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# Urinary Retention after Gynecologic Surgeries for Benign Diseases in Egyptian Women

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## Abstract

**Background:** A condition known as postoperative urinary retention (POUR) occurs when a patient is unable to produce urine immediately after surgery. This is a typical issue that arises after gynecologic surgery procedures, particularly those that deal with procedures to treat urine incontinence and prolapse of the pelvis.

**Objective:** To determine the incidence of urine retention and the variables impacting it in Egyptian women who have undergone benign gynecologic surgery.

**Patients and methods:** One hundred patients from Al-Hussein University Hospital had gynecologic procedures performed on them between November 2021 and November 2022 for noncancerous reasons; all were part of the study cohort.

**Results:** Thirteen out of one hundred women who had gynecologic operations for noncancerous conditions experienced postoperative urine retention (POUR). Within 24 hours after surgery, the void volume dropped dramatically while the post-void residual volume rose. When looking at demographic data and POUR levels, no statistically significant differences were discovered. However, a significant association was noted between POUR and cesarean section (CS), as well as the need for an indwelling catheter. Patients with POUR exhibited lower void volumes and higher post-void residuals 24 hours postoperatively compared to those without retention.

**Conclusion:** The findings of this study suggest that voiding dysfunction following benign gynecologic surgery may be impacted in an unanticipated way.

**Keywords:** Urinary Retention; Gynecologic Surgery; Benign Diseases

## 1. Introduction

One major issue that might arise after surgery is postoperative urinary retention (POUR), which is defined as the inability to pass urine no matter how hard you try.<sup>1</sup> Individuals afflicted by this ailment not only endure pain, annoyance, and anxiety, but it also adds to the postoperative discharge delays.<sup>2</sup> People with this condition not only deal with discomfort, irritation, and worry, but it also prolongs the time it takes to get them back on their feet after surgery.<sup>3</sup>

General anesthesia's impact on detrusor activity and preoperative medication usage, especially of opioids, are two of the many causes of postoperative urinary retention (POUR).<sup>4</sup> There is an increased risk of

postoperative urinary tract infections (POURs) in patients undergoing pelvic procedures due to the genitourinary system's proximity to the manipulated tissues and nerves. To comprehend and lessen the effect of POUR on postoperative results, it is essential to acknowledge these complexities.<sup>5</sup>

When it comes to patients, some groups are more likely to have POUR (Postoperative Urinary Retention). Patients with a history of lower urinary tract symptoms or retention, those using tricyclic antidepressants (TCAs), those having scopolamine patches applied during surgery, and those who are older than 50 years old are at a higher risk of experiencing POUR. Also, surgeries lasting longer than two hours are associated with a higher risk of POUR incidence.<sup>6</sup>

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Patients who have no symptoms at all may still develop chronic urine dysfunction as a consequence of permanent alterations to bladder contractility brought on by over-distension during POUR.<sup>7</sup> Research shows that after surgery, 44% of patients have bladder contents higher than 500 mL, and 52% of those individuals report feeling fine.<sup>2</sup>

Preoperative risk assessment should be conducted with high-risk patients, and postoperative pain management, bleeding control, and appropriate hydration should be the primary goals of postoperative prevention measures to lessen the likelihood of postoperative oedema and related complications (POUR).<sup>1</sup>

The therapy for POUR, which involves re-catheterization and bladder rest, is mostly benign, despite the fact that replacing a Foley catheter is painful, inconvenient, increases the risk of urinary tract infections (UTIs), and slows healing because of mobility restrictions.<sup>8</sup>

## 2. Patients and methods

The current study included a group of one hundred patients who had gynecologic procedures to correct noncancerous conditions at Al-Hussein University Hospital between November 2021 and November 2022.

Women who had gynecologic procedures for noncancerous conditions and were 18 years old or older were eligible to participate. Incontinence procedures, cancer, hysterectomy during pregnancy, lumbosacral lesions, diabetes, and illnesses affecting the central nervous system (CNS) were all disqualified.

Full instances were gathered: The following demographic details were collected: age, ethnicity, BMI, cigarette use, parity, gravidity, previous birth style, and history of abdominal and pelvic surgeries. We recorded menopausal state and the particular reason for the index procedure, like uterine fibroids. Ultrasound void volume and post-void residual measurements, urine analysis, and uroflowmetry were all part of the preoperative data collection process. Data collected during the operation encompassed the following: information regarding the procedure, the patient's condition, the site of surgery, the amount of time spent under anesthesia, whether general anesthesia was used, and any problems that developed throughout the operation. Following is a list of the surgical sites: uterovesical fold, adnexa, pelvic side-wall, uterus, uterosacral ligaments, and the

pouch of Douglas. Clinical data comprised the amount of time a patient spent in the hospital, how long it took to insert an indwelling catheter, and whether or not dysfunction played a role in the patient's longer hospital stay. Data collected after surgery included evaluation of postoperative problems, 30-day readmission rates, and urine tests. Uroflowmetry evaluations were performed at one month, one week, and twenty-four hours postoperatively to monitor postvoid residual volumes and void volumes; an in-out catheter was used for postvoid residual volumes exceeding 200 mL, and the residual volume was recorded.

The postvoid residual volume was quickly evaluated using ultrasound because measurement accuracy can be affected by delays of up to 10 minutes following bladder evacuation. To evaluate bladder capacity externally, the patient was placed in a prone posture and the Mindray DC-7 ultrasonography probe was placed over the suprapubic area. The bladder was photographed in both sagittal and transverse orientations, with measurements taken across the board for breadth, depth, and height.

The majority of ultrasound devices have an automatic volume calculation function that uses measurements taken with an ultrasonic caliper. The formula for volume, which is length times width times height times 0.52, was utilized as a fallback when the automated computation failed. The most crucial measurements to take into account when assessing the bladder are its maximum breadth, length, and anterior-posterior height.

We took the urine bladder residuals immediately after micturition or four hours after catheter removal in cases where no voiding had occurred. Any post-void residual volume over 200 mL requires the use of an in-out catheter in addition to residual volume measurement. The scan was stopped and, if it was deemed clinically suitable, the patient was released when the residues reached 100 mL for two consecutive days after a 150 mL hiatus.

Patients who do not require a catheter are scanned if the remaining volume is between 100 and 200 mL. If a patient's residuals were 200 mL or more for at least 24 hours before to release, they were instructed on self-catheterization and assessed with a midstream urine sample.

Patients who prefer or are unable to self-catheterize will be admitted to the hospital until they achieve acceptable bladder function.

### 3. Results

Table 1. Demographic attributes and pertinent history of the examined cohort.

	MEAN & SD	MEDIAN	RANGE	INTERQUARTILE RANGE
AGE (YEARS)	46.36 ± 9.945	46.00	30.0, 62.0	37.25, 56.00
BMI (KG/M <sup>2</sup> )	27.27 ± 3.195	27.30	22.0, 33.3	24.36, 29.64
PARITY	1.96 ± 1.435	2.00	0.0, 4.0	1.00, 3.00
GRAVIDITY	2.85 ± 1.666	3.00	0.0, 6.0	1.25, 4.00
OPERATIVE TIME (MINUTES)	66.85 ± 20.359	65.00	30.0, 125.0	50.00, 83.75
LENGTH OF ADMISSION (DAYS)	2.70 ± 0.959	3.00	1.0, 5.0	2.00, 3.00
SMOKING HISTORY	15 (15.0%)			
ABDOMINO-PELVIC SURGICAL HISTORY	71 (71.0%)			
MENOPAUSAL STATUS				
Pre- menopausal	55 (55.0%)			
Post- menopausal	45 (45.0%)			
MODE OF PREVIOUS BIRTHS				
VD	49 (49.0%)			
CS	51 (51.0%)			
SURGERY				
Uterine myomas	20 (20.0%)			
Hysterectomy	34 (34.0%)			
Ovarian Cyst Removal	43 (43.0%)			
Total Laparoscopic Hysterectomy	3 (3.0%)			
NEED FOR INDWELLING CATHETER	22 (22.0%)			
30-DAY READMISSION	3 (3.0%)			

MEDIAN, MEAN, AND STANDARD DEVIATION ARE SEVERAL WAYS DATA IS PRESENTED. OTHER COMMON WAYS INCLUDE PERCENTAGES AND FREQUENCIES.

According to the data in the table, 71% of the cases had a prior history of abdominal-pelvic surgery, and 15% were smokers. Not only that, 51% of the participants had had prior cesarean sections (CS), and 55% were premenopausal. In terms of surgical procedures, ovarian cyst removal accounted for 43% of all cases, hysterectomy for 34%, and total laparoscopic hysterectomy for 3%. An indwelling catheter was necessary in 22.0% of instances, and a 30-day readmission was required in 3% of cases.

Table 2. Void volume and postvoid residual volume measurements for the analyzed sample.

	MEAN & SD	MEDIAN	RANGE	IQR		
VOID VOLUME (ML)	Preoperative	454.25 ± 55.169	450	350, 550	400, 500	-
	24 hours	232.0 ± 94.554	225	50, 400	150, 318.75	< 0.001
	Postoperative					
	One-week	454.0 ± 62.130	475	350, 550	400, 500	0.975
POSTVOID RESIDUALS VOLUME (ML)	Preoperative	31.30 ± 11.160	30.0	15, 50	20, 40	-
	24 hours	68.30 ± 43.089	60.0	25, 215	40, 73.75	< 0.001
	Postoperative					
	One-week	33.25 ± 9.984	35.0	15, 50	25, 45	0.182
UROFLOWMETRY (ML/SEC)	Preoperative	16.5±2.1	18	12,20	14,18	-
	24 hours	8.36±3.41	9	2,14	5,12	< 0.001
	Postoperative					
	One-week	15.74±2.16	17	11,21	13,18	0.24

P IS SIGNIFICANT WHEN < 0.05.

The data shown in the table shows that there is a notable drop in void volume 24 hours after surgery when compared to measurements taken before and one week after surgery (P < 0.001), as well as a notable drop in Uroflowmetry 24 hours after surgery when compared to measurements taken before and one week after surgery (P < 0.001). Alternatively, there was a notable rise in the post-void residual volume 24 hours after surgery when compared to both levels before surgery and one week after surgery (P < 0.001).

Table 3: Demographic characteristics and pertinent history of the examined sample based on the presence of Postoperative Urinary Retention (POUR).

	NO RETENTION (N= 87)	RETENTION (N= 13)	95% CI	P
AGE (YEARS)	46.20 ± 10.072	47.46 ± 9.351	- 7.2, 4.6	0.758
BMI (KG/M <sup>2</sup> )	27.36 ± 3.318	26.66 ± 2.201	-1.2, 2.6	0.499
PARITY	1.91 ± 1.403	2.31 ± 1.653	-1.2, 0.4	0.328
GRAVIDITY	2.75 ± 1.608	3.54 ± 1.941	-1.8, 0.2	0.121
OPERATIVE TIME (MINUTES)	65.80 ± 19.378	73.85 ± 25.832	- 20.0, 3.9	0.368
LENGTH OF ADMISSION (DAYS)	2.68 ± 0.946	2.85 ± 1.068	-0.7, 0.4	0.584
SMOKING HISTORY	13 (14.9%)	2 (15.4%)	-	0.967
ABDOMINO-PELVIC SURGICAL HISTORY	60 (69.0%)	11 (84.6%)	-	0.246

MENOPAUSAL STATUS	Pre- menopausal	48 (55.2%)	7 (53.8%)	-	0.929
	Post- menopausal	39 (44.8%)	6 (46.2%)	-	
MODE OF PREVIOUS BIRTHS	VD	46 (52.9%)	3 (23.1%)	-	0.045
	CS	41 (47.1%)	10 (76.9%)	-	
SURGERY	Uterine myomas	18 (20.7%)	2 (15.4%)	-	0.134
	Hysterectomy	30 (34.5%)	4 (30.8%)	-	
	Ovarian Cyst Removal	38 (43.7%)	5 (38.5%)	-	
	Total Laparoscopic Hysterectomy	1 (1.1%)	2 (15.4%)	-	
NEED FOR INDWELLING CATHETER		14 (16.1%)	8 (61.5%)	-	< 0.001
30-DAY READMISSION		2 (2.3%)	1 (7.7%)	-	0.344
95% CI: 95% CONFIDENCE INTERVAL OF THE MEAN DIFFERENCE BETWEEN BOTH READINGS.					

According to the data in the table, thirteen out of the hundred women who took part in the study showed signs of retention. Age, body mass index (BMI), parity, gravidity, duration of operation, smoking history, history of abdominal and pelvic surgeries, menopause status, surgery type, and 30-day readmission were not significantly different from one another in terms of the prevalence of postoperative urinary retention (POUR) within the study population ( $P > 0.05$ ). When comparing the No Retention and Retention groups according to the mode of prior births, significant differences were found statistically. More specifically, the rate of cesarean section (CS) was significantly greater in the group that retained the baby compared to the one that did not (47.1% vs. 76.9%,  $P = 0.045$ ). In addition, the retention group had a considerably higher need for an indwelling catheter ( $P < 0.001$ ).

*Table 4. Void volume and postvoid residual volume measurements for the studied sample categorized based on the presence of Postoperative Urinary Retention (POUR).*

		NO RETENTION (N= 87)	RETENTION (N= 13)	95% CI	P
VOID VOLUME (ML)	Preoperative	455.75 ± 54.145	444.23 ± 63.043	- 21.1, 44.2	0.549
	24 hours	247.99 ± 89.184	125.00 ± 50.000	72.6, 173.4	< 0.001
	Postoperative				
	One-week	454.31 ± 60.905	451.92 ± 72.501	-34.5, 39.2	0.914
POSTVOID RESIDUALS VOLUME (ML)	Preoperative	31.03 ± 11.158	33.08 ± 11.463	-8.6, 4.6	0.488
	24 hours	53.79 ± 16.030	165.38 ± 41.706	-123.9, - 99.2	< 0.001
	Postoperative				
	One-week	33.45 ± 10.295	31.92 ± 7.783	-4.4, 7.4	0.600
UROFLOWMETRY (ML/SEC)	Preoperative	17.2±2.3	16.9±2.2	- 18.3, 38.6	0.66
	24 hours	15.3±2.4	7.36±2.8	58.4, 125.6	< 0.001
	Postoperative				
	One-week	16.8±2.6	17.4±2.5	-32.8, 36.9	0.44
Postoperative					

It can be seen from the table that there was a significant difference between patients with and without retention in terms of void volume and Uroflowmetry 24 hours after surgery ( $P < 0.001$ ) and between patients with and without retention in terms of Uroflowmetry ( $P < 0.001$ ). Furthermore, individuals who experienced retention had a considerably greater post-void residual volume compared to those who did not have retention 24 hours after the operation ( $P < 0.001$ ).

#### 4. Discussion

Our findings align with the work of Won et al.<sup>2</sup> who estimated a 19.61% incidence of bladder dysfunction after gynecological surgery, on average, 210 cc of leftover fluid after voiding was found in 20 out of the 102 women studied.

After laparoscopic hysterectomy, Sandberg et al.<sup>9</sup> examined the results of two catheter removal techniques, ICR and DCR, in terms of retention. A total of 10 women in the ICR group reported an incontinence-inducing episode within 6 hours, compared to 0 in the DCR group (risk difference 13.5%, 5.6-24.8,  $P = 0.88$ ). On the other hand, seven of the women in the ICR group demonstrated normal urination independence by the 9-hour mark.

Similarly, following a hysterectomy, Ghezzi et

al.<sup>10</sup> uncovered that of the patients who underwent surgery, 21% encountered difficulties with voiding, 32% reported entire retention of urine, and 17% had a residual amount over 150 mL. All patients in this group who had issues with urination had their symptoms go away within two days, which is rather remarkable.

In contrast to our study and other previous investigations, Siedhoff et al.<sup>8</sup> assessed the likelihood of postoperative urinary retention following benign gynecologic surgery and found a very low 3.8% prevalence.

Consistent with our findings, Ghezzi et al.<sup>10</sup> found that catheterized volumes in patients with incontinence varied between 464 and 255 milliliters. The average volume remaining after voiding was  $444 \pm 176$  mL in patients whose estimated residual on bladder ultrasonography was greater than 150 mL. Excluding patients with



indwelling catheterization, the study cohort had a median time to first void of 5 hours (range: 1-10 hours). The majority of patients ( $1.3 \pm 0.5$ ) who experienced voiding dysfunction received catheterizations, and out of all patients, 29 women (12.4%) needed more than one surgery. Consistent with our study results, fourteen patients (6.0%) required an indwelling catheter to be inserted, and most women restored regular urine after 48 hours.

Regardless of the presence of Postoperative Urinary Retention (POUR), no significant variations were observed in any of the demographic factors within the study population. Here are some of the factors that are taken into consideration: age, body mass index, parity, gravidity, duration of operation, duration of hospital stay, smoking status, history of abdominal and pelvic surgeries, menopause, surgery type, and 30-day readmission ( $P > 0.05$ ). Nevertheless, there were notable disparities seen when comparing the existence of POUR, the incidence of cesarean section (CS) ( $P = 0.045$ ), and the necessity of an indwelling catheter ( $P < 0.001$ ).

Similarly, in the study conducted by Won et al.<sup>2</sup> An increased risk of bladder dysfunction following surgery was not associated with longer surgical procedures ( $p = 0.54$ ) or more surgical sites ( $p = 0.31$ ). Patients who experienced postoperative bladder dysfunction had an equal risk of intraoperative problems as those who did not ( $p = 0.20$ ). Patients with and without bladder impairment used opioids at similar rates prior to, during, and after surgery. Neither group significantly outnumbered the other in terms of the number of patients who required dissection of the uterovesical folds, pelvic sidewall, uterosacral ligaments, or pouch of Douglas. Patients who utilized the ADEPT anti-adhesion solution during surgery were more likely to experience postoperative bladder dysfunction ( $p = 0.001$ ).

Additionally, Ghezzi et al.<sup>10</sup> determined that no demographic, preoperative, postoperative, or historical variables were significantly correlated with the onset of voiding dysfunction following surgery. Some of the variables that did not show a significant correlation were operating time, drug use, and expected blood loss. The type of hysterectomy approach was the only factor determined to significantly affect the occurrence of postoperative voiding issues. Patients undergoing total laparoscopic hysterectomy (TLH) had a lower risk of voiding issues compared to those undergoing vaginal hysterectomy (VH), with an odds ratio (OR) of 2.8 (95% CI 1.5-5.4).

This study shows that benign gynecologic surgery may dramatically and differentially

impact voiding function. The long-term consequences on bladder function and the mechanisms behind them are unknown. These findings and definitions should not be ignored, despite the lack of a commonly agreed definition, the effect at higher urine volume rates, and the risk of long-term issues.

#### 4. Conclusion

This study proposes that seemingly benign gynecological procedures can exert significant and varied effects on postoperative voiding issues. The long-term impacts on bladder function and the intricacies of their underlying mechanisms introduce challenges in formulating definitive conclusions. While limitations such as the absence of a universally accepted definition, the substantial impact even at elevated rates of residual urine volume, and the potential for long-term difficulties may be considered constraints to external validity, it is crucial not to disregard these results and definitions.

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