



## **Comparison of the Effect of Pregabalin and Diclofenac Suppository on Pain Relief after Elective Cesarean Section**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Introduction:** Cesarean section is one of the most common major surgeries performed worldwide. Considering the importance of post-cesarean pain, finding a drug that can provide the patient with the least amount of complications can make the patient feel the least pain and most relaxation. The aim of this study was to compare the effect of pregabalin and diclofenac suppository on pain relief after elective cesarean section with spinal anesthesia.

**Methods:** This study was performed in 2016 on 100 women admitted to Ali Ibn Abi Talib Hospital due to elective cesarean section. Patients were divided into two groups of 100mg rectal diclofenac half an hour before surgery and 300mg pre-gabalin group. Data were analyzed using SPSS software. Probability level lower than 0.05 was considered significant.

**Results:** The mean score of after surgery pain at 6 and 12 hours after surgery in the diclofenac group was significantly lower than in the pregabalin group, but at 18 and 24 hours, the difference

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between the two groups was not statistically significant. The mean dose of pethidine used in the diclofenac group was significantly lower than the pregabalin group. Maternal satisfaction was significantly higher in the diclofenac group.

**Conclusion:** According to the results of this study, diclofenac has a stronger antinociceptive effect than pregabalin.

*Keywords:* Cesarean section; diclofenac; pregabalin.

## 1. INTRODUCTION

Cesarean delivery is referred to as the birth of a fetus by cutting the abdominal wall and the uterine wall [1]. This is one of the most commonly used surgeries worldwide [2]. Acute pain after surgery is a complex physiological response to tissue damage, visceral dilatation or disease and has various physiological effects on various organs. Pain that restricts the patient's after surgery gait, along with increased stress-coagulation capacity, can contribute to the development of deep vein thrombosis [3]. Considering the importance of post-cesarean pain, finding a drug that can provide the patient with the least side effects and most pain relief is one of the most important issues after cesarean section. Currently, systemic opioids are used to control pain, providing high satisfaction in patients, but these drugs have side effects such as nausea, respiratory depression, and drowsiness [4,5]. In general, antinociceptive therapies can affect the central mechanism of pain (such as opioids), or block the activity of pain receptors (such as lidocaine), or such as non-steroidal anti-inflammatory drugs used to reduce topical hormonal responses to injury, directly reduce pain receptor activity [6,7]. Non-steroidal anti-inflammatory drugs, or NSAIDs, reduce pain by inhibiting cyclooxygenase. One of these NSAIDs is diclofenac sodium, a derivative of phenylacetic acid. This drug exerts its antinociceptive and anti-inflammatory effects by inhibiting the synthesis of prostaglandins and is largely excreted by the kidney and small amounts by the bile. A study by Rahmanpour et al. (2007) showed that the use of diclofenac suppository was more effective than other forms of pain medication and could reduce post-cesarean pain and significantly reduce the need for opiate use [8].

Pregabalin is a new synthetic molecule and a synthetic derivative of the gamma aminobutyric acid inhibitor. It is  $\alpha$ -2 $\alpha$ -ligand that has anesthetic, anticonvulsant, antisense and sleep-modulating effects. In cases of acute pain after surgery, pregabalin plays a role in treatment by

reducing the excitability of posterior horn neurons caused by tissue damage [9]. Based on the results of the study by Essam, et al. (2015), it was found that the use of pregabalin or ketamine significantly reduces the need for morphine use after surgery [10].

According to a review of the literature, no study performed about comparing the effects of pregabalin and diclofenac on post-cesarean pain control. Therefore, considering the importance of pain control after cesarean section and the important side effects [11,12] of NSAIDs (Cardiovascular thrombotic events, increased risk of gastrointestinal bleeding, kidney damage), on the other hand the lack of a study on comparing concomitant Pregabalin and Diclofenac, a study was done in Ali Ibn Abi Talib Hospital aimed at comparing the effect of Pregabalin and Diclofenac suppository on post-cesarean pain relief in post cesarean patients.

## 2. METHODS

This study is a double-blind randomized clinical trial. The study population consisted of all women hospitalized in the labor ward of Ali Ibn Abi Talib Hospital in Zahedan, Iran, who underwent cesarean section in 2017. Data were collected through a questionnaire and then the study conditions were explained to the patients. They were included in the study if they wanted and completed the informed consent form and having the study criteria.

Inclusion criteria was; be their first cesarean, age between 20 and 45 years, weight between 60 and 80 kg, term pregnancy, elective cesarean section, class of anesthesiologist's association 1 and 2 and spinal anesthesia method. Exclusion criteria in this study was: sensitivity to NSAIDs and pregabalin, History of asthma, previous abdominal surgery, having hemorrhoids, proctitis, pregnancy blood pressure, preeclampsia, coagulopathy, gastrointestinal wounds, kidney and liver diseases, severe visual impairments, addiction to drugs or any other psychoactive

substance, spinal anesthesia failure and general anesthesia, patient dissatisfaction, having diabetes and use of anticonvulsant drugs.

**2.1 Sample Size and Sampling Method**

Based on the formula and considering the 95% confidence level and the values below, the sample size was calculated to be 50 in each group (100 in total).

$$\text{Alpha } 0.05 = \text{beta} = 0.2 \quad S1 = 1.16 \quad X1 = 2.89 \\ S2 = 0.90 \quad X2 = 2.25 \quad N = 48$$

$$n = \frac{(s_1^2 + s_2^2)(z_{1-\alpha} + z_{1-\beta})^2}{(\bar{x}_1 - \bar{x}_2)^2}$$

Finally, 50 patients were studied in each group.

**2.2 Method of Study**

Patients' unwillingness to participate in the study had no effect on the normal course of treatment. Patients were randomly divided into two groups of 50 each. Sampling was done by randomized block design. Thus, according to the sample size [100 (50 patients in the pre-gabaline group and 50 patients in the diclofenac group)], 10 blocks were identified.

Before surgery, the visual analogue scale (VAS) was trained and the corresponding number was recorded in her information form and then under spinal anesthesia, cesarean section was performed. Patients were randomly assigned to receive 300 mg of pre-gabaline capsule orally and diclofenac 100 mg rectally, half an hour before surgery, respectively.

Patients were then assessed for vital signs and VAS, up to 24 hours, every 6 hours from entry to recovery (6, 12, 18, 24 hours), as well as pethidine requirement and patient satisfaction (= 1 excellent, = 2 Good, = 3 Moderate, = 4 Dissatisfaction) were recorded in each patient's information form. In VAS above score 3, 25 mg of pethidine was slowly injected for the patient.

**2.3 Data Analysis Method**

The data were entered into SPSS software version 22. Then, descriptive statistics (mean, standard deviation, frequency and percentage) were analyzed. The relationship between variables was examined using Chi-square and Fisher's exact tests at the significance level of 0.05.

**3. RESULTS**

In this study, 100 women undergoing cesarean section were studied. Table 1 compares the mean age of patients and weight of patients in the two groups based on independent t-test. As can be seen in Table 1, there was no significant difference between the study groups.

Also, according to Chi-Square test, patients' gravid did not differ significantly between the two groups. The majority of patients in both groups were Gravid 1 or 2 (Table 2).

According to the independent t-test, the mean score of after surgery pain at 6 and 12 hours after surgery was significantly lower in the diclofenac group (P value: 0.029 and 0.023, respectively). But at 18 and 24 hours, the difference between the two groups was not statistically significant (P values: 0.127 and 0.175, respectively, Table 3).

The mean post operation pain score during the 24 hours in the studied patients was 51±28 and 39±22 mg respectively for the pregabalin and diclofenac groups. Comparison of mean pethidine consumption during the 24 hours after surgery showed that this amount was significantly lower in the diclofenac group (P = 0.04, Table 4).

The results of maternal satisfaction are presented in Table 5. In this study, the highest percentage of patients in the pregabalin group had moderate satisfaction (30%). Most of the patients in the diclofenac group had excellent satisfaction (44%). According to the Chi-Square test, mothers' satisfaction in the pregabalin group was significantly lower than the diclofenac group (P=0.028, Table 5).

**Table 1. Comparison of patients' age and weight in the two study groups**

Parameter	Diclofenac	Pregabalin	Value P
Age	29.54±5.48	30.30±5.82	0.504
Weight	71.18±6.26	70.92±5.96	0.832

**Table 2. Comparison of the gravid of patients in the two groups**

Gravid	Diclofenac	Pregabalin	Value P
1	23 (46%)	21 (42%)	0.098
2	19 (38%)	20 (40%)	
3	7 (14%)	8 (16%)	
4	1 (2%)	1 (2%)	

**Table 3. Comparison of mean pain scores in the diclofenac and pregabalin groups**

Time (h)	Diclofenac	Pregabalin	Value P
6	4.76±1.58	5.56±1.99	0.029
12	3.02±1.05	3.62±1.49	0.023
18	1.84±1.26	2.26±1.45	0.127
24	0.50±0.88	0.78±1.14	0.175

**Table 4. Mean dose of pethidine consumed in the diclofenac and pregabalin groups**

Treatment	Mean ± SD	Value P
Diclofenac	39±22	0.04
Pregabalin	51±28	

The results of this study showed that the median time to first analgesic application in the diclofenac group was 5.6±1.9 hours and this index was 4.6±1.5 hours in the pregabalin group. Median time to first analgesic application for pregabalin recipient group was significantly lower than diclofenac recipient group (P=0.028, Table 6).

#### 4. DISCUSSION

In this study, 100 patients undergoing cesarean section were studied. The mean pain score at the 6th and 12th hours after surgery in the diclofenac group was significantly lower than that of the pregabalin group, but at 18 and 24 hours, the difference between the two groups was not statistically significant. Also, the mean dose of pethidine used in the diclofenac group was significantly lower than in the pregabalin group. Maternal satisfaction was significantly lower in the pregabalin group than in the diclofenac group. In the diclofenac group, 44% of patients were satisfied and only 6% were dissatisfied, but in the pregabalin group, 26% were dissatisfied

and 26% were satisfied. The mean time of first analgesic application in the pregabalin group was significantly less than that of the diclofenac group. This means that patients in the pregabalin group needed additional pain relief shortly after surgery.

In a study evaluating the analgesic effect of rectal diclofenac on reducing after surgery opiate use on 80 women, Rabie, et al. (2006) reported that the number of pethidine's received in the diclofenac recipient group was significantly lower than the control group. Mean pain score in the receiving group was not significantly different from the control group [13]. In another study by Joshi Vyankatesh S, et al. (2013), they compared the analgesic effect of rectal tramadol and diclofenac suppositories in patients undergoing cesarean section and studied 60 patients. In that study, it was reported that mean pain scores at 2, 4, 6, 8 and 10 hours were significantly lower in the diclofenac group than in the tramadol group [14].

Also, in another study by Somboon Thienthong, et al. (2012) investigating the effect of intravenous diclofenac on pain relief after cesarean section using 30 patients showed that the mean pain score in diclofenac recipient group was significantly lower than the placebo group in the 24th h after surgery. Tramadol intake was not significantly different between the two groups [15]. In another study conducted by Akhavan Akbari and colleagues in Ardabil in 2013, they evaluated the effect of indomethacin, diclofenac and acetaminophen on pain and opioid use in patients undergoing cesarean section, using 120 women. The pain intensity in the control group was significantly higher than the other groups. Pain intensity was significantly lower in the acetaminophen group than in the indomethacin and diclofenac groups. Duration of first analgesic application in the three intervention groups was significantly longer than the control group [16].

In another study conducted by Sumesh, et al. In 2013 on 66 patients undergoing head and neck surgery, the effect of diclofenac (75 mg orally) compared to pregabalin (150 mg orally) on

**Table 5. Comparison of maternal satisfaction in pregabalin group with diclofenac**

Satisfaction	Diclofenac	Pregabalin	P value
Excellent	22 (44%)	13 (26%)	0.028
Good	12 (24%)	9 (18%)	
Medium	13 (26%)	15 (30%)	
Dissatisfaction	3 (6%)	13 (26%)	

**Table 6. Comparison of mean time to first analgesic application in the diclofenac and pregabalin group**

Treatment	Mean $\pm$ SD	Value P
Diclofenac	5.6 $\pm$ 1.9	0.009
Pregabalin	4.6 $\pm$ 1.5	

severity Postoperative pain and need for analgesics were assessed. The results of this study showed that patients in the pregabalin group showed less pain intensity at 12 and 24 hours postoperatively and fewer patients required analgesia after surgery [17]. In another study conducted by Mohsen Mohamed El-guoshy and colleagues in Egypt in 2018, they investigated the effect of pregabalin on the reduction of the frequency of post-cesarean headache using spinal anesthesia and studied 400 patients. The frequency of shivering, nausea, vomiting, headache frequency, and the need for additional analgesics were significantly lower in the pregabalin group than in the control group [18].

In a study by Darwish, et al. (2014), 120 women undergoing cesarean section under spinal anesthesia were selected to evaluate the analgesic effect of diclofenac and paracetamol compared to meperidine in cesarean section. In this study, women were randomly divided into two groups. In the first group, subjects received diclofenac suppository at the end of surgery and then 1 g bolus of paracetamol and in the second group received 20 mg bolus of meperidine to control postoperative pain after transfer to the recovery room. The results of this study showed that combination of paracetamol and diclofenac had better efficacy in controlling postoperative pain compared to meperidine and reduced the need for analgesia [19].

## 5. CONCLUSION

According to the results of this study, the rate of pain reduction after cesarean section with diclofenac was significantly higher than that of pregabalin. In general, since diclofenac is more effective than pregabalin and patients are more satisfied with the less need for additional analgesics, it is recommended to use diclofenac to control post-cesarean pain.

## CONSENT

As per international standard or university standard written patient consent has been collected and preserved by the author(s).

## ETHICAL APPROVAL

As per international standard or university standard ethical approval has been collected and preserved by the authors.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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