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Evaluation of the efficacy of ilioinguinal and iliohypogastric blocks on postoperative pain relief and use of opioids after lower segment caesarean section

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ABSTRACT

Background: Caesarean delivery can be associated with considerable postoperative pain. This study designed to evaluate the efficacy of ilioinguinal and iliohypogastric (II-IH) blocks on postoperative pain relief and use of opioids after lower segment caesarean

section. *Materials and Methods:* One hundred fifty mothers candidate for elective cesarean section (CS) included in the study and randomly allocated into two groups. Procedure of CS was equal in all cases. group I were assigned randomly to receive nerve block with either 20ml of 0.25% bupivacaine and in group II 20ml normal saline solution. Opioids dose was measured during the postoperative period during 8 hours. Postoperative pain was assessed with a visual analog scale (VAS). *Results:* II-IH nerve blocks with bupivacaine injection in CS may cause reduction of postoperative pain and analgesic consumption after CS. There was a significant decrease in opioid administration and pain on visual analog scale in nerve block group, as compared with placebo Group. 8 hours after the operation, pain severity in both nerve blocks and placebo groups were similar. Total dose of opioid administration was significantly lower in group I. *Conclusion:* This study shows that nerve blocks with bupivacaine injection in CS may cause reduction of postoperative pain in mothers.

Keywords: Nerve block, Bupivacaine, pain relief, Ilioinguinal and Iliohypogastric (II-IH).

1. INTRODUCTION

Postoperative pain may cause many malfunctions in various systems, including increase of sympathetic tone, catecholamine release and increase of catabolic hormones. These alterations may result in sodium and water retention, hypertension and hyperglycemia (Liu et al., 1995). Hyper-coagulopathy, increase of myocardial oxygen consumption and probably myocardial ischemia, respiratory failure and bowel ileus are other examples of effects of pain on body systems (Wu and Fleisher, 2000). Caesarean delivery (CD) has been one of the most frequently performed major surgical interventions and causes severe postoperative pain (Sakalli et al., 2010). CD and subsequent manipulation performed through Pfannenstiel incision are associated commonly with a significant degree of pain in the postoperative period; 79% of women experience pain at the incision site that can last for up to 2 months (Bell et al., 2002). Inadequate postoperative analgesia is one of the most common causes for poor patient satisfaction following caesarean delivery (Bell et al., 2002 and Mishriky et al., 2012).

Childbirth is an emotion-filled event, and the mother wants to bond with her newborn as early as possible. Inadequate postoperative pain relief after CD can negatively impact ambulation, breastfeeding, and even maternal bonding (Abdallah et al., 2012 and Nguyen et al., 2010). The provision of effective postoperative analgesia is a key to facilitate early mobilization of the mother, infant care, and prevention of postoperative morbidity. Improvement in postoperative analgesia may not only increase patient satisfaction but also diminish the duration of hospital stay and reduce the risk of complications (Buhagiar et al., 2011 and Li et al., 2015).

Therefore, postop pain management is one of main goals in any kind of surgery. There are many routes and methods of postop pain control; like intravenous injection of drugs, local anesthesia, epidural injection of local anesthetics (Hurley et al., 2010). Opioids are the most famous pain killers in postop pain control. Indeed, because of side effects of opioids like itching, nausea and vomiting, risk of delayed maternal respiratory depression, many studies designed to find a good substitute for opioids (Bell et al., 2002 and Mishriky et al., 2012 and Li et al., 2015). In obstetric and gynecologic surgeries, ilioinguinal and iliohypogastric nerve block with bupivacaine is a good choice for postop pain control; it can cause pain relief for at least 5-7 hours via nerve block (Sweetman, 2002).

Previous studies showed that bupivacaine nerve block can cause pain relief in many lower abdominal surgeries through ultra-sonographic localization or blind localization of those nerves (Sweetman, 2002 and Huffnagle and Norris, 1996 and Bugedo and Carcamo, 1995 and Costello et al., 2009 and Belavy et al., 2009 and Gucev et al., 2008), Therefore this randomized study designed to evaluate the efficacy of ilioinguinal and iliohypogastric (II-IH) blocks on postoperative pain relief and use of opioids after lower segment caesarean section.

2. MATERIALS AND METHODS

In a double blinded randomized clinical trial 150 women who were candidate for cesarean section (CS) in Shaheed Akbarabadi hospital of Tehran enrolled in study after inclusion and exclusion criteria. All steps of study explained for each case and an informed contest obtained. If any case had medical problems like diabetes mellitus, hypertension COPD or any condition that influences anesthesia or have hypersensitivity to bupivacaine, coagulopathy or any drug addiction excluded from study.

Patients were randomly allocated into two equal groups. All cases underwent CS with spinal anesthesia. Before abdominal wall reconstruction, two catheters entered in pre-pritoneal area of anterior abdominal wall medial to anterior superior iliac spine under direct visualization. A 22G needle was advanced to the skin and after piercing the external oblique fascia, one sixth of 10 ml of 5% bupivacain (Naropin®, AstraZeneca AB, Södertalje, Sweden) was injected after a negative aspiration test. Then the needle was

advanced until the loss of resistance was felt between internal oblique muscle and transverse muscle. Another one sixth of the local anesthetic solution was injected. The needle was withdrawn and this procedure was repeated by changing the needle to medially and then laterally at angles of 15° at the same horizontal plane in a fanlike pattern. The same procedure was performed on the contralateral side and a total volume of 20 ml of local anesthetic was administered for both sites of injection. Placebo block with same amount of saline was performed using the technique described by Bell et al. in the placebo block group. After the procedure, surgery accomplished well and patient transferred to the obstetric ward.

If patient was allocated in case group, 2 hours after surgery 20 cc of 0.25% bupivacaine administered through catheter for blocking those nerves and if patient allocated in placebo group, 20cc of normal saline administered. All patients and examiner were blind to the drug administered and syringes were same between two groups. Pain score of each patient recorded via a visual analog score system at the time of nerve block by using visual analogue scale (VAS) ranging from 0 (no pain) to 10 cm (intolerable pain) at the PACU in 2, 4, 6, 8 hours postoperatively. If patients had pain or if pain score was equal or over 3, 30mg of pentazoscine administered intramuscularly. If pain control was poor, 30mg of pentazoscine administered after 1 hour. Pain score of 2, 4, 6 and 8 hours postoperatively, amount of pentazoscine administered for each patient, adverse effects of pentazoscine, itching, nausea, vomiting or any complication were recorded in two groups.

Statistical Analysis

Primary end point of the study was to evaluate 30% decrease in analgesic consumption between the two groups at estimated time intervals postoperatively. A sample size of at least 75 patients per group was required to detect this difference with a power of 90% at the 5% significance level. Data analyzed with SPSS v19 software accordingly (Statistical Package for Social Sciences) for Windows. Means were compared by using Student's t or Mann Whitney U tests, where appropriate.

Ethical committee approval code

This research has approval code ethic IR.1396.110.23, Iran University of Medical Sciences, Tehran, Iran.

3. RESULTS

One hundred Fifty mothers were included in the study. Gestational age in case group was between 36 to 41weeks and in placebo l group was between 37 to 41 weeks. There was not significant difference between two groups (T test P=0.825). Mean of BMI was 25.3±0.4 in case group and 25.6±0.45 in placebo l group that there is not significant difference between them (P=0.43). No significant differences with regard to demographic data, duration of surgery or gestational week could be observed among the study groups (Table 1).

Table 1 Comparison of demographic and clinical data of cases between 2 groups

	Nerve block (n=75)	placebo block (n=75)	P value
Maternal age	28.8±4.6[1]	28.9± 5.3	0.948
Gestational age	37.2±2.6	36.8±2.91	0.825
BMI	25.3±3.5	25.6± 3.9	0.648
Gravidity	1-6 (max 2)[2]	1-5 (max 2)	0.384
Parity	0-3 (max 1)	0-4 (max 1)	0.185

1: Mean ± SD 2: Range (mode)

Pain score based on VAS was between 1 to 4 in Nerve block group 2 hours postoperatively that pain score of 1 was most frequent (53.3%), but in control group this measure was between 1 and 4 and pain score of 2 was the most significant (53.3%) and there is not significant difference between groups (P=0.11) Pain score of 4 hours postoperative was between 1 and 4 in Nerve block group and pain score of 2 was the most frequent (29.3%) and this measure in control group was between 1 and 5 that the most

frequent pain score was 2 (49.3%), the difference between 2 groups was significant (P=0.0002). 6th hour postoperative pain score in Nerve block group was between 0 and 2 and pain score of zero was the most frequent in Nerve block group and in control group pain score of 6th hour postoperative was between 1 to 3 and pain score of 1 was the most frequent (87.7%) and difference was significant (P=0.001) 8th hour postoperative pain score in Nerve block group was between 0 and 1 and frequent pain score in this group was zero (77.3%) and in control group was between 0 and 1 and the most frequent score was 68% that this difference was not significant (P=0.202) (Table 2 & figure 1).

Table 2 Comparison of pain score between groups

Pain score	Nerve block (n=75)	Placebo block (n=75)	P value
In 2 hrs.	1.6±0.88[1]	10.90±0.73	0.11
In 4 hrs.	1.18±0.92	1.86±0.89	0.00
In 6 hrs.	0.52±0.57	1.2±0.45	0.00
In 8 hrs.	0.22±0.42	0.32±0.46	0.202

1: Mean ± SD

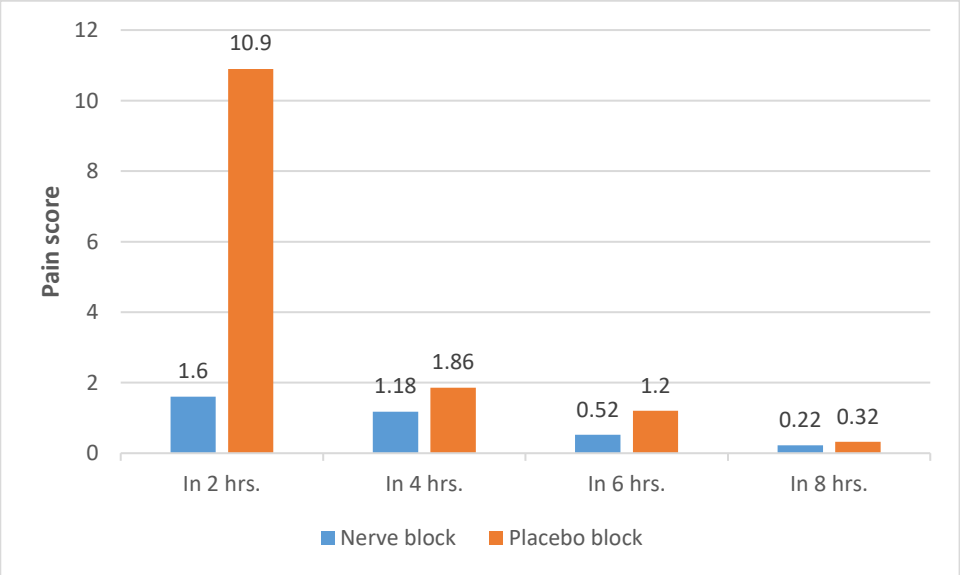

Figure 1 Comparison of pain score between Nerve and Placebo block

68 patients (90.66%) never get pentazoscine in case group and in control group this measure was 23 patients (30.6%) that difference between 2 groups was significant (P=0.0001). Frequency of itching in case group was 71cases (94.6%) and in control group was 69 cases (92%) and difference was not significant (P=0.074). Frequency of nausea and vomiting in case group was 5 cases (6.7%) and in control group this measure was 12 cases (16%), difference was not significant(P=0.077). There was a case of hematoma of catheter site in control group that resolved with close observation.

Frequency of nausea and vomiting after 8hour of operation was not different between 2 groups in our study but nausea frequency was slightly higher in placebo group. Itching frequency was not different between case and control group in our study, but it was higher in some previous studies in opioid use group.

4. DISCUSSION

The present data indicate that II-IH nerve blocks with bupivacaine injection in CS may cause a reduction of postoperative pain and analgesic consumption after CS. Block of ilioinguinal and iliohypogastric nerves enables somatic pain relief in CS operations, but is

ineffective for visceral pain, as viscerae are innervated by nerve roots from T10-L1 segments (Scott et al., 1989). II-IH block has been reported to decrease the need for postoperative analgesics at rates of 35% to 78%, depending on the operative procedure or anatomical variations (Naghshineh et al., 2015). Bunting et al. performed II-IH nerve block technique on CS patients with 0.5% bupivacaine and found out that II-IH block group had lower pain scores and lower analgesic requirements compared to no- block group (Bunting and McConachie, 1988). In another study, Ganta et al. reported lower VAS scores and less need for additional analgesia with II-IH block in patients after CS under general anesthesia (Ganta et al., 1994). Ilioinguinal and iliohypogastric nerve block had been performed with bupivacain in numerous studies (Emanuelsson et al., 1995 and Albright, 1979 and Scott et al., 1989 and Wulf et al., 2001 and Pitkanen et al., 1992). In this study, bupivacain was preferred to other local anaesthetics for its lower central nervous system and cardiovascular toxicity.

In the present study postoperative pain score in case group were significantly lower in 4th and 6th hour postoperatively. But there is not significant difference in 2nd and 8th hour postoperative pain score between groups. Equal results of pain score in our groups during 6th to 8th hours postoperative showed that all cases and placebo despite the route of analgesia have good pain control. On the other hand, a study done by Sakalli et al. showed that the II-IH nerve block decreased the mean VAS score both at rest and at movement within 24 hours after CD (Sakalli et al., 2010). This is comparable with our finding. Similarly, a study done in Jordan showed a significant reduction in the mean VAS score after the II-IH nerve block when compared with the placebo group in parturients who underwent caesarean delivery under general anesthesia (Naghshineh et al., 2015 and Al-Dehayat and Al-Momany, 2008 and McDonnell et al., 2008).

Overall our study demonstrated that II-IH reduced the pain score which is consistent with a study done by Bunting and McConachie and Ganta and colleagues, they found it to be less with the II-IH block as compared with the placebo group in parturients who underwent caesarean delivery (Bunting and McConachie, 1988). A study of Bell and colleagues also demonstrated that the VAS score was reduced with the II IH nerve block (Bell et al., 2002).

5. CONCLUSION

The use of II-IH block group after cesarean section reduces corticosteroids such as tramadol in breast milk and this contributes to maternal and neonatal health. In addition, new drugs and methods for pain relief and productivity is very important. This study shows II-IH nerve block with bupivacaine 0.25% is good substitution for opioid in postoperative pain control and may reduce amount of opioid administration postoperatively.

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Conflicts of Interest: The authors declare no conflict of interest.

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