



A prospective randomized clinical trial comparing immediate versus delayed removal of urinary catheter following elective cesarean section



Akmal El-Mazny*, Mohamed El-Sharkawy, Amr Hassan

Department of Obstetrics and Gynecology, Faculty of Medicine, Cairo University, Egypt

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ABSTRACT

Objective: To compare immediate and 12 h postoperative removal of urinary catheter after elective cesarean section.

Study design: In a prospective clinical trial at a university teaching hospital, 300 eligible women admitted for primary or repeat elective cesarean section were randomized into two equal groups. In group A, the catheter was removed immediately after the procedure; whereas in group B, the catheter was removed 12 h postoperatively.

Results: The incidence of postoperative significant bacteruria ($p = 0.020$), dysuria ($p = 0.030$), burning on micturition ($p = 0.016$), urinary frequency ($p = 0.031$), and urgency ($p = 0.011$) were significantly lower in group A compared with group B. The mean postoperative ambulation time ($p < 0.001$), time till the first voiding ($p < 0.001$), and length of hospital stay ($p < 0.001$) were also significantly shorter in group A. There were no significant differences between the two groups in the incidence of urinary retention necessitating recatheterization ($p = 0.371$).

Conclusion: Immediate removal of urinary catheter after elective cesarean section is associated with lower risk of urinary infection and earlier postoperative ambulation.

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Introduction

Cesarean delivery rates have risen steadily [1]. Cesarean section carries all the complications of any major surgery; including major organs injury [2]. From the obstetricians' point of view, empirical urinary catheterization is widely practiced during cesarean sections as it can decompress the bladder and decrease urinary tract injuries, improve lower uterine segment exposure, and avoid post cesarean urine retention [3,4].

However, the duration of catheter use postoperatively is based on custom rather than evidence-based knowledge and so varies considerably [5]. The catheter is usually removed immediately after operation or 12–24 h or more after surgery to avoid post cesarean urine retention.

Despite infection control policies and procedure, catheter associated urinary tract infection (CAUTI) remains a significant problem in many tertiary centers, using identified risk factors, tailored intervention strategies should be implemented to reduce

the rate of CAUTI [6]. Immediate postoperative removal of a urethral catheter after elective cesarean delivery may be associated with a lower risk of urinary infection [7].

Furthermore, catheter use has been associated with late ambulation because of patients' discomfort and fear of accidental removal of catheter when moving. The results of a recent systematic review [8], including two RCTs and one non-RCT, suggested that the routine use of indwelling urinary catheters for cesarean delivery is not necessary, and can be harmful. However, better and larger RCTs were recommended to confirm these findings.

The objective this study was to compare immediate and 12 h postoperative removal of urinary catheter after elective cesarean section; and whether early removal is associated with lower risk of urinary infection compared with delayed catheter removal.

Materials and methods

This prospective randomized clinical trial was conducted at the Department of Obstetrics and Gynecology, Faculty of Medicine, Cairo University, during the period from November 2012 to March 2014. The study protocol was approved by the Scientific Research

* Corresponding author. Tel.: +20 1001454576.

E-mail address: dr_akmalelmazny@yahoo.com (A. El-Mazny).

Committee, and informed consent was obtained from all participants.

Women admitted to the prenatal wards for primary or repeat elective cesarean section were screened to determine eligibility for inclusion. Exclusion criteria were urinary infection (assessed clinically and by midstream urinalysis), significant vaginal bleeding, severe pre-eclampsia or eclampsia and/or any other conditions requiring postoperative monitoring of urinary output, and contraindications for general anesthesia.

A total of 300 women were allocated into two groups in a 1:1 ratio by block randomization using computer-generated random numbers. In all participants, a Foley urethral catheter (French size 16) was inserted under sterile conditions on the operating table immediately before the procedure. In group A, the catheter was removed immediately after the procedure; whereas in group B, the catheter was removed 12 h postoperatively.

Cesarean sections were performed in the standard manner under general anesthesia. Abdominal incisions were Pfannenstiel; the loose peritoneum fold overlying the upper margin of the bladder was gently separated from the underlying myometrium with blunt or sharp dissection not exceeding 5 cm in depth; a transverse lower uterine segment incision was performed. Typically, all patients received the same regimen of IV fluids (sterile saline solution 2000 ml over 24 h), antibiotic prophylaxis (Cefazolin 2 g IV single dose 30 min before surgery), and postoperative analgesia (Voltaren 75 mg IM when needed).

Patients in group A were asked to void only upon feeling the urge; if the urge to void was reported at a time when mobilization was impossible, a bedpan was given. If the desire to void was reported later, when mobilization was possible, they were helped to a nearby bathroom. If still patient had difficulty in passing urine after 6 h and/or if abdominal examination shows palpable urinary bladder, recatheterization was done [9].

The main outcome measures were significant bacteriuria ($\geq 100,000$ bacteria per ml urine [10] in a midstream sample collected 24 h postoperatively) and urinary symptoms (urinary retention necessitating recatheterization, dysuria, burning on micturition, urinary frequency, and urgency). Other outcome measures were the time till start of oral rehydration and return of intestinal sounds after the operation, the time of first voiding, postoperative ambulation time, and the length of hospital stay.

Based on our hypothesis that immediate removal of the urethral catheter would be as safe as retaining the catheter for 12 h after elective cesarean section, a sample size of at least 100 women in each group was required to obtain 80% power and type I error of 0.05 in a two-sided test.

Continuous data were expressed as mean \pm SD, and were compared using the Student *t* test. Categorical data were expressed as number (%), and were compared using the Fisher exact test. A two tailed probability value (*p*-value) < 0.05 was considered statistically significant. Data analysis was performed using the Statistical Package for the Social Sciences program, v16.0 (SPSS Inc., Chicago, IL, USA).

Results

A total of 300 women were finally enrolled in this trial, with 150 women randomized to each group (Fig. 1). There were no significant differences between the two groups regarding maternal age ($p = 0.136$), parity ($p = 0.507$), gestational age ($p = 0.118$), indications for elective cesarean section ($p = 0.638$), and body mass index ($p = 0.239$) (Table 1).

Regarding urinary complications after catheter removal, the incidence of postoperative significant bacteriuria ($p = 0.020$), dysuria ($p = 0.030$), burning on micturition ($p = 0.016$), urinary frequency ($p = 0.031$), and urgency ($p = 0.011$) were significantly lower in group A compared with group B. Four women (2.7%) in

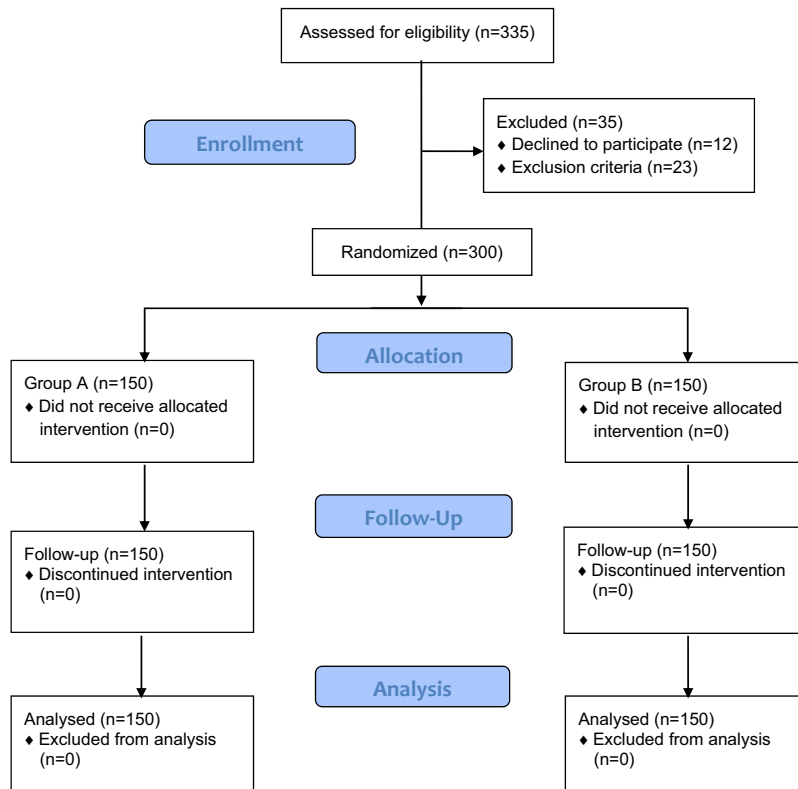


Fig. 1. Flow chart.

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