

	Group A (n = 53)	Group B (n = 68)	p
Age (years)*	70.4 ± 9.3	73.6 ± 9.0	0.066[a]
BMI (kg/m^2)**	28.0 (25.5–32.0)	28.0 (26.0–33.0)	0.607[b]
Perioperative catheterization time (day)***	--	88.0 (40–136)	--
IPSS	25.8 ± 1.62	26.3 ± 1.78	0.134[a]
PSA	1.90 (0.98–3.57)	3.97 (1.89–7.54)	**<0.001[b]**
ASA classification			0.329[c]
1	18 (34.0%)	20 (29.4%)	
2	20 (37.7%)	18 (26.5%)	
3	14 (26.4%)	27 (39.7%)	
4	1 (1.9%)	3 (4.4%)	
Prostate volume (cm^3)**	50.0 (40.0–58.5)	95.0 (75.0–119.2)	**<0.001[b]**
Operation time (min)***	50.0 (30.0–150.0)	55.0 (40–160)	**0.004[b]**
Specimen weight (cm^3)**	26.0 (20.0–31.5)	40.0 (35.0–50.7)	**<0.001[b]**
Resection rate**	0.54 (0.46–0.62)	0.42 (0.37–0.51)	**<0.001[b]**
Perioperative catheterization time (day)***	2.0 (2.0–3.0)	3.0 (2.0–5.0)	**<0.001[b]**
Length of hospital stay (day)***	4.0 (1.0–12.0)	4.0 (2.0–16.0)	0.122[b]
Follow-up time (month)***	16.0 (12.0–24.0)	17.0 (12.0–25.0)	0.339[b]

Descriptive statistics for continuous variables are shown as *mean ± standard deviation, **median (25^{th}–75^{th}) percentiles, or ***median (minimum–maximum), where appropriate. [a]Student's t-test, [b]Mann-Whitney U test, [c]Fisher-Freeman-Halton test. Group A: patients awaiting surgery without a catheter, Group B: patients with prolonged catheterization, BMI: body mass index, IPSS: international prostate symptom score, PSA: prostate-specific antigen, ASA: American Society of Anesthesiologists.

Table 2. Perioperative complications.

	Group A (n = 53)	Group B (n = 68)	p
Perioperative COVID-19 infection	4 (7.5%)	3 (4.4%)	0.698[a]
Death from COVID-19	1 (1.9%)	1 (1.5%)	>0.999[a]
Urinary tract infection	21 (40.4%)	27 (40.3%)	>0.999[b]
Hematuria	10 (19.2%)	12 (17.9%)	>0.999[b]
Clot retention	9 (17.3%)	12 (17.9%)	>0.999[b]
Immediate AUR/recatheterization	-	6 (9.0%)	**0.035[a]**
Immediate reoperation rate	-	3 (4.5%)	0.256[a]

[a]Fisher's exact test, [b]Continuity-corrected χ^2 test. Group A: patients awaiting surgery without a catheter, Group B: patients with prolonged catheterization.

QoL scores (p>0.05).

The number of complications at the 12^{th} postoperative month and during long-term follow-up was similar between the groups (Table 4).

Finally, Table 5 reports both univariate and multivariate analyses comparing patients with an IPSS V/S ratio of 1 or below to those with a ratio above 1 at 12 months and in the long term.

At the 12-month evaluation, although mean age did not differ significantly between the two groups (p = 0.101), patients with an IPSS V/S ratio above 1 had significantly more frequent perioperative catheterizations, longer operative times, and a lower resection ratio (p<0.001, p = 0.009, and p<0.001, respectively). Multivariate logistic regression analysis demonstrated that perioperative catheterization was an independent risk factor for predicting an IPSS V/S ratio above 1. After adjusting for all potential confounding factors, perioperative catheterization significantly increased the likelihood of having an IPSS V/S ratio exceeding 1 (OR = 97.135, 95% CI: 22.713–415.416, p<0.001).

Our long-term findings showed that although mean age did not differ significantly between the two groups (p = 0.140), patients with an IPSS V/S ratio above 1 continued to exhibit significantly higher rate of perioperative catheterizations, longer operative times, and a lower resection ratio (p<0.001, p = 0.002, and p<0.001, respectively). Multivariate logistic regression analysis again demonstrated that perioperative catheterization was an independent risk factor for predicting an IPSS V/S ratio above 1. After adjusting for all potential confounding factors, perioperative catheterization significantly increased the likelihood of an IPSS V/S ratio exceeding 1 (OR = 77.048, 95% CI: 19.305–307.514, p<0.001).

DISCUSSION

While it was initially believed that SARS-CoV-2 primarily targeted the lungs in the early stages of the pandemic, the overwhelming burden it placed on the healthcare system had long-term negative effects on patients and various medical conditions [7,8]. Due to the heightened health burden and the feared risk of cross-infection during the COVID-19 pandemic, significant changes occurred in urology practice. Hos-

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Table 3. Results of 12-month and long-term follow-up visits.

	Group A (n = 53)	Group B (n = 68)	p
IPSS			
12 months	12.0 (11.0–13.0)	11.0 (10.0–13.0)	0.380[a]
Long term	12.0 (10.0–13.0)	11.0 (10.0–13.0)	0.684[a]
IPSS voiding score			
12 months	6.0 (5.0–6.0)	7.0 (6.0–8.0)	**<0.001[a]**
Long term	6.0 (5.0–6.0)	7.0 (6.0–8.0)	**<0.001[a]**
IPSS storage score			
12 months	6.0 (6.0–7.0)	4.0 (4.0–5.0)	**<0.001[a]**
Long term	6.0 (5.3–7.0)	4.0 (4.0–5.0)	**<0.001[a]**
IPSS V/S			
12 months	0.88 (0.84–1.00)	1.60 (1.40–1.75)	**<0.001[a]**
Long term	0.87 (0.83–1.00)	1.59 (1.41–1.75)	**<0.001[a]**
IPSS voiding/storage > 1.0			
12 months	7 (13.5%)	63 (94.0%)	**<0.001[b]**
Long term	7 (13.5%)	62 (92.5%)	**<0.001[b]**
Q_{max}			
12 months	15.0 (12.0–16.8)	15.0 (13.0–16.0)	0.623[a]
Long term	15.0 (12.0–16.8)	14.0 (13.0–16.0)	0.535[a]
PVR			
12 months	50.0 (35.0–65.0)	56.0 (45.0–70.0)	**0.021[a]**
Long term	50.0 (35.0–65.0)	56.0 (45.0–70.0)	**0.021[a]**
QoL index			
12 months	1.0 (0.0–1.0)	1.0 (0.0–1.0)	0.938[a]
Long term	1.0 (0.0–1.0)	1.0 (0.0–2.0)	0.866[a]

Descriptive statistics are shown as median (25^{th}–75^{th}) percentiles. [a]Mann-Whitney U test, [b]Continuity-corrected χ^2 test. Group A: patients awaiting surgery without a catheter, Group B: patients with prolonged catheterization. IPSS: international prostate symptom score, Q_{max}: maximum flow rate, PVR: post-void residual, QoL: quality of life

Table 4. Complications at 12-month and long-term follow-up visits.

Parameter	Group A, n (%)	Group B, n (%)
Urethral strictures		
12 months	2 (3.8)	3 (4.4)
Long term	2 (3.8)	1 (1.4)
Incontinence		
12 months	1 (1.9)	2 (2.9)
Long term	1 (1.9)	2 (2.9)
Reoperation		
12 months	2 (3.8)	3 (4.4)
Long term	3 (5.7)	2 (2.9)
Bladder neck contracture		
12 months	0	0
Long term	2 (3.8)	0

Group A: patients awaiting surgery without a catheter, Group B: patients with prolonged catheterization.

pitals were compelled to implement extensive measures to address a potential increase in COVID-19 cases [9]. Despite patients' requests to postpone elective surgeries due to the fear of contracting COVID-19 during their hospital stay, individuals experienced a consistent and progressive deterioration not only in their QoL but also in the progression of their underlying diseases, as elective medical and surgical treatments became unattainable [10].

During the COVID-19 pandemic, many patients with urinary symptoms sought telemedicine consultations. While these virtual appointments provided a non-contact solution for medical consultation and continuity of care, they did not resolve the issue of postponed surgical interventions [4,11,12]. Various triage systems were implemented to manage the challenges posed by the COVID-19 pandemic in urology services [13,14]. Recommendations were made to defer elective surgeries for benign pathologies until the burden of COVID-19 on the hospital system was alleviated [15,16]. It has been reported that there was a decrease of more than 90% in surgical procedures and outpatient clinic attendance, while the rate of AUR visits to emergency departments remained unchanged [17].

A hierarchy for canceled surgeries was established to mitigate healthcare delays and facilitate the orderly resumption of postponed activities with proper planning [18,3]. Plans were devised to postpone elective surgeries and resume endourological procedures as soon as the local prevalence of COVID-19 subsided [7]. Patients with symptomatic obstruction underwent surgery with knowledge of their COVID-19 status, determined by PCR testing of oropharyngeal and nasopharyngeal swabs, following an elective preoperative protocol [15]. If a patient tested positive for COVID-19 via PCR, surgery was postponed until full recovery due to the increased

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Table 5. Results of univariate and multivariate analyses for IPSS V/S.

	IPSS V/S ≤ 1.0	IPSS V/S > 1.0	p	OR (%95 CI)	p
12 months	n = 49	n = 70			
Age (years) *	70.5 ± 8.6	73.3 ± 9.6	0.101[a]	0.999 (0.932--1.072)	0.982
Perioperative catheterization	4 (8.2%)	63 (90.0%)	**<0.001**[b]	97.135 (22.713--415.416)	**<0.001**
Operative time (min)**	50.0 (30.0--150.0)	55.0 (30.0--160.0)	**0.009**[c]	1.007 (0.980--1.034)	0.620
Resection rate***	0.53 (0.45--0.62)	0.45 (0.37--0.53)	**<0.001**[c]	1.215 (0.006--248.607)	0.943
Long term	n = 50	n = 69			
Age (years) *	70.7 ± 8.7	73.2 ± 9.6	0.140[a]	0.992 (0.926--1.062)	0.810
Perioperative catheterization time	5 (10.0%)	62 (89.9%)	**<0.001**[b]	77.048 (19.305--307.514)	**<0.001**
Operative time (min)**	50.0 (30.0--150.0)	55.0 (40.0--160.0)	**0.002**[c]	1.015 (0.989--1.041)	0.259
Resection rate ***	0.53 (0.43--0.62)	0.44 (0.37--0.53)	**<0.001**[c]	1.255 (0.008--208.566)	0.931

Descriptive statistics for continuous variables are shown as *mean ± standard deviation, **median (minimum–maximum), or ***median (25^{th}–75^{th}) percentiles, where appropriate. [a]Student's t-test, [b]Continuity-corrected χ^2 test, [c]Mann-Whitney U test. IPSS V/S: International Prostate Symptom Score voiding/storage ratio.

risk of complications and potential impact on mortality [19]. Operations were conducted under spinal anesthesia whenever possible as a measure to conserve ventilators [20,21].

Acknowledging that the COVID-19 pandemic disproportionately affects older and male patients, the elderly male population with lower urinary tract symptoms (LUTS) was significantly impacted by this public health crisis [22]. Literature has demonstrated a strong correlation between COVID-19 and LUTS [10]; thus, some publications recommended investigating COVID-19 infection in any patient presenting with LUTS during the pandemic, while others suggested that COVID-19 might be associated with poorer prognosis in patients with BPH [23,24]. Studies have also reported an increased risk factor of urinary retention in patients with LUTS due to BPH during the COVID-19 outbreak [25]. We were already aware of the evidence indicating that emergency surgery following AUR is associated with high morbidity. In clinical practice, it was established that the initiation of alpha-blockers and a catheter-free trial reduced the need for BPH surgery [26,27]. However, few studies have concurrently investigated both the objective and subjective voiding outcomes of B-TURP in catheterized patients. Long-term preoperative Foley catheterization outcomes have been reported in patients with AUR in developing countries, where pre-pandemic urological care was limited and financially inadequate, and hospitals had restricted surgery quotas [28]. Despite the emergence of new modalities aimed at reducing hospital stays as alternatives to open prostatectomy during the pandemic, we had to perform B-TURP in large prostates due to availability and cost constraints.

In our study, mean prostate volume and PSA levels were higher in the catheterized group. The increased prostate volume and potential inflammation caused by catheterization may have contributed to elevated PSA levels. Additionally, a cohort study in the literature attributed PSA elevation to SARS-CoV-2, suggesting that the virus itself may increase PSA levels [29].

The higher postoperative long-term IPSS values observed in our study compared to previous studies may be attributed to delayed treatment access during the pandemic. While Qmax was similar between the two groups, the lower postoperative IPSS in the catheterized group indicated higher subjective satisfaction. On the other hand, the post hoc power analysis conducted for both the 12-month and long-term IPSS V/S > 1 ratios demonstrated an overall power of approximately 99.999%, suggesting that the observed group differences were supported by robust statistical power. Eliminating urethral catheters may have also contributed to a better QoL in preoperatively catheterized patients. Moreover, the high IPSS V/S ratio in the catheterized group, despite a low overall IPSS, may indicate detrusor insufficiency. As stated in previous studies, in prostate surgery, the IPSS V/S ratio has shown more effective results in younger patients, with higher resection rates and lower preoperative PVR [30], which is also supported by our study. Huang et al. reported better voiding function in patients with BPH-related AUR who underwent immediate transurethral surgery [31]. This may explain the impaired voiding symptoms in the catheterized group in our study.

According to the literature, patients with BPH experiencing AUR face a higher risk of complications, longer hospital stays, and greater comorbidities after B-TURP compared to those without AUR [32]. Although other studies have reported higher infection rates in patients with urinary retention, our study did not show a significant difference in infection rates between patients waiting for surgery with and without a catheter. This discrepancy may be attributed to our implementation of catheter care training, regular intermittent catheter replacement, the use of silicone catheters, and the administration of 10-day course of methenamine hippurate as prophylactic treatment before surgery in the catheterized group [33].

Postoperative recatheterization was not required for any patient in the group awaiting surgery without preoperative catheterization. Conversely, 9% of patients in the catheter-

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ized group necessitated postoperative recatheterization, a rate commensurate with prior research. Early reoperation was attributed to causes such as bladder clot formation, uncontrolled hemorrhage, or insufficient resection. Our study's long-term complication profile, characterized by a limited patient cohort and complication incidence, aligns with published rates: urethral stricture (2.2%–9.8%), bladder neck contracture (0.3%–9.2%), and urinary incontinence (0.3%–5.2%) [34].

Limitations

The retrospective and single-center design inherently limits the generalizability of these findings. A significant limitation was the uneven matching of the two groups, with Group B containing more severe BPH cases. This group exhibited higher PSA levels, larger prostate sizes, elevated recatheterization rates, greater resection volumes, and extended postoperative hospital stays. The observed increase in voiding symptoms after B-TURP in the catheterized Group B presents a confounding factor, as it is unclear whether this was due to their initial prostate size or the prolonged catheterization. Therefore, a matched subset analysis would be more appropriate for meaningful comparisons. Moreover, the study merely points to the existence of symptom subscores without explaining their underlying rationale. Finally, preoperative scoring for patients with a Foley catheter who cannot spontaneously urinate introduces a potential for bias or skew.

CONCLUSION

Due to the pandemic, disruptions in routine urology practice, especially delays in surgical treatment, were observed. Elective surgeries were performed with necessary precautions as soon as local COVID-19 prevalence declined. In patients who developed AUR due to BPH during the COVID-19 pandemic, the postponement of elective surgeries and prolonged preoperative catheterization led to functional impairments in voiding symptoms following B-TURP.

Ethics Committee Approval: The study was approved by the Ethics Committee for Non-Interventional Procedures of Adıyaman University (2022/1-7) on January 18, 2022.

Informed Consent: Written informed consent was obtained from the legal guardians of all participating patients.

Peer-review: Externally peer-reviewed.

Conflict of Interest: The authors declare no competing interests.

Author Contributions: Concept: B.K.; Design: B.K., M.K.K., A.Ç.; Supervision: B.K., M.Ö.Y; Materials: B.K., C.B.; Data Collection and/or Processing: B.K., M.K.K.; Analysis and/or Interpretation: B.K., Literature Review: B.K., Writing: B.K., Critical Review: B.K.

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