Best practices in minimally invasive gynecology: making sense of the evidence

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Chapter 6

Urinary catheterization management after laparoscopic hysterectomy: a national overview and a nurse preference survey

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Abstract

The aim of this study was to evaluate catheterization regimes after laparoscopic hysterectomy (LH) in Dutch hospitals and to assess nurses' opinion on this topic. This was particularly relevant as no consensus exists on the best moment to remove urinary catheter after LH. All 89 Dutch hospitals were successfully contacted and provided information on their catheterization regime after LH: 69 (77.5%) reported removing the catheter the next morning after LH, while nine hospitals (10.1%) removed it directly at the end of the procedure. The other 11 hospitals had different policies (four hours up to two days). Additionally, all nurses working at the gynaecologic departments of the hospitals affiliated to Leiden University were asked to fill in a self-developed questionnaire. Of the 111 nurses who completed the questionnaire (response rate 81%), 90% was convinced that direct removal was feasible and 78% would recommend it to a family member or friend.

Impact statement

- Although an indwelling catheter is routinely placed during hysterectomy, it is unclear what the best moment is to remove it after LH specifically. To fully benefit from the advantages associated with this minimally invasive approach, postoperative catheter management, should be, amongst others, optimal and LH-specific. A few studies have demonstrated that direct removal of urinary catheter after uncomplicated LH is feasible, but evidence is limited.
- While waiting for the results of randomised trials, this present study provides insight into nationwide catheterization management after LH. Despite the lack of consensus on the topic, catheterization management was quite uniform in the Netherlands: most Dutch hospitals removed the urinary catheter one day after LH. Yet, this was not in line with the opinion of the surveyed nurses, as the majority would recommend direct removal. This is interesting as nurses are closely involved in patients' postoperative care.
- Although randomised trials are necessary to determine optimal catheterization management, the findings of this present study are valuable if a new urinary catheter regime has to be implemented.

Introduction

Compared with abdominal hysterectomy, laparoscopic hysterectomy (LH) is associated with many well-known advantages, including quicker hospital discharge and faster return to normal activities.[1] To fully benefit from the advantages associated with this minimally invasive approach, post-operative patient care, including postoperative catheter management, should be optimal and LH-specific. Although an indwelling catheter is routinely placed during hysterectomy, it is specifically for LH unclear what the best moment is to remove it after surgery. Clinical practice guidelines on LH such as the ones published by the American Association of Gynecologic Laparoscopists (AAGL) or the National Institute for Health and Care Excellence (NICE) do not formulate any recommendations on when to remove the urinary catheter after LH.[2;3;4;5] The hysterectomy patient leaflet of the Royal College of Obstetrics and Gynecology (RCOG) only mention that the urinary catheter is usually in place for up to 24 hours and the Dutch Society of Obstetrics and Gynaecology (NVOG) state it will be removed 'after a certain amount of time'.[6;7] Looking at the literature, a few studies have demonstrated that direct removal of urinary catheter after uncomplicated LH is feasible, but evidence is limited.[8;9;10;11] As such, a randomised controlled trial (RCT) is currently being conducted in six hospitals in the Netherlands comparing direct versus delayed removal of urinary catheter after LH (MUCH trial, registration number at Clinicaltrials.gov:NCT02742636).

While waiting for the results of the trial, it is valuable to get insight into nationwide catheterization management after LH. This is particularly interesting since Hakvoort et al. published in 2009 a nationwide survey regarding catheterization regimes after vaginal prolapse surgery and demonstrated high practice variation among hospitals due to insufficient evidence.[12] Furthermore, the opinion of nurses on this topic is also relevant to study, as nurses are closely involved in patients' postoperative care. Being aware of the national policies and the attitude of the nurses is valuable if a new policy has to be widely implemented. In this light, the aim of this study was firstly to evaluate catheterization regimes after LH in all Dutch hospitals and secondly to survey all nurses working in one of the hospitals participating in the MUCH trial regarding the best time to remove urinary catheter after LH.

Material and methods

Telephone consultation

All Dutch gynaecologic inpatient departments were contacted by phone. One of the chief nurses was asked to provide information on the urinary catheter regime after LH in their hospital. The nurse was also asked whether their catheter policy was written in a guideline.

Nurse preference survey

All nurses working at a gynaecologic department of one of the six hospitals participating in the MUCH trial, all affiliated to Leiden University, were asked to fill in anonymously a self-developed questionnaire. The survey was developed by the gynaecologic department of Leiden University Medical Centre (LUMC), together with the department of Medical Decision Making and included 19 questions (6 open questions and 13 multiple-choice). A pilot study was performed at the gynaecologic department of LUMC by asking five nurses to fill in the questionnaires. Questions were reviewed and adapted afterwards if necessary. Topics covered in the survey were baseline characteristics of the responding nurses, current catheter management in their hospital and their personal opinion regarding direct or delayed removal of the catheter. To put their answers into context, nurses were also asked to estimate the overall incidence of urinary tract infections and urinary retention after LH. In Appendix 6.1 a summary of the topics that were covered in the survey can be found as well as the questionnaire (translated from Dutch into English).

The survey was available online (using the program NetQhttps://www.netqhealthcare.nl/) or on-paper. The questionnaire was sent out to all nurses by e-mail via the chief nurse of each hospital. Paper-based copies were also available in the nurses' stations of the different hospitals. Two and four weeks after the first request, a reminder was sent out by e-mail.

Statistics

Data analysis was performed using SPSS 23 (SPSS Statistics UK, Spss Inc, Chicago, IL, USA). Continuous data were expressed as median with range (minimum-maximum), while categorical data were expressed as numbers and percentages (%). We qualitatively analysed all open-ended responses from our survey and arranged these answers in thematic groups. Sub-analysis by age and experience was performed using independent t-test. A p-value $<.05$ was considered as significant.

Ethical approval

Because of the nature of the study, Institutional Review Board (IRB) approval did not apply.

Results

Telephone consultation

All 89 Dutch hospitals, including eight academic hospitals, 34 teaching hospitals and 47 non-teaching hospitals, were contacted by phone. All hospitals provided us with information on their urinary catheter management after LH (response rate 100%). As can be seen in Figure 6.1, a total of 69 hospitals (77.5%) reported removing the catheter the next morning after surgery, while 9 hospitals (10.1%) removed the catheter directly at the end of the operation. Seven hospitals (7.9%) removed the catheter on the same day but with a delay of four to six hours after surgery. Three hospitals (3.4%) removed the catheter 24 hours after operation. One hospital (1.1%) left the catheter in place up to two days after procedure, based on their guideline for vaginal hysterectomy.

All hospitals affirmed that they possessed a protocol describing when to remove the urinary catheter after LH. In 75 hospitals (84.2%), this was a standard postoperative care guideline used after all type of gynaecological surgical interventions and not specifically designed for LH. In 14 hospitals (15.7%) a specific guideline for LH existed with information on post-operative catheter management.

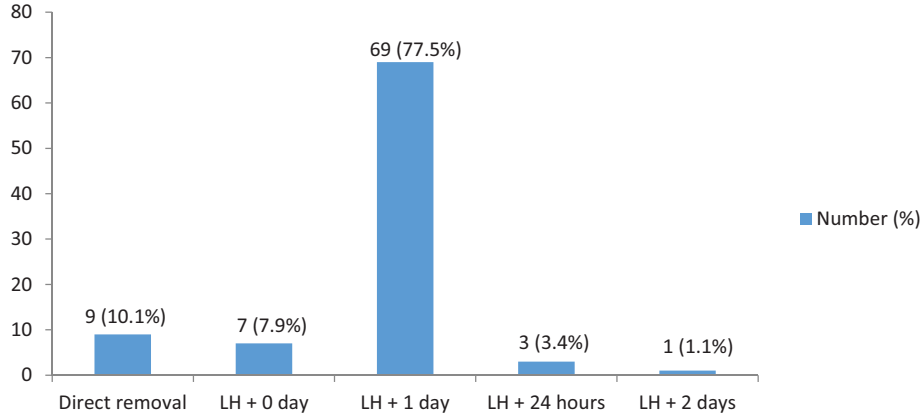

Figure 6.1: Moment of urinary catheter removal after laparoscopic hysterectomy in Dutch hospitals.
LH, laparoscopic hysterectomy. LH+0: the urinary catheter is removed on the same day as LH but with a delay of 4 to 6 hours.

Nurse preference survey

The survey was sent to 137 nurses working at one of the six gynaecological inpatient departments of the included hospitals. These included one academic hospital (LUMC), four teaching hospitals and one non-teaching hospital. A total of 111 nurses completed the entire questionnaire (response rate of 81%). The response rate varied per hospital from 57.6% up to 90.9%.

Table 6.1 presents the baseline characteristics of the responding nurses. The nurses working in one of the five non-academic hospitals reported that before the trial urinary catheter was usually left in place until the next morning. In the academic hospital, the policy was to directly remove the catheter after surgery.

Table 6.1: Baseline characteristics of the responding nurses

Characteristics	
Gender	
Male	2 (1.8)
Female	109 (98.2)
Age (years)	34.0 (19–61)
Graduated	
Yes	95 (85.6)
No	16 (14.4)
Work experience (years)	
As a nurse	7 (0–41)
On a gynecology ward	2 (0–37)
Hours per week at work	32 (16–36)

Data are presented as median (range) or as number (percentage).

As demonstrated in Table 6.2, most nurses (90.1%) believed that it was feasible to directly remove the catheter after procedure. Eighty-seven nurses (78.4%) mentioned that if a friend or family member would undergo a LH, they would advise direct removal. For both questions, sub-analysis by age demonstrated that nurses favouring direct catheter removal were significantly younger than the group that preferred delayed removal ($p=.022$ and $p=.008$, Table 6.2). Similarly, the group of nurses that believed in direct removal had significantly less working experience on a gynaecological ward compared to the nurses preferring delayed removal ($p=.008$ and $p<.001$, Table 6.2). The age of the nurses and their working experience were directly correlated (person correlation 0.9, $p<.001$). Of note, an additional sub-analysis for these questions revealed no significant difference in the answers given by the nurses working in the LUMC where before the trial direct catheter removal policy was in place, compared to the nurses from the other hospitals.

Table 6.2: The opinion of nurses on timing of urinary catheter removal after LH

	Number (%)	Mean age ± SD (years)	p-value	Mean working experience on gynecologic ward ± (years)	p-value
Is direct removal feasible?					
Yes	100 (90.1)	35.4±12.6	.022	5.0±7.6	.008
No	11 (9.9)	44.7±12.8		12.4±14.9	
Recommendation to family					
Direct removal	87 (78.4)	34.4±12.3	.008	3.8±5.7	<.001
Delayed removal	21 (18.9)	42.7±13.7		11.7±14.2	
Other	3 (2.7)				
Age dependent	2 (1.8)				
Patient health	1 (0.9)				
Situations where it would be better not to remove the catheter directly					
In all cases direct removal is better	47 (42.3)	--	--	--	--
The level of activity of the service	5 (4.5)				
Patient with BMI >30	22 (19.8)				
Patient age >65 years	38 (34.2)				
Other	30 (27.0)				
Physical difficulties	15 (13.5)				
General well-being	8 (7.2)				
Epidural use	3 (2.7)				
Level of severity of the procedure	4 (3.6)				

BMI, Body Mass Index. Statistics: Independent T-test. Data are presented as mean ± standard deviation (SD) or as number (percentage).

A total of 42.3% of the nurses believed that direct removal was in all cases better, whereas 57.7% thought that in specific situations direct removal might be contra-indicated. Specific factors against direct removal were the age of the patient (>65 years) (34.2%); a BMI >30 (19.8%); physical difficulties (13.5%) or the general well-being of the patient (7.2%). Other mentioned criteria included the level of activity of the service (4.5%), the level of severity of the procedure (e.g. adhesions) (3.6%) and the use of an epidural as analgesic (2.7%).

Nurses reported that compared to delayed removal, direct removal was associated with advantages such as a decreased risk of urinary tract infections (75.7%), earlier post-operative mobilization (73.9%) and faster hospital discharge (58.6%) (Table 6.3). Regarding the risk of urinary retention, the opinion was divided: 45.9% reported that direct removal was associated with an increased risk, 28.8% thought the moment of catheter removal was not of influence on the risk of urinary retention and 25.2% said that direct removal

Table 6.3: Influence of timing of urinary catheter removal on several outcomes, according to the nurses

Influence of direct removal (compared with delayed removal)	No influence	Increases	Decreases
Risk of urinary tract infections	14 (12.6)	13 (11.7)	84 (75.7)
Risk of urinary retention	32 (28.8)	51 (45.9)	28 (25.2)
Post-operative pain	63 (56.8)	35 (31.5)	13 (11.7)
Workload of the nurses	58 (52.3)	43 (38.7)	10 (9.0)

Influence of direct removal (compared to delayed removal)	No influence	Later	Earlier	Too early
Mobility	20 (18.0)	7 (6.3)	82 (73.9)	2 (1.8)
Discharge	41 (36.9)	5 (4.5)	65 (58.6)	0 (0)

Data are presented as number (percentage).

decreased the risk. While the majority of the nurses reported that direct removal had no influence on postoperative pain (56.8%) or on their own workload (52.3%), more than one third thought that direct removal of the catheter did negatively affect these outcomes (31.5% and 38.7%). Nurses reporting that direct removal was associated with more workload had significantly more working experience (mean 8.8 (11.2) years versus 3.9 (6.5) years, p=.007) but were not significantly older than the nurses reporting no difference in workload (mean 38.6 (13.3) versus 34.7 (12.8), p=.142).

Finally, nurses estimated that overall 10.5% (12.6) of the women undergoing LH in their hospital will have urinary retention and that 9% (13.5) will get a urinary tract infection.

Discussion

Telephone consultation

The national overview of catheter management after LH presented in this study demonstrated that the majority of Dutch hospitals (78%) have the policy to leave the urinary catheter in place until the next morning. Despite the lack of evidence-based recommendations on this topic, it is interesting to observe that practice variation regarding catheter management was minimal in the Netherlands. This is in discordance with previous studies that showed that without a convenient standard of care, doctors are more prone to adopt their own medical practices that are based on personal experience.[13;14] How the hospitals guidelines on urinary catheterization were developed and by which evidence it was supported, is unclear though.

Reviewing the literature, only a few studies have been published on the best moment to remove urinary catheter after hysterectomy and most do not differentiate between the different types of approaches (open, vaginal and laparoscopic).[8;9;10;11] Despite the limited evidence, the available studies all favour direct catheter removal after the different types of hysterectomy as it was associated with a lower risk of urinary tract infections, a quicker mobilization and an earlier hospital discharge.[8;9;10;11] The only RCT that exclusively included 150 LHs concluded that women in the direct catheter removal group had a significant lower risk of urinary infection (4% versus 18%, p=.034).[11] Another RCT comparing direct versus delayed catheter removal, including 16 LHs, 43 vaginal hysterectomies and 37 abdominal ones, demonstrated a reduced mean ambulation time (p<.05), a shorter hospital stay of nearly 19 hours (36.5 hours versus 55.2 hours, p<.05) and a lower but non-significant risk for urinary tract infection (3.1% versus 15.6%, p=NS).[8] Though, in this study no specific sub-analysis was performed for the types of approach.

The most important argument against direct urinary catheter removal is the potential increased risk of urinary retention after surgery.[8;9;10;11] In the RCT by Liang et al. the rate of urinary retention after LH was 34% in the direct removal group compared to 12% in the group where catheter was removed the next day.[11] Ghezzi et al. demonstrated in their prospective study with 142 LHs, a urinary retention rate of 14% when directly removing catheter after the laparoscopic procedure.[15]

Catheter management after LH is an important topic to address in the field of minimally invasive gynaecology as in more and more hospitals throughout the world patients are being discharged on the same-day of surgery.[16] A recent systematic review on this topic observed that one of the factors associated with a successful same-day discharge was a reduced time before voiding following catheter removal.[17] Interestingly, the inability to void was never a reason of re-admission.[17] Assumptions can be made that voiding dysfunctions are in most cases detected during admission and that these patients are most probably not discharged on the same day. To start implementing same-day discharge after LH, an optimal and LH-specific catheter policy is essential. With this in mind, it is notable to mention that most hospitals in the Netherlands did not have a specific protocol for LH but rather used a general surgical protocol. By applying the policies of open surgery, the benefits associated with this minimally invasive approach might be undone. As such, we recommend a protocol specific for LH in every hospital regarding urinary catheter policy.

Nurse survey

In the second part of this study, the opinion of the nurses regarding catheter management was assessed. Assessing their opinion is valuable as nurses do not decided when to remove

the urinary catheter but they do closely monitor the patients in the postoperative period and have as a result much clinical experience on this topic. Furthermore, it seems relevant to study the attitude of the nurses when it comes to implementing (new) evidence-based recommendations on catheter removal.

Although the results of the randomized controlled trial are not yet available that compare direct versus delayed catheter removal after LH (MUCH trial), it seems that the nurses deemed clinical advantages with the direct removal regimen. From our survey, we observed that 90% of the surveyed nurses, all working on a gynaecological ward where both catheterization policies were in place due to the MUCH trial, indicated that direct removal was feasible (90%) and 78% would recommend it to a friend or family member.

Also, it was interesting to note that nurses' opinion on urinary retention and timing of catheter removal varied. Almost half of the nurses reported that direct removal was associated with an increased risk of urinary retention (45.9%) whereas the other half was convinced that that direct removal had no influence (25.2%) or even a decreased risk (28.8%) on voiding dysfunction. This variety in responses should also serve as a general reflection in terms of education on this topic. Indeed, there is currently sufficiently literature available demonstrating that direct catheter removal is not associated with a decreased risk of urinary retention.[9;15;18]

Regarding risk factors associated with voiding dysfunction after laparoscopic gynaecologic surgery, several studies have been published with varying results.[13;19] Although some characteristics such as diabetes and age have been appointed as risk factors after hysterectomy, a study demonstrated that it was for LH often unpredictable to determine which patient will develop urinary retention.[19] As a result, it remains challenging to select beforehand the low-risk patients. In our survey, a total of 57.7% of the nurses appointed specific criteria where direct removal of catheter might be contra-indicated, including (pre-operative) physical co-morbidities and complications.

Finally, the results of our survey also revealed that particularly the nurses with more experience, who appeared to be the older nurses, had a tendency to favour delayed removal. Possible explanations could be the fact that they have been working with this policy for years with good outcomes. Also, the possible increased workload associated with direct removal did seem to be influenced by experience, as shown in our sub-analysis. These findings are relevant to take into consideration when implementing catheter removal policies in the future.

Limitations

One of the limitations of our study was that for the telephonic consultation we did not collect the protocols of each hospital but rather asked over the phone what the catheterization management of that specific hospital was. Yet, as we interviewed the head nurses that were working according to these guidelines, we believe our findings are reliable. Furthermore, we did not explicitly evaluate if all surgeons within one hospital followed the same protocol. As a result, individual differences within one hospital may be present. In addition, these national data should be compared with caution to the data of the nurse survey as the latter was limited to six hospitals. Finally, as the MUCH trial was being conducted at the time of the survey, the opinion of the nurses might be influenced by it. On the other hand, it can also be considered as a strength that the nurses had the opportunity to work with both catheter policies. Other strengths of the study were the fact that we had a 100% response rate for our telephone consultation and that 81% of the nurses responded to our survey.

Conclusion

To conclude, most Dutch hospitals removed the urinary catheter one day after LH (78%). Of the survey nurses, 78% recommend direct removal. Although randomised trials are necessary to determine optimal catheterization management, our findings are helpful if a new urinary catheter policy has to be implemented.

References

(1) Aarts JW, Nieboer TE, Johnson N, Tavender E, Garry R, Mol BW, Kluivers KB. Surgical approach to hysterectomy for benign gynaecological disease. Cochrane Database Syst Rev 2015;CD003677.

(2) AAGL. AAGL position statement: route of hysterectomy to treat benign uterine disease. J Minim Invasive Gynecol 2011;18:1-3.

(3) AAGL. AAGL Practice Report: Practice guidelines for intraoperative cystoscopy in laparoscopic hysterectomy. J Minim Invasive Gynecol 2012;19:407-411.

(4) AAGL. AAGL practice report: practice guidelines for laparoscopic subtotal/supracervical hysterectomy (LSH). J Minim Invasive Gynecol 2014;21:9-16.

(5) NICE. Laparoscopic techniques for hysterecomty, interventional procedures guidinace. In: https://www.nice.org.uk/guidance/ipg239/resources/laparoscopic-techniques-for-hysterectomy-1899865344377797. 2007.

(6) NVOG. http://www.nvog.nl/sites/files/0000000075_baarmoederverwijdering_bij_goedaardige_aandoeningen.pdf. 2005.

(7) RCOG. https://www.rcog.org.uk/globalassets/documents/patients/patient-information-leaflets/recovering-well/laparoscopic-hysterectomy-for-print.pdf. 2015.

(8) Ahmed MR, Sayed Ahmed WA, Atwa KA, Metwally L. Timing of urinary catheter removal after uncomplicated total abdominal hysterectomy: a prospective randomized trial. Eur J Obstet Gynecol Reprod Biol 2014;176:60-63.

(9) Alessandri F, Mistrangelo E, Lijoi D, Ferrero S, Ragni N. A prospective, randomized trial comparing immediate versus delayed catheter removal following hysterectomy. Acta Obstet Gynecol Scand 2006;85:716-720.

(10) Liang CC, Lee CL, Chang TC, Chang YL, Wang CJ, Soong YK. Postoperative urinary outcomes in catheterized and non-catheterized patients undergoing laparoscopic-assisted vaginal hysterectomy--a randomized controlled trial. Int Urogynecol.J Pelvic Floor Dysfunct 2009;20:295-300.

(11) Hakvoort RA, Burger MP, Emanuel MH, Roovers JP. A nationwide survey to measure practice variation of catheterisation management in patients undergoing vaginal prolapse surgery. Int.Urogynecol.J Pelvic Floor Dysfunct 2009;20:813-818.

(12) Kandadai P, Saini J, Patterson D, O'Dell K, Flynn M. Urinary Retention After Hysterectomy and Postoperative Analgesic Use. Female Pelvic Med Reconstr Surg 2015;21:257-262.

(13) Mercuri M., Gafni A. Medical practice variations: what the literature tells us (or does not) about what are warranted and unwarranted variations. J Eval.Clin Pract 2011;17:671-677.

(14) Ghezzi F, Cromi A, Uccella S, Colombo G, Salvatore S, Tomera S, Bolis P. Immediate Foley removal after laparoscopic and vaginal hysterectomy: determinants of postoperative urinary retention. J Minim Invasive Gynecol 2007;14:706-711.

(15) Schiavone MB, Herzog TJ, Ananth CV, Wilde ET, Lewin SN, Burke WM, Lu YS, Neugut AI, Hershman DL, Wright JD. Feasibility and economic impact of same-day discharge for women who undergo laparoscopic hysterectomy. Am J Obstet Gynecol 2012;207:382-389.

(16) Korsholm M, Mogensen O, Jeppesen MM, Lysdal VK, Traen K, Jensen PT. Systematic review of same-day discharge after minimally invasive hysterectomy. Int J Gynaecol Obstet 2017;136:128-137.

(17) Zhang P, Hu WL, Cheng B, Cheng L, Xiong XK, Zeng YJ. A systematic review and meta-analysis comparing immediate and delayed catheter removal following uncomplicated hysterectomy. Int Urogynecol J 2015;26:665-674.

(18) Won HR, Maley P, Chetty N, Chan K, Abbott J. Bladder dysfunction after gynecologic laparoscopic surgery for benign disease. J Minim Invasive Gynecol 2012;19:76-80.