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Original Contribution

Preoperative paracetamol improves post-cesarean delivery pain management: a prospective, randomized, double-blind, placebo-controlled trial

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Abstract

Study Objective: To evaluate the analgesic effect of preoperative single dose intravenous paracetamol on postoperative pain and analgesic consumption within 24 hours after elective cesarean surgery.
Design: Prospective, randomized, double-blind, placebo-controlled clinical trial.
Setting: University Teaching Hospital.
Patients: American Society of Anesthesiologists (ASA) I and II 60 patients between 18–40 years of age who were scheduled to undergo elective cesarean section.
Interventions: Patients were randomized into two groups to receive either intravenous 1 g paracetamol (100 mL) (Group P) or 0.9% NaCl solution (100 mL) (Group C) 15 minutes before the induction of general anesthesia. After delivery of newborn 0.15 mg kg^{-1} morphine was administered to all patients in both

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groups. Postoperative analgesia was provided with patient-controlled intravenous analgesia with morphine in the postoperative period.
Measurements: Pain which is the primary outcome measure was assessed at 15th, 30th minutes and 1st, 2nd, 4th, 6th, 12th, 24th hours by the Visual Analogue Scale. Patients' demographics, hemodynamics, Apgar score, additional analgesic requirement, side effects, patients' satisfaction and postoperative total morphine consumption within 24 hours were recorded.
Main Results: Median visual analogue scale for pain in Group P was significantly lower compared to Group C at all time points except for the score at 24th h postoperatively ($P < .05$). Additional analgesic requirement during postoperative first hour was lower in Group P ($P < .05$). Total morphine consumption was higher in Group C compared with Group P ($P < .05$). There was no difference between groups with respect to Apgar scores, side effects, and patient satisfaction ($P > .05$).
Conclusions: Preoperative use of single-dose intravenous 1 g paracetamol was found to be effective in reducing the severity of pain and opioid requirements within 24 hours after cesarean section.

1. Introduction

Pain is the most common complaint of women having cesarean deliveries [1]. Pain after a cesarean delivery blocks the relationship between the mother, and newborn as well as the care and feeding of the newborn. Furthermore, inadequate pain management constitutes an important risk factor for postpartum depression, and chronic pain development [2,3].

Spinal anesthesia is the preferred anesthesia method for elective and emergency cesarean surgeries. However, general anesthesia still has its place in patients with specific conditions including coagulopathy, fetal distress, bleeding, eclampsia, HELLP syndrome (hemolysis, elevated liver enzymes, and low platelet count), and skin infections of the lumbar region or the patient's unwillingness to receive regional methods.

Treatment modalities widely used for postoperative analgesia in patients undergoing general anesthesia include systemic opioid administration (intramuscular or intravenous), oral-rectal analgesics, and patient-controlled intravenous analgesia (PCIA) methods. Non-opioids are commonly added to treatments to increase analgesic efficacy and reduce opioid consumption and opioid side effects. Adjuvant medications such as paracetamol and non-steroidal anti-inflammatory drugs (NSAID) are added to opioid therapy for this purpose.

Paracetamol is a non-opioid agent that affects the central nervous system (CNS) primarily by inhibiting central cyclooxygenase (COX), and activating serotoninergic pathways via the inhibition of nociceptive signal transmission in the spinal cord [4].

This randomized, double-blind, placebo-controlled study was conducted to evaluate the efficacy of preoperative IV paracetamol to prevent and treat post-cesarean delivery pain. We hypothesized that a single dose of IV paracetamol administered before general anesthesia would significantly reduce acute postoperative pain, and provide less total morphine consumption than the placebo over a 24-hour period.

2. Materials and methods

The Baskent University Institutional Review Board and Ethics Committee approved this prospective, randomized, double-blind study (Project KA 13-180). The study was supported by Baskent University Research Fund and was completed over a period of 4 months. The protocol for this clinical trial was registered at ClinicalTrials.gov (NCT02369133).

Sixty pregnant women having an American Society of Anesthesiologists (ASA) I and II between 18 and 40 years of age who were scheduled to undergo an elective cesarean surgery under general anesthesia were enrolled in this study. Inclusion criteria included a single-fetus pregnancy, more than 38 weeks of gestational age, refusal to have regional anesthesia during cesarean section and being scheduled for an elective cesarean section. The exclusion criteria included a body mass index greater than 40 $kg \cdot m^{-2}$, being allergic to any of the study drugs, psychiatric or cardiopulmonary diseases, chronic use of analgesics, complications during the cesarean section, and being unable to use a PCIA device.

2.1. Intervention

Preoperatively, all patients were informed about the study parameters including pain management methods to be used during the study including a visual analogue scale (VAS) and the use of the PCIA device. Written informed consent was obtained from all patients. All patients refrained from eating and drinking for 8 hours before surgery.

Patients were randomly divided into two groups by a closed envelope method. A computer-generated table of random numbers was obtained to randomly assign the patient into one of the two groups. The assignment number was concealed in closed envelopes until the patient was approved to enroll in the study. These envelopes were prepared by an independent