N. J. Obstet. Gynaecol Vol. 2, No. 1, p. 29 - 34 May - June 2007

A randomized controlled trial comparing short-term versus long-term catheterization after vaginal prolapse surgery

Nupur Thakur, Geeta Gurung, Ashma Rana
Dept of Obs/Gyn, TU Teaching Hospital

Abstract

Aim: To determine whether short term bladder catheterisation for 24 hrs after vaginal hysterectomy for prolapse would be more advantageous to routinely practiced 3 days catheterisation.

Method: Randomized comparative study was done as thesis topic in Gynaecological Ward of TU Teaching Hospital, Maharajgunj, Kathmandu from 30th October 2004 to 2nd November 2005. A total of 100 women were included in this study. Prior to surgery at OT table, and before giving prophylactic antibiotics urine samples were collected from metal catheter for routine analysis. They were randomized into two groups. In groups 1 (n=50) transurethral catheter was removed after 24 hrs of surgery. In group 2 (n=50) catheter was removed on 3rd post operative day. Urine culture was taken before removal of the catheter. Residual volume of urine after the first voiding was measured by transabdominal ultrasound. Recatheterisation for three more days was considered whenever residual volume exceeded 200ml.

Result: Recatheterisation was not needed in either groups for residual volume >200ml. Regarding recatheterisation 4 needed them after 2-3 hrs of first voiding. Among these 4 women, cause of urinary retention was accountable for pelvic haematoma leading to pelvic abscess in one case, which belonged to group 1 where as urinary tract infection was responsible for urinary retention in group 2. There were no explainable causes in two cases. But urinary tract infection was seen in two cases in group 1 and 11 cases in group 2 (P value 0.017).

Conclusion: This study has shown that short term catheterisation is more beneficial in terms of lower incidence of urinary tract infection (2 Vs 11) and related febrile morbidity as compared to long term catheterisation.

Key words: Uterovaginal prolapse, pelvic floor repair with vaginal hysterectomy, catheterisation.

Introduction

It is estimated that 15% to 25% of all the hospitalized patients have indwelling urethral catheters, mainly as an investigative purposes, to assist accurate measurement of urine output routinely after an operation, treat urinary retention or during acute illness.[1] And despite the use of aseptic techniques and closed sterile drainage bacteriuria has been reported in 10-27% of these catheterized patients,[2] which has been linked to length of the duration of indwelling urinary catheterization.[3] Seven out of 11 trials dealing with shorter postoperative duration of catheter versus longer duration, have shown fewer urinary tract infections when a catheter was removed earlier (for example 1 versus 3 days, RR 0.50, 95% CI 0.29 to 0.87).[4]

surprisingly most of the studies have been primarily confined to either transurethral or suprapubic catheter for surgeries other than pelvic floor repair with vaginal hysterectomy.[5] Bladder drainage adversely affects the post operative recovery in any gynaecological surgery because of the likelyhood of UTI observed more frequently in vaginal than abdominal hysterectomy in studied 2362 population, where suprapubic catheter was found to cause less urinary tract infection than the indwelling transurethral catheter.[6]

Correspondence
Dr Geeta Gurung FCPS
Dept of Obs/Gyn, TU Teaching Hospital
Email: gurunggeeta@hotmail.com

Findings from a smaller study including equal number of women, 50 in each group where the catheter was removed in the morning after or on the 5th postoperative day following anterior colporrhaphy, showed lesser percentage of residual volumes exceeding 200 ml and the need for recatheterisation 9% in prolonged catheterisation as compared to the early catheterisation group 40% (OR 0.15, 95% CI 0.045-0.47); but more with positive urine cultures 40% versus 4% (OR 15, 95% CI 3.2-68.6).[7]

Induced from this study result, we also felt the necessity to develop the best strategies for the removal of transurethral urinary catheters following gynecological prolapse surgery (pelvic floor repair and vaginal hysterectomy) and to determine whether a short-term indwelling urethral catheter would be more beneficial. Thus keeping in mind that our women having had already suffered from severe degrees of uterovaginal prolapse for a minimum of 10 years by the time they reach us do not suffer from urination post operatively.[8,9]

Method

Setting: Department of Obstetrics and Gynaecology, Institute of Medicine, Tribhuvan University Teaching Hospital, Kathmandu. **Duration:** 30th October 2004 to 2nd November 2005. **Study design:** Randomized, comparative clinical trial approved from research committee of the institute. **Sample Size:** 100 women were recruited for this study, 50 in each group. In group 1 (short term catheterisation group) a transurethral catheter was removed after 24 hrs. post operatively. In group 2 (long term catheterisation group) transurethral catheter was removed on 3rd post operative day. Women were randomly selected by the use of closed envelope at admission into either short term catheterisation group or long term catheterisation group. **Study population:** women operated for uterovaginal prolapse, excluding cases which already had UTI ($\geq$ 10 white blood cells per high power field and significant microscopic bacteriuria in the urine sediment in samples collected prior to surgery), requiring laparotomy for any reasons, sustained intraoperative bladder trauma requiring prolonged catheterisation and development of vesico-vaginal fistula postoperatively. **Preliminaries:** The purpose of the study and the procedure were explained to the patients whether they agreed or did not to participate in the study.

For Urinalysis, urine was collected by metal catheter preoperatively (at OT table) before giving prophylactic antibiotics. All patients undergoing vaginal hysterectomy with pelvic floor repair were given Metronidazole 2 gm stat intraoperatively, antibiotics ciprofloxacin 500 mg BD for 5 days as per protocol. Postoperatively all patients were randomly catheterised for 24 hrs (group 1) or 3 days (group 2). (e.g. If surgery was done at 4 p.m., catheter was removed next day at 4 p.m. in 24 hrs. group). Urine was sent for culture and sensitivity before catheter removal. All patients were informed to report after their first void following catheter removal for transabdominal ultrasound measurement of residual urinary volume. This was calculated as hypoechoic area of bladder, applying a formula –

$$\text{Residual volume (ml)} = \frac{\text{Width X Depth X Height}}{2}$$

Recatheterisation for 3 days was decided whenever the post voided residual urinary volume amounted to be > 200ml after removing catheter or for any causes of urinary retention. Urinary analysis and culture were clinically correlated in both the groups.

Results

Uterovaginal prolapse was seen in adolescent age group in two cases in group 1. In reproductive age group (18-49), it was almost equally seen in group 1 (33 women) and group 2 (32 women). Only two women had first appearance of uterovaginal prolapse at the age of 70 years and above. Age was $\geq$ 50 in 69 women, women of the reproductive age groups (WRAG) were 31. The mean age in group 1 and 2 were 55.56 ±9.48 and 54.48 ±10.49 respectively.

Duration of prolapse was more than 35 years in 6 cases, of which 3 were in each group; > 20-35 years 38% and > 10 -20 years in 32%. Rest was within 10 years. In group 1, forty-one women had parity > 4 and 36 women in group 2 had parity > 4. It showed that the high parity is one of aggravating factor for the uterovaginal prolapse. Nineteen women were seen to develop uterovaginal prolapse after they had attended menopause. Out of which 13 women had onset of prolapse within 1-5 years of menopause. Uterovaginal prolapse more than second degrees were seen in 84 cases. Severe degrees of uterovaginal prolapse were seen in 52 cases including third degree of uterovaginal prolapse and procidentia. Cystocele was present in all the cases of uterovaginal prolapse. Mean time of first voiding after removal of catheter was almost equal in both groups, i.e. 1 hr 33 min ± 1 hr 5 min in group 1 and 1 hr 38 min ± 42 min in group 2. Seventy eight percent women had 1-2 hrs first voiding time after removal of catheter. Duration of catheterisation did not affect the duration of first voiding time after removal of catheter. (Table 1)

None of the women had residual volume of urine >200 ml in both group. (Table 2) Thirty nine women (78%) in group 1 had residual volume of urine < 50 ml. whereas only 8 women (16%) had the same residual urinary volume in group 2. Eleven women (22%) had residual volume of 50-200ml in group 1, similarly forty-two women (84%) in group 2. Mean ± SD of the residual

Table 1. Residual volume of urine after the first voiding in both study groups

1st. voiding time after removal of catheter (hrs.)	Gr. 1 (24hrs.) (n = 50)	Gr. 2 (3 days) (n= 50)	p value
< 1	9 (18)	3(6)	
1 – 2	35 (70)	43 (86)	
> 2 -3	3 (6)	3 (6)	
> 3 – 4	2 (4)	1 (2)	0.27
> 4 – 5	0	0	
> 5 – 6	1 (2)	0	
Mean ± SD	1 hr 33 min ± 1 hr 5 min	1 hr 38 min ± 42 min	

Table 2. Residual volume of urine after the first voiding in both study groups

Residual vol. of urine (ml)	Gr. 1 (24 hr) (n= 50) No. (%)	Gr. 2 (3 days) (n= 50) No. (%)	Total	p value
< 50	39 (78.0)	8 (16.0)	47	< 0.0001
50 – 200	11 (22.0)	42 (84.0)	53	< 0.001
> 200	0 (0%)	0 (0%)	00	–
Mean± SD	38.40±22.04	56.66±15.17		0.0001

Table 3. Recatheterisation for urinary retention after the 1st void with normal residual volume in both study groups

	No. of patients (Recath.)	Residual Volume	Timing of recathete-risation (after1st voiding)	Amount of urine drained at the time of recath.	Probable Cause ofretention	Rx apart from 3> days of recath.	P value
Gr.1(24 hr.)		30 ml.	3 hrs.	600ml.	No	-	
(n = 50)		140ml	2 hrs.	800ml.	No	-	
No.(%)	3(6.0%)	80ml	2 hrs.	700ml.	vaginal cuff abscess	USG guided drainage of abscess	0.617
Gr.2 (3 days) (n = 50) No.(%)	1(2.0%)	50 ml	3 hrs.	600 ml	UTI +ve on day 3rd culture E. coli, detected	Anti-biotics	

Table 4a. Urinary tract infection in both study groups

Urinary tract infection	Gr. 1 (24hrs.) N=50 No. (%)	Gr. 2 (3 days) N=50 No. (%)	Total N=100	p value
Negative	48 (96.0)	39 (78.0)	87	0.017
Positive	2 (4.0)	11 (22.0)	13	
Symptoms of UTI in positive cases	0	5 (on day 3)		

Table 4b. Causative organism of UTI in both study groups

Groups and Culture positivity	E. coli	Klebsiella pneumoniae	Staphylococcus aureus	Total	p value
Gr. 1 (24hrs.) (n=50)No.	1	1	0	2	
Gr. 2 (3 days) (n= 50)No.	8	1	2	11	0.312
Total	9	2	2	13	

volume is significant and was found to be 38.40 ± 22.04 and 56.66 ± 15.17 in group one and two with significant values.

Duration of recatheterisation was four days (Gr.1) and 6 days (Gr.2). None required more than one repeat recatheterisation.

Recatheterisation was needed for total four women; in 3 (6%) in group 1 within 2-3 hrs after 1st of voiding without any evidences of UTI. (Table 3) Urine microscopic examination in these 3 cases was within 5/ HPF (1-2 in 2 cases, 4-5 in 3rd case). Urinary residual volume had been 30ml, 140ml and 80 ml respectively in all these three cases after their first void. Amount of urine drained at the time of recatheterisation was 600 ml, 800 ml and 700 ml respectively. In first 2 cases of recatheterisation, there was no probable whereas it was attributable to hematoma resolving into pelvic abscess in 3rd. In group 2, one woman (2%) required recatheterisation after 3 hrs of the 1st voiding and 600 ml of urine was drained at the time of recatheterisation. There was evidence of UTI in this particular case. Routine urine examination showed plenty of WBC and culture positive of E-coli. Preoperative OT sample had 3-4 WBC. Only one case in group 2 had plenty of pus cells and demonstrable albuminuria and culture positivity showing E coli infection (Table 4b). Urine sample collected just before removing the catheter showed E. coli infection in 9 cases and 8 of them were Grp 2. Klebsiella pneumoniae were detected in two cases one in each group. Whereas 2 women had staphylococcus in Grp 2, showing positive culture in 11 cases in Grp 2 versus 2 in Grp 1. This result shows that the incidence of urinary tract infection in group 1 was significantly lesser than in group 2 (2 versus 11) having a very significant P value. Symptoms of urinary frequency were seen only in five cases, which is very important finding. Mean duration of hospital stays in group 1 was 7.42 days and in group 2 was 7.96 days which was almost equal.

Discussion

Complications related to vaginal prolapse surgery are mainly intraoperative. Bleeding from the retracted uterine artery need laparotomy.[10] Laparotomy has been also needed in a case of bowel injury.[11] While bladder injuries have been dealt vaginally there and then except some of them that were missed have resulted into vesicovaginal fistula in very small number of cases.[8, 12] Apart from these there are vault and para renal hematoma described.[13-16] A case of broad ligament hematoma has been caused merely from vaginal packing.[16] Others are remote complications.[17,18] But routine complications like UTI have not found adequate attention in gynecological surgery. So this study aims to find a way to reduce such infection by shortening the duration of catheterization.

In both the groups mean time taken for first voiding after removal of catheter was almost equal, 1 hr 33 min for 24 hrs catheterisation and 1 hr 38 min for 3 days catheterisation. This indicated that the duration of

catheterisation did not affect the first voiding time after the removal of catheter. This is due to early voiding tendency due to bladder and urethral irritation. Maximum time taken for first voiding was 6 hrs and 4 hrs in Group 1 and 2 respectively. There are scarcities of literature regarding the post operative bladder evacuation following prolapse surgery.

The residual urinary volume (RUV) after the first void can be taken as a functional bladder parameter and the values <200ml are urologically placed as normal. This was <50 ml (78%: 6%) ; 50-200ml (22%: 82%) in Group 1 and 2 with statistical significance (p value <0.0001, <0.001). RUV is an important investigation in the management of voiding dysfunction. The gold standard for the measurement is invariably emptying the bladder by catheterisation, which is more invasive having risk of acquiring bacteriuria even after a single catheterisation, which varies between 2 -15%. Hence RUV was assessed by USG; which besides being non invasive was free of cost for academic purpose. Accuracy of USG assessment of residual volume has been published from Singapore (Tan Tock Seng Hospital) where observed mean absolute error of scanner was 52 ml. An error of 24 ml and 36 ml has been accepted for each 100ml and 200ml RUV respectively.[19] Scandinavian study showed the difference between the USG and catheter volume measurement was 21.5ml.[20] None of the women in our study needed immediate recatheterisation after the first void, as the RUV was never >200ml. While some study have shown immediate requirement of recatheterisation RUV >200ml in 40% of cases in 24 hrs catheterisation group, which is alarmingly high and 9% in 5 days of catheterisation.[7] The same study also recognized prolong catheterisation to build up of better bladder function. Whereas all the 100 women in our study did have a good physiological bladder though more than half (52%) had severe degree of prolapse However, there were few cases (4) of urinary retention following catheter removal. Two had explainable causes: pelvic haematoma progressing to abscess (Grp 1), UTI (Grp2). Two did not have explainable cause, which can be presumed to be due to bladder neck irritation and edema caused by Foleys catheter balloon. All these 4 when traced had normal RUV who needed recatheterisation within 2-3 hrs of the first void; urinary volume ranging from 600ml- 800ml. In one case UTI was responsible for retention which fell in Group 2 but the other was due to cuff haematoma. Catheterisation was needed in 5 /125 when catheter was not used at all after the vaginal hysterectomy in 3 or removed after 24 hrs 20 .[20] According to similar study conducted in Nepal only 5/ 257 developed urinary retention after removal in 24 hours and mainly from UTI.[21] Similarly 9% (In 5 days Grp) and 40% women in (24 hrs) group did require recatheterization; mean duration of catheterisation was significantly shorter (P <0.001) in short term compared to long term catheterisation group.[7]

It is understood that there is a slight increased chance of UTI with every catheterisation or whenever the catheter is placed for more days. UTI was predominantly found in 11 (22%) in 3 days catheterisation Group 2 (P value being significant (0.017) versus 2 women (4%) in Group 1 with similar observation in short term catheterisation (4% VS 40%) from others.[7] But the UTI was tremendously higher (40%) because of 5 days duration of catheterisation. One day catheterisation again was responsible for 4% UTI as against 20% of patients who were catheterised for 3 days.[21] Long duration of the catheterisation did have inherent problem of UTI alike our study findings.

Conclusion

This study has shown that short term catheterisation is more beneficial in terms of lower incidence of urinary tract infection and related co-morbidity as compared to long term catheterisation.

References

1. Griffiths R, Fernandez R. Cochrane Database Syst Rev. Policies for the removal of short-term indwelling urethral catheters 2005; 25 (1): CD004011.

2. Niel-Weise BS, Van D Broek PJ. Urinary catheter policies for short term bladder drainage in adults. Cochrane Database Syst Rev. 2005; (3):CD004203.

3. Wiley MJ, Tran TA. Perioperative urinary catheterisation in conjunction with epidural anaesthesia for hip and knee surgery. Int J Surg Investig 1999; 1(2):157-60.

4. Phipps S, Lim YN, McClinton S, Barry C, Rane AN. Dow J. Short term urinary catheter policies following urogenital surgery in adults. Cochrane Database Syst Rev. 2006; 19(2):CD004374.

5. Becker R, Moltz L. Advantages and disadvantages of transurethral and suprapubic urinary drainage following gynecologic operations. Geburtshilfe Frauenheilkd 1984; 44(9): 587-90.

6. Hagel C, Loskant G. Experience with bladder drainage following gynecologic operations. Geburtshilfe Frauenheilkd. 1990; 50(10):794-7.

7. Hakvoort RA, Elberink R, Vollebregt A, Ploeg T, Emanuel MH. How long urinary bladder catheterisation should be continued after vaginal prolapse surgery? A randomised controlled trial comparing short term versus long term

catheterisation after vaginal prolapse surgery. Comment in: BJOG. 2005; 112(3):386; author reply 386-7. Evid Based Nurs. 2005; 8(2):54.

8. Rana A, Gurung G, Pradhan N, Manandhar B. and Giri K. Prolapse & Problem. Journal of the Society of Surgeons of Nepal, 2001; 4:32-37.

9. Gurung G, Rana A, Pradhan N, Singh M, Manandhar B, Giri K. et al. 53rd Annual Congress of The Japan Society of Obstetrics and Gynecology. ACOG-JSOG, Sapporo, Japan. May 12-15, 2001, Ref. code 20010512C, ISBN: 88,323-1514-4.

10. Draca P. Complications following vaginal hysterectomy. Jugosl Ginekol Opstet. 1976; 16(2):105-13.

11. Rana A, Manandhar B, Giri K, Vaiday P, Khakurel MP. Bowel injury at vaginal hysterectomy. Gynaecology and Obstretical Health letter. 2003; 9: 6-7.

12. Rana A, Singh M, Gurung G, Pradhan N. Uterovaginal prolapse as a gynaecological morbidity in T.U.Teaching Hospital. International Journal of Gynaecology and Obstetrics. 2000; 70(2):B68.

13. Rana A, Jha R, Singh KP. Haemorrhage following vaginal hysterectomy (A case report) Follice 1998;I3 (2): 14-16.

14. Malinowski A, Molas JMaciolek-Blewniewska G, Cieslak J The modification in surgical technique of incision and closure vault of the vagina during vaginal hysterectomy on the incidence of vault haematoma. Ginekol Pol. 2006; 77(2):117-25.

15. Lev-Gur M, Patel S, Greston WM, McGill F. Pararenal hematoma as a complication of vaginal hysterectomy. J Reprod Med. 1987; 32(1):68-71.

16. Parulekar SV. Post hysterectomy broad ligament haematoma: A complication of vaginal packing. POST J Postgrad Med. 1989; 35(1):51-3.

17. Verity L, Bombieri L. Vaginal evisceration, small bowel prolapse and acute obstruction as a late complication of sacrospinous suspension. Int Urogynecol J Pelvic Floor Dysfunct. 2005; 16(1):77-8.

18. Fan QB, Liu ZF, Lang JHSun DW, Leng JH, Zhu L, Ning L. Fallopian tubes prolapse following vaginal hysterectomy. Chin Med Sci J. 2006;21(1):20-3

19. 48. Ding YY, Sahadevan S, Pang WS, Choo PW. Clinical utility of a portable ultrasound scanner in the measurement of residual urine volume. Singapore Med J. 1996; 37(4): 365-68.

20. 37 Dunn TS, Sholay J, Forshner D. Are in-dwelling catheters necessary for 24 hours after hysterectomy? Am J Obstet Gynaecol. 2003; 189(2): 435-37.

21. Pant PR. An effective short duration postoperative catheterisation after vaginal hysterectomy and pelvic floor repair. JIOM. 2006; 28 (1): 33-35.

22. Alonzo-Sosa JE, Flores-Contreras JT, Paredes-Canul M. Method for transurethral catheterisation for 1-3 days for pelvic floor relaxation in the post operative period. Ginecol Obstet Mex.1997; 65: 455-57.