Comparison Study of Urinary Retention Incidence in Assisted Vaginal Delivery Case with and without 24-Hour Catheterization

Eighty Mardiyan Kurniawati[1], Hari Parathon[2], Suskhan Djusad[1], Fernandy Moegni[1], Junizaf[1], Budi Iman Santoso[1]

[1]Division of Urogynaeocology and Reconstruction, Department of Obstetrics and Gynaecology, Faculty of Medicine, Universitas Airlangga - Dr. Soetomo General Hospital, Surabaya 60131, Indonesia,
[2]Head of Division of Urogynaeocology and Reconstruction, Department of Obstetrics and Gynaecology, Faculty of Medicine, Universitas Indonesia -Dr.Cipto Mangunkusumo General Hospital, Jakarta 10430, Indonesia

Abstract

Background: Urinary retention is a condition commonly seen after vaginal delivery, especially in the high-risk cases, such as assisted vaginal delivery, grade 3-4th perineal rupture, or another high risk. Urinary retention caused by unsynchronized between the contraction of the bladder detrusor. Urinary catheterization is one of the preventions of urinary retention. It gives a time for perineal trauma to relieve and no longer edema, so that urethra can be fully relaxed. Therefore, 24-hour catheterization expected to prevent bladder overdistention. It also prevents the bladder from becoming atonia.

Objective: This research aims to study the incidence of urinary retention in assisted vaginal delivery with and without 24-hour catheterization.

Method: This study used randomized control trials that compared two groups with 24-hour catheterization and without 24-hour catheterization. This study was conducted on 40 women in each group who experienced assisted vaginal birth at Dr Soetomo Hospital, Indonesia.

Result: Six women (15%) experienced urinary retention with 24-hour catheterization and six women (15%) had urinary retention without catheterization. There was no significant difference in the incidence of urinary retention with 24-hour catheterization and without 24-hour catheterization (p-value = 1.00). Also, there was no significant interference of urinary retention in the normal and prolonged second stage of labor (p-value = 0.736), and there was no significant risk factor contributing to urinary retention.

Conclusion: No significant difference in urinary retention occurred in assisted vaginal delivery with and without 24-hour catheterization.

Keywords*: urinary retention, assisted vaginal delivery, catheterization.*

Corresponding author:
Eighty Mardiyan Kurniawati dr., Sp.OG-K
Department of Obstetrics and Gynaecology, Faculty of Medicine, Universitas Airlangga, Dr. Soetomo General Hospital, Surabaya 60131, Indonesia
Phone: +628113534449
Email: eighty-m-k (at) fk.unair.ac.id, eighty.mardiyan.kurniawati.unair@gmail.com

Introduction

Urinary retention is a condition commonly seen in post vaginal delivery[1–3]. This condition may become bladder overdistention and atrophy of bladder detrusor. If not treated immediately, this condition may become worse and increase into hospital stay [4,5]. If not treated properly, urinary retention will turn into acute urinary retention [6,7]. The variation incidence may occur due

to the broad definition of urinary retention. Urinary retention may be classified as overt and covert. Overt type is symptomatic, characterized by the inability to spontaneous micturition wheater covert is a type of asymptomatic while the patient cannot empty the bladder adequately so there is a little residual volume in the bladder. This classification often difficult to classified due to the difference in residual urine volume between 50-250 ml[8]. Urinary retention incidence also varied in some country. In Canada, according to Musselwhite, urinary retention incidence occurs in 4.7%. In Denmark, previous research report it only 0.7% in 2003[8]. Lim KJ report 6% case from 860 vaginal delivery in Korea[9] .

Glavind K and Bjork J report that 33% of women with assisted vaginal delivery experience urinary retention. Also, 17% of episiotomy may complicate urinary retention and 33% of anal sphincter rupture contribute and 33% use of epidural anesthesia may contribute as well to urinary retention. A significant risk contributed to assisted vaginal delivery and sphincter rupture[8]. In 2010, previous study reported 10.6% urinary retention case in India. An assisted vaginal delivery and longer stage of labor significantly contribute to urinary retention[10]. Another study also reports 0.2% of urinary retention. Primiparity, epidural anesthesia, assisted vaginal delivery, episiotomy, prolonged stage 1, and stage 2 labor significantly increase the risk of urinary retention. In 35 women who underwent assisted vaginal delivery, 16 of them experience urinary retention[11]. Carley stated that assisted vaginal surgery and epidural anesthesia are independent risk factors[12]. Yip stated urinary retention after labor may worry about the impact, even after 2-5 days of revocery[13].

Unidentified urinary retention may over distended bladder and need prolonged catheter use. The use of a 24-hour catheter in post vaginal delivery women with the risk factors of urinary retention is expected to prevent overdistention of the bladder. Catheters are also often used for Ventriculo Peritoneal (VP) bypass surgery, and the resulting complications are very rare[14]. At Dr Soetomo Hospital, Surabaya, there is no certain protocol to prevent urinary retention, including 24-hour catheterization in post vaginal delivery. Since assisted vaginal delivery significantly risks to cause urinary retention, this study aims to compare the incidence of urinary retention in assisted vaginal delivery with and without 24-hour catheterization.

Method

This randomized control trial study was conducted at Dr. Soetomo General Hospital Surabaya for nine months. All subjects were gathered by consecutive sampling. The study population divided into two groups with a random lottery. One group consisted of women who underwent assisted vaginal surgery, then were treated with 24-hour catheterization, the other group was without 24-hour catheterization. Each group used a female catheter no.12 to gather residual urine and to ensure there was no residual urine bladder. Analgesia with sodium diclofenac was administered to women with post assisted vaginal delivery.

In the group with 24-hour catheterization after 24 hours, the catheter use was discontinued then observed for 6 hours. The residual urine samples were collected and classified in urinary retention if the residual urine volume were 200 ml or more. The group without 24-hour catheterization was observed for 6 hours after labor. If a subject could not spontaneously urinate in 6 hours, She was then treated the same as the 24-hour catheterization group. The residual urine volume was calculated by ultrasonography using the Koelbl formula described in Figure 1. The statistical Analysis employed T unpaired test, Chi-square test, and the Mann-Whitney test. All analyses were conducted using SPSS.

Results

As 80 subjects met the inclusion criterion, all subjects had homogenous characteristics in age, newborn birth weight, parity, instrumentation during labor, episiotomy, and perineal rupture. In stage 2 labor. As many as 75% of the women in the control group and 50% of the women in the experimental group had a prolonged second stage. These women had experienced assisted vaginal surgery before. A chi-square test was used to compare both groups with significant test results (p-value = 0.021).

The urinary retention was classified if the residual urine volume was more than 200 ml. Statistical analysis using chi-square revealed that there were no significant differences between the two groups (p-value = 1.00), as displayed in Table 2. To identify whether there was the interference of the second stage of labor in urinary retention, a statistical analysis using the Fischer test was performed. The analysis revealed no significant difference between the two groups as shown in Table 3. These subject risk factors were present and could affect

the incidence of urinary retention. To identify whether there was an interference of risk factors, multivariate analysis was conducted as displayed in Table 4. The analysis revealed no significant risk factor contributing to urinary retention (p-value >0.05).

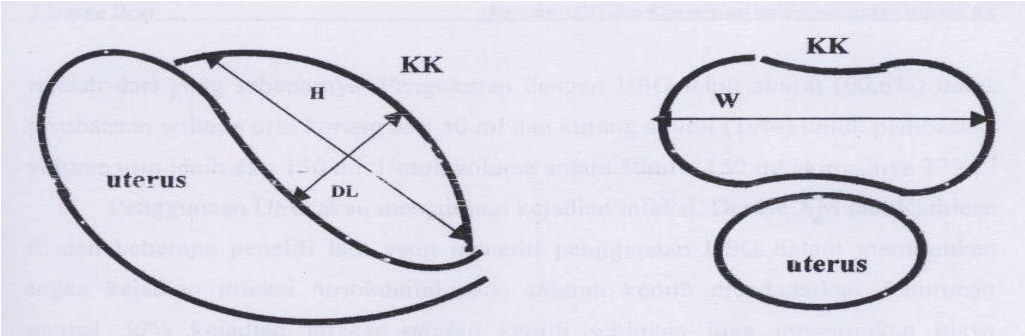

Figure 1. Koelbl formula, V= 0.7 (H x W x DL). H =*height*, highest superoinferior diameter, DL=*depth*, highest anteroposterior diameter, the height and depth are measured from sagital aspect. W= width, is the highest anterolateral diameter measured from the transversal aspect. KK= bladder [9].

Table 1. Subject Characteristics

Characteristic	Without 24-hour catheterization	With 24-hour catheterization	P-value
	(n=40)	(n=40)	
Age (Mean + sd)	27.42 + 6.06	28.85 + 6.51	0.314*
Birth weight (gram)	3177 + 361	3105 + 452	0.431*
Second stage of labor			
Prolonged	30 (75%)	20 (50%)	0.021**
Normal	10 (25%)	20 (50%)	
Parity			
Primiparity	20 (50%)	21(52.5%)	0.823**
Multiparity	20 (50%)	19(47.5%)	
Instrumentation			
Vaccum	37 (92.5%)	31 (77.5%)	0.060**
Forceps	3 (7.5%)	9 (22.5%)	
Episiotomy			
Yes	37 (92.5%)	37 (92.5%)	1.000***
No	3 (7.5%)	3 (7.5%)	
Perineal rupture			
Intact	2 (5.0%)	0 (0%)	0.198***
Grade 1-2	14(35.0%)	23(57.5%)	
Grade 3-4	24 (60%)	17(42.5%)	

*) T unpaired test **) Chi-square test ***) Mann Whitney test

Table 2. Incidence of urinary retention between two groups

Urinary retention	Without 24-hour catheterization	With 24-hour catheterization	Total	P-value
Yes	6 (15%)	6 (15%)	12 (15%)	1.000
No	34 (85%)	34 (85%)	68 (85%)	
Total	40 (100%)	40 (100%)	80 (100%)	

Table 3. Interference of the second stage of labor in urinary retention

Stage 2 of labor		Urinary retention (-)	Urinary retention (+)	Total	P-value (Fischer test)
Prolonged duration	Catheter(-)	24 (80%)	6 (20%)	30 (100%)	0.736
	Catheter(+)	15 (75%)	5 (25%)	20 (100%)	
	Total	39 (78%)	11 (22%)	50 (100%)	
Normal duration	Catheter (-)	10 (100%)	0 (0%)	10(100%)	1.000
	Catheter (+)	19 (95%)	1 (5%)	20 (100%)	
	Total	29 (96.7%)	1 (3.3%)	30 (100%)	

Table 4. Interference of subject risk factor in urinary retention.

	B	Odd ratio	P value	CI 95% (min-maks)
Age	-0.007	0.99	0.894	0.90-1.10
Birth weight	0.001	1.001	0.194	0.999-1.003
Second stage of labor	2.102	8.179	0.05	0.999-66.980
Parity	0.870	2.387	0.187	0.656-8.686
Episiotomy	1.163	3.200	0.211	0.517-19.820
Perineal rupture	-0.121	0.886	0.847	0.259-3.032

Discussion

These complex factors explained why there is no significant difference in urinary retention incidence between both groups. Therefore, 24-hour catheterization is expected to prevent bladder overdistention. It also prevents the bladder from becoming atonia. Traumatic factors such as the vulva or urethral injury cannot be eliminated. Nevertheless, the micturition requires coordination between detrusor muscle contraction and urethral relaxation. Subject characteristics in this study become known risk factors of urinary retention. Many studies report consistent risk factors for urinary retention. A previous study of a case-control study reported 52 cases of overt urinary retention in 860 postpartum women. Risk factors, such as perineal trauma and prolonged second stage, are significant in urinary retention [9].

In this study at Dr. Soetomo General Hospital, mediolateral episiotomy also contributed to risk factors compared to the subjects who do not undergo episiotomy (OR 3,2). Some study reported that assisted vaginal surgery is a significant risk factor for urinary retention. In this study, the researchers utilized 24-hour catheterization to prevent the weakening of detrusor muscle due to overdistention. In the group without 24-hour catheterization, a researcher found six subjects with urinary retention due to the inability to urinate in the first six hours or residual urine more than 200 ml, and 34 subjects could spontaneously urinate in six hours.

In the group with 24-hour catheterization, six subjects had urinary retention. One subject had symptom relief after first try intermittent catheterization,and five subjects were relieved after two times intermittent catheterization. Statistical analysis, t unpaired test revealed no significant difference between both groups. In this study, the second stage of labor was found as a confounding factor. In the group without 24-hour catheterization, the subjects with the prolonged second stage were greater than in the group with 24-hour catheterization. This factor was significant. To eliminate this factor, statistical analysis was conducted using the Fischer test. The result was there no significant interference of urinary retention in the group with 24-hour catheterization, where the subjects experienced a prolonged second stage or normal second stage of labor.

According to the previous study, urinary retention had occurred due to the neurological dysfunction, immobilization, trauma of the vulva, abnormality in bladder contraction, spasm of the external urethra due to perineal rupture [13]. In this study, all subjects were administered with mefenamic acid as analgesia. Risk factors such as the duration of the second stage of labor (OR 8.179), parity (2.387), and episiotomy procedure (3.200) contributed to urinary retention incidence, respectively.

Conclusion

There is no significant difference in urinary retention incidence in assisted vaginal delivery with and without 24-hour catheterization. However, this study requires more research with a bigger number of samples to determine the effect of 24-hour catheterization as prevention of urinary retention in assisted vaginal surgery.

Conflict of Interest: There is no conflict of interest

Source of Funding: All of the cost and fees related with this research are paid by the authors only with no sponsorship nor external funds.

Ethical Clearance: This research involves participants in the process using a questionnaire that was accordant with the ethical research principle based on the regulation of research ethic regulation. The present study was carried out in accordance with the research principles. This study implemented the basic principle ethics of respect, beneficence, non-maleficence, and justice.

References

1. Mulder FEM, Hakvoort RA, Schoffelmeer MA, Limpens J, Van der Post JAM, Roovers JPWR. Postpartum urinary retention: a systematic review of adverse effects and management. Int Urogynecol J [Internet]. 2014 Dec 20;25(12):1605–12. Available from: http://link.springer.com/10.1007/s00192-014-2418-6
2. Bouhours AC, Bigot P, Orsat M, Hoarau N, Descamps P, Fournié A, et al. Rétention vésicale du post-partum. Progrès en Urol [Internet]. 2011 Jan;21(1):11–7. Available from: https://linkinghub.elsevier.com/retrieve/pii/S1166708710002319
3. Dolezal P, Zahumensky J, Otapkova P, Papcun P, Krizko M. Covert postpartum urinary retention. Bratislava Med J [Internet]. 2019;120(09):673–5. Available from: http://www.elis.sk/index.php?page=shop.product_details&flypage=flypage.tpl&product_id=6348&category_id=146&option=com_virtuemart
4. Zaki MM, Pandhit M JS. Short Communication: National Survey for intrapartum and Postpartum Bladder Care: Assessing the need for guidelines. Int J Obstet Gynaecol. 2004;111:874–6.
5. Farkas B, Szakacs M. Female urethral dilatation (bougierung): a case report. J Med Case Rep [Internet]. 2018 Dec 19;12(1):382. Available from: https://jmedicalcasereports.biomedcentral.com/articles/10.1186/s13256-018-1900-z
6. Kurniasari D., Budiono, Tarmono, Hardjowijoto S. Predicts the successfulness of a trial voiding without catheter (Twoc) through urine retention volume, detrusor wall thickness (dwt) and intravesical protrusion of prostate (ipp) on acute

urinary retention (aur) patients due to benign prostatic hyperplasi. Indian J Public Heal Res Dev. 2019;10(4):1309–14.

7. Pifarotti P, Gargasole C, Folcini C, Gattei U, Nieddu E, Sofi G, et al. Acute post-partum urinary retention: analysis of risk factors, a case–control study. Arch Gynecol Obstet [Internet]. 2014 Jun 21;289(6):1249–53. Available from: http://link.springer.com/10.1007/s00404-014-3144-5
8. Glavind K BJ. Incidence and Treatment of Urinary Retention Postpartum. Int Urogynecol J. 2003;14:119–21.
9. Lim KJ, Lee M, Maan YJ, Kim SK BS. Postpartum Urinary Retention After Vaginal Delivery: Assesment of Contributing Factors. J Womens Med. 2009;2:147–50.
10. Kekre AN, Vijayanand S, Dasgupta R KN. Pospartum Urinary Retention After Vaginal Delivery. Int J Gynaecol Obs. 2011;112(2):112–5.
11. Teo R, Punter Jeanette, Abrams K, Mayne C TD. Clinically Overt Postpartum Urinary Retention After Vaginal Delivery: A Retrospective Case-Control Study. 2007;18:521–4.
12. Carley ME, Carley JM, Vasdev G, Lesnick TG, Webb MJ RK. Factors that are associated with Clinically Overt Post Partum Urinary Retention after Vaginal Delivery. Am J Obs Gynecol. 2002;187:430–3.
13. Yip SK, Sahota D, Pang MW CA. Post-Partum Urinary Retention. Acta Obs Gynecol Scand. 2004;83:881–91.
14. Asra Al Fauzi, Wihasto Suryaningtyas, Joni Wahyuhadi, M. Arifin Parenrengi, Agus Turchan, Maria C. Wijaya, Michael Jonatan, Mahyudanil HS. Upward migration and peroral extrusion of a peritoneal shunt catheter: Case report and review of the literature. Surg Neurol Int. 2017;8(1):178.
15. D L. Urine Retention. In: Indonesian Uroginecology Teaching Book. the & Santoso BI, editor. 2011. 133-134 p.