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Full length article

## The impact of subcutaneous irrigation on wound complications after cesarean sections: A prospective randomised study



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### ABSTRACT

**Objective:** To assess the effectiveness of subcutaneous saline irrigation in preventing wound complications after cesarean sections.

**Study design:** Patients undergoing primary cesarean sections were randomly assigned to either the subcutaneous saline irrigation group or the control group. The participants were asked to come to the hospital for routine inspection of the skin incision on day 7 and day 30 postoperatively. The wounds were inspected for hematoma, seroma, separation and signs of superficial infection. The prime outcome was the comparison of the superficial surgical site infection (SSI) rates among the groups. Additionally, factors associated with wound complications were also analyzed using logistic regression.

**Results:** A total of 204 women undergoing primary cesarean sections were randomized, and 185 were included in the final analysis. There was no significant difference in terms of SSI rates among the groups (14.3% in the saline group vs 12.8% in the control group,  $p = 0.76$ ). However, the existences of hematoma and seroma were significantly lower in the saline irrigation group compared to the control group.

**Conclusion:** Irrigation of subcutaneous tissue decreases the occurrences of both postoperative hematoma and seroma in women undergoing primary cesarean sections.

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### Introduction

Cesarean deliveries are one of the most common surgical procedures performed worldwide [1]. As with any surgical procedure, it is sometimes accompanied by complications. The incidence of wound complications after cesarean delivery varies from 3% to 30% [2]. Wound complications can include surgical site infection (SSI) or non-infectious complications such as hematoma, seroma, and wound separation [3,4]. SSIs as well as non-infectious complications increase post cesarean maternal morbidity, health costs and prolongs hospitalization. Further, many SSIs occur after discharge, leading to readmission of the patient [5,6]. A variety of preventive methods have been investigated to decrease post-operative wound complications including prophylactic antibiotic use, skin preparation, different ways of placental removal and suturing of layers [7].

One questionable prophylactic method is the irrigation of the subcutaneous tissue. Before the skin closure, prophylactic irrigation of wounds with topical antibiotics, povidone-iodine or saline have been shown to reduce the risk of SSI [8]. However, another meta-analysis on different surgeries reported low-quality evidence on prophylactic incisional irrigation with a povidone-iodine solution to prevent SSI [9].

Normal saline (0.9% sodium chloride) is the most commonly used solution for wound irrigations due to its safety. One of the earliest trials on wound irrigations with saline after abdominal surgery reported a reduction in SSI from 25% to 8.7% [10]. Prophylactic wound irrigation of the subcutaneous and deep soft tissue with saline or any antiseptic solution is an easy and economical option to reduce SSI rates [11–13]. There is limited data on the effect of subcutaneous saline irrigation in women undergoing cesarean sections. Therefore, the objective of our study is to evaluate the impact of subcutaneous saline irrigation on wound complications in women undergoing cesarean sections. For this purpose, our primary focus is to examine superficial SSI rates and additionally non-infectious complications between the subcutaneous saline irrigation group and the control group.

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## Materials and method

This randomized, parallel group, blinded study was conducted at a single center between October 2017 and March 2018. A total of 204 patients who underwent primary cesarean sections were included. The study was approved by the ethics committee of our hospital and was also registered with ClinicalTrials.gov (NCT03321175). Informed consent was obtained from all participants before the study.

The inclusion criteria were women undergoing caesarean sections for the first time, with no prior history of lower abdominal surgery, age 18–40 years old. Patients with body mass index (BMI)  $\geq 30$  kg/m<sup>2</sup>, diabetes mellitus, gestational diabetes mellitus, pregnancies with chorioamnionitis, patients with surgical drains, emergency cesarean sections, history of abdominal surgery, subcutaneous tissue thickness of  $\geq 3$  cm [7,14], anemia (hb < 7 g/dl), thrombocytopenia and patients using steroids/antibiotics were excluded.

Patients undergoing caesarean sections were randomized using a computer-generated sequence 1:1 either to the subcutaneous saline irrigation group or to the control group (no irrigation). Sealed envelopes opened sequentially by the operating room nurse just prior to surgery, dictated the study groups. All women received 1.5 g intravenous cefuroxime 30 min before the procedure. All cases were performed by experienced obstetricians. In all cases, the cesarean section commenced with a Pfannenstiel skin incision

2 cm above the pubic symphysis. After the sequential closure of the uterus and peritoneum, the fascia was closed with a continuous number 1 polyglactin 910 (Vicryl). Before the subcutaneous tissue closure in the saline group the subcutaneous saline irrigation was performed with a 200cc of saline (0.9%NaCl). No subcutaneous irrigation was applied in the control group before the skin closure. Subcutaneous tissue hemostasis was achieved using an electrocautery and a 3-0 polyglactin 910 (Vicryl Rapide) suture was used for skin closure.

The surgical dressing was removed 24 h after surgery and patients were discharged from the hospital 48 h upon surgery completion. Participants were asked to come to the hospital for routine inspection of the skin incision on day 7 and day 30 postoperatively. All wounds were inspected for hematoma, seroma, separation and signs of superficial infection. An abdominal ultrasound was performed to inspect the subcutaneous tissue hematoma and/or seroma. The participants, primary investigator and care providers evaluating skin incisions were blinded to the intervention (saline/control). The primary outcome was to compare superficial SSI rates between the groups 30 days after the operation. The secondary outcome was to calculate the percentages of all wound complications including hematoma, seroma and wound separation.

Sample size was calculated according to the prevalence of post-cesarean SSI at our institution. Before our study, the annual rate of post-cesarean SSI rate was 14%. The formula including 95%

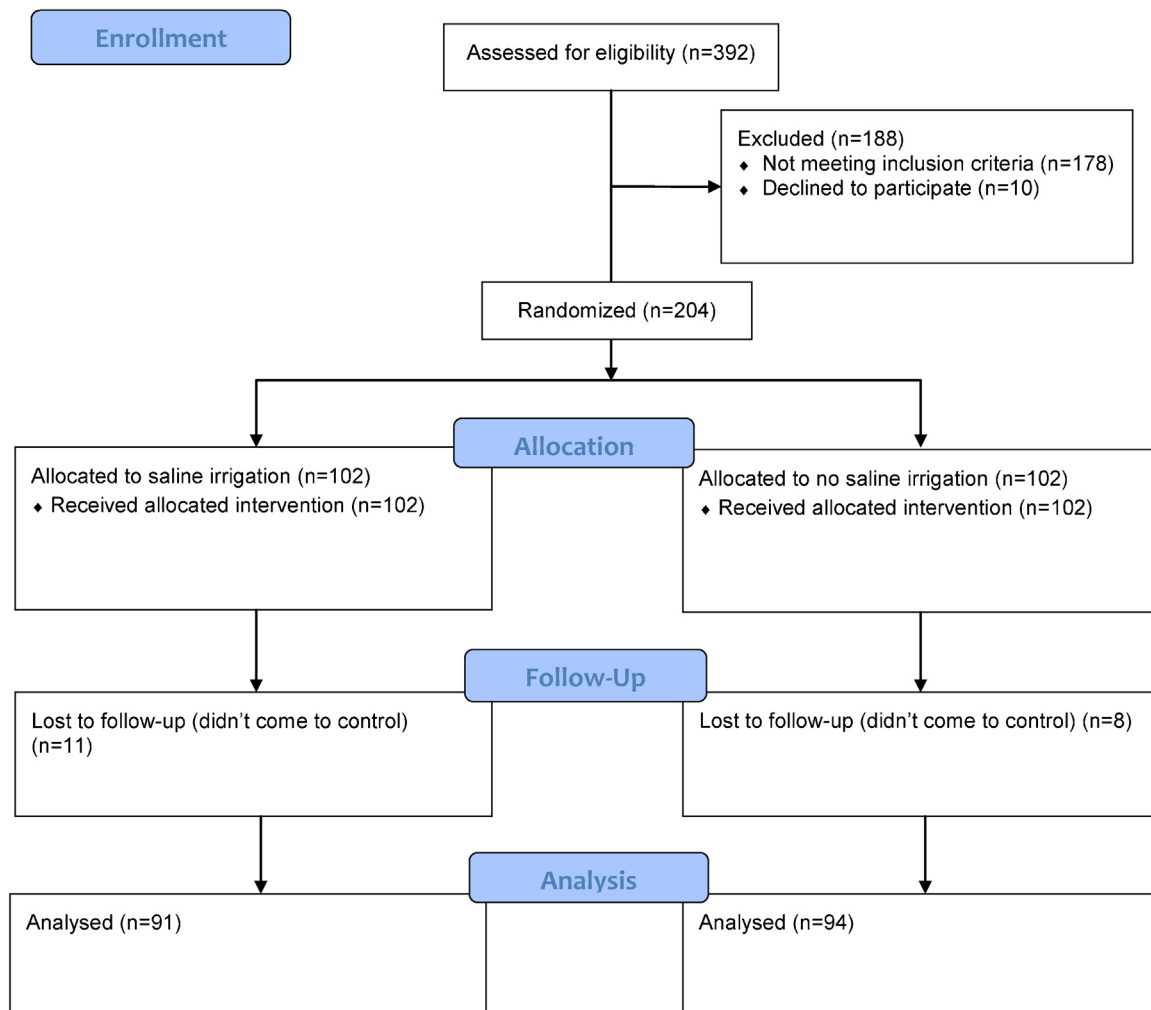


Fig. 1. Flow diagram.

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