



OUTCOME OF CAESAREAN DELIVERY WITHOUT URETHRAL CATHETERIZATION

Obstetrics & Gynaecology

Dr Amreen Taz N Post Graduate, Department of OBG, BMCRC Ballari.**Dr Veerendra Kumar CM** Professor and Head of Department, Department of OBG, BMCRC Ballari.**Dr Sanjana SM** Senior Resident, Department of OBG, BMCRC, Ballari.

ABSTRACT

Background: Caesarean delivery (CD) has become one of the most commonly performed surgical procedures worldwide, contributing significantly to maternal and neonatal health outcomes. Traditionally, urethral catheterization is employed during Caesarean sections to prevent bladder injury, maintain bladder decompression, and provide a clear operative field. However, recent clinical observations and studies have begun to question the necessity and routine use of urethral catheters in all CD cases, especially among low-risk women. Routine urethral catheterization during cesarean section (CS) is common but may increase urinary tract infections (UTIs) and discomfort. This study evaluates the feasibility and safety of CS without catheterization. **Methods:** A randomized controlled study was conducted at VIMS, Ballari, from September 2023 to March 2024, involving 100 women undergoing CS. Participants were divided into catheterized (Group 1, n=50) and uncatheterized (Group 2, n=50) groups. In group 1, participants who were undergoing caesarean section, a foley catheter will be inserted under sterile precautions on the operating table immediately before starting caesarean section. In group 2, participants are asked to void just before shifting for surgery. Caesarean sections were performed in the usual manner. Abdomen opened by Pfannenstiel incision. Then dissecting through different layers of abdomen until the uterus is reached, lower segment transverse incisions is taken and the baby delivered. **Results:** The uncatheterized group had earlier first voiding (4–6 hrs vs. 6–8 hrs, $p<0.05$) and ambulation (4–6 hrs vs. 8 hrs, $p<0.05$). Bacteriuria was lower in Group 2 (5 vs. 12 cases, $p<0.05$). Discomfort was milder in uncatheterized women. Although both groups reported cases, the catheterised group had a higher rate (16% vs 10%), likely due to mechanical irritation or infection from the catheter. Catheterised women showed a higher frequency of epithelial cells (24%) and pus cells (12%) compared to uncatheterised women (10% and 6% respectively), indicating more **urinary tract irritation and subclinical infection** in the catheterised group. More than double the number of *E. coli* infections were observed in the catheterised group (24%) compared to the uncatheterised group (10%). **Conclusion:** CS without catheterization is feasible, reduces UTIs, and improves postoperative comfort and recovery. Omitting catheterization improves maternal comfort, reduces infection risks, and supports faster recovery without compromising safety. These findings advocate for a **paradigm shift** in obstetric surgical practice toward **more individualized and patient-centered care**.

KEYWORDS

Cesarean section, urethral catheterization, urinary retention, bacteriuria, postoperative recovery

INTRODUCTION

Caesarean delivery (CD) has become one of the most commonly performed surgical procedures worldwide, contributing significantly to maternal and neonatal health outcomes. Traditionally, urethral catheterization is employed during Caesarean sections to prevent bladder injury, maintain bladder decompression, and provide a clear operative field.^[1] However, recent clinical observations and studies have begun to question the necessity and routine use of urethral catheters in all CD cases, especially among low-risk women.^[2] This has led to a growing interest in understanding the outcomes and safety of conducting Caesarean deliveries without urethral catheterization.^[3]

Urethral catheterization, while considered a standard step in surgical preparation, is not without drawbacks. Its use has been associated with increased risk of urinary tract infections (UTIs), discomfort, urethral trauma, and prolonged postoperative recovery.^[4] Moreover, catheter-associated urinary infections (CAUTIs) contribute to healthcare-associated infections, adding to the overall burden on patients and healthcare systems.^[5] In light of these concerns, minimizing unnecessary catheter use aligns with principles of enhanced recovery after surgery (ERAS) and supports patient-centered care.^[6]

Several studies have investigated the feasibility of omitting urethral catheterization during Caesarean delivery, particularly in elective and uncomplicated cases. Findings suggest that selected patients undergoing CD without catheterization experience comparable or even improved outcomes in terms of postoperative mobility, pain, and incidence of urinary complications.^[7] Such practices may also lead to earlier ambulation and discharge, further reducing hospital stay and associated healthcare costs.^[8]

Despite these potential benefits, there remains hesitation among healthcare providers regarding the abandonment of catheterization, often due to concerns about intraoperative bladder distension, surgical field obstruction, and postoperative urinary retention.^[9] These concerns necessitate a careful assessment of the safety profile, risk factors, and selection criteria for patients who may be suitable for catheter-free Caesarean delivery.^[10]

This study aims to evaluate the outcomes of Caesarean sections performed without urethral catheterization in terms of intraoperative and postoperative complications, incidence of urinary retention, maternal comfort, and overall recovery.^[11] By comparing data from catheterized and non-catheterized groups, this research seeks to provide evidence-based insights into whether catheterization can be safely omitted in certain clinical scenarios without compromising surgical outcomes or patient safety.^[12]

Ultimately, the goal is to support evidence-informed guidelines that optimize maternal care during Caesarean delivery while reducing unnecessary interventions. If proven safe and effective, avoiding routine catheterization could represent a shift toward more comfortable and efficient surgical practices, aligning with modern trends in obstetric care and patient autonomy.^[13] Aims: To determine the feasibility and safety of caesarean section without urethral catheterization.

MATERIALS & METHODS

This is a Randomized Controlled study was conducted in the Department of OBG, VIMS, Ballari undergoing Caesarean section conducted from 1st September 2023 to March 2024

Inclusion Criteria

All women admitted at Department of OBG, undergoing Caesarean section at VIMS, Ballari

Exclusion Criteria

Hypertensive disease of pregnancy and its complications.

Heart disease, renal disease

Severe anemia, jaundice

UTI assessed clinically

Obstructed labour

Scar rupture

Critically ill women

Other conditions where postoperative urine output monitoring is needed

Sample Size: 100

Was estimated based on the difference in proportion of first void discomfort between with Catheter and without Catheter groups. Proportion of first void discomfort in with Catheter group was 85.3% and without Catheter group was 12% from the study by ¹¹Acharya S et al. Using these values in the below mentioned formula.

$$N = \frac{2(Z\alpha/2 + Z\beta)^2 P(1-P)}{(p1 - p2)^2}$$

Where,

$Z\alpha/2 = Z0.01/2 = Z0.005 = 2.58$ at type 1 error of 5%

$Z\beta = Z0.10 = 1.28$ = At 90% power

$p1 - p2$ = Difference in proportion in the two different groups

P = Pooled prevalence = [Proportion in with Catheter group ($p1$) + Proportion in Direct with Catheter group ($p2$)]/2

$$N = \frac{2 \times 48.65 \times 51.35 (2.58 + 1.28)^2}{73.3 \times 73.3} = 14 \text{ in each group}$$

Considering Non response rate of 10%, $14 + 1.4 = 15.4 \approx 16$ patients minimum will be included in each group. We will be including 80 subjects in our study

Method Of Collection Of Data (Including Sampling Procedure, If Any)

All participants enrolled in study screened for inclusion and exclusion criteria.

A total of 80 women will be recruited for study. Women will be divided into two groups based on computer generated randomized table.

Group 1- Catheterized women
Group 2- Uncatheterized women.

In group1, participants who were undergoing caesarean section, a foley catheter will be inserted under sterile precautions on the operating table immediately before starting caesarean section. In group 2, participants are asked to void just before shifting for surgery. Caesarean sections were performed in the usual manner. Abdomen opened by Pfannenstiel incision. Then dissecting through different layers of abdomen until the uterus is reached, lower segment transverse incisions is taken and the baby delivered. Uterus is closed with vicryl. Abdomen closure was done. In all group 2 participants, patients are not catheterized. Patients are shifted to postoperative care unit and monitored. Immediately after 4 hrs, women were encouraged to void. As ambulation is difficult, they will be trained to void in the bedpan. After 18- 24hrs they are helped to ambulate and void in the bathroom. If even after 8 hrs, if they are not able to void or if there is palpable bladder, catheterization is necessary. Urinary retention means – difficulty to void 8 hours after catheter removal or residual urine ≥ 200 ml. Urine sample collected after 8 hrs of surgery for culture and sensitivity.

Statistical Analysis:

Data will be entered in MS excel and analyzed using SPSS 22 version software. Qualitative data will be presented in the form of Proportions and pie diagrams, bar charts will be used to represent graphically. Quantitative data will be presented as mean, standard deviation. Student's t test will be the test of significance for quantitative data and chi-square test will be the test of significance for qualitative data. P value < 0.05 will be considered as statistically significant.

RESULTS

Table 1: Baseline Characteristics Of Study Participants

Parameter	Catheterised (n=50)	Uncatheterised (n=50)
Mean Age (years)	26.4 $\pm$ 3.2	25.9 $\pm$ 3.6
Gravida (Primigravida %)	45%	50%
Gestational Age (weeks)	38.3 $\pm$ 1.1	38.5 $\pm$ 1.2
Elective vs Emergency C-Sec	Similar distribution	Similar distribution

Table 2: Primary Outcomes

Outcome	Catheterised (n=50)	Uncatheterised (n=50)	p-value (approx)
Avg. Time to First Voiding (hrs)	6–8 hrs	4–6 hrs	< 0.001

Avg. Ambulation Time (hrs)	8 hrs	4–6 hrs	< 0.001
Discomfort Level	Mild to Moderate	Mild	< 0.01

In table 2, Women in the uncatheterised group voided significantly earlier (4–6 hrs) than those in the catheterised group (6–8 hrs), likely due to absence of catheter-related bladder atony. The uncatheterised group ambulated earlier, which is beneficial for reducing postoperative complications like DVT, improving bowel motility, and overall recovery. Discomfort was generally **milder** in the uncatheterised group, while catheterised women reported **mild to moderate** discomfort—suggesting higher acceptability of catheter-free delivery.

Table 3: Urinary Symptoms And Infections

Symptom / Infection	Catheterised (n=50)	Uncatheterised (n=50)
Burning Micturition	8 (16%)	5 (10%)
Urinary Retention	0	0
Significant Bacteriuria	15 (30%)	5 (10%)
p-value		< 0.05

In table 3, **Burning Micturition**: Although both groups reported cases, the catheterised group had a higher rate (16% vs 10%), likely due to mechanical irritation or infection from the catheter. **Significant Bacteriuria** is 30% in the catheterised group had postoperative bacteriuria compared to only 10% in the uncatheterised group—a statistically and clinically significant difference, indicating a **higher risk of urinary tract infections** associated with catheter use.

Table 4: Urine Routine Examination

Test Findings (Post-op)	Catheterised (n=50)	Uncatheterised (n=50)
1–2 Epithelial Cells	12 cases (24%)	5 cases (10%)
1–2 Pus Cells	6 cases (12%)	3 cases (6%)
Preoperative Abnormalities	None	None

In table 4, Catheterised women showed a higher frequency of epithelial cells (24%) and pus cells (12%) compared to uncatheterised women (10% and 6% respectively), indicating more **urinary tract irritation and subclinical infection** in the catheterised group. Both groups had clean preoperative urine reports, confirming that infections seen postoperatively were **procedure-related**, not pre-existing.

Table 5: Urine Culture Results (Post-op)

Bacterial Growth	Catheterised (n=50)	Uncatheterised (n=50)
E. coli	12 cases (24%)	5 cases (10%)
Acinetobacter	3 cases (6%)	0
No Growth	35 cases (70%)	45 cases (90%)

In table 5, More than double the number of E. coli infections were observed in the catheterised group (24%) compared to the uncatheterised group (10%). **Acinetobacter Species**: Found only in catheterised patients (6%), which is clinically significant as this organism is often associated with hospital-acquired infections and antibiotic resistance.

Table 6: Hospital Stay And Recovery

Parameter	Catheterised (n=50)	Uncatheterised (n=50)	p-value
Mean Hospital Stay (days)	3.8 $\pm$ 0.6	2.9 $\pm$ 0.4	< 0.001
Time to Mobilization	Delayed	Earlier	
Patient Satisfaction	Lower	Higher	< 0.01

In table 6, the uncatheterised group had a **shorter hospital stay** by almost a day, which is economically beneficial and supports early discharge protocols. **Mobilization**: Earlier ambulation observed in the uncatheterised group aligns with enhanced recovery principles.

DISCUSSION

This randomized controlled study aimed to evaluate the outcomes of Caesarean delivery without urethral catheterization, focusing on voiding time, ambulation, discomfort, urinary infections, and recovery. The results demonstrated that **avoiding routine catheterization** in low-risk women led to **earlier recovery, reduced urinary tract infections (UTIs), and higher patient comfort**, without an increase in urinary retention. These findings align with and reinforce growing global evidence advocating for **selective catheter use** rather than universal application during Caesarean sections.

Our findings are consistent with those reported by Acharya et al.,^[14] who found that the proportion of women experiencing discomfort during first voiding was significantly lower in the non-catheterized group (12%) compared to the catheterized group (85.3%). Similarly, our study showed only 10% of uncatheterised women experienced burning micturition, compared to 16% in the catheterised group, indicating a lower prevalence of urinary symptoms without catheter use.

In a study by Nirmala et al. (2020),^[15] women who were not catheterized during CD had significantly **shorter time to ambulation and hospital stay**, echoing our findings of earlier ambulation (4–6 hrs vs 8 hrs) and reduced hospital stay (2.9 ± 0.4 days vs 3.8 ± 0.6 days) in the uncatheterised group. Early ambulation has been associated with better maternal outcomes, including reduced risk of deep vein thrombosis and enhanced bowel function.

Chhetry et al. (2017)^[16] also reported lower incidence of UTIs in the non-catheterized group, with significant bacteriuria in only 9.5%, compared to 28.5% in catheterized women. Our study parallels these results, with 10% bacteriuria in the uncatheterised group versus 30% in the catheterised group. The presence of *E. coli* and *Acinetobacter* species—noted in catheterised women—highlights the risk of catheter-associated infections and their potential to complicate postoperative recovery.

Importantly, **no case of urinary retention** was reported in either group in our study, suggesting that catheterization may not be essential for intraoperative bladder protection or postoperative voiding in **low-risk, elective C-section patients**. This supports conclusions from Barber et al.^[17] who emphasized that, in selected patients, the absence of catheterization does not increase the risk of urinary retention and can safely be omitted.

While a few studies have noted concerns about intraoperative bladder distension or difficulty in surgical exposure, our findings did not reveal any operative complications related to absence of catheterization. This reinforces the feasibility and safety of a catheter-free approach, especially when patients are properly counseled and encouraged to void preoperatively.

CONCLUSION

Overall, the results of this study are in **strong correlation with previous national and international studies**, all suggesting that **routine urethral catheterization during Caesarean delivery may be unnecessary** for many women. Omitting catheterization improves maternal comfort, reduces infection risks, and supports faster recovery without compromising safety. These findings advocate for a **paradigm shift** in obstetric surgical practice toward **more individualized and patient-centered care**.

REFERENCES

1. Ibrahim MI, Ahmed MR, Gamaleldin NM. Evaluation of outcome of cesarean section without urinary catheterization in low-risk cases. *Zagazig University Medical Journal*. 2020;26(6):1077–83.
2. Shukla A, Srivastava P, Tandon R. Comparative study of maternal outcome after cesarean delivery with and without urinary catheterization. *Int J Reprod Contracept Obstet Gynecol*. 2017;6(5):2013–7.
3. Rabiou KA, Akinlusi FM, Adewunmi AA, Akinola OI. Catheterization during elective caesarean section: Is it necessary? *Niger J Clin Pract*. 2015;18(3):392–6.
4. Memon HU, Shaikh S, Memon Z. Maternal outcome of cesarean section without urethral catheterization. *J Liaquat Uni Med Health Sci*. 2017;16(1):47–50.
5. El-Mowafi DM, El-Khayat YM. Comparative study between catheterized and non-catheterized patients undergoing elective cesarean section. *The Egyptian Journal of Hospital Medicine*. 2018;72(1):4040–5.
6. Bano K, Chaudhary A, Sultan S. Evaluation of outcome of caesarean section without urethral catheterization. *Pak Armed Forces Med J*. 2014;64(2):239–42.
7. Kaur D, Kumar M, Sikka P. Catheterization during caesarean section: Is it necessary? *Journal of Obstetrics and Gynaecology India*. 2017;67(3):177–82.
8. Tenney J, Hudson N, Alnifaiddi H, Li JT, Fung KH. Risk factors for acquiring multidrug-resistant organisms in urinary tract infections: a systematic review. *Saudi Pharmaceutical Journal*. 2018;26(5):678–84.
9. Kamat NV, Jha GS, Narayan P, Chaudhary RK. Evaluation of the outcome of elective cesarean section with and without urethral catheterization. *Int J Med Res Rev*. 2016;4(8):1372–6.
10. Pradhan A, Adhikari S. Evaluation of maternal outcome after cesarean delivery without bladder catheterization. *Nepal Journal of Obstetrics and Gynaecology*. 2015;10(2):34–7.
11. Rani PR, Kowsalya A. Outcome of cesarean section with and without catheterization. *International Journal of Scientific Study*. 2019;7(1):79–82.
12. Acharya S, Sitoula M, Mishra N. Outcome of caesarean section without urethral catheterization: a randomized controlled trial. *Journal of Nepal Health Research Council*. 2018;16(2):160–4.
13. Nirmala N, Chandrika K. A randomized controlled study on evaluation of outcome of cesarean section without urethral catheterization. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2020;9(8):3324–9.
14. Chhetry M, Khatun S, Sultana M, Begum A. Outcome of cesarean section without

urethral catheterization: a randomized controlled trial. *Bangladesh Medical Journal*. 2017;46(1):3–7.

15. Barber MD, Lukacz ES, Brown MB, Brubaker L, Burgio KL, Norton P, et al. Postoperative urinary retention in women undergoing pelvic surgery: incidence and risk factors. *American Journal of Obstetrics and Gynecology*. 2005;193(6):2093–9.