Manual bladder washouts for urinary clot retention: a survey of knowledge among healthcare workers

Murtaza Dungerwalla, MBBS,[1] Nicholas Davies, MBBS,[2] Marlon Perera, MBBS,[1] Nathan Papa, MBBS,[1] Nathan Lawrentschuk, PhD[1,3,4]

[1]Department of Surgery, University of Melbourne, Urology Unit, Austin Hospital, Melbourne, Australia
[2]Department of Urology, Royal Hobart Hospital, Hobart, Australia
[3]Olivia Newton John Cancer Research Institute, Austin Hospital, Melbourne, Australia
[4]Department of Surgical Oncology, Peter MacCallum Cancer Centre, Melbourne, Australia

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Introduction: *Manual bladder washouts (MBWs) are an integral skill for healthcare workers dealing with urological patients. Despite this they are often overlooked by educators and omitted from formal teaching curricula. We aimed to determine the level of competence and training among healthcare workers in performing a MBW.*
Materials and methods: *Following a literature review for correct MBW technique, a 15-question survey was developed to assess knowledge and self-reported competency of doctors and nurses in performing a MBW. Two hundred paper and email-based surveys were distributed to doctors and nurses in the urology wards of Australian public and private hospitals.*
Results: *The survey response rate was 79% with the majority of responses received from senior nurses and surgical registrars, comprising a final study population of 133 respondents. Reported levels of education pertaining to MBW were poor, with only 5% of doctors and 35% of nurses claiming to have been taught the skill as a student. Opinions surrounding the technical aspects of MBW varied significantly across both clinician and nursing subgroups. Interpretation of completion of a MBW was inconsistent, with 72% of nurses stating this occurred when continuous irrigation ran freely compared to only 25.3% of registrars. Despite this, confidence in performance of a MBW in clinicians was high (> 95% agree or strongly agree). Confidence levels in knowledge and procedural skills were significantly lower in the nurse cohort than the registrar cohort ($p < 0.01$).*
Conclusions: *The indications and technique for MBW are poorly described in the literature. Despite high self-reported competency, MBW appears poorly understood by both doctors and nurses. This valuable and common skill is rarely taught to healthcare students, suggesting better education may improve expertise and patient outcomes.*

Key Words: hematuria, urinary retention, urinary catheterization, urinary bladder, patient safety, medical education

Introduction

Urinary retention secondary to hemorrhage and clots ("clot retention") is a common urological emergency. It may present de novo or be the result of recent surgery, trauma, infection or coagulation disorders. Definitive treatment of clot retention requires clearance of intravesical clots, usually with a manual bladder washout (MBW).

Despite the prevalence of clot retention, the specific technique for performing a therapeutic and safe MBW is poorly understood.[1] Many institutions have their own protocols, but the procedure is commonly not discussed or assumed as knowledge among health professionals – leading to inappropriate or ineffective MBWs. The principal aims of a MBW are to extract all blood, urine and associated clot material from the bladder in a timely and efficient fashion with minimal patient morbidity.

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Address correspondence to Dr. Nathan Lawrentschuk, Suite 5, 210 Burgundy Street, Heidelberg, Vic 3084, Australia

Recently, the need for a greater understanding of the technique for MBW was highlighted in Australia via the Victorian Audit of Surgical Mortality (VASM) following a death secondary to clot retention.[2] Therapeutic MBWs for urinary clot retention (also described as manual bladder irrigation or instillation) are an essential skill for urologists, urology nurses and other emergency and primary care health workers. This article seeks to define the technique for MBW and reviews the understanding and self-reported competency of doctors and nurses in performing a MBW.

Materials and methods

Literature review: manual bladder washout technique

A literature review was performed using PubMed, OVID and Embase to identify articles containing key words for the principles and technique for a MBW. This search was supplemented by local hospital protocols, an internet search and review of common urological textbooks.

Data collection and participants

A 15-question survey was developed by a panel of health workers, designed to ascertain the level of knowledge of MBW by doctors and nurses with various levels of experience. Demographic data of the participants included: gender, professional role, healthcare system of practice (private or public), level of experience and department of work. The remaining questions assessed confidence in insertion of Foley or suprapubic catheters, knowledge of "whistle-tip" catheters and MBW technique. Responses were in the form of a five-level Likert scale ('strongly disagree', 'disagree', 'neither agree nor disagree', 'agree', and 'strongly agree').[3]

Surveys were distributed to doctors and nurses from two public and three private metropolitan hospitals in Victoria, Australia. The survey was conducted primarily on urological wards, however the survey was also provided to those in the emergency department, general surgery ward, spinal ward, and rehabilitation ward.

Statistical analyses

Data was entered into an Excel 2003 spreadsheet (Microsoft, Redmond, WA, USA). Data responses were classed as categorical data. Non-parametric Wilcoxon rank-sum test was utilized to compare the categorical data. To account for multiple comparisons we employed the Bonferroni-Holm correction method. Subgroup analysis was also performed with the same technique and software (Stata v. 12.0 SE, Statacorp, College Station, TX, USA).

Results

Questionnaire results

Two hundred paper and email-based surveys were distributed to doctors and nurses in several Victorian hospitals. The overall response rate was 79% with 157 surveys returned: 79 (50%) from surgical registrars, 54 (34%) from senior nurses, 19 (12%) from graduate nurses, two from resident medical officers, one each from consultant surgeons and medical students and another unknown. The more junior staff completing the survey (n = 22) were inexperienced with MBW universally. Thus for the purpose of analysis, surgical registrars and senior nurses were included in the final statistical analysis, as they made up the majority of respondents and had similar years of experience in the medical field (6-10 years). In total, 133 respondents were included for statistical analysis.

There were similar numbers of male (52%) and female (48%) respondents and the majority worked in either urology (50%) or surgical (32%) wards. Of interest, the majority of the doctors worked on urology wards (72%), while the area of work was more varied for the nurses, with only 17% working on a urology

TABLE 1. **Demographics of the study population**

	Surgical registrars	**Senior nurses**	**Total**
Male	62 (78.5%)	7 (13.0%)	69 (51.9%)
Female	17 (21.5%)	47 (87.0%)	64 (48.1%)
Urology ward	57 (72.2%)	9 (16.7%)	66 (49.6%)
Surgical ward	22 (27.8%)	21 (38.9%)	43 (32.3%)
Spinal ward	0	16 (29.6%)	16 (12.0%)
Emergency dept.	0	4 (7.4%)	4 (3.0%)
Rehab. ward	0	3 (5.6%)	3 (2.3%)
Unknown	0	1 (1.9%)	1 (0.8%)

ward and 38% working on other surgical wards. Respondent demographics are summarized in Table 1.

Overall, registrars and nurses felt competent in placing both male and female catheters, however a greater proportion of the registrars felt competent in comparison to the nurses ($p < 0.01$). Registrars reported competency in exchanging suprapubic catheters, see Table 2. Conversely, the perceived skill level among nurses was much more varied: 37% felt competent, and the remainder were either unsure or not competent in the exchange of suprapubic catheters. The discrepancy between the groups increased when comparing the level of competence in inserting suprapubic catheters, as opposed to simply exchanging them, with only 18.5% of senior nurses confident in their ability to complete this task.

TABLE 2. **Overall summary of survey results**

Survey question		Strongly disagree (%)	Disagree (%)	Neither agree nor disagree (%)	Agree (%)	Strongly agree (%)	No response (%)	p value
I feel competent at placing a Foley urinary catheter in a male	Registrars	2 (2.5)	0	0	2 (2.5)	75 (95)	0	< 0.0001
	Nurses	3 (5.6)	7 (13)	3 (5.6)	13 (24.1)	27 (50)	1 (1.9)	
I feel competent at placing a Foley urinary catheter in a female	Registrars	2 (2.5)	0	0	3 (3.8)	74 (93.7)	0	< 0.001
	Nurses	0	1 (1.9)	2 (3.7)	13 (24.1)	37 (68.5)	1(1.9)	
I feel competent at exchanging a Foley urinary suprapubic catheter	Registrars	2 (2.5)	0	0	13 (16.5)	64 (81.8)	0	< 0.001
	Nurses	9 (16.7)	18 (33.3)	4 (7.4)	4 (7.4)	16 (29.6)	3 (5.6)	
I feel competent at inserting a Foley urinary suprapubic catheter	Registrars	1 (1.3)	4 (5.1)	3 (3.8)	23 (29.1)	48 (60.8)	0	< 0.001
	Nurses	21 (38.9)	17 (31.5)	6 (11.1)	4 (7.4)	6 (11.1)	0	
I have an understanding of what a whistle-tip catheter is	Registrars	7 (8.9)	12 (15.2)	6 (7.6)	13 (16.5)	41 (51.9)	0	< 0.001
	Nurses	10 (18.5)	14 (25.9)	3 (5.6)	17 (31.5)	8 (14.8)	2 (3.7)	
I was taught specifically as a student how to competently perform a manual bladder washout for clot retention	Registrars	51 (64.6)	22 (27.9)	2 (2.5)	2 (2.5)	2 (2.5)	0	< 0.001
	Nurses	8 (14.8)	23 (42.6)	3 (5.6)	5 (9.3)	14 (25.9)	1 (1.9)	
I feel competent at performing a manual bladder washout for clot retention	Registrars	2 (2.5)	0	1 (1.3)	23 (29.1)	52 (65.8)	1 (1.3)	0.171
	Nurses	1 (1.9)	1 (1.9)	1 (1.9)	21 (38.9)	29 (53.7)	1 (1.9)	
I believe that a manual washout is complete when the continuous bladder washout runs fairly easily	Registrars	11 (13.9)	37 (46.8)	10 (12.7)	14 (17.7)	6 (7.6)	1 (1.3)	< 0.001
	Nurses	1 (1.9)	8 (14.8)	6 (11.1)	33 (61.1)	6 (11.1)	0	
I believe a continuous bladder washout will continue to evacuate small clots from the bladder	Registrars	7 (8.9)	21 (26.6)	16 (20.3)	30 (38)	4 (5.1)	1 (1.3)	<0.001
	Nurses	0	3 (5.6)	8 (14.8)	36 (66.7)	7 (13)	0	

Whistle-tip catheters have an open-ended tip and provide a larger lumen for performing bladder irrigation. Almost 52% of registrars strongly agreed that they had a good understanding of them, while only 15% of senior nurses felt likewise ($p < 0.01$). Despite the fact that most registrars were not taught how to perform a MBW during medical school, the majority (94.9%) felt competent in performing the procedure. Around one third (35.2%) of nurses had been taught this technique as a student, compared to only around 5% of doctors ($p < 0.01$). At the time of the survey, the majority or participants, irrespective of role or department, felt capable of performing a MBW.

Responses differed between the two groups when assessing the understanding of the role of a MBW (p values < 0.01). Inconsistencies were identified in the interpretation of completion of a MBW: 72% of nurses reported that this occurred when continuous irrigation ran freely, while most registrars did not share this view. There was similarly a lack of consensus over whether continuous irrigation would continue to remove small clots from the bladder. Subgroup analysis did not identify differences between responses based on the gender of participants or whether they worked in surgical or urological departments.

Discussion

Clot retention may occur as a complication following urological surgery or in the setting of malignancy, coagulopathy, calculus or infection. It is generally painful and if not dealt with adequately can lead to further hemorrhage, clots and episodes of retention even when a catheter with continuous irrigation remains in situ. MBW for urinary clot retention is an integral skill for urologists and urology nurses. One study identified it as a regular activity performed by 80.4% of their advanced practice nurses.[4] Despite its relative frequency, there is limited literature outlining safe and effective MBW techniques for clot retention.

There is no standardized MBW technique, and published, evidence-based descriptions of how to perform a MBW are lacking. Most sources advocate removal of clots with repetitive instillation and suction of irrigation fluid using a 40 mL-60 mL syringe through a large bore three-way or whistle-tip catheter.[1,2,5-7] This should be continued until either the return fluid becomes clear,[1,6] or for a further liter after the last clot is retrieved.[8] Although commonly performed as a ward procedure, some difficult cases are best conducted in the operating room to improve efficacy and patient comfort.[9] Once completed, continuous bladder irrigation or traction using a large volume balloon for hemostasis can help prevent further clot formation, especially for lower urinary tract bleeding.[2,5,10]

Normal saline is most commonly used as irrigation fluid; however hydrogen peroxide has been successfully utilized in published case reports.[9] Antibiotic prophylaxis during MBW is controversial, with evidence for their use being inferred from perioperative antibiotic use in transurethral urological surgeries. A recent systematic review concluded that antibiotic prophylaxis reduced the incidence of symptomatic urinary tract infections in those undergoing transurethral resection of prostate and transurethral resection of bladder tumor. Evidence of benefit in less invasive endourological procedures was lacking, and it is unclear into which category MBW would fall.[11]

Given these principles, we propose that an effective MBW involves a large-bore Foley catheter (20-22 French gauge) that is moved around the bladder to dislodge clots and allow extraction, Figure 1. Irrigation fluid, usually normal saline, is instilled manually under pressure through the main drainage lumen of the catheter with a large syringe to break down clots. The fluid is withdrawn and the process repeated until no further clots are seen to return. Ideally, a washout should be done following the rule of "last clot plus a liter" using different catheter positions within the bladder throughout to ensure all clots are dislodged and removed.[8,12] The result is a bladder (and prostate) that will contract around the balloon to aid in hemostasis due to vasoconstriction and the bulk muscle effect of detrusor contraction, which tamponades bleeding. Further bleeding and clot formation should cease or be controlled by continuous gentle irrigation for a short period.[5] It is important to recognize that any attempt at washout has the potential to cause urethral, bladder or prostatic trauma if not done with caution.

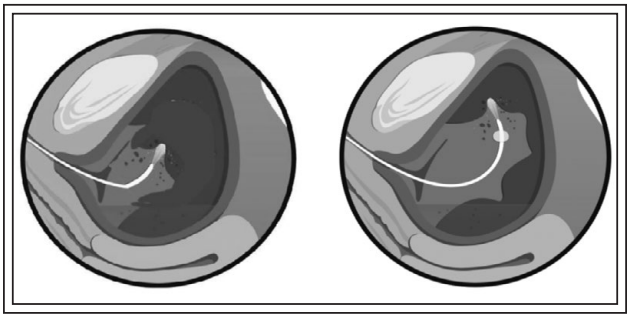

Figure 1. Left - the catheter is inserted and the clot begins to be broken up. The irrigant acts to agitate and break up clots. Right - the catheter is pushed further inside as space is created where some clot has been evacuated.

Whistle-tip catheters have an open tip that communicates with the main drainage lumen of the catheter, as opposed to the side holes found on most Foley catheters. These catheters facilitate greater ability to direct the flow of washout fluid and aid clot breakdown. A whistle-tip catheter may not always be available so options include cutting off the end of a catheter to create this, or using an in-out urethral catheter that has a single, wider lumen than typical two or three-way catheters. One may liken a complete and correct washout to debriding a contaminated skin wound and thus should be done to completeness rather than the "bare minimum".

Given the lack of literature on how to perform a MBW the variability of self-reported competency of doctors and nurses in performing a clot evacuation is not surprising. This observation is consistent with previous literature. Roe found that when interviewed, nurses from urology and geriatric wards were inconsistent regarding frequency of washout, washout solution, and the rationale for such recommendations.[13] Similarly, a questionnaire audit of district nurses found their knowledge of catheter management, including bladder washouts, was suboptimal.[14] The present study's questions were focused on self-reported knowledge and competency rather than direct observation or assessment, however the responses suggest further education is required.

It is likely that inadequate teaching has contributed to the variable self-reported competency in performing a MBW. Although there are no available studies documenting doctors' knowledge or competency in performing MBW, there is a large body of literature on medical student and residency training in urological skills. Regarding urethral catheterization, participants reported either inadequate practical training, or were found to have poor understanding regarding the correct procedure and potential complications.[15,16] Students and interns have been found to be generally inadequately prepared to manage common urological conditions such as acute urinary retention and hematuria.[17,18]

MBW is not routinely addressed in current curricula. The American Urological Association website (www.aua.net.org) features a student education video on catheterization but no specific information or education regarding MBW. Strict training protocols for urinary catheterization have been trialed, where a combination of didactic teaching, skills training, and subsequent formal assessment were found to be associated with improved skills and a reduced complication rate.[12,19] Similar success could be hypothesized for MBW if dedicated training in its technique was also provided, however to determine this would require another appropriately designed study. Also, training models for simulation of suprapubic catheter insertion have emerged recently, and it could be worthwhile to devise similar models for MBW.[20,21] Urology nurses have previously been upskilled in areas such as urodynamics and neobladder care, hence it is likely they could have a front-line role in training other staff to ensure that the correct MBW technique is widespread.

A plan for teaching such a task has been proposed: 1) create a new and standardized approach to teaching, performing, and evaluating inpatient medical procedures; 2) determine the number of procedures required until trainees develop competence, by assessing both clinical knowledge and psychomotor skills; and 3) improve patient safety with more efficient procedures.[22] It is intuitive that hospitals should take a greater interest in MBW because if done correctly there is a potential to reduce patient morbidity (blocked catheters from clots are painful and distressing) and ultimately costs. Correct initial MBW would negate the need for repeated washouts that waste equipment and time, reduce emergency theatre requirements and shorten length of stay because if the clots are removed earlier then healing will be expedited in many instances.

The limitations of this study are that it represents one region of a single country and needs to be validated in other jurisdictions. Self-reported competency caries an inherent potential for bias but has been utilized in multiple previous studies. This study has highlighted a general lack of teaching and knowledge of MBW and a suitable follow up would be to introduce formal MBW training and assess its efficacy.

In conclusion, a definitive MBW requires good technique, time and persistence. This study demonstrates that MBWs are not considered as key elements of urological education and the medical literature regarding their technique and use are limited. MBW as a procedure appears poorly understood by both nurses and doctors. Further study is required to determine if formal teaching of MBW technique in medical and nursing curricula would result in better skills among healthcare workers and ultimately, better patient outcomes. □

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