Original Research

Patient Removal of Urinary Catheters After Urogynecologic Surgery

A Randomized Controlled Trial

Amy L. Askew, MD, MPH, Samantha L. Margulies, MD, Ijeoma Agu, MD, Katie M. LeCroy, BA, Elizabeth Geller, MD, and Jennifer M. Wu, MD, MPH

OBJECTIVE: To compare postoperative urinary retention rates in the early postoperative period between home and office catheter removal. Secondary outcomes included pain, difficulty, satisfaction, likelihood to use again, and health care utilization.

METHODS: We conducted a nonblinded, randomized controlled, noninferiority trial of women undergoing surgery for stress incontinence and prolapse from March 2021 to June 2022. Exclusion criteria were preoperative voiding dysfunction (need for self-catheterization or postvoid residual [PVR] greater than 150 mL), urethral bulking, and need for prolonged postoperative catheterization. Participants discharged with indwelling catheters because of an initial failed void trial were randomized 1:1 to home compared with office removal on postoperative day 3–4. For home removal, participants were instructed to remove the catheter at 7 AM and to drink two glasses of water. If they had difficulty voiding 5 hours after catheter removal, they came to the office for a void trial. For office removal, participants returned for a backfill void trial with PVR assessment. Our primary outcome was rate of early postoperative *urinary retention*, defined as confirmed retention (PVR greater than half the voided volume) after catheter removal. Secondary outcomes were assessed at a 2-week call. Health care utilization (telephone calls and office visits) related to catheter issues was also assessed. At 80% power and $\alpha=0.05$, we needed 100 participants (50/group) to detect a noninferiority margin of 11%.

RESULTS: Among 117 participants, the home (n=59) and office (n=58) removal groups were similar in mean age (60 years vs 61 years), mean body mass index (29 vs 30), pelvic organ prolapse quantification system stage 3 or 4, and proportion who underwent hysterectomy or apical suspension. Sling procedures were more common in the office group (45.8% vs 77.6%). For our primary outcome, the rate of early postoperative retention was 11.9% in the home group and 22.4% in the office group ($P=.13$). Our predetermined noninferiority margin was greater than the upper bound of our 95% CI; thus, we conclude noninferiority of home removal. For secondary outcomes, the home removal group was more likely to report "no pain" ($P=.02$) and "very likely" to use this method again ($P=.004$). There were no differences in difficulty or satisfaction between groups. Number of nursing calls was not different ($P=.66$); however, number of office visits was higher in the office group (median 0 [interquartile range 0–1] vs 1 [1–1], $P<001$).

CONCLUSION: Postoperative urinary catheter removal by the patient at home was noninferior to office removal when early urinary retention rates were compared. Participants in the home removal group had fewer office visits and reported low pain, low difficulty, and high satisfaction.

See related editorial on page 163.

From the Division of Urogynecology and Reconstructive Pelvic Surgery, Department of Obstetrics & Gynecology, University of North Carolina at Chapel Hill, and the University of North Carolina at Chapel Hill School of Medicine, Chapel Hill, North Carolina.

Presented at the 49th Annual Scientific Meeting of the Society of Gynecologic Surgeons, March 19–22, 2023, Tucson, Arizona; and at the 48th Annual Meeting of the International Urogynecologic Association, June 21–24, 2023, The Hague, the Netherlands.

The authors thank Drs. Michelle Schroder, Marcella Willis-Gray, AnnaMarie Connolly, and Christine Chu for their assistance with recruitment of participants for this study. The authors also thank Paul Nietert, PhD, for his statistical consultation and acknowledge his funding source, a grant from the National Center for Advancing Translational Sciences of the NIH under grant UL1 TR001450.

Each author has confirmed compliance with the journal's requirements for authorship.

Corresponding author: Amy L. Askew, MD, MPH, Department of Obstetrics & Gynecology, Division of Urogynecology and Reconstructive Pelvic Surgery, Medical University of South Carolina, Charleston, SC; askewa@musc.edu.

Financial Disclosure
The authors did not report any potential conflicts of interest.

ISSN: 0029-7844/24

CLINICAL TRIAL REGISTRATION: ClinicalTrials.gov, NCT04783012.
(Obstet Gynecol 2024;143:165–72)
DOI: 10.1097/AOG.0000000000005454

Voiding trials after surgery are an important part of postoperative management in patients undergoing urogynecologic surgery because of the risk for postoperative urinary retention. Up to 50% of patients undergoing urogynecologic surgery experience immediate postoperative urinary retention.[1] Risk factors for postoperative urinary retention after urogynecologic surgery include age older than 50 years, preexisting voiding dysfunction, length of surgery, concurrent neurologic disease, incontinence procedure, severe postoperative pain, and use of regional anesthesia.[2] Management includes placement of indwelling transurethral catheters and clean intermittent self-catheterization.[3,4] Typically, patients discharged home with a transurethral catheter will return to the office for an in-person voiding trial. This can lead to significant catheter burden and clinic resource utilization.[5] In addition, patients often view the need for urinary catheters after surgery more negatively than surgeons perceive.[6] Elkadry et al[7] found that 9% of patients viewed catheterization postoperatively as a surgical complication, and 15% of patients considered catheterization to be the worst aspect of the surgical experience.

Approaches that can improve the efficiency and patient satisfaction for voiding trials after surgery are needed. Strategies that have been studied include voiding trials with and without postvoid residual (PVR) assessment, force of stream assessment, use of valve catheters, and self-removal of catheters.[1,8–12] Shatkin-Margolis et al[10] examined self-discontinuation of catheters after apical suspension and found it to be noninferior to office management for postoperative urinary retention at 1 week. Home removal of catheters offers an attractive alternative; however, there are scant data about its safety and satisfaction in the early postoperative period.

Given the limitations in existing literature, we sought to evaluate whether patient removal of urinary catheters at home in the early postoperative period (before 1 week) is noninferior to standard office removal in terms of early postoperative urinary retention, health care resource utilization, and patient experience.

METHODS

This was a nonblinded, randomized controlled trial comparing patient removal of urinary catheters at home (home removal) and office-based catheter removal (office removal) for management of early postoperative urinary retention. Approval was obtained from the University of North Carolina at Chapel Hill IRB (IRB No. 20-3376). The study was registered at ClinicalTrials.gov (NCT04783012).

Potential participants were identified and recruited during the preoperative visit from January 2021 to June 2022. Preoperative visits were conducted virtually by phone after the coronavirus disease 2019 (COVID-19) pandemic began. We recruited women aged 18 years or older who were scheduled to undergo urogynecologic surgery for pelvic organ prolapse and or stress urinary incontinence. Women were excluded if they were non–English-speaking, pregnant, or undergoing urethral bulking procedures; had physical or cognitive impairment affecting their ability to safely remove the catheter at home; or had preoperative *voiding dysfunction*, defined as a PVR greater than 150 mL or being dependent on catheterization. Women were also excluded if they experienced an intraoperative event requiring prolonged catheterization postoperatively. Written informed consent was obtained from all participants on the day of surgery in the preoperative holding area, before administration of any sedating medications for anesthesia.

All patients underwent a standard backfill void trial before discharge from the hospital after surgery. The protocol was as follows: The bladder was backfilled with 300 mL of fluid through a transurethral Foley catheter. The catheter was then removed, and the patient was given 15 minutes to void. The voided volume was measured, and PVR was assessed with a bladder scanner. Patients were considered to have passed the void trial if the PVR was less than 100 mL or less than half the voided volume if the voided volume was greater than 200 mL. Patients who passed their void trial before discharge exited the study. Those who had failed void trials were discharged home with an indwelling Foley catheter and randomized 1:1 to home or office removal. Balanced randomization was achieved with computer-generated assignments through REDCap (Vanderbilt University, Nashville, Tennessee) to generate random permuted blocks with block sizes varying among 4, 6, and 8. Participants were assigned a catheter removal date of postoperative day 3, unless their surgery occurred on a Thursday, in which case their removal date was designated as the following Monday (postoperative day 4). Home removal participants received a packet with illustrated and written instructions for cutting the catheter valve and allowing the fluid to drain from the balloon before removing the catheter

from the urethra (Fig. 1). This strategy was chosen for ease and safety; the participant would not be required to use syringes or to risk incompletely draining the catheter balloon before removal. The packet also contained a URL address for video instructions. Date and time of the assigned catheter removal were printed clearly on the front of the packet, as well as contact information and instructions for when to call the clinic for help. Participants were all instructed to remove their catheter at 7 AM and to drink two 8-ounce glasses of water. They were instructed to present to the clinic 5 hours later if they had not voided or the nearest emergency department if after clinic hours to address retention as needed.

Participants who were randomized to office catheter removal returned to the office for a repeat backfill void trial per the previously described inpatient protocol. Home removal participants passed their home void trial if they were able to void after catheter removal and did not perceive any voiding difficulties at home. Home removal participants failed if they were unable to void and required an unplanned encounter for catheter reinsertion or clean intermittent self-catheterization teaching.

Instructions for How to Remove Your Urinary Catheter

Supplies

- ☐ A pair of scissors
- ☐ A towel

Instructions

1. Empty the bag of urine, if it is full.
2. Gather your supplies.
3. Wash your hands with soap and warm water. Dry them well.
4. Cut the valve of the catheter off, just behind the colored ring (see picture below). Do not cut the actual catheter tube, just the valve.
5. Allow the water to drain out on the towel for about 30-60 seconds (this is not urine!). About 1 tablespoon of water will drain out.
6. When the water stops, gently pull the catheter out slowly and discard the catheter and the urine bag into the trash.

If you encounter any resistance or water does not leak out after cutting the valve, please call our office.

A video showing how to remove the catheter can be found at this link:
https://tinyurl.com/myCAREstudy

Call [redacted] for help between 8:00AM – 4:00PM.
AFTER HOURS (After 4:00PM and on weekends), call [redacted] and have the operator page the Gynecology resident on call.

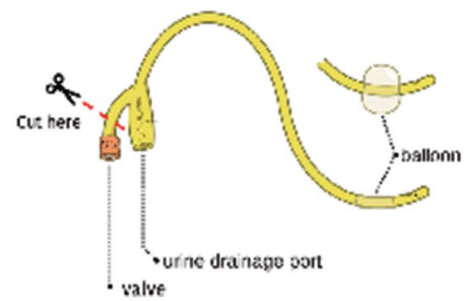

Fig. 1. Instructions for catheter removal.

Askew. Patient Removal of Catheters After Urogynecologic Surgery. Obstet Gynecol 2024.

Study staff called participants about 2 weeks after surgery. During this call, participants were asked whether they were able to void or if they had any issues with voiding. Participants were also asked four questions regarding pain, ease of use, satisfaction, and likelihood to use again. Responses were scored using a 4- or 5-point scale, converted from a visual analog scale (VAS) with the assistance of a survey development expert at the Odum Institute at the University of North Carolina at Chapel Hill. An example of the question for pain assessment was the following: "How much pain did you experience from the catheter removal? Would you say none (0), a little (1), some (2), a lot (3), or a whole lot (4)?" Questions were asked by phone because of limitations on in-person research visits during the COVID-19 pandemic. Participants returned to the clinic for their usual postoperative appointment at 6 to 8 weeks after surgery. A bladder-scan PVR was obtained at this visit.

Demographic, comorbidity, perioperative, and intraoperative information was obtained through review of the electronic medical record. In addition, per our clinic protocol, all clinical phone calls to the participant were documented by the nursing staff as telephone encounters in the medical record. A review of telephone and office encounters by nurses or physicians and emergency department and urgent care visits was also obtained through review of the electronic medical record.

Our primary outcome was the rate of early postoperative *urinary retention*, defined as a failed void trial on postoperative day 3–5. Secondary outcomes were number of telephone calls pertaining to catheter or voiding issues, number of office visits for catheter or voiding issues, scores for pain, and patient perception of ease of use, satisfaction, and likelihood to use again. For the office removal group, the required clinic visit for the backfill void trial was counted as one office visit because it reflected resource utilization. Participants were determined to have prolonged voiding dysfunction if they had catheterization for longer than 2 weeks or if they returned to the operating room for a sling revision at any point after their initial surgery.

The study was performed as a noninferiority trial. Prior studies at our institution demonstrated a 5% rate of postoperative urinary retention with the second void trial after discharge from the hospital with a catheter.[1] We used this rate for our control group. Rates of urinary retention risk in a prior study examining self-removal of catheters and in studies examining office-based catheter removal in the early postoperative period (2–4 days) ranged between 14% and 23%.[10,13] The noninferiority margin in the prior study of self-removal of catheters was 15%. Thus, we felt that a noninferiority margin of 11% was reasonable to use for this study. To determine whether noninferiority was established, a 95% CI of the difference in outcomes was constructed. If the predetermined noninferiority margin was greater than the upper bound of the 95% CI, noninferiority could be declared. We estimated that we needed a sample size of 100 participants (50/group) for this noninferiority trial, with a power of 80%, an α of 0.05, and a noninferiority margin of 11. We accounted for a dropout rate of 20%; therefore, our recruitment goal was 120 participants total.

Statistical analysis was performed with SPSS 28.0.0.0 with an intent-to-treat analysis. Continuous data were compared using the Student *t* test or Wilcoxon rank-sum test for nonparametric data; χ^2 and Fisher exact tests were used for nominal data. Charlson Comorbidity Index scores were compared using the Mann–Whitney *U* test.[14] Noninferiority testing was performed with a one-sided *z* test for comparing binomial proportions.[15] Data are presented according to CONSORT (Consolidated Standards for Reporting Trials) guidelines for randomized trials.[16]

RESULTS

A total of 329 women were identified at their preoperative encounter as interested in participating in the study. Twenty-six women declined participation on the day of surgery or had surgery postponed or cancelled as a result of COVID-19 pandemic restrictions. Among 303 consented participants, 120 were randomized. Three participants withdrew from the study after randomization; therefore, 117 participants were included in the final analysis. Among 117 participants, 59 (50.4%) were randomized to home removal, and 58 (49.6%) were randomized to office removal (Fig. 2).

The groups were similar in baseline demographics and perioperative characteristics, including age (mean 60±13 years vs 61±12 years for home and office groups, respectively), body mass index (BMI, calculated as weight in kilograms divided by height in meters squared), race, Charlson Comorbidity Index score, smoking status, diabetes mellitus, anticholinergic use, *advanced prolapse* (defined as pelvic organ prolapse quantification system stage 3 or 4), and proportion undergoing hysterectomy or apical suspension (Table 1). Race was included in our demographics analysis to assess for potential generalizability of the results. Anti-incontinence procedures were more common in the office group (45.8% vs 77.6%).

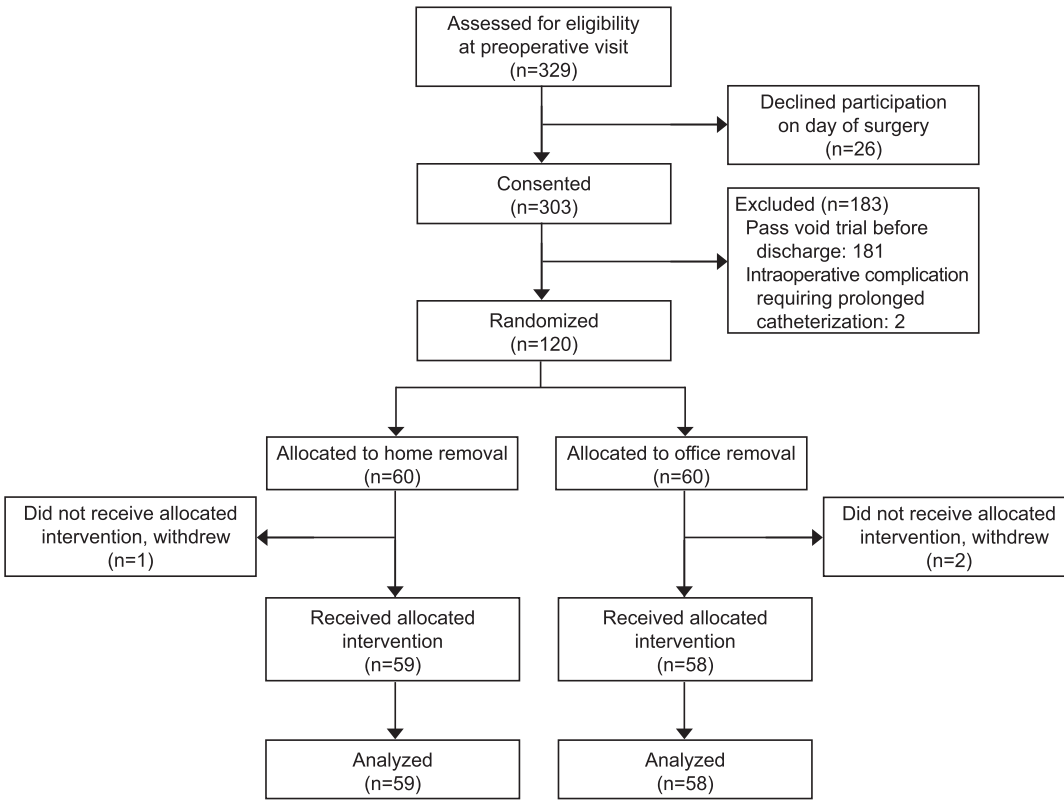

Fig. 2. Enrollment and randomization of all participants.

Askew. Patient Removal of Catheters After Urogynecologic Surgery. Obstet Gynecol 2024.

There was no difference between groups in the rate of postoperative day 3 catheter removal (71.2% home vs 55.2% office), and all catheters were removed by postoperative day 5.

For our primary outcome, the rate of early postoperative retention was 11.9% in the home group and 22.4% in the office group (P=.13). Our predetermined noninferiority margin of 11% was greater than the upper bound of our 95% CI; thus, we reject the null hypothesis and conclude noninferiority of home removal (95% CI, $-\infty$ to 0.01) (Fig. 3). Because antiincontinence procedures are a known risk factor for postoperative urinary retention, we also conducted a subset analysis of participants who underwent an antiincontinence procedure and found no difference in the rate of void trial failure (14.8% home vs 24.4% office, P=.33). There was also no difference in the rate of void trial failure between catheter removal groups among those participants who were unable to void at all (voided volume 0 mL) during their immediate postoperative void trial before discharge after surgery (19.4% home vs 40.0% office, P=.07). Two participants in the home group (3.4%) and four in the office group (6.9%) had prolonged voiding dysfunction after surgery (P=.44). Four participants underwent sling release procedures (one [1.7%] in the home group and three [5.2%] in the office group, P=.36).

For our secondary outcomes, four participants did not complete the 2-week call (two in the home group and two in the office group). Participants in the home removal group were more likely to report "no pain" (75.4% vs 53.6%, P=.02) and were "very likely" to use this method again (93% vs 72.7%, P=.004) (Table 2). Notably, nine participants (16.1%) in the office removal group reported they were "not at all" likely to use this method again compared with zero in the home removal group. There were no differences in difficulty or satisfaction between groups, with 96.5% vs 91.1% reporting "not at all difficult" in the home compared with office removal group, respectively (P=.23), and 94.7% compared with 85.7% reporting "very satisfied" in the home compared with office removal group, respectively (P=.11).

We assessed health care utilization as measured by phone calls to our practice and office visits. The number of calls was not different (median [interquartile range] 1 [0–1] vs 0 [0–1], P=.66); however, the number of office visits was significantly higher in the

Table 1. Baseline Characteristics of Women Undergoing Home or Office Catheter Removal After Surgery

Characteristic	Home (n=59)	Office (n=58)	Total (N=117)
Age (y)	60.2±13.4	61.2±11.6	60.7±12.5
BMI (kg/m^2)	28.9±8.6	29.5±8.4	29.2±8.5
Race			
Black	4 (6.8)	3 (5.2)	7 (6.0)
White	53 (89.8)	55 (94.8)	108 (92.3)
None of the above	2 (3.4)	0 (0)	2 (1.7)
CCI score	2 (1, 3)	2 (1, 3)	2 (2)
Current smoker	5 (8.5)	2 (3.4)	7 (8.5)
Diabetes	6 (10.2)	7 (12.1)	13 (11.1)
Anticholinergic use	5 (8.5)	7 (12.1)	12 (10.3)
Advanced prolapse*	31 (52.5)	27 (46.6)	58 (49.6)
Hysterectomy	36 (61.0)	26 (44.8)	62 (53.0)
Apical suspension	45 (76.3)	44 (75.9)	89 (76.1)
Anti-incontinence procedure†	27 (45.8)	45 (77.6)	72 (61.5)
Postoperative day 3 removal	42 (71.2)	32 (55.2)	74 (63.2)

BMI, body mass index; CCI, Charlson Comorbidity Index.
Data are mean±SD, n (%), or median (interquartile range).
* Stage 3 or greater prolapse in any compartment.
† Includes midurethral slings and Burch urethropexy.

office group (median [interquartile range] home 0 [0–1] vs office 1 [1–1]). A total of eight participants had a catheter subsequently reinserted at an emergency department visit, five (8.5%) in the home removal group and three (5.2%) in the office removal group, with no significant difference between groups (P=.71).

DISCUSSION

Our study found that in the early postoperative period, patient removal of urinary catheter at home was noninferior to office removal for early urinary retention rates. Participants in the home removal group reported low pain, low difficulty with catheter removal, and high satisfaction. Home removal also decreased the utilization of resources in the office.

One other study has examined self-removal of catheters after urogynecologic surgery. Shatkin-Margolis et al[10] found that self-discontinuation of transurethral catheters was noninferior to office-based discontinuation after apical prolapse surgery 1 week postoperatively. The void trial failure rate in that study was about 14%, whereas our study found a failure rate of about 17% among all participants. Patients in that study kept their catheters in for 7 days, which is longer than national practice patterns, whereas ours were removed on postoperative day 3–4. In a survey of Accreditation Council for Graduate Medical Education–accredited urology, obstetrics and gynecology, and female pelvic medicine and reconstructive surgery residency and fellowship programs, 89% practices reported repeating voiding trials within 7 days, with the majority at 1 to 3 days.[4] Despite this, optimal timing of the second voiding trial is not known. A Cochrane Review demonstrated a 5% cumulative daily risk for developing urinary tract infection in the setting of catheterization; therefore, surgeons generally prefer to limit the duration of catheter use.[17] Although earlier removal is seen as beneficial in the prevention of postoperative urinary tract infection, it can also be associated with higher void trial failure rates.[13,18]

In our study, a participant was deemed to pass their void trial at home if they were able to void and did not perceive any difficulty with voids; office removal participants had stricter criteria, which

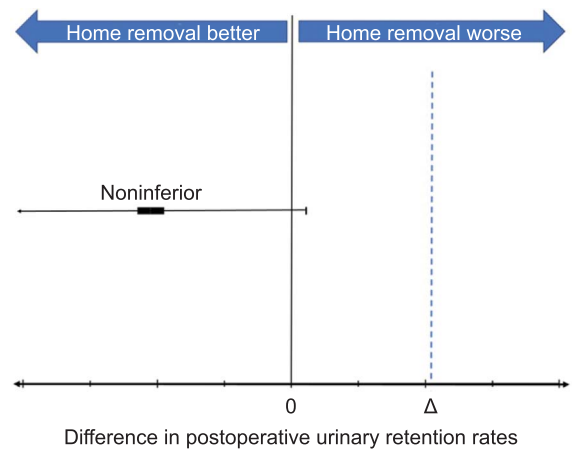

Fig. 3. Results of the noninferiority analysis. Noninferiority margin Δ=0.11 (95% CI, −∞ to 0.01).

Askew. Patient Removal of Catheters After Urogynecologic Surgery. Obstet Gynecol 2024.

Table 2. Secondary Outcomes for Home or Office Catheter Removal After Surgery

Outcome	Home (n=57)	Office (n=56)	*P*
No pain	43 (75.4)	30 (53.6)	.02*
Not difficult	55 (96.5)	51 (91.1)	.23*
Very satisfied	54 (94.7)	48 (85.7)	.11*
Very likely to use again	53 (93.0)	40 (72.7)	.004*
No. of nursing calls	1 (0–1)	0 (0–1)	.66†
No. of office visits‡	0 (0–1)	1 (1–1)	<.001†

Data are n (%) or median (interquartile range) unless otherwise specified.
* The χ^2 test.
† Mann–Whitney *U* test.
‡ Office void trials for individuals in the office group required at least one visit; therefore, statistical testing may be inherently biased for this variable.

included a PVR assessment. The more liberal definition of pass in the home removal group may account for the lower failure rate in that group. Prior studies comparing PVR-free void trials with traditional void trials with PVR assessment have shown that foregoing PVR assessments in postoperative void trials is safe and can lead to avoidance of unnecessary catheterizations without sacrificing patient safety.[1,3,9,10] In addition, a systematic review of randomized trials comparing postoperative void trial assessments demonstrated that a void trial by backfill with or without PVR assessment, autofill, and force of stream assessments resulted in similar outcomes, with no one method being superior.[3] These finding taken together with the results of our study indicate that home catheter removal without PVR assessment can be considered for patients undergoing urogynecologic surgery.

Although our study was not powered for our secondary outcomes, we found that participants in the home removal group were more likely to report no pain on the pain scale and being very likely to use this method again. Participants in the home removal group experienced low difficulty and high satisfaction with catheter removal at home. Shatkin-Margolis et al[10] also demonstrated significantly better VAS scores with regard to pain from catheter removal, ease, and how likely participants were to use the same method again. All the participants in our home removal group and the participants in the Shatkin-Margolis study were able to successfully remove their catheters at home without issue. We believe this addresses a key question as to whether our population of patients in urogynecology are capable of or willing to remove their catheters on their own at home. A recent study by Wang et al[19] also demonstrated that self-removal of catheters is one of the most cost-saving options for management of postoperative urinary retention compared with office removal, especially among patients who travel more than 5 miles to the clinic, which can lead to annual societal savings of $420,000 to $7.2 million. Our study adds to the growing body of evidence that home catheter removal is a feasible option to offer patients, and, if more practices adopted this option, there is the potential for significant cost savings.

It is important to note that proper guidance is key to avoiding negative outcomes for patients. Preoperative and postoperative instructions should include clear counseling regarding when to return to clinic if retention occurs after home catheter removal. Given that voiding dysfunction and urinary retention are already inherent risks of prolapse and anti-incontinence surgeries, this type of counseling is likely already an integral part of perioperative counseling with patients.

The strengths of our study include the randomized, controlled study design; inclusion of common urogynecologic procedures that reflect real-world practice; a large sample size; and a defined surgical cohort. We also used a defined and validated VAS to assess pain, difficulty, and satisfaction with catheter removal.

In addition to the previously discussed limitation of different void trial failure definitions between groups, another limitation of our study was that despite randomization there was a difference in anti-incontinence procedures between groups. However, we did not find a difference in rates of retention between groups among participants whose surgeries included an anti-incontinence procedure. In addition, neither health care professionals nor participants were able to be masked to randomization assignment because of the inherent nature of the two catheter management approaches.

In conclusion, patient home removal of urinary catheters in the early postoperative period was noninferior to office removal in comparisons of early urinary retention rates. Participants in the home removal group had fewer office visits, less pain with removal, and higher satisfaction. Future research could assess for superiority of home catheter removal, the financial implications of decreasing voiding trial office visits, and how catheter removal compares with other patient-centered catheter management strategies such as clean intermittent self-catheterization.

REFERENCES

1. Willis-Gray MG, Wu JM, Field C, Pulliam S, Husk KE, Brueseke TJ, et al. Is a postvoid residual necessary? A randomized trial of two postoperative voiding protocols. Female Pelvic Med Reconstr Surg 2021;27:e256–60. doi: 10.1097/SPV.0000000000000743
2. Geller EJ. Prevention and management of postoperative urinary retention after urogynecologic surgery. Int J Womens Health 2014;6:829–38. doi: 10.2147/IJWH.S55383
3. Dieter AA, Conklin JL, Willis-Gray MG, Desai S, Grant M, Bradley MS. A systematic review of randomized trials investigating methods of postoperative void trials following benign gynecologic and urogynecologic surgeries. J Minim Invasive Gynecol 2021;28:1160–70.e2. doi: 10.1016/j.jmig.2021.01.016
4. Boyd SS, Tunitsky-Bitton E, O'Sullivan DM, Steinberg AC. Postoperative catheter management after pelvic reconstructive surgery: a survey of practice strategies. Female Pelvic Med Reconstr Surg 2018;24:188–92. doi: 10.1097/SPV.0000000000000542
5. Dieter AA, Wu JM, Gage JL, Feliciano KM, Willis-Gray MG. Catheter burden following urogynecologic surgery. Am J Obstet Gynecol 2019;221:507.e1–7. doi; 10.1016/j.ajog.2019.05.014
6. Fitzgerald J, Siddique M, Miranne JM, Saunders P, Gutman R. Development of a patient-centered pelvic floor complication scale. Female Pelvic Med Reconstr Surg 2020;26:244–8. doi: 10.1097/SPV.0000000000000705
7. Elkadry EA, Kenton KS, FitzGerald MP, Shott S, Brubaker L. Patient-selected goals: a new perspective on surgical outcome. Am J Obstet Gynecol 2003;189:1551–7. doi: 10.1016/s0002-9378(03)00932-3
8. Meekins AR, Siddiqui NY, Amundsen CL, Kuchibhatla M, Dieter AA. Improving postoperative efficiency: an algorithm for expedited void trials after urogynecologic surgery. South Med J 2017;110:785–90. doi: 10.14423/SMJ.0000000000000733
9. Pilkinton ML, Williams KS, Sison CP, Shalom DF, Winkler HA. Comparing force of stream with a standard fill voiding trial after surgical repair of apical prolapse: a randomized controlled trial. Obstet Gynecol 2019;133:675–82. doi: 10.1097/AOG.0000000000003159
10. Shatkin-Margolis A, Yook E, Hill AM, Crisp CC, Yeung J, Kleeman S, et al. Self-removal of a urinary catheter after urogynecologic surgery: a randomized controlled trial. Obstet Gynecol 2019;134:1027–36. doi: 10.1097/AOG.0000000000003531
11. Boyd SS, O'Sullivan DM, Tunitsky-Bitton E. A comparison of two methods of catheter management after pelvic reconstructive surgery: a randomized controlled trial. Obstet Gynecol 2019;134:1037–45. doi: 10.1097/AOG.0000000000003525
12. Jannelli ML, Wu JM, Plunkett LW, Williams KS, Visco AG. A randomized controlled trial of clean intermittent self-catheterization versus suprapubic catheterization after urogynecologic surgery. Am J Obstet Gynecol 2007;197:72.e1–4. doi: 10.1016/j.ajog.2007.02.043
13. Schachar JS, Ossin D, Plair AR, Hurtado EA, Parker-Autry C, Badlani G, et al. Optimal timing of a second postoperative voiding trial in women with incomplete bladder emptying after vaginal reconstructive surgery: a randomized trial. Am J Obstet Gynecol 2020;223:260.e1–9. doi: 10.1016/j.ajog.2020.06.001
14. Kim S, Park J, Kwon JH, Oh AR, Gook J, Yang K, et al. The Charlson Comorbidity Index is associated with risk of 30-day mortality in patients with myocardial injury after non-cardiac surgery. Sci Rep 2021;11:18933. doi: 10.1038/s41598-021-98026-4
15. Tunes da Silva G, Logan BR, Klein JP. Methods for equivalence and noninferiority testing. Biol Blood Marrow Transpl 2009;15:120–7. doi: 10.1016/j.bbmt.2008.10.004
16. Schulz KF, Altman DG, Moher D; CONSORT Group. CONSORT 2010 statement: updated guidelines for reporting parallel group randomized trials. Obstet Gynecol 2010;115:1063–70. doi: 10.1097/AOG.0b013e3181d9d421
17. Lam TB, Omar MI, Fisher E, Gillies K, MacLennan S. Types of indwelling urethral catheters for short-term catheterisation in hospitalised adults. The Cochrane Database of Systematic Reviews 2014, Issue 9. Art. No.: CD004013. doi: 10.1002/14651858.CD004013.pub4
18. Xie N, Hu Z, Ye Z, Xu Q, Chen J, Lin Y. A systematic review comparing early with late removal of indwelling urinary catheters after pelvic organ prolapse surgery. Int Urogynecol J 2021;32:1361–72. doi: 10.1007/s00192-020-04522-y
19. Wang R, Tunitsky-Bitton E. Short-term catheter management options for urinary retention following pelvic surgery: a cost analysis. Am J Obstet Gynecol 2022;226:102.e1–9. doi: 10.1016/j.ajog.2021.07.025

Authors' Data Sharing Statement

Will individual participant data be available (including data dictionaries)? *No.*

What data in particular will be shared? *Not available.*

What other documents will be available? *Not available.*

When will data be available (start and end dates)? *Not applicable.*

By what access criteria will data be shared (including with whom, for what types of analyses, and by what mechanism)? *Not applicable.*

PEER REVIEW HISTORY

Received August 4, 2023. Received in revised form September 21, 2023. Accepted September 28, 2023. Peer reviews and author correspondence are available at http://links.lww.com/AOG/D499.