Voiding trial methods used after prolapse or incontinence surgery

Salma Rahimi[1,2], Laurephile Desrosiers[2], Erika Wasenda[2], Alejandro D Treszezamsky[2], Charles J Ascher-Walsh[2]

Rahimi S, Desrosiers L, Wasenda E, et al. Voiding trial methods used after prolapse or incontinence surgery. J Clin Diag Treat 2018;1[1]:23-25.

OBJECTIVE: There are no standardized techniques for trials of void [TOV] after prolapse or incontinence surgery. Our aim was to describe current methods being used by attendees of the American Urogynecologic Society [AUGS] meeting.

METHOD: Surveys were distributed to AUGS attendees [October 2012] and consisted of 18 questions regarding TOV methods and 8 questions regarding respondent characteristics. Statistical analysis was performed with SAS 9.2, with hypothesis testing at 0.05 level of significance.

RESULT: Response rate was 11% [227 of 2000 surveys returned]. Majority of participants were fellowship-trained physicians working in academic settings. Most perform TOV after prolapse and incontinence surgery. 80% instill 300 mL fluid into the bladder prior to catheter removal. Median time given to void was 30 minutes. To determine post void residual volume [PVR], 35% subtract voided from instilled volume, 19% use ultrasound, 10% perform straight catheterization, and 32% report other methods. Most commonly reported PVR volumes at which catheter is replaced were 100 and 150 mL. After failed TOV, most physicians send patients home with indwelling catheters and 50% repeat TOV in 1-3 days. Fifty-seven percent prescribe prophylactic antibiotics while patients have a catheter. Providers from the South and Northeast were more likely to perform TOV compared to providers from the West and Midwest [p<0.0001].

CONCLUSION: Most respondents perform TOV after prolapse or incontinence surgery and prefer a retrograde fill method using a volume of 300 mL, with PVR 100-150mL considered satisfactory. For failed TOV, most send patients home with indwelling catheter and repeat TOV in 1-3 days.

Key Words: *Void trial, Prolapse surgery, Incontinence surgery*

Postoperative urinary retention is a common complication of urogynecologic surgery affecting between 5-36% of patients (1,2). If undiagnosed, patients may develop cystitis, bladder over-distention, and in severe cases, renal damage. Currently, there is no standardization in technique for postoperative trial of void [TOV]. Reported rates of postoperative voiding dysfunction range from 5% to 71% (3,4). This wide variation is likely due to the different types of surgeries performed as well as different definitions of urinary retention [5]. Methods of evaluating postoperative voiding function vary greatly based on practice patterns with no current definitive best practice to use for guidance. Some common methods include retrograde filling, spontaneous filling, and bladder scanning via ultrasound. Each technique has its own advantages. The retrograde method may result in faster performance, fewer catheterizations, and accurate measurement of post-void residual. However, the auto-fill technique may better represent voiding conditions when at home.

Our primary aim was to evaluate what the most common methods are currently used to simply gives surgeons a metric by which to gauge their own practice.

MATERIALS AND METHODS

This was a cross-sectional study using a survey distributed to all attendees of the American Urogynecologic Society [AUGS] 33rd Annual Scientific Meeting held October 2012 in Chicago, Illinois.

distributed with meeting registration packets and participation was voluntary and anonymous. The conference organizers estimated that there would be approximately 2000 attendees. 2000 questionnaires were created and distributed to the first 2000 registrants. Surveys consisted of 18 questions regarding void trial methods used by participants and 8 demographic questions. Demographic information obtained included age, years in practice, practice region, practice type, professional degree, and fellowship training. Statistical analysis was performed using with SAS 9.2 [SAS institute, Cary, NC] including Student's *t* test for continuous variables, χ^2 and Fisher's exact for categorical variables, multivariate analyses. Statistical significance was defined as $P < 0.05$.

RESULTS

Out of 2000 surveys handed out, 227 of them were returned [response rate of 11%]. Participant demographic data is listed in Table 1. Ninety-two percent of respondents were physicians with the remainder being allied health professionals [8%].

Of the physicians, 74% were fellowship-trained and mean number of years in practice was 12. Of all study participants, 42% worked in university hospitals, 28% in community hospitals, and 20% in private practice setting. Practice region was found to be evenly distributed among participants.

Table 1
Participant demographic information

Occupation	%	[n]	Work Setting	%	[n]
Physician	92	-210	University Hospital	42	-95
Nurse Practitioner	4	-8	Community Hospital	28	-64
Nurse	2	-4	Private	20	-45
Physician's Assistant	1	-2	Other	10	-22
Other	1	-2			
Fellowship Training	**%**	**[n]**	**Practice Region**	**%**	**[n]**
Urogynecology/FPMRS	72	-148	Northeast	28	-60
Female Urology	2	-4	South	24	-53
Other	3	-6	West	24	-52
Not Fellowship Trained	24	-49	Midwest	22	-47
			Outside of US	2	-5

When participants were asked about after which type of surgery they would perform void trials, 98% of participants have TOV performed after mid-urethral slings, 81% after anterior colporrhaphy, 78% after colpocleisis, 75% after sacrocolpopexy, 69% after sacrospinous ligament suspension, and 68% after uterosacral ligament suspension (Table 2).

Most reported TOV were performed by nurses [91%], followed by residents and fellows [24%] and the attending surgeon [13%]. Eighty percent reported retrograde filling of the bladder with fluid prior to catheter removal. The majority [68%] fill the bladder with 300 mL [range 150–500 mL] (Table 3).

The median time patients are given to void after filling is 30 minutes

[1]*South Nassau Communities Hospital Oceanside, NY,* [2]*Department of Obstetrics and Gynaecology/Division of Female Pelvic Medicine and Reconstructive Surgery. Mount Sinai School of Medicine, New York*

Correspondence: Charles Ascher-Walsh, Department of Obstetrics and Gynaecology/Division of Female Pelvic Medicine and Reconstructive Surgery, Mount Sinai School of Medicine, 1176 Fifth Ave, 9th floor New York, NY 10029. Telephone + 917-880-6591, e-mail Charles.ascher-walsh@mssm.edu

Received: March 30, 2018, Accepted: April 02, 2018, Published: April 09, 2018

TABLE 2
Surgical procedures for which TOV performed

Surgical Procedure	%	[n]
Mid-urethral sling	98	-219
Anterior colporrhaphy	81	-180
Colpocleisis	78	-174
Sacrocolpopexy	75	-168
Sacrospinous Ligament Suspension	69	-154
Uterosacral Ligament Suspension	68	-152
Vaginal hysterectomy	34	-76

TABLE 3
Methods used by respondents to perform TOV

	%	[n]
Retrograde Bladder Filling	80	-177
Volume Instilled		
200 mL	6	-11
250 mL	16	-27
300 mL	68	-116
Determination of Post Void Residual	**%**	**[n]**
Voided minus Instilled Volume	35	-79
Ultrasound measurement	19	-43
Straight catheterization	10	-22
Other	32	-72

[range 0-360 minutes]. Several methods are used to determine the post void residual volume [PVR]. Thirty-five percent of respondents calculate PVR by subtracting volume voided from volume instilled, 19% use ultrasound or bladder scans, 10% perform straight catheterization, and 32% reported using "other methods". The PVR at which a catheter is replaced also varied with 40% of respondents using a cut-off of 100 mL, 38% using 150 mL, and 12% using 200 mL.

After a failed TOV, 61% of participants send patients home with an indwelling catheter, 11% have patients perform clean intermittent self-catheterization [CIC], while 20% said they have patients do either Foley or CIC. For patients who are sent home with indwelling catheters, 50% repeat TOV within 3 days, 7% in either 4 or 5 days, 17% in either 6 or 7 days, and 24% reported a range of >7 days. Fifty-seven percent of the participants stated they would prescribe prophylactic antibiotics while patients have a catheter in place.

Multivariate analysis showed that practice setting and region affected the type of TOV performed. Eighty-eight percent of respondents in university hospitals, retrograde fill the bladder compared to 61% percent for community hospitals and 66% in private practice [p=0.02]. We also found that providers from the South and Northeast were more likely to perform voiding trials on patients having undergone prolapse surgery compared to providers from the West and Midwest [p<0.0001] (Table 4).

TABLE 4
Criteria for diagnosis and treatment for failed TOV

PVR at which Catheter Replaced	%
100	40
150	38
250	12
Method Used After Failed TOV	**%**
Indwelling catheter	61
Intermittent self	11
Either	20

DISCUSSION

Post-operative voiding dysfunction is a common complication in women who undergo surgery for pelvic organ prolapse and or urinary incontinence. Multiple methods currently exist to evaluate patients for post-operative urinary retention, with variations both between and within each method. Data regarding optimal techniques, diagnostic accuracy as well as a standardized method of performance remains limited. Our goal was to better characterize current methods of void trials being used by gynaecologic surgeons to give surgeons a reference by which to evaluate their own methods. From our cross sectional study, most respondents perform void trials after prolapse or anti-incontinence surgery and the majority prefer a retrograde fill method. Two percent of respondents did not use any type of voiding trial and there was no means in this questionnaire to assess why they believed that it was unnecessary. Diagnostic accuracy of TOV methods was evaluated by Gellher and co-authors showed the retrograde filling method to be more accurate in identifying patients with post-operative voiding dysfunction as well as more preferred by patients (5,6). Both methods, however, had low positive predictive values, 56% and 44% respectively. Foster and co-authors also showed that patients who had vaginal surgery and underwent the backfill method were more likely to be discharged home without a catheter compared to patients who were allowed to spontaneously void (7). No differences in occurrence of voiding dysfunction was noted between the two groups up to six weeks post operatively, however, the study may have been underpowered to show this.

Our participants reported a variety of methods to determine PVR, with a volume of 100-200 mL considered satisfactory in excluding voiding dysfunction. No consensus on PVR which can definitively exclude voiding dysfunction has been agreed upon. Several authors have proposed their best estimates for appropriate residuals. Foster et al., for example, defined it as a voided volume of at least 200 cc with PVR less than the amount voided (7). Kleeman and co-authors defined successful emptying as a PVR of 50% or less of total volume (8). Pulvino and co-authors on the other hand, were stricter and defined a successful trial as a void of greater than two-thirds of total bladder volume (9). Germain and co-authors used the strictest definition we identified in the literature and defined a satisfactory PVR as equal or less than 25% of the total volume (10). Unfortunately due to the nature of the survey we were not able to determine what volume of PVR was associated with voiding dysfunction.

After patients were determined to have voiding dysfunction by the various methods, the majority of respondents placed a Foley catheter and repeated void trials in 1-3 days. The remainder of participants reported using a variety of methods including placing a Foley and repeating a void trial in 7 days or having patients perform CIC. Although no consensus exists as to when to re-evaluate patients who have immediate post-operative voiding dysfunction, few studies report on their methods on post-operative management. In their evaluation of the two techniques for voiding trials after vaginal surgery, Foster and co-authors designated those who failed void trials to either be discharged home with Foley or perform intermittent self-catheterization; however, the length of time prior to repeating a voiding trial was not disclosed (7). Wheeler and co-authors sent all their patients who failed the void trial home with the Foley catheter or had them perform CIC and repeated a void trial in 5 days (11). They found median time of 4 days to return to normal PVR more a factor of waiting for the follow up appointment rather than actual time to return to normal bladder function.

CONCLUSION

Our study reports on current voiding trial methods being used by gynaecologic and urologic surgeons as well as health professionals in the field of general gynaecology and urogynecology. Although our study sheds light on trends in void trial methods being used, it also highlights the continued lack of standardization for this common post-operative test. These variations in testing may impede the accurate diagnosis and reporting of post-operative voiding dysfunction. A limitation of our study is the 11% response rate. Eleven percent is, however, an average response rate for this type of questionnaire. Using AUGS members to complete the study is both a strength and weakness. While using this large organization allows for the reporting of trends from various parts of the country as well as collecting data from physicians and allied health staff who encounter the issue of post-operative voiding dysfunction regularly, it may not be generalizable to general gynaecologists or urologists. It is, however, more likely to represent the thought-leaders in our field. Currently a standardized and accurate method to identify patients with post-operative voiding dysfunction does not exist. Further studies are needed to help better guide physicians in defining the best method. This study allows surgeons to evaluate their own method in relation to others in our field.

REFERENCES

1. Sultana CJ. Bladder drainage and urinary protective methods. In: Urogynecology and Pelvic Reconstructive Surgery, 2nd ed. Edited by MM Karram and MD Walters. St. Louis: Mosby 1999.

2. Vierhout ME. Prolonged catheterization after vaginal prolapse surgery. Acta Obstet Gynecol Scand 1998;77:997.

3. Pavlin DJ, Pavlin EG, Fitzgibbon DR, et al. Management of bladder function after outpatient surgery. Anesthesiology 1999;91:42-50.

4. Petros JG, Rimm EB, Robillard RJ, et al. Factors influencing postoperative urinary retention in patients undergoing elective inguinal herniorrhaphy. Am J Surg 1991;161:431-33.

5. Darrah DM, Griebling TL, Silverstein JH. Postoperative urinary retention. Anesthesiol Clin 2009;27:465-84.

6. Geller E, Hankins K, Parnel B, et al. Diagnostic Accuracy of Retrograde and Spontaneous Voiding Trials for Postoperative Voiding Dysfunction: A Randomized Controlled Trial. American College of Obst and Gyn 2011;118:637-42.

7. Foster RT, Borawski KM, South MM, et al. A randomized, controlled trial evaluating 2 techniques of postoperative bladder testing after transvaginal surgery. Am J Obstet Gynecol 2007;197**:**627.

8. Kleeman S, Goldwasser S, Vassallo B, et al. Predicting postoperative voiding efficiency after operation for incontinence and prolapse. Am J Obstet Gynecol 2002;187**:**149.

9. Pulvino J, Duecy E, Buchsbaum GM, et al. Comparison of 2 Techniques to Predict Voiding Efficiency After Inpatient Urogynecologic Surgery. J Urology 2010;184:1408-12.

10. Germain MM. Urinary retention and overflow incontinence. In: Urogynecology and Urodynamics Theory and Practice, 5th ed. Edited by DR Ostergard, AE Bent and GW Cundiff. Philadelphia: Williams & Wilkins 2003:285-91.

11. Wheeler TL, Riecther HE, Greere WJ, et al. Predictors of success with postoperative voiding trials after a mid-urethral sling procedure. J Urology 2008;179;600-4.