THE USE OF RECTAL DICLOFENAC SODIUM VERSUS INTRAVENOUS PARACETAMOL FOR POST CESAREAN SECTION ANALGESIA

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ABSTRACT

Background

Pain management is one of the most important aspects of postoperative care. Pain causes unpleasant experiences such as prolongation of postoperative recovery and development of stress reactions. Pain relief is of great importance in patients with CCesarean section by relaxing the mother, enhancing the ability of self-care, resulting into early discharge and subsequently reduces nosocomial infections and hospitalization costs.

Objectives

To compare the analgesic efficacy of Diclofenac sodium suppository (100 mg) versus intravenous paracetamol (1000 mg) in postoperative pain management for women undergoing Caesarean section.

Patients and Methods

This study is a single blinded randomized clinical trial conducted in Sulaimani Maternity Teaching Hospital from 1st of June 2018 to 1st of February 2019 on 124 pregnant women who underwent 1st or 2nd Caesarean section under spinal anesthesia without any medical disease or drug allergy. After obtaining informed consent from the participants, patients were randomly divided into two groups. Group A (62 patients) received 100 mg rectal Diclofenac sodium, Group B (62 patients) received 1000 mg intravenous Acetaminophen immediately after Cesarean section. The patients were observed for 12 hours after the end of surgery. The pain intensity was judged using McGill pain scale at time periods 1, 6 and 12 hours after the ending of surgery.

Results

Mean pain score was significantly lower at 1, 6 and 12 hours of Diclofenac sodium group comparing to that of paracetamol group $p<0.001$. After 1 hour, 60 patients (96.8%) in Diclofenac group had no pain, while 26 of paracetamol group (41.9%) had no pain The paracetamol group significantly needed more additional analgesia than Diclofenac group $P<0.001$. No side effects were recorded in any of the two groups.

Conclusion

For post Cesarean pain relief, rectal Diclofenac sodium was found to be safe and effective and has much better analgesic effect than intravenous paracetamol infusion.

Keywords: *Cesarean section, Analgesia, Diclofenac sodium suppository, Paracetamol infusion.*

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INTRODUCTION

Postoperative pains from the wound and from uterine contractions are the two sources of pain after Cesarean section [1]. Pain-induced hypoxia by stimulating the sympathetic nervous system in body organs may lead to respiratory, gastrointestinal and renal disorders and consequently result in patient's inability to perform activities, prolonged hospitalization, incapability of self-care and increase in healthcare cost [2]. Pain management has also been important in prevention of postoperative complications and is considered as the fifth vital sign [3]. Regarding the care of women delivered by caesarean section in the early hours after birth, pain management is necessary for communicating with the newborn and initiation of breastfeeding [4, 5]. Pain relief is of great importance in patients with Cesarean section by relaxing the mother, enhancing the ability of self-care, resulting into early discharge and subsequently reduces nosocomial infections and hospitalization cost.

Prevention of postoperative pain and post-anesthetic shivering should be considered and managed as two important components to improve the outcomes in terms of the remarkable consequences mentioned above [6]. The use of opioid analgesics for postoperative pain relief is a base treatment, but they are associated with many side effects including respiratory depression, excessive sleepiness, decreased gastrointestinal motility, nausea, vomiting and spasm of the bile ducts [7]. Opioid use can lead to addiction and abuse [8], sedation associated with opioid-based analgesia following Cesarean section can disrupt breastfeeding, infant care, and mother-infant bonding [9], while sub optimal pain management or increased sedation may impair the mother's ambulation, which increases the risk of thromboembolic disease [10]. Due to the complications of opioids, recently physicians have focused on non-steroidal anti-inflammatory drugs (NSAID) for pain control [11, 12].

NSAIDs exert their action by inhibiting prostaglandin synthesis via inhibition of cyclooxygenase. NSAIDs have been reported to be effective in suppressing shivering and relieving pain. Diclofenac sodium is among the NSAID category of drugs, it is effective in postoperative pain management and reducing postoperative narcotic demands [13-15]. Diclofenac Sodium has a wide indication in postoperative pain relief through a direct anti-inflammatory and analgesic effect and indirect effect on chemical mediators responsible for painful impulses. Moreover, Diclofenac sodium neither causes respiratory depression, nor other side-effects such as vomiting, itching and hemodynamic instability. However, Diclofenac sodium like other NSAIDs has some GI effects and there is a theoretical risk of postoperative hemorrhage as it prolongs bleeding time and reduces platelet aggregation [16, 17].

Acetaminophen (paracetamol) is a synthetic, non-opiate, centrally acting analgesic and antipyretic derived from p-aminophenol. It has not been shown to affect platelet function, increase surgical bleeding, or affect kidney function [18] and is, therefore, appropriate for use at any time during the perioperative period. The opioid-sparing qualities of acetaminophen have been recognized and these properties may lead to acetaminophen being incorporated effectively as an adjunct therapy [7]. Unlike non-steroidal anti-inflammatory drugs (NSAIDs), acetaminophen has no substantial peripheral anti-inflammatory activity [19].

Despite more than a century of study, the mechanism of action of acetaminophen is not definitively known, although it is believed that part of its analgesic action may be associated with centrally acting cyclooxygenase (COX) inhibition with weak peripheral effects [20-22]. This central action could explain the antipyretic effect of acetaminophen, and the minimal peripheral effects could be responsible for the lack of gastric irritation and clotting abnormalities often associated with NSAIDs. Owing to its efficacy, safety, and lack of the side effects associated with other analgesics, acetaminophen has been considered a fundamental component of the multimodal analgesic approach to which NSAIDs and other drugs are added [23].

At therapeutic dose paracetamol associated with fewer side effects than either opioids and/or NSAID. Serious skin rash may rarely occur, and too high dose can result in liver failure. In those with liver disease, it may still be used but in lower doses [24].

The aim of this study was to compare the analgesic efficacy of Diclofenac sodium suppository (100mg) versus intravenous paracetamol (1000mg) in postoperative pain management for women undergoing caesarean section.

PATIENTS AND METHODS

This study is a single blinded randomized clinical trial conducted in Sulaimani maternity teaching hospital from 1st of June 2018 to 1st of February 2019. After being approved by the Research Ethics Committee of the board council and obtaining the written informed consent from participants. The study included 124

pregnant women who underwent 1st or 2nd caesarean section under spinal anesthesia without any medical disease or drug allergy; patient with chronic medical disease, multiple pregnancy was excluded from the study.

Ethical consideration

This study received ethical approval from the institutional review board and the Research Ethics Committee of Sulaimani maternity teaching hospital. All the participants signed a written informed consent before participation and were assured of the confidentiality of their personal information. They all also had the right to withdraw from the study at any time.

Intervention

After obtaining informed consent from the participants, patients were randomly divided into two groups. Group A (62 patients) received 100 mg rectal Diclofenac sodium immediately after Cesarean section, Group B (62 patients) received 1000 mg intravenous acetaminophen immediately after Cesarean section. The patients were observed for 12 hours after the end of surgery. The patients were blinded to the type of drug used. The pain intensity was judged using the McGill Pain Questionnaire (25) (Table 1) at time periods 1, 6 and 12 hours after the ending of surgery. The descriptors in the McGill Pain Questionnaire fall into 4 major groups: sensory (items 1-10), affective (items 11-15), and evaluative (item 16), and miscellaneous (items 17-20). The present pain intensity (PRI) is based on a scale of 0 (no pain) to 5 (excruciating pain). The pulse, blood pressure, oxygen saturation, urine output, and adverse effect were noted. If a patient reported pain scale greater than 2 additional analgesia was given. The need of rescue analgesic was recorded and comparison done between the two groups.

Table 1. McGill's pain intensity scale

McGill scale	Pain intensity
0	No pain
1	Mild pain
2	Discomfort
3	Distressing
4	Horrible
5	Excruciating

Source: Katz and Melzack (2011) [25].

Statistical analysis

After data collection, the question of study coded, the data entered by using an excel spreadsheet then analysis done by " IBM SPSS program version 25 " The data presented in tubular forms showing the frequency distribution different variable among the both groups of patient (Diclofenac sodium group and paracetamol group). A *P*-value of (≤0.05) was considered as statistically significant, and a *P*-value of (<0.001) as statistically highly significant. In addition, Pearson Chi _Square test was used to find out the significance of association between independent and dependent variable pairs and Pearson R correlation was used to calculate the direction of the correlation between the two variables. Pain score of both groups was compared after administration of the medication.

RESULTS

A total 124 women underwent Cesarean section included in the study, 62 women received (100 mg) rectal Diclofenac sodium and 62 women received (1000) mg intravenous paracetamol.

1. Demographic characteristics

The mean age for Diclofenac group was 27.6 ± 6.3 and for the paracetamol group it was 26.8 ±7.3. The mean of gestational age (GA) in weeks for both groups was 38.9 week, about two thirds of women in both groups were nulliparous. The difference was statistically not significance as shown in Table 2.

2. Pain intensity after 1 hour of drug administration

The pain scale was observed by using McGill pain intensity scale. After 1 hr of drug administration in Diclofenac sodium group, 60 women had score 0 (no pain), 2 women had score 1 (mild pain). While in paracetamol group 26 women had score 0 (no pain), 35 women had score 1 (mild pain), 1 women had score 2 (discomfort).The difference in the two groups was statistically significant (p< 0.001) as shown in Table 3.

3. Pain intensity in the women received rectal Diclofenac sodium (100mg) and IV paracetamol (1000mg) after 6 hours of drug administration using McGill pain scale

In Diclofenac sodium group; 5 women had score 0 (no pain), 22 women had score 1 (mild pain), 27 women had score 2 (discomfort), 7 women had score 3 (distressing), only 1 woman had score 4 (horrible) and no one had

score 5 (excruciating). While no women in paracetamol group had score 0 and score 1, 14 women had score 2 (discomfort), 32 women had score 3 (distressing) and 16 women had score 4 (horrible) also no one had score 5 (excruciating). The difference between the two groups was statistically significant (p – value <0.001) as shown in Table 4.

4. Pain intensity in the women received rectal Diclofenac sodium (100mg) and IV paracetamol (1000mg) after 12 hours of drug administration using McGill pain scale

After 12 hours of drug administration in Diclofenac sodium group; 14 women had score 0 (no pain), 35 women had score 1 (mild pain), 10 women had score 2 (discomfort) and 3 women had score 3 (distressing), while in paracetamol group; 3 women had score 0 (no pain), 14 women had score 1(mild pain),33 women had score 2(discomfort) and 12 women had score 3 (distressing). The difference was statistically significant as shown in Table 5 (p< 0.001).

5. The need for additional analgesia

Additional analgesia used in both Diclofenac and paracetamol group is shown in Table 6, in Diclofenac group; 3 women needed another analgesia, while in paracetamol group 17 women needed another analgesia.

6. Side effects of drugs in both groups

Regarding side effect there are no significant side effects in both group.

Table 2. Demographic characteristics of the women received rectal Diclofenac sodium (100 mg) and IV paracetamol (1000 mg) after Cesarean section.

Variables		Rectal Diclofenac sodium (100 mg) group		IV paracetamol (1000 mg) group		P-value
		Mean ± SD	Range	Mean ± SD	Range	
Age (year)		27.6 ± 6.3	17 to 43	26.8 ±7.3	17 to 44	0.383
Occupation (%)	House wife	28 (45.2)		37 (59.7)		0.273
	Officer (Employee)	9 (14.5)		4 (6.5)		
	Student	12 (19.4)		12 (19.4)		
	Teacher	13 (21)		9 (14.5)		
Gestational age (week)		38.9 ± 1.2	37 to 41	38.9 ± 1.4	37 to 42	0.302
Parity (%)	Nulliparous	40 (64.5)		41 (66.1)		0.857
	Multiparous	22 (35.5)		21 (33.9)		
Gravida		1.9 ± 1.2	1 to 6	2.1 ± 1.7	1 to 9	0.912
Para		0.66 ± 1.2	0 to 5	0.82 ± 1.6	0 to 7	0.84
Abortion		0.21 ± 0.68	0 to 4	0.21 ± 0.45	0 to 2	0.078

IV = intravenous; SD = standard deviation

Table 3. Pain intensity in the women received rectal Diclofenac sodium (100 mg) and IV paracetamol (1000 mg) after 1 hour of drug administration using McGill pain scale.

Type of analgesia	McGill's pain scale (1 hour postoperatively)			Total (%)	P-value (Pearson R Correlation)
	No pain (%)	Mild pain (%)	Discomfort (%)		
Rectal Diclofenac sodium (100 mg)	60 (96.8)	2 (3.2)	0 (0)	62 (100)	<0.001 (0.586)
IV paracetamol (1000 mg)	26 (41.9)	35 (56.5)	1 (1.6)	62 (100)	

IV = intravenous

Table 4. Pain intensity in the women received rectal Diclofenac sodium (100 mg) and IV paracetamol (1000 mg) after 6 hours of drug administration using McGill pain scale .

Type of analgesia	McGill's pain scale (6 hours postoperatively)					Total (%)	P-value (Pearson R Correlation)
	No pain (%)	Mild pain (%)	Discomfort (%)	Distressing (%)	Horrible (%)		
Rectal Diclofenac sodium (100 mg)	5 (8.1)	22 (35.5)	27 (43.6)	7 (11.3)	1 (1.6)	62 (100)	< 0.001 (0.671)
IV paracetamol (1000 mg)	0 (0)	0 (0)	14 (22.6)	32 (51.6)	16 (25.8)	62 (100)	

Table 5. Pain intensity in the women received rectal Diclofenac sodium (100mg) and IV paracetamol (1000mg) after 12 hours of drug administration using McGill pain scale.

Type of analgesia	McGill's pain scale (12 hours postoperatively)				Total (%)	P-value (Pearson R Correlation)
	No pain (%)	Mild pain (%)	Discomfort (%)	Distressing (%)		
Rectal Diclofenac sodium (100 mg)	14 (22.6)	35 (56.5)	10 (16.1)	3 (4.8)	62 (100)	< 0.001 (0.480)
IV paracetamol (1000 mg)	3 (4.8)	14 (22.6)	33 (53.2)	12 (19.4)	62 (100)	

Table 6. The need for additional analgesia in both groups.

Extra analgesia	Type of analgesia		P-value (Pearson R Correlation)
	Rectal Diclofenac sodium (100 mg) (%)	IV paracetamol (1000 mg) (%)	
Needed no extra analgesia	59 (95.2)	45 (72.6)	<0.001 (-0.336)
Needed another analgesia	3 (4.8)	17 (27.4)	
Total	62 (100)	62 (100)	

DISCUSSION

The use of non-opioid analgesics for postoperative analgesia is a standard practice worldwide as it reduces opioid induced side effects [18, 26].

The mechanism behind the postoperative pain is not completely understood but it is thought that prostaglandin release and local edema caused by the surgical procedure are involved as causative factors. Prostaglandin E2 increases the sensitivity of the sensory nerve ends to pain stimulants [27]. This effect could be counteracted by the anti-prostaglandin action of non-steroidal anti-inflammatory agents. Uterine cramps, another source of postpartum pain, occurs as a result of prostaglandin action on the myometrium which stimulates contractions. In the present study both drugs (Diclofenac sodium and paracetamol) were effective in reducing the severity of pain but the Diclofenac sodium was more effective. In our study, in the Diclofenac group the requirement of rescue analgesia was significantly lower compared to paracetamol group. This result agreed with Rashid M et al. (2000) [18] they studied the use of rectal Diclofenac for post-Cesarean analgesia, they found; as recorded by visual analogue scale (VAS), that Diclofenac sodium group had less postoperative pain and less needed to adding another analgesia. Meanwhile there are some studies indicating that the use of Diclofenac alone is more effective to control postoperative pain in comparison with acetaminophen alone. Results of Sidik et al. [16] of 80 patients undergoing scheduled Cesarean section in 4 groups, placebo, rectal Diclofenac, intravenous paracetamol and paracetamol–Diclofenac combination, showed less pain severity score and need for narcotics in patients receiving Diclofenac while acetaminophen was less effective than the combination of Diclofenac-acetaminophen.

Also the current research agreed with the findings of Joshi Vyankatesh S et al [28]. They did a comparative study of analgesic efficacy of rectal suppository of tramadol versus Diclofenac in suppressing postoperative pain after Cesarean section**.** They found as recorded by VAS score that mean VAS was less in Diclofenac group than in tramadol group and this difference was statistically significant.

Furthermore, the result of the present study is comparable with the findings of Ali Janpour Ebrahim1 et al [29], they studied early postoperative relief of pain and shivering using Diclofenac suppository versus intravenous pethidine in spinal anesthesia, they found as recorded by VAS scale that sodium Diclofenac can provide satisfactory analgesia immediately after surgery.

Meanwhile the results of the present study are not agreeing with the findings of Fozieh Bakhsha et al [3]. They studied effects of Diclofenac suppository and intravenous acetaminophen and their combination on the severity of postoperative pain in patients undergoing spinal anaesthesia during Cesarean section. They found as recorded by VAS scale, in terms of mean pain severity scores during the study, combined acetaminophen-Diclofenac group had the lowest mean score and the highest mean score was found in the Diclofenac group.

In conclusion; for post Cesarean pain relief, rectal Diclofenac sodium was found to be safe, effective and has much better analgesic effect than intravenous paracetamol infusion.

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