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Indwelling Bladder Catheter Using in Cesarean Section: Is It Really Necessary?

Sezaryende Kullanılan Kalıcı Mesane Kateteri: Gerçekten Gerekli mi?

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ÖZ

Amaç: Bu çalışma kalıcı mesane kateteri olmadan sezaryen doğumun (SD) güvenliğini değerlendirmeyi amaçlamıştır. Ayrıca bu çalışmada üriner kateteri olan ve olmayan hastaların SD sonrası klinik ve idrar boşaltım özellikleri arasındaki farklılıkların karşılaştırılması da amaçlanmıştır.

Gereç ve yöntemler: Bu vaka-kontrol çalışması Gazi Üniversitesi Tıp Fakültesi Hastanesi'nde Nisan ile Eylül 2021 tarihleri arasında retrospektif olarak yürütüldü. Elektif sezaryen olan toplam 40 hasta incelendi. Bu hastalardan idrar sondası kullanımına göre iki grup incelendi: idrar sondası olmayan hastalar (Grup 1 / Çalışma) ve idrar sondası olan hastalar (Grup 2 / Kontol). Sonuç ölçütleri postoperatif idrara çıkma, postoperatif mobilizasyon ve hastaların taburcu olma süresi idi.

Bulgular: Grup 1'de sezaryen süresi anlamlı olarak daha uzun iken, grup 2'de postoperatif idrara çıkma, postoperatif mobilizasyon ve hastaneden çıkış süreleri anlamlı olarak daha uzundu ($p<0.05$). İşeme rahatsızlık oranı ve rezidüel hacim gruplar arasında benzerdi. Her iki grupta da operasyon sırasında herhangi bir cerrahi komplikasyon gelişmedi. Ayrıca, çalışma popülasyonunda idrar yolu enfeksiyonu ve mesane distansiyonu gözlenmedi.

Sonuç: Rutin kalıcı mesane kateteri sezaryene giden hastalarda zorunlu görünmemektedir. Birçok klinisyen cerrahi komplikasyonları önlemek için bu kateterleri kullanmaya devam etse de, ameliyat sonrası mobilizasyon, idrara çıkma ve hastaneden taburcu olma süreleri kalıcı idrar sondalarından olumsuz etkilenebilir. Sezaryen ile doğum, mesane kateteri olmadan da güvenle yapılabilir. Uzun hastanede kalışlarda COVID-19 pandemisinin daha yüksek riski göz önüne alındığında, bu yaklaşım uygun bir seçenek olarak kabul edilebilir.

Anahtar sözcükler: Sezaryen, İdrar kataterleri, İdrar yapma, Mesane

ABSTRACT

Aim: This study aimed to evaluate the safety of cesarean section (CS) without an indwelling bladder catheter. We also aimed to compare the differences in clinical and voiding characteristics in patients with or without the urinary catheter after CS.

Materials and Methods: This case-control study was conducted retrospectively in Gazi University Faculty of Medicine Hospital between April and September 2021. A total of 40 patients having an elective CS were reviewed. Among these patients, two groups were analyzed according to urinary catheter use: Patients without the urinary catheter (Group 1 / Study) and patients with urinary catheters (Group 2 / Control). Outcome measures were postoperative urination, postoperative mobilization, and the discharge time of the patients.

Results: While cesarean duration was significantly longer in group 1, postoperative urination, postoperative mobilization, and hospital discharge times were significantly longer in group 2 ($p<0.05$). Voiding discomfort rate and residual volume were similar between groups. There was no surgical complication during the operation in the two groups. Besides, urinary tract infection and postoperative urinary retention were not observed in both groups.

Conclusion: Routine indwelling bladder catheter seems not obligatory in patients undergoing cesarean section. Although many clinicians still use these catheters to avoid surgical complications, indwelling urinary catheters might negatively affect postoperative mobilization, urination, and hospital discharge times. Cesarean delivery can be performed safely without the bladder catheter. Given the higher risk of the COVID-19 pandemic in prolonged hospital stays, no catheter insertion may be considered a suitable option.

Keywords: Cesarean Section, Urinary Catheters, Urination, Urinary Bladder

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INTRODUCTION

Cesarean section (CS) is one of the most common preferred surgical operations globally (1). Indwelling urinary catheterization is nearly a routine preoperative procedure before CS, although there is no clear scientific evidence. It is generally proposed that the risk of bladder or urinary tract injury during surgery and postoperative urinary retention may decrease with urethral catheterization (2, 3). Besides this, urinary catheterization increases surgical exposure during CS and provides closer follow-up of urinary tract injury and urinary output in and after surgery. It is also suggested that the full bladder may not allow favorable uterine retraction after delivery (2).

Urinary catheterization during CS is a long-standing practice that is not supported by evidence-based. Current data suggests that some maternal morbidities, such as urinary tract infection (UTI), maternal discomfort, delayed ambulation time, and higher costs, are related to using urinary catheters during CS (2, 4). Delayed return to daily activities may also be an adverse effect of urinary catheterization (5). Urinary tract infections are accounted for 1.5 to 35% percent of cesarean deliveries (6-9). It is suggested that catheterization has consistently been linked to UTIs (10, 11), and approximately 80% of nosocomial UTIs are associated with indwelling urinary catheters (6, 12). Treatment of these infections also increases cost and morbidity after delivery.

Although some studies have shown adverse outcomes on bladder catheterization (5, 13), the use of routine indwelling urinary catheters continues due to the surgical concerns of clinicians. Considering longer hospital stay duration after catheterization (5), delay in patients' discharge after CS might be an important problem regarding the negative impacts of the COVID-19 pandemic in recent days. In addition, there is a lack of information about the safety of surgery and surgical time differences with or without urinary catheterization.

For this reason, we aimed to evaluate the safety and probability of CS without urinary catheterization and compare the differences of clinical and voiding characteristics of patients with or without the indwelling catheter after cesarean section.

MATERIALS AND METHODS

This retrospective case-control study was conducted on patients who had undergone cesarean section at Gazi University Faculty of Medicine, Department of Obstetrics and Gynecology, between April and September 2021. It was approved by the Local Ethics Committee of Gazi University Faculty of Medicine (Approval no: 2022 - 013). A total number of 40 patients having a history of CS were found from the medical records of the hospital. Two groups were formed according to whether the indwelling urinary catheter was inserted during cesarean operation or not: Group 1= 20 patients without a catheter (study) and Group 2= 20 patients with a catheter (control).

All patients undergoing elective CS were included in the study. Patients with previous CS or prior pelvic surgery, emergency CS, polyhydramnios, antepartum hemorrhage, maternal disease, pre-eclampsia and eclampsia, febrile morbidity, clinical features of obstructed labor, and preoperative urinary tract infection were excluded.

Cesarean section was performed under general anesthesia. All patients had cefazolin (2 g intravenous dose) for antibiotic prophylaxis during CS and were treated with similar medications and doses under general anesthesia. Morphine, propofol, and paracetamol were used for anesthesia procedures in all patients. A bladder catheter was inserted in the operating room before starting the surgery by paying attention to the sterilization conditions. After cleaning the orifice of the urethra with povidone-iodine solution, 16 French Foley catheter was placed in all urinary catheter group of patients. Operations were performed only by the same surgeon in a traditional manner. Abdominal incisions were performed with Pfannenstiel incision. After incision of the peritoneum, vesicouterine serosa was detected between the uterus and the bladder. The vesicouterine fold of the peritoneum and bladder were separated from the lower uterine segment with blunt and sharp dissection. A transverse lower uterine segment (Kerr) incision was performed in all patients. After delivery of the fetus and placenta, the uterine incision was closed with a 1-0 vycril suture. The visceral peritoneum was not closed in all patients. The operation was completed after hemostasis. Bladder catheters were removed in all patients 12 hours after the operation in terms of standardization.

Clinical characteristics of patients, including age, parity, body mass index (BMI), gestational age at delivery, birth weight, CS time, and discharge time, were evaluated. Cesarean section-time was defined as the interval between the start of the surgery and the end of skin closure. In addition, voiding discomfort, postoperative urination, mobilization, and hospital discharge times were recorded. Voiding discomfort was defined as difficulty in the first voiding after surgery. Postoperative mobilization time was defined as the time interval between the start of the sur-

gery and the first postoperative mobilization of the patients. There were two ways to determine the first postoperative urination time; First, the time interval from removing the indwelling catheter, and the first spontaneous voluntary voiding for the catheterized group. Second, the time interval between the start of the surgery and the first spontaneous voluntary voiding for the non-catheterized group. Residual volume was evaluated by ultrasound after the first spontaneous voiding and determined the amount of urine in the bladder after the first voiding of the patients. A formula was used to assess residual volume as described before (Volume = length x width x height x 0.52) (14). The volume was measured at its maximal transverse (width), longitudinal (length) and anterior-posterior (height) diameters by the same physician ED. Discharge time was defined as the interval between the day of surgery and hospital discharge.

The primary outcome measures were the postoperative urination time, postoperative mobilization time, and discharge time of the patients. The secondary outcome measures were the CS time and residual volume after spontaneous voiding.

Data analysis was performed by Statistical Package for Social Sciences (SPSS, version 21.0, Statistics, 2013, Chicago, IBM, USA). Normality tests, including the Kolmogorov-Smirnov test, were used for determining the normal distribution of variables. Comparison of normally distributed metric data was performed with the Student's T-test. Mann-Whitney U test was used for non-parametric comparisons. The Chi-square test was used to compare the categorical data. Data were expressed as mean ± standard deviation (SD), median (minimum-maximum), or percentages. Statistical significance was considered as $p<0.05$.

RESULTS

A total of 40 patients were evaluated in this study. Group 1 had 20 patients without the urinary catheter (study group), and Group 2 had 20 patients with the urinary catheter (control group).

Baseline and surgical characteristics among groups were compared in Table 1.

Table 1. Comparison of baseline and surgical characteristics between groups

Variable	Group 1 (Patients without the urinary catheter) (n=20)	Group 2 (Patients with the urinary catheter) (n=20)	*p*-value
Age of patients (years)	32.7 ± 3.8	30.8 ± 6.0	0.261
BMI (kg/m²)	25.8 ± 1.0	26.5 ± 1.4	0.076
Parity, n	0 (0-2)	0 (0-1)	0.521
Gestational age at delivery (week)	38.4 ± 0.1	38.5 ± 0.2	0.177
Birth weight (gram)	3035.0 ± 140.0	3119.1 ± 218.7	0.152
Cesarean duration (minutes)	54.5 ± 5.2	47.8 ± 6.5	0.001

Data were presented as mean ± standard deviation (SD) and median (minimum-maximum). BMI: Body mass index. $p<0.05$ was considered significant.

There was no statistical difference regarding patients' age, BMI, parity, gestational age at delivery, and birth weight among groups ($p>0.05$). However, cesarean duration was significantly longer in group 1 (54.5 ± 5.2 minutes) than in group 2 (47.8 ± 6.5 minutes) ($p<0.05$). There was no surgical complication during CS in both groups.

The comparison of clinical results and voiding characteristics between groups was presented in Table 2.

Table 2. Comparison of clinical results and voiding characteristics between groups

Variable	Group 1 (Patients without the urinary catheter) (n=20)	Group 2 (Patients with the urinary catheter) (n=20)	*p*-value
Voiding discomfort, n (%)	7 (35)	4 (20)	0.480
Postoperative urination time (hour)	5.4 ± 2.1	7.2 ± 1.2	0.003
Postoperative mobilization time (hour)	6.0 ± 0.8	6.7 ± 0.7	0.005
Residual volume (ml)	148.3 ± 28.3	129.2 ± 54.0	0.171
Discharge time (day)	1.5 ± 0.7	2.2 ± 0.4	0.001

Data were presented as mean ± standard deviation (SD) and percentages. $p<0.05$ was considered significant.

Postoperative urination and postoperative mobilization times were significantly shorter in group 1 (5.4 ± 2.1 and 6.0 ± 0.8) compared to group 2 (7.2 ± 1.2 and 6.7 ± 0.7) ($p<0.05$ and $p<0.05$, respectively). Discharge time was also significantly shorter in group 1 (1.5 ± 0.7) than in group 2 (2.2 ± 0.4) ($p<0.05$). However, voiding discomfort rate and residual volume

were similar among the two groups (p>0.05). There was no UTI in any of the patients. Besides, postoperative urinary retention was not observed postoperatively in both groups. The threshold value for detecting the occult distention was accepted as >200 ml according to the previous data (15) .

DISCUSSION

In the present study, we evaluated the safety and probability of cesarean section without urinary catheterization and compared the clinical and voiding characteristics of patients with or without the indwelling catheter during CS. We found that postoperative urination, mobilization, and hospital discharge time were significantly shorter in patients without the urinary catheter, although cesarean duration was significantly longer in this group than in patients with the urinary catheter.

With the increased rates of CS in recent years (16), clinicians have more closely focused on the settings of the surgery and the preparation of the patients due to the increased maternal morbidity with higher CS rates. Urinary tract infection is one of the most important reported problems that contribute to patients' morbidity after cesarean delivery (7, 8, 17, 18). There are inconsistent results in the literature about the relationship between UTI and indwelling urinary catheter use during CS. In three studies, it was shown that the UTI rates were higher in patients with indwelling catheters compared to those without catheters during CS (4, 13, 19). Another study reported that the UTI was lower in patients whose catheter was removed immediately after CS than those whose catheter was removed 24 hours after surgery (20). However, a Cochrane review reported similar UTI rates among patients with or without indwelling bladder catheters during CS (21). These controversial results may be attributed to the other risk factors of UTI rather than the urinary catheter. Different hospital and operating room conditions may also have contributed to these inconsistent results. In addition, there was no UTI in our study population. This favorable outcome might be due to our controlled catheter insertion process by paying attention to the sterilization conditions.

Results of the first voiding time are also inconsistent in the literature. In our study, postoperative urination time was significantly longer in the catheterized group, which was similar to the previous study (5). However, another study has presented a shorter postoperative urination time in the catheterized group compared to the non-catheterized group (4). These controversial results could be explained by the heterogeneous study populations, including emergency and elective surgery, and individual differences in the desire for voluntary voiding. Besides, postoperative mobilization time and discharge time were significantly shorter in patients without catheters in our study, which was compatible with previous studies (2, 4). This result may be explained by the feeling of discomfort with the urinary catheter after surgery. In our research, late urination in the urinary catheter group may also be due to the difficulty in patients' mobilization. Given that there was no complication in surgery and no maternal morbidity after surgery, delayed urination time may have resulted in prolonged discharge time of the patients.

In our study, although the duration of cesarean section was longer in the group without the urinary catheter, there are also studies with no significant difference (4, 13, 19). The reason for the long cesarean duration in our study may be that we are accustomed to the cesarean procedure with urinary catheters. Therefore, more careful and slower surgery in patients without indwelling catheters may lead to this prolonged cesarean time, although all patients accomplished bladder discharge just before surgery.

The main strength of the current study is the evaluation of the safety and probability of elective cesarean section in patients without the indwelling catheter. Another strength is the comparison of clinical parameters, including cesarean time and voiding characteristics, among patients with or without urinary catheters after elective CS. The major limitations are retrospective design, the small number of patients, and the biased potential of medical records.

CONCLUSION

Routine use of urinary catheters during CS seems not advantageous for patients due to the negative impacts of these catheters on patients returning to daily activities earlier. Although operation without an indwelling catheter slightly extends the cesarean duration, this result may be preferred to the prolonged postoperative mobilization, urination, and hospital discharge times caused by performing urinary catheter in CS. Rapid discharge of the patients is also essential to reduce contamination during the Covid 19 pandemic in recent years. In addition, a urinary catheter may cause the formation of an infection focus regarding UTI. This risk can be reduced in CS without using a urinary catheter. Our study shows that CS without the urinary catheter does not negatively affect the clinical conditions of patients and can be performed in a safe manner. Finally, clinicians should not hesitate to perform CS without using a urinary catheter in an emergency or elective condition.

Ethics Committee Approval: This study was approved by the Local Ethics Committee of Gazi University Faculty of Medicine (date: December 21, 2021; number: 2022 - 013).

Authorship Contributions

ED: data analysis, manuscript writing, editing. MFCA: data collection, manuscript writing. EST: data collection. ROK: project development, data analysis, manuscript editing

Conflict of Interest: The authors declare no conflict of interest.

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