Original Article

Comparative Study of the Effect of Propofol and Ketamine on Complications after Cesarean Section under Spinal Anesthesia

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ABSTRACT

Introduction: Cesarean section is one of the most common surgeries in gynecology, after which pain leads to many complications. This study aimed at comparing the effects of propofol and ketamine on postoperative complications under spinal anesthesia.

Material and Methods: In this study, to compare the effect of propofol and ketamine on pain, chills and nausea, and vomiting after cesarean section under spinal anesthesia, 111 patients who were candidates for elective cesarean section were compared in terms of side effects of propofol and ketamine.

Results: The rest of the pain intensity in the ketofol and ketamine groups was significantly lower in the other groups ($p < 0.05$). Also, the rate of drug use in the ketofol and ketamine groups was significantly lower compared with the other groups ($p < 0.05$).

Conclusion: The combination of ketamine + propofol (ketofol) can control the complications after spinal anesthesia in elective cesarean section.

Introduction

Recently, multimodal pain treatment methods have attracted a great deal of attention. Our study revealed that ketamine plus propofol significantly reduces pain and complications after surgery, increases patient satisfaction, and reduces drug use. These results are consistent with previous studies [1-3].

Nowadays, due to the mentioned side effects of narcotics, it is recommended to use multimodal pain and chills control processes and to use two or more methods to control acute and postoperative pain and chills [4]. One of the

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multimodal methods to control the complications mentioned above after cesarean section is the use of intravenous anesthetics [5]. Propofol and ketamine are sedatives and non-narcotic sedatives. Propofol is a safe and selective anesthetic drug for induction of anesthesia that is widely used by anesthesiologists due to its rapid onset, short duration, and no side effects. Ketamine is also a safe drug in anesthesia due to its relatively rapid onset of action and minimal hemodynamic changes [6]. According to researchers, ketamine and propofol are safe and effective drugs [7].

Material and Methods

This study was conducted from 2018 to 2020 with the participation of 111 women candidates for elective cesarean section at Al-Zahra Hospital (Tabriz University of Medical Sciences). Patients were selected using the available sampling method, and after signing the informed consent form, they were provided with relevant drugs.

Inclusion criteria included age over 18 and under 45 years, candidate for elective cesarean section and cesarean section under spinal anesthesia, and exclusion criteria included multiple pregnancies, emergency cesarean section, and dissatisfaction with participation in the study.

Patients were divided into four groups. One group received ketamine, and the other group received propofol. The third group received ketamine (low dose) + propofol, and the fourth group received propofol (low dose) + ketamine. All drugs were injected after surgery, and the severity of pain, nausea, vomiting and postoperative shivering were assessed among the study groups.

This study was conducted after being approved by the ethics committee of Tabriz University of Medical Sciences (IR.TBZMED.REC.1398.1163), coordinated with the director of Imam Reza Hospital (Tabriz Medical Sciences). The study's objectives were explained to the patients, and after explaining the research objectives, informed consent was obtained from all of them.

Appropriate tests such as T T-test, Fisher's Exact Test, Kolmogorov-Smirnov, Mann-Whitney U, and repeated measures analysis of variance were used in data analysis. The normality of the data was investigated using a one-sample Klomogorov-Smirnov test. If the data are not normal, the Mann-Whitney U test is used. The software used in this research is SPSS 21, and the significance level of the tests is less than 0.05.

Results

Pain intensity in ketofol and ketamine groups was significantly lower than in other groups ($p < 0.05$). Drug use in ketofol and ketamine groups was significantly lower than in other groups ($p < 0.05$). Complications after cesarean section in the ketofol and ketamine groups were significantly lower than in the other groups ($p < 0.05$). The rate of onset of lactation after cesarean section in the ketofol and ketamine groups was significantly lower than in other groups ($p < 0.05$).

Discussion

The researchers conducted a study to compare the effect of propofol and midazolam on the rate of nausea and vomiting during the cesarean section under spinal anesthesia in Tabriz. In a double-blind, randomized trial, 90 cesarean section patients underwent spinal anesthesia in 3 groups. The midazolam group (1 mg blues and 0.1 mg/kg/h), propofol (20 mg blues and 0.1 mg/kg/h), and the placebo group (normal saline) were administered intravenously immediately after umbilical cord ligation. The rate of nausea, vomiting, and nausea in the placebo group was higher compared with other groups. In general, nausea and vomiting in the midazolam group were less than in the propofol group, and no hemodynamic changes were observed. The results indicated that the minimum dose of midazolam or propofol effectively prevented nausea and vomiting during or after cesarean section under spinal anesthesia and had no significant effect on patients' hemodynamics [8, 9].

Another researcher conducted a study aiming to assess the subcutaneous effect of ketamine on

pain after cesarean section under spinal anesthesia in Ahvaz, Iran. In a double-blind, randomized trial, 60 cesarean section patients underwent spinal anesthesia in 3 groups. Pain intensity and drug use were measured within 24 h after surgery. The first time of drug application was higher in the subcutaneous injection groups before and after the incision, and the amount of drug used within 24 h in these groups was less than placebo. Pain intensity up to 12 h after the intervention was significantly lower than the placebo in the subcutaneous injection groups before and after the incision. There was no statistically significant difference between the two groups before and after the injection in terms of pain intensity, drug use, and the first time of drug application. The results indicated that subcutaneous injection of ketamine in the abdominal incision area before or after the incision significantly reduces pain intensity and drug use [10].

A researcher and colleagues compared propofol and ketamine versus propofol and fentanyl in TL surgery in India. In a double-blind, randomized trial, 60 patients were divided into 2 groups. In the first group, the ketamine-propofol combination was injected 160 mg of propofol plus 200 mg of ketamine. In the second group, 2 µg of fentanyl plus 160 mg of propofol were injected intravenously. The study results showed that patients in the propofol-ketamine group had better surgical conditions and recovery concerning pain and sedation. The results revealed that the propofol-ketamine combination is safe and a superior alternative for TL patients in terms of hemodynamic stability and respiratory depression [11].

This study aimed to compare the effects of propofol, remifentanil, and ketamine on pain and analgesia in lower abdominal surgery under general anesthesia. 75 patients were randomly divided into 3 groups. In the first group 0.25 mg/kg propofol, in the second group 0.25 mic/kg remifentanil. In the third group, 0.3 mg/kg ketamine was injected intravenously after induction of anesthesia. Pain intensity, drug use, and side effects were controlled at 2, 6, 12, and 24 h after the intervention. Pain intensity was significantly lower in the remifentanil group after recovery and at 2 and 6 h. However, at 12 and 24 h, the propofol and ketamine groups had less pain intensity. Morphine consumption in 24 h after surgery was significantly lower in the propofol group than in the other groups. Conclusions The study indicated that single-dose prophylaxis of propofol 0.25 mg/kg significantly reduced analgesia and pain intensity compared with ketamine at 0.3 mg/kg or remifentanil at 0.25 mic/kg [12].

Conclusion

Although many studies used various drugs in cesarean section patients under spinal anesthesia, none of those studies have suggested the preferred method of routine analgesia, chills, and nausea and vomiting that can be done routinely today. Combined analgesic methods seem to increase postoperative pain control and reduce the need to use high doses of narcotics to control pain. The limitations of the above study were the small sample size and patients' mental perception of pain. One of the study's strengths was performing surgeries by a surgeon and collecting data from a center. The results demonstrated that the combination of 25 mg of ketamine and 25 mg of propofol immediately after fetal withdrawal significantly reduced the pain compared to other groups. Complications and morphine use after cesarean section were lower compared with other groups with propofol plus ketamine.

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