

Indwelling Catheterization in Caesarean Section: Time To Retire It!

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ABSTRACT

Background: Routine placement of indwelling catheter preoperatively in Caesarean Section is being practiced without justified scientific evidence.

Aim: To evaluate the effect of routine indwelling catheterization on the postoperative ambulation, morbidity and hospital stay in women undergoing Caesarean section.

Settings and Design: Case-Control study carried in a tertiary teaching hospital.

Materials and Methods: This study was carried over 150 women undergoing primary Caesarean section without any medical complication or pre-existing Urinary Tract Infections (UTI). The subjects were randomly allocated to 2 groups i.e. Group 1 (Non-Catheterized; NC) and Group 2 (Catheterized for 24 hours postoperatively; C).

Parameters noted were; duration of surgery, time of ambulation, postoperative voiding discomfort {graded as - no, mild, moderate-severe, by Visual Analog Scoring (VAS)}, incidence of UTI, postoperative urinary retention, need of postoperative antibiotics and duration of hospital stay.

Statistical Analysis: Results were analysed using unpaired t-test.

Results: There was no significant difference in duration of surgery and postoperative urinary retention in both groups. However, it was seen that non-catheterized patients had significantly earlier ambulation, shorter hospital stay, took less time for first voiding, lesser voiding discomfort, less incidence of UTI and lesser use of postoperative antibiotics.

Conclusion: The routine use of indwelling catheter in Caesarean section is unscientific and unnecessary. There should be selective rather than routine catheterization.

Keywords: Nosocomial infections, Urinary tract infection, Voiding discomfort

INTRODUCTION

Catheter Associated Urinary Tract Infection (CAUTI) is one of the most common nosocomial infections accounting for up to 40% of all hospital acquired infections [1]. Eighty percent of these are associated with the use of urinary catheters [2]. Risk of infection is about 5-10% with each day of indwelling catheterization [3,4] and 1-3% with each insertion in intermittent catheterization. Infection reaches bladder via two routes. Either access is gained intraluminally by entering the catheter system at catheter collecting tube junction or patient's own gut flora may colonize the periurethral area and reach bladder via external surface of catheter, females being more prone due to close anatomic proximity. The rate of Caesarean Section has seen a soar in the past few decades, varying from 0.4% to as high as 41.9% across the world [5]. The reported rates of caesarean section are 3.3% in Africa, 33.7% in Latin America, 27.3% in Asia and 40.5% in China with an average of 15.9% [5-7].

Each surgery requires a certain set of preoperative preparation. One of such preoperative preparation practice done routinely without proper evidence is the placement of indwelling urinary catheter prior to cesarean section. The reasons cited are, better bladder exposure during surgery, decreased risk of intraoperative injury to the urinary system [8], urinary output assessment and prevention of postoperative urinary retention [8,9]. But this practice imposes the cost of urinary catheters, urine bags and antimicrobial therapy for UTI, besides patient's discomfort and delayed ambulation. Furthermore in the current scenario, need to assess the cost-effectiveness of health care delivery services is increasingly and particularly important in developing countries like India.

The catheter is usually removed immediately after surgery or 12-24 hours or more post- surgery. This practice has been associated with urinary tract infections [10,11]. Indwelling catheterization may

lead to urinary colonization leading to spectrum from asymptomatic bacteriuria to symptomatic Catheter Associated UTI (CAUTI). Asymptomatic bacteriuria or asymptomatic urinary infection has been defined as "isolation of a specific quantitative bacterial count in an appropriately sampled urine specimen obtained from a person without symptoms or signs of urinary infection" [12]. Symptomatology of acute Urinary Tract Infection includes urgency, frequency, dysuria, pelvic or flank pain and fever [13]. Besides these morbidities, it can lead to potentially serious complications like pyelonephritis, renal failure, dyselectrolytemia, septicemic shock, and respiratory distress. This study was carried out with the aim to evaluate the feasibility and benefits of carrying out primary caesarean deliveries without routine indwelling urinary catheterization.

MATERIALS AND METHODS

This was a prospective case control study done at a tertiary care centre over 2 months period from 1st June to 31st July, 2012. One hundred and fifty haemodynamically stable women (75 assigned to each group) without any medical or surgical complication undergoing emergency or elective primary caesarean section were randomly selected by use of table of random numbers and allocated to two groups;

Group 1: Non- Catheterized (NC),

Group 2: Catheterized for 24 hours postoperatively (C).

Both groups were comparable in terms of age, parity, indication for cesarean section, type of caesarean section, anaesthesia and same operating surgeon.

Exclusion criteria: 1) Associated medical problem (e.g. Pregnancy Induced Hypertension or chronic hypertension, Gestational Diabetes Mellitus or Overt Diabetes Mellitus, Renal Disease etc. 2). Surgical complication or previous Caesarean section. 3) Rupture of

membranes > 4 hours. 4) Pre-existing UTI. All patients received a single dose of antibiotic ampicillin one gram intravenously (after test dose) after clamping of the cord.

Parameters noted were duration of surgery (minutes), time of ambulation after surgery (hours), duration of hospital stay (days), need of postoperative antibiotics, postoperative urinary retention, discomfort at first voiding, level of discomfort at first voiding and time of first voiding.

UTI was evidenced by urine microscopy and culture and sensitivity done in urine sample at the end of 24 hours postoperatively in both groups.

Caesarean section was done under spinal anaesthesia by same anaesthetist. Operative procedure was performed by conventional manner by the same surgeon in all cases. The time of onset of surgery (administration of spinal anaesthesia) was designated as zero hour. The duration of surgery was defined as interval between the onset of surgery till completion of skin closure, measured by standard clock in OT. In the postoperative period, patient were monitored closely, given nothing per orally for 6 hours post-surgery and received diclofenac for analgesia (intravenous) for first 24 hours, oral thereafter. The duration of hospital stay was defined as the time from onset of surgery to the hospital discharge. Discomfort at first voiding was defined as burning, urging and difficulty at voiding. For the assessment of the level of discomfort the Visual Analog Scoring (VAS) (Numerical Rating Scale from 0-10) was shown to each subject to guide them in their pain assessment [14]. Numeric Rating Scale is a numeric version of VAS where the subject chooses a number from 1 to 10, that best describes his pain intensity [14]. According to the score, three categories were divided

No discomfort (VAS=0)

Mild discomfort (VAS=1-3)

Moderate to Severe discomfort (VAS=4-10)

The time of first voiding was defined into two ways; First (Ta), as the time interval between removal of urinary catheter and first spontaneous voiding. Second (Tb), as the time interval from the onset of surgery and first spontaneous voiding.

The time of first ambulation was defined as interval between onset of surgery and the time patient first ambulated. Method of voiding was noted in the form of use of bedpan or bathroom.

Febrile morbidity due to UTI and postoperative urinary retention was also noted.

Urine of all patients was sampled immediately before and 24 hours post-surgery and subjected to routine and microscopy examination and culture and sensitivity. Those, whose culture report was positive received antibiotics, accordingly.

The factors considered for discharge were as follows; return of bowel function (documented by bowel sounds and passage of flatus), acceptance of oral feeds, afebrile for 24 hours and shifted on oral medication.

Results were compared and analysed using unpaired student t-test. EXCEL and Spss 10.0 Software used.

RESULTS

A total of 150 women were enrolled in the study, 75 were assigned to each group. The type of Caesarean Section (Lower Segment Caesarean Section), type of anaesthesia (spinal anaesthesia) and the anaesthetist as well as operating surgeon were same in all cases.

[Table/Fig-1] shows that there was no significant difference between the NC and C groups in terms of duration of surgery. However, the patients in NC group initiated ambulation in 7.42±1.38 hours post-surgery as compared to 27.17±1.73 hours in group 2 (p<0.001, significant). As compared to patients in NC group whose hospital stay was of 3.99 ±1.28 days, patients in C group had significantly

longer hospital stay of 5.2±2.43 days (p<0.001, significant). Although postoperative urinary retention was seen in one patient of NC group but this was statistically non-significant (p=0.285). UTI was seen in 29.3% cases of C group as compared to 4% in NC group which is statistically significant. UTI with febrile morbidity was seen in 17.33% cases of C group as compared to nil in NC group which is statistically significant. Time of first spontaneous void had conflicting results. Time of first spontaneous void was analysed in two ways. Based on the time of first voiding from onset of surgery (Tb), patient in NC group took 6.5±0.82 hours versus 26.11±0.953 hours taken by C group. Conversely, if the time interval was taken after catheter removal till first voiding (Ta), the C group patients took significantly lesser time i.e. 2.163±0.88 hours versus 6.486±0.82 hours in NC group.

[Table/Fig-2] depicts the number of patients who experienced discomfort and the level of discomfort which was assessed by VAS Scoring. It shows that 39 (52%) patient of NC group experienced pain of which 33/39 (84.6%) had mild discomfort and 6/39 (15.4%) had moderate to severe discomfort while in C group 64/75(85.3%) patients experienced pain which is significantly more than in NC group. Out of 64, 26/64 (40.6%) had mild pain while 38/64 (59.4%) had moderate to severe pain which was statistically significant.

[Table/Fig-3] shows that 68/75 (90.7%) patients did not require postoperative antibiotics in NC group as compared to 49/75 (65.3%) in C group. Thus there was significantly lesser use of postoperative antibiotics in NC group. Similarly postoperative antibiotic use for UTI was seen in significantly higher number of patient i.e. 29.3% (22/75) in C group.

Parameters	Group 1 (non catheterized; NC) n=75	Group 2 (Catheterized for 24 hours; C) n=75	Level of significance (p-value*)	
Duration of surgery(minutes)	44.5±7.6	46.2±6.9	p=0.1529	NS
Time of ambulation(hours)	7.42±1.38	27.17±1.73	p<0.001	S
Hospital stay duration(days)	3.99±1.28	5.2±2.43	p<0.001	S
Urinary retention	1	NIL	p=0.285	NS
Time of first voiding(Ta)(hours)	6.5±0.82	2.163±0.885	p<0.005	S
Time of first voiding(Tb)(hours)	6.5±0.82	26.11±0.953	p<0.005	S
UTI(positive urine culture)	3(4%)	22(29.3%)	p<0.005	S
UTI(with febrile morbidity)	NIL	13(17.33%)	p<0.005	S

[Table/Fig-1]: Parameters compared in both groups

NS=non significant

S=significant

*p value by unpaired t test

S.No.	Patient details	Group 1 (non catheterized; NC) n=75	Group 2 (catheterized for 24 hours; C) n=75	p-value
1.	Patients who had no voiding discomfort	36(48%)	11(14.7%)	<0.001*
2.	Patients with discomfort at first voiding	39(52%)	64(85.3%)	<0.001*
VAS Score				
3.	Mild	33(84.6%)	26(40.6%)	<0.001*
4.	Moderate-Severe	6(15.4%)	38(59.4%)	<0.001*

[Table/Fig-2]: Level of discomfort at first voiding

*p<0.001 significant

S.No.	Reasons of postoperative antibiotic use	Group 1 (non catheterized; NC) n=75	Group 2 (catheterized for 24 hours; C) n=75	p-value
1.	Nil	68(90.7%)	49(65.4%)	<0.001*
2.	UTI	3(4%)	22(29.3%)	<0.001*
3.	Other than UTI	4(5.3%)	4(5.3%)	0.383

[Table/Fig-3]: Use of postoperative antibiotics
*p<0.001 significant

DISCUSSION

The present study confirmed the merits of non-catheterization during cesarean section over the use of catheter. There were a few studies done with the same objectives, the outcome have been comparable and have shown significant results. There was no significant difference in duration of surgery in both groups as the patient selected underwent primary caesarean section and all sections were done by same surgeon. Senanayake H et al., [11] also concluded that Caesarean section without urethral catheterization doesn't compromise the safety and ease of surgery and reduces the risk of UTI as well. The patients in NC group initiated ambulation significantly earlier. This was due to physical restraints in moving freely with the indwelling catheter because of pain and fear of accidental expulsion [9]. Thus, non-use of urinary catheters was associated with less time until ambulation which was in coherence with Ghorieshi et al., [8] and Nasr et al., [10]. The hospital stay was also shorter in NC group. The catheterized group had longer hospital stay owing to postoperative urinary tract infections and fever. Factors such as financial restraints for pharmacy as well as nursery clearance were already not considered as factors for discharge. Similar results were seen in studies by Ghorieshi et al., Senanayake et al., and Arlyn E et al., where the reasons of prolong hospital stay were postoperative morbidities due to catheter use [8,11,12].

Beyond the health and financial burden of inappropriate catheter use is the substantial patient discomfort caused by catheter. The discomfort at first voiding was experienced by 85.3% in C group with 50.7% experiencing moderate-severe discomfort while majority (44%) of patients in NC group experienced only mild discomfort. Azar Kish et al., demonstrated that removal of foley's catheter is effective in reduction of pain after caesarean section [13]. Discomfort at first voiding was seen in 83% of catheterized patients by Arlyn et al., of which 28% had severe discomfort [12].

The urethral catheter as a cause of UTI in pregnancy and puerperium has been well established [15]. Bacteriuria in pregnancy has been associated with abortion, preterm labour, hypertension, anaemia and even pyelonephritis. The problem of bacteriuria associated with indwelling urethral catheterization in the postoperative period has been found to be an important cause of hospital-acquired urinary tract infection [1]. Thus keeping these immediate and remote complications with catheter use leading to UTI, use of prophylactic catheterization is completely unjustified.

UTI was seen in 29.3% in C group, which was significantly more ($p<0.05$). Likewise febrile morbidity was seen in significantly lower number in NC group. The UTI and fever led to longer hospital stay and the use of postoperative antibiotics. UTI was the main reason for the use of postoperative antibiotics in C group. UTIs have been demonstrated with the use of indwelling catheter by Onile et al., and Tangtrakul S et al., [16,17]. Onile et al., compared immediate postoperative removal of urethral catheter versus indwelling catheter in elective Caesarean section and found lower risk of UTI with immediate removal. This was in slight contrast to the methodology of our study where we compared non-catheterization versus catheterization.

One important rationale of bladder catheterization has been the avoidance of postoperative urinary retention but in the present study this was observed only in one patient in NC. Other studies have reported much higher rate of retention from 3.3 to 39.2%

[18]. Tangtrakul S et al., compared intermittent and indwelling catheterization in Caesarean Section cases and found that higher number of patients with intermittent catheterization developed retention as compared to indwelling one. Low urinary retention rate in present study was probably the result of adequate analgesia and early ambulation. Thus, we suggest that in anticipation of development of postoperative urinary retention in a patient undergoing cesarean section, indwelling catheterization should not be used as a prophylactic measure; as such practice will only lead to rise in morbidities and unjustified and futile use of hospital consumables.

This study also demonstrated that the longer time the patient took to ambulate, the higher was the degree of discomfort. The degree of discomfort was more for bed pan users probably due to unaccustomed position.

Time of first spontaneous void had conflicting results. Time of first spontaneous void was analysed in two ways. Based on the time of first voiding from onset of surgery (Tb), patient in group 1 took 6.5 ± 0.82 hours versus 26.11 ± 0.9526 hours taken by group 2. This is explained by fact that group 1 patients were already non catheterized, thus initiated voiding earlier.

Conversely, if the time interval was taken after catheter removal till first voiding (Ta), the group 2 patients took significantly lesser time i.e. 2.163 ± 0.885 hours versus 6.5 ± 0.82 hours in group 1. This can be due to the fact that noncatheterized patient were under the effect of spinal anaesthesia for atleast 2-4 hours.

In summary, non-placement of an indwelling urinary catheter is associated with a reduced incidence of Urinary tract Infections, less discomfort at first voiding, early ambulation, shorter hospital stay and reduced cost of health care delivery services. In cases where indwelling catheterization is required, aseptic catheter insertion technique, closed drainage maintenance, avoidance of prolonged catheterization and proper catheter care can decrease the risk of acquiring UTI.

CONCLUSION

Routine placement of indwelling urinary catheters for caesarean delivery in haemodynamically stable patients is not necessary and can be harmful. Moreover the women needing catheterization should be selectively chosen. Thus it should be "Selective Catheterization" rather than "Catheterization for All". However, in order to have better evaluation of rate of postoperative re-catheterization, larger sample size needs to be studied. Patients with previous uncomplicated Caesarean Section can also be recruited for the study.

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