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# The Incidence of Acute Urinary Retention Following the Early Removal of the Urinary Catheter after a Cesarean Section under Spinal Anesthesia

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**A B S T R A C T**

**Introduction:**

Cesarean sections, commonly performed surgical interventions, often involve postoperative bladder catheterization. The optimal timing for catheter removal remains debated, with concerns about acute urinary retention (AUR). This study, part of an enhanced recovery after cesarean section protocol, aims to assess AUR incidence when removing the urinary catheter early after cesarean section under spinal anesthesia.

**Materials and Methods:**

This prospective study involved 157 patients undergoing cesarean sections under spinal anesthesia. Inclusion criteria included age over 18, ASA score of 1 or 2, and informed consent. Cesarean sections were performed with regional anesthesia, and urinary catheter removal was guided by vigilant monitoring. Ethical principles and committee approval were strictly observed

**Results:**

Urinary catheter removal before the 6th hour occurred in 91.72% (n=144) of patients. The mean time for spontaneous voiding was 6.25 hours ± 3.1. Evacuator catheterization was performed in 3.8% of cases. Early removal (⩽ 6H) showed a higher risk of evacuator catheterization compared to removal after the 6th hour.

**Discussion:**

Placement of pre-surgery urinary catheters is contentious, balancing surgical benefits and patient discomfort. AUR risk factors were controlled for early removal, aligning with enhanced recovery protocols. Postpartum AUR risk is influenced by physiological changes. In this study, early removal demonstrated feasibility with low AUR risk.

**Conclusion:**

Early urinary catheter removal after cesarean section under spinal anesthesia appears feasible, associated with low AUR risk. Decisions should consider factors like early mobilization, reduced IV fluid administration, and nursing assessments. Bladder-scan usage could enhance postpartum urinary retention management precision.

Keywords: Cesarean section, spinal anesthesia, urinary catheter, acute urinary retention, enhanced recovery, postoperative care.

## Introduction

Cesarean section, a frequently performed surgical intervention, is often accompanied by bladder catheterization in the postoperative period, offering clear benefits but also presenting potential challenges. The optimal timing for catheter removal after this procedure remains a subject of debate, with concerns, particularly among healthcare professionals, about the risk of acute urinary retention (AUR) hindering early removal.

Amidst the balance between postoperative comfort and potential risks, the medical literature presents diverse opinions and controversies regarding the timing of urinary catheter removal following cesarean sections under spinal anesthesia. A recent audit, conducted as part of an enhanced recovery after cesarean section (ERACS) protocol, reported no complications following urinary catheter removal at 7 postoperative hours (1) (2).

This study aims to contribute to assessing the incidence of acute urinary retention when the urinary catheter is removed early after a cesarean section under spinal anesthesia.

## Materials and Methods

This descriptive, prospective incidence study, a single center chosen for resource availability and experience in performing cesarean sections under spinal anesthesia. A total of 157 patients, all briefed about the protocol during pre-anesthetic consultations, were included in the study.

Inclusion criteria encompassed age over 18, scheduling for a cesarean section under spinal anesthesia, ASA score of 1 or 2, and informed consent from the patients. Exclusion criteria involved age under 18, refusal to participate, cesarean section under general anesthesia, ASA score greater than 2, comorbidities requiring close diuresis monitoring or infusion maintenance, and a high risk of bleeding.

Cesarean sections were conducted under regional anesthesia with limited vascular co-filling of 1000 ml of 0.9% saline solution, combined with ephedrine. Venous closure was performed upon exiting the post-interventional monitoring room to facilitate rapid autonomy. Urinary catheter removal occurred upon motor block resolution, at the exit from the Post-Anesthesia Care Unit (PACU), with vigilant diuresis monitoring.

In cases of AUR occurrence, nurses were strictly instructed, including performing evacuator catheterization eight hours after urinary catheter removal in the absence of diuresis resumption. If recurrent urinary retention occurred, the catheter was left in place.

Obstetric and operative parameters, along with characteristics of urinary resumption, were collected. AUR was diagnosed for a urinary volume equal to or greater than 400 ml during catheterization.

The study adhered to the ethical principles of the Helsinki Declaration, and all patients provided informed consent. The protocol gained approval from the institution's ethics committee.

## Results

Urinary catheter removal before the 6th postoperative hour was conducted in 91.72% (n=144) of patients (fig1). The mean time for spontaneous urine voiding was 6.25 hours +/- 3.1. Evacuator catheterization was performed in six patients (3.8% of cases) due to acute urinary retention. Urinary catheter removal allowed normal urine voiding in 76.9% (n=10) of patients who had catheter removal after the 6th hour, while the risk of evacuator catheterization was higher when the urinary catheter was removed before the 6th hour.

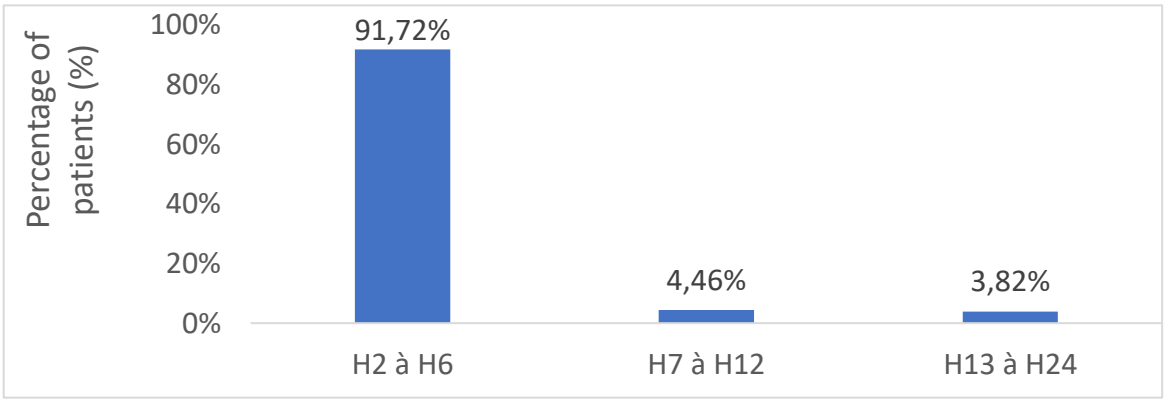


**Figure 1: Time of removal of the urinary catheter**

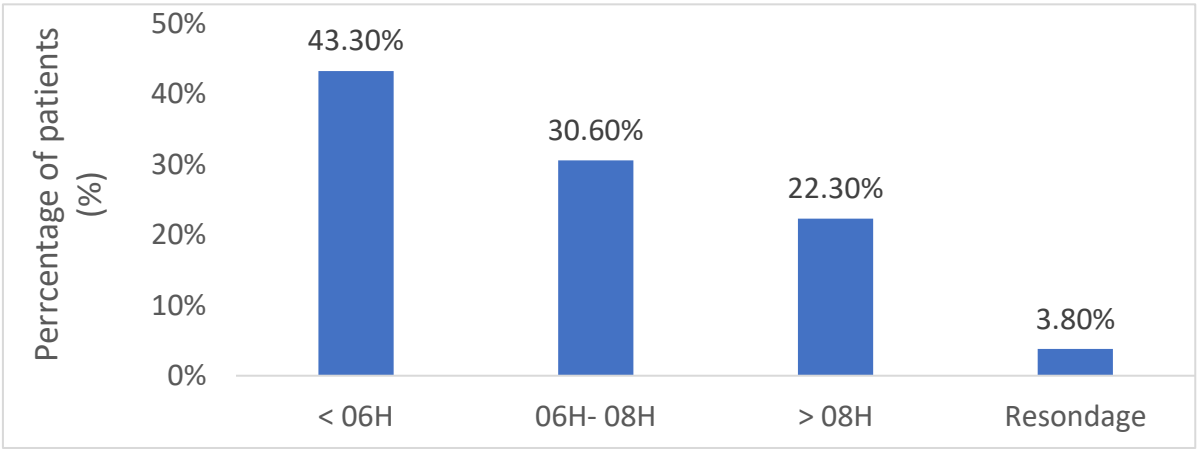


**Figure 2: The time of urine voiding and the incidence of recatheterization**

**Table 1: Time to urine voiding based on the time of urinary catheter removal**

| Urine Voiding Time | Catheter Removal ≤ 06H [n(%)] | Catheter Removal ≥ 07H [n(%)] | p |
|---|---|---|---|
| **< 06H** | 58 (40.3) | 10 (76.9) | |
| **06H - 08H** | 47 (32.6) | 1 (7.7) | |
| **> 08H** | 33 (22.9) | 2 (15.4) | <0.001 |
| **Recatheterization** | 6 (4.2) | 0 (0) | |
| **Total** | 144 | 13 | |

## Discussion

The routine placement of a pre-surgery urinary catheter is contentious. While advocated by some for reasons such as improved surgical exposure and reduced risk of bladder trauma, its impact on rehabilitation and the discomfort it causes necessitate its timely removal, aligning with enhanced recovery protocols. Despite this, the fear of AUR often leads to delayed removal (> 24h).

AUR risk depends on controllable factors (spinal anesthesia, local anesthetic doses, morphine doses, intraoperative fluid input, postoperative immobilization) (3). Early urinary catheter removal, demonstrated by Keita H's 2005 study, is a viable option due to the low AUR risk.

Consideration of early removal in accelerated rehabilitation requires factors like early patient mobilization and reduced intravenous fluid administration (5) (6). Close diuresis monitoring is essential, and managing urinary retention may demand extra attention from the nursing team.

Additionally, the postpartum AUR risk relates to pregnancy-induced lower urinary tract changes. Starting from the third gestational month, progesterone reduces smooth muscle tone, increasing bladder capacity. Pressure from the gravid uterus doubles between 15 and 38 weeks, limiting capacity. Post-delivery, a return to normal physiology occurs, but urinary retention can happen. In our study, 27 to 45% of women experienced micturition disorders immediately postpartum.

In our study, 91.72% (n=144) had urinary catheter removal before the 6th hour, with reasons for delays being diverse. Regarding AUR, the mean time for spontaneous urine voiding was 6.25 hours +/- 3.1, with evacuator catheterization necessary in 3.8% of cases. One patient required a permanent catheter due to a second AUR episode.

In 22.3% of cases, the eight-hour protocol deadline was exceeded, mainly due to patient and caregiver apprehension. Similar findings were observed in trials by El-Mazny et al. and Onile et al., with urinary retention rates after cesarean section ranging from 3.3% to 39%. The Mann-Whitney test indicated a significant advantage in favor of catheter removal beyond 6 hours.

In Saudi Arabia, Nisreen Khaled Aref (2019) suggested, through a prospective trial, that urinary catheter removal six hours after cesarean section appears more advantageous, with higher retention incidence in the immediate removal group and increased infection rates in the late removal group.

In conclusion, early urinary catheter removal after cesarean section under spinal anesthesia seems feasible, associated with low AUR risk. Decisions should be individualized, considering factors like early patient mobilization, reduced IV fluid administration, and nursing team assessment. Bladder-scan usage could enhance postpartum urinary retention management precision.

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