

Patient-controlled versus nurse-controlled post-operative analgesia after caesarean section

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Abstract

Background: The aim of this study was to compare the differences in the quality of analgesia by patient-controlled analgesia (PCA) and nurse-controlled analgesia (NCA) for post-caesarean section analgesia.

Materials and Methods: 350 women who undertake elective cesarean section were assigned to the three groups. Group I (n=200), IV-PCA morphine; group II (n=100), IV-PCA methadone; group III (n=50) NCA morphine. Data collected during the 24 h observation period included visual analog scale (VAS) pain and patient satisfaction scores, the incidence of nausea and vomiting, severe sedation and pruritis.

Results: VAS pain scores for each time at which it was evaluated were higher for NCA group than other groups. Also patient satisfaction was significantly increased in the IV-PCA Group as compared with group III. The prevalence of pruritis was higher for NCA group than other groups.

Conclusion: In post caesarean section, PCA morphine or methadone improves 24-h VAS compared with NCA.

Key Words: Caesarean section, morphine, methadone, patient-controlled analgesia, nurse-controlled analgesia

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INTRODUCTION

Depending on the operation, anesthetist, patient and circumstances, Postoperative analgesia technique are varies. Intravenous Patient-Controlled Analgesia (IV-PCA) is an effective way of supporting postoperative analgesia and has gained wide acceptance. In addition

it used as a standard method to manage acute postoperative pain. Also it is well accepted by both patients and medical personnel.^[1-4] Physicians often choose IV-PCA because it has a simple route of administration and is safe.^[5,6]

Today, cesarean delivery is a widespread surgical procedure with rising rate.^[7] Thirty five percent of infants in Iran are delivered by caesarean section.^[8] After caesarean section, pain may reduce the ability of the mother for breast-feeding. Also it may harm the mother's ability to best care for her infant in the immediate postpartum period.^[9] Therefore, good analgesia is important after caesarean section because it will provide opportunities for mothers' child bonding and hence leading to greater overall patient satisfaction.^[10]

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Several studies compared the PCA with different routes of opioids administration for post-caesarean analgesia.^[10,11] Other studies compared the PCA with different regimens to manage the pain after caesarean section.^[12,13] In addition, in one study they compared the PCA with morphine in patients who underwent elective cesarean section under general anesthesia with different anesthetic techniques.^[14] Also, previous studies reported that in the postoperative pain after cardiac surgery, PCA is a better way in improving analgesia in comparing with traditional Nurse-Controlled Analgesia (NCA) treatment, so patients prefer it.^[15-17]

We could not find any information about comparisons between NCA and IV-PCA morphine and methadone for acute post-operative pain after cesarean section. Therefore, we decided to undertake a randomized clinical trial of NCA and IV-PCA morphine and methadone in a series of elective cesarean surgery patients.

MATERIALS AND METHODS

This study was a randomized controlled trial and conducted in the Sadi hospital in Iran, Isfahan; over an 8 months period from Apr 2010 to Nov 2010, Ethical approval was obtained from our hospital's ethics committee before recruitment. Patients were eligible for enrolment if they didn't have evidence of eclampsia, preeclampsic toxemia, bacteremia or coagulopathy, inability to use the PCA device, known allergy to any of the study medications, diabetes mellitus and history of drug abuse. Written informed consent was recorded from subjects who agreed to participate.

350 women who requested general anesthesia for elective cesarean section were randomly assigned to the three groups using a computer-generated number list. Group I (n=200) were assigned to receive IV-PCA morphine, group II (n=100) to receive IV-PCA methadone and group III (n=50) to receive NCA morphine.

As the general anesthesia resolved, patients received IV-PCA or NCA when they were admitted to the post-anesthesia care unit and were awake, able to answer questions and follow commands. The total volume of IV-PCA medication was determined to be 100 cc, consisting of 10 mg solution of morphine or 5 mg solution of methadone. The continuous IV-PCA regimens consisted of 4 cc/h (0.4 mg of morphine solution or 0.2 mg of methadone solution), with 15 min lockout time and bolus of 1 cc (0.1 mg of morphine solution or 0.05 mg of methadone solution). The NCA regimen consisted of a 10 mg/1cc solution of morphine

with a dose of 5 mg, given every 5 hour based on patients requested and nursing.

Data collection included the number of injections actually delivered by the PCA, the number of demands by each patient to nurse administer, visual analog scale (VAS) pain score, VAS patient satisfaction score, sedation score and the incidence of nausea and vomiting and pruritis. Pain intensity was measured on a 10 point VAS that ranged from "0" (no pain) to "10" (worst possible pain). Overall satisfaction was assessed by using a 10 point scale (0 = no satisfaction to 10 = best satisfaction).

Study measurements in 24 hour were taken at 0 h, 1 h, 3 h, 5 h, 9 h and 24 h. Patients had been in the post-anesthesia care unit for maximum 30 minutes and the time when they were admitted to the ward was designate as time 0 for the purpose of assessment.

All analyses were done with the use of PASW software (version 18). Data are presented as means \pm 1SD, median (IQR) or number (percent) as appropriate. Repeated Measurement of ANOVA was used to compare trend of pain score during 24 hours follow-up. One-way ANOVA was used to compare mean of age, Kruskal-wallis was used to compare median of pain, satisfaction and sedation score (24h) and chi-square was used to compare incidence of nausea and vomiting and pruritis among groups. *P* value of less than 0.05 was regarded as statistically significant.

RESULTS

Of the 17 patients who did not enter the study, 11 patients met the screening criteria but refused consent and 6 patients did not meet the inclusion criteria. All patients in the three groups were included in the analysis [Figure 1].

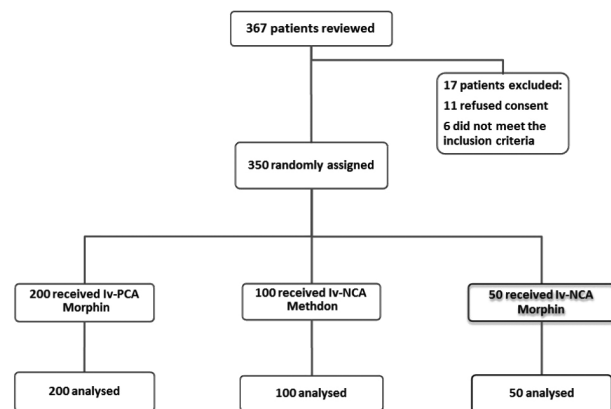


Figure 1: Trial Profile

Table 1: Mean of VAS pain scores in 350 patients for each time at which it was evaluated after elective cesarean section

	n	Time						P value*
		0 h	1 h	3 h	5 h	9 h	24 h	
PCA morphine group	200	4.5±2.2	2.9±1.8	1.7±1.1	1.3±1.2	1.2±1.3	0.4±0.8	<0.0001
PCA methadone group	100	3.8±2	2.5±1.6	1.7±1.4	1.2±1.1	0.8±0.9	0.6±0.7	
NCA morphine group	50	6.6±2.1	5.4±1.6	4.9±1.4	4.4±1.2	1.9±2.1	1.9±1.4	

*Repeated Measurement of ANOVA was used for P value.

Table 2: Pain, satisfaction, sedation scores and side effects in 350 women who had elective cesarean section

	Group I (n=200)	Group II (n=100)	Group III (n=50)	P value
Pain score (24h)	2.2 [1.4-3]	2 [1.2-2.6]	4.7 [4.2-5.6]	<0.0001*
Satisfaction score (24h)	3.2 [2.8-3.8]	3.2 [2.6-3.8]	2.2 [2-2.6]	<0.0001*
Sedation score (24h)	1.2 [0.8-1.8]	1.4 [0.6-2.1]	1.2 [0.4-2.1]	0.58*
Nausea and Vomiting (24h)	9 (4.5)	4 (4)	6 (11)	0.1†
Pruritis (24h)	15 (7.5)	1 (1)	6 (11)	0.02†

Data are median [IQR], and number (%). Group I; received PCA morphine, group II; received PCA methadone, group III; received NCA morphine P value calculated with*Kruskal-wallis and †chi-square

There were 350 women with a mean age of 29 ± 4.6 years for all patients, 29.2 ± 4.5 years for group I, 28.8 ± 4.6 years for group II and 28.9 ± 4.7 years for group III. There were no significant differences among three groups regarding age (P value = 0.8).

Table 1 shows the mean of the VAS pain scores. Pain values for each time at which it was evaluated were higher for NCA group and the difference among the three groups was statistically significant significantly (P value < 0.0001).

The median of VAS pain, patient satisfaction and sedation scores and the incidence of nausea and vomiting and pruritis during 24 hours are shown in Table 2. Pain, patient satisfaction scores and pruritis were statistically significant among the groups (P value < 0.05).

DISCUSSION

[Pain management is the cornerstone of obstetric care. Pain decreases the ability to function and interferes with maternal care of the newborn. Severe postoperative pain is also associated with longer postoperative stay, nausea and vomiting, reduced cough, sputum retention, atelectasis, hypoxemia and increased risk of cardiac events].^[18] The present study hypothesized the differences between IV-PCA morphine or methadone with NCA morphine for pain management after caesarean section and demonstrated that in the first 24 hours after caesarean section, IV-PCA methadone or morphine provided more effective analgesia than NCA with morphine. VAS pain score was significantly decreased in the IV-PCA group.

Also patient satisfaction with postoperative analgesia was significantly increased in the IV-PCA group as compared with the control group. The prevalence of nausea and vomiting in NCA group was more than IV-PCA groups like sedation and pruritis, but just the differences between groups for pruritis was significant.

Because of limitation in trials to compared NCA with IV-PCA after cesarean section -previous trials mostly evaluated the PCA with different routes of opioids administration^[10,11] and different regimens^[12,13] for post caesarean analgesia- we were unable to find similar studies to compare our results, but in a meta-analysis^[17] and a systematic review^[15] of randomized trials that compared NCA with IV-PCA with opioids in the postoperative pain after cardiac surgery, the authors reported evidence that supports the efficacy of IV-PCA versus NCA which are similar with the findings of the present study in cesarean population. Also in contrast of our results Andrew *et al*^[19] in a randomized trial showed that nurse-administered subcutaneous morphine is a satisfactory alternative to IV-PCA after cardiac surgery. Lim *et al*^[10] compared intrathecal (IT), epidural (EP) and IV-PCA morphine for post-caesarean section analgesia. And concluded that the use of IT and EP morphine were associated with lower pain scores than IV-PCA. Also both EP and IT morphine were associated with a greater risk of pruritis than IV-PCA which is similar with the present study that showed the prevalence of pruritis in IV-PCA group was lower than NCA group even though study groups were different in both trails.

In conclusion, the results of this study showed that the use of IV-PCA was associated with lower pain

scores when compared with NCA. Also the use of IV-PCA methadone enhanced the efficacy of analgesia of IV-PCA morphine. Future trials should focus on patient and surgical variables effect on IV-PCA. And cost-effectiveness studies will be needed to find out whether the usual use of PCA should be advocated in place of NCA in post-caesarean surgical patients.

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