

A Double-Blind Randomized Assessment of Analgesic Efficacy of Bilateral Ilioinguinal and Iliohypogastric Nerve Block for Post Caesareans Delivery under Spinal Anaesthesia

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Abstract

Aim: The aim of the present study was to assess the analgesic efficacy of bilateral ilioinguinal and iliohypogastric nerve block for post caesareans delivery under spinal anaesthesia.

Methods: The present study was conducted in the department of Anesthesiology ESIC MCH, Bihta, Patna, Bihar, India from August 2021 to July 2022. 100 ASA I and II parturients who underwent non emergent caesarean delivery requiring spinal anaesthesia were included in this study. Parturients with severe preeclampsia, eclampsia, history of substance abuse, infection at needle insertion site, or allergy to local anaesthetics and declined to participate were excluded from the study.

Results: The two groups were not statistically different regarding demographic variables. There were 60% and 56% nulliparous in group B and group C. In the present study, 70% and 72% had caesarean delivery once in group B and group C respectively. The two groups were not statistically different regarding parity and number of caesarean delivery. According to independent sample t-test, in both groups, mean changes in SBP, DBP and h were not significantly different ($P>0.05$). Pain severity scores were similar on arrival in the ward in both groups but were significantly decreased at 4 h, 6 h, 8 h, 12 h and 24 h in II-IH block group compared to a control group both at rest and on movement ($P<0.001$).

Conclusion: Compared to no intervention, bilateral II-IH blocks in patients undergoing caesarean delivery with Pfannenstiel incision had significantly improved pain relief at rest and with movement and resulted in significantly less tramadol consumption in the first 24 h after surgery. These results support the use of bilateral II-IH blocks as part of a multimodal analgesic regimen.

Keywords: Cesarean delivery; Ilioinguinal/iliohypogastric nerve block; Postoperative pain; Postoperative total analgesia consumption

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Introduction

The ilioinguinal and iliohypogastric (IIH) block can be used as part of a multimodal analgesic regimen for postoperative pain in

patients undergoing lower abdominal and inguinal surgeries [¹⁻³] including caesarean delivery. [^{4,5}] Real-time ultrasound (US)

guidance allows for direct visualization of the needle and deposition of local anesthetic in close proximity to the nerves which, compared to the blind technique, can increase block success rate, require less local anesthetic, and reduce complications. [2,6]

Pain management is crucially important in the postoperative period as it increases patient comfort and satisfaction. [7] Caesarean delivery (CD) has been one of the most frequently performed major surgical interventions and causes severe postoperative pain. [8] Caesarean delivery 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. [4]

Inadequate postoperative analgesia is one of the most common causes for poor patient satisfaction following caesarean delivery. [4,9] 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. Poor pain control in the postoperative period can lead to chronic pain syndromes and poor quality of life. [8,10] 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. [11,12]

The ideal form of postoperative analgesia is unknown, but many procedures are carried out under spinal anesthesia, and currently, opioids are commonly used for relief of postoperative pain after caesarean section, either by intrathecal administration prior to section or by postoperative parenteral administration as

a component of multimodal analgesia during the postoperative period. [11,13] An ideal method of pain relief after caesarean delivery should be cost-effective, safe for the mother, require minimal monitoring, and use drugs that are not secreted into breast milk. Moreover, the mother should not be sedated by the drugs that prevent her from moving freely and caring for the newborn. Minor side effects, such as pruritus and shivering, may interfere with care of the newborn, leading to less maternal satisfaction. Drug availability, maternal health conditions, patient preferences, and availability of medical expertise and trained support staff also play a role in choice of the analgesic method.

The aim of the present study was to assess the analgesic efficacy of bilateral ilioinguinal and iliohypogastric nerve block for post caesareans delivery under spinal anaesthesia.

Materials and Methods

The present study was conducted in the department of Anesthesiology ESIC MCH, Bihta, Patna, Bihar, India from August 2021 to July 2022. 100 ASA I and II parturients who underwent non emergent caesarean delivery requiring spinal anaesthesia were included in this study. Parturients with severe preeclampsia, eclampsia, history of substance abuse, infection at needle insertion site, or allergy to local anaesthetics and declined to participate were excluded from the study.

Operational definition

Verbal numerical rating scale: A pain assessment tool in which the number assigned from 0-10 to represent severity of pain. 0=no pain, 1-3=mild pain, 4-6=moderate pain, 7-10=severe pain. Total opioid analgesic consumption: The amount of opioid analgesic drugs given for the patient in the first 24 h. Non urgent caesarean delivery: A caesarean delivery in which, there are no maternal and fetal compromises existed, like fetal distress,

cord prolapse, uterine rupture, obstructed labour Hypotension: If SBP <20% of the preoperative value.

Bradycardia: Defined as a heart rate less than 50 beats/min

Parity: Number of births she has given to a fetus with a gestational age of >24 weeks regardless of whether the child was born alive or was stillborn.

Nulliparous: Has not given birth previously.

Primiparous: Has given birth once.

Multiparous woman: Has given birth more than once.

Data collection procedures

All voluntary parturients who underwent non urgent caesarean delivery via Pfannenstiel incision under spinal anaesthesia were included in the study. All parturients were given cimetidine 200 mg IV and metoclopramide 10 mg 10-20 min before the operation according to the institution protocol and written informed consent was obtained just before anaesthesia given by the investigator. After obtaining written informed consent, standard monitoring like NIBP, pulse oximeter, electrocardiogram(ECG) were attached, while coloaded with 10-15 mg/kg of crystalloid, each patient received spinal anesthesia between L3-L4 level with 2-2.5 ml of 0.5% heavy bupivacaine (according to the height of the patient) using 22-26-Gauge spinal needle. After the spinal needle withdrawn the patients were repositioned in supine position with slight elevation of the head for comfort and level of sensory block was assessed and tested using pinprick sensation at 5 min intervals by one of the investigators who were unaware of the group allocation. The maximum level of sensory block was the highest level of disappearance of pinprick sensation and operations were started when the spinal block with sensory level reaches at T4. Maternal blood pressure was measured every 1 min for the first 15

min and every 2-5 min throughout the procedure.

After the spinal anaesthesia given, the study population were randomly assigned into two groups by using lottery method, Group B: those who received ilioinguinal and iliohypogastric nerve block with 0.25% bupivacaine (Block group) and Group C: those who not received the block (control group). In the study group, the nerve block was performed by one of the investigator using the technique described by bell et al.⁴ immediately after skin closure while they were screened with drape. In the control groups, the block was not performed. After the procedure all patient were transferred to the ward. All participants received diclofenac sodium 75 mg IM 8 hourly and the first dose was given at the end of operation. Patients and personnel who were involved in the data collection were not informed on the group type of patients.

Sociodemographic variables were filled by one of the investigator and the remaining postoperative outcome variables and hemodynamic variables were filled by the data collectors who were unaware of the group allocation. After the patient transferred to the ward, the data collectors were assessed the pain intensity within the given time interval using NRS. Assessment of the presence and intensity of pain was done immediately after transfer to the ward (0 h) and at 4 h, 6 h, 8 h, 12 h and 24 h after surgery both at rest and with movement (turning from side to side) by using verbally administered Numerical rating scale pain assessment tools.

At the same time the HR and BP were also assessed and the patients' opioid consumption was recorded. Each participant was treated for pain according to the pain management protocol. All data were coded by the investigator to identify patients on the questionnaire and the completed questionnaires were kept in a secured location.

Statistical analysis

Data were cleaned and checked for completeness before entered in to database by the Investigator. The data were entered to SPSS version 20.0 statistical package. Distribution of data was checked using Shapiro-Wilk normality test. Normally distributed demographic data were analyzed using independent student t-test. Not –normally distributed data were

analyzed using Mann whinny U test. Means was compared by using Student's t or Mann Whitney U test. Normally distributed data were presented as mean \pm Standard deviation. Not normally distributed data were presented as median (IQR). A p value less than 0.05 was considered as statistically significant.

Results

Table 1: Demographic details

| Demographic data | Group B(n=50) | Group C(n=50) | P-value |
|---------------------|---------------------|--------------------|---------|
| Age (year) | 29.71 \pm 5.55 | 27.83 \pm 5.36 | P=0.430 |
| Weight (kg) | 65.35 \pm 6.34 | 64.26 \pm 5.02 | P=0.920 |
| Height (cm) | 159.21 \pm 2.48 | 159.81 \pm 2.90 | P=0.310 |
| BMI (kg/m) | 25.45 \pm 2.70 | 26.14 \pm 1.96 | P=0.215 |
| Duration of surgery | 60.3860 \pm 10.02 | 62.4370 \pm 9.56 | P=0.359 |

100 participants were recruited in this study 50 in Group B and 50 in Group C. The two groups were not statistically different regarding demographic variables.

Table 2: Data on parity and number of previous caesarean delivery

| Data | Group B(n=50) | Group C(n=50) |
|------------------------------------|---------------|---------------|
| Parity=n (%) | | |
| Nulliparous | 30 (60) | 28 (56) |
| Primiparous | 15 (30) | 14 (28) |
| Multiparous | 5 (10) | 8 (16) |
| Number of previous CD=n (%) | | |
| 1 | 35 (70) | 36 (72) |
| 2 | 13 (26) | 13 (26) |
| 3 | 2 (4) | 1 (2) |

There were 60% and 56% nulliparous in group B and group C. In the present study, 70% and 72% had caesarean delivery once in group B and group C respectively. The two groups were not statistically different regarding parity and number of caesarean delivery.

Table 3: Mean systolic, diastolic blood pressure and Heart Rate at various time intervals

| Group | Mean SBP at various time intervals (mmHg) | | | | | |
|---------|--|--------------------|--------------------|--------------------|-------------------|-------------------|
| | Time | 4 h | 6 h | 8 h | 12 h | 24 h |
| Group B | Mean \pm SD | 112.92 \pm 11.31 | 114.89 \pm 10.98 | 113.23 \pm 11.54 | 113.35 \pm 9.47 | 114.53 \pm 8.39 |
| | Group C | Mean \pm SD | 115.02 \pm 13.09 | 115.12 \pm 10.09 | 113.02 \pm 9.45 | 114.95 \pm 9.71 |
| Group | Mean diastolic blood pressure at various time intervals (mmHg) | | | | | |
| | Time intervals | 4 h | 6 h | 8 h | 12 h | 24 h |
| Group B | Mean \pm SD | 70.00 \pm 8.14 | 70.49 \pm 5.95 | 70.08 \pm 6.37 | 70.33 \pm 6.075 | 70.74 \pm 5.91 |

| | | | | | | |
|----------------|---|------------------|------------------|------------------|------------------|------------------|
| Group C | Mean \pm SD | 70.70 \pm 8.72 | 72.12 \pm 7.66 | 69.20 \pm 5.92 | 70.12 \pm 7.08 | 71.51 \pm 6.15 |
| Group | Mean HR at various time intervals(bpm) | | | | | |
| | Time | 4 h | 6 h | 8 h | 12 h | 24 h |
| Group B | Mean \pm SD | 87.58 \pm 7.48 | 86.82 \pm 7.63 | 87.53 \pm 7.47 | 87.56 \pm 7.47 | 79.02 \pm 4.96 |
| Group C | Mean \pm SD | 86.24 \pm 8.38 | 86.29 \pm 8.53 | 86.00 \pm 8.14 | 85.80 \pm 8.01 | 80.43 \pm 5.80 |

According to independent sample t-test, in both groups, mean changes in SBP, DBP and h were not significantly different ($P>0.05$).

Table 4: Postoperative pain severity using numeric rating scale at rest and on movement

| Median numeric rating scale at rest | | | | | | |
|--|------------|------------|------------|------------|-------------|-------------|
| Time intervals | 0 h | 4 h | 6 h | 8 h | 12 h | 24 h |
| Group B | 0 (0) | 1 (1) | 2 (1) | 2 (1) | 2 (2) | 2 (1) |
| Group C | 0 (0) | 3 (2) | 4 (2) | 3 (1) | 4 (0) | 4 (0) |
| Median numeric rating scale on movement | | | | | | |
| Time intervals | 0 h | 4 h | 6 h | 8 h | 12 h | 24 h |
| Group B | 0 (0) | 1 (1) | 2 (1) | 2 (1) | 2 (2) | 2 (1) |
| Group C | 0 (0) | 5 (3) | 6 (1) | 5 (2) | 6 (1) | 5 (1) |

Pain severity scores were similar on arrival in the ward in both groups but were significantly decreased at 4 h, 6 h, 8 h, 12 h and 24 h in II-IH block group compared to a control group both at rest and on movement ($P<0.001$).

Discussion

Caesarean delivery via a Pfannenstiel incision is one of the main surgical approaches. [9,14] Caesarean delivery (CD) and subsequent manipulation performed through Pfannenstiel incision is commonly associated with severe pain in the postoperative period that may last for several months. [4] Under treatment of postoperative pain is the main reason for patient dissatisfaction. [4,15]

The ilioinguinal-iliohypogastric block (IIH) is commonly used as a part of multimodal analgesia for lower abdominal, inguinal, and pediatric surgeries. [3] Aasbø et al. [1] found that an ilioinguinal field block is superior to general anesthesia for inguinal hernia repair regarding postoperative pain scores, analgesic consumption, postoperative mobilization,

time to discharge readiness, and patient satisfaction. Traditionally, the IIIH block has been performed using a blind technique that relies on anatomical landmarks and subtle tactile sensations of fascial “clicks” or “pops” during the procedure to determine correct block placement. However, disadvantages of using this blind technique include a block failure rate of 10–25% secondary to difficulty in approximating the ilioinguinal and iliohypogastric nerves and increased possibility of major vessel, peritoneal, and bowel puncture. [3,16] US allows for real-time guidance and direct visualization of the needle. [5]

In this study, hemodynamic parameters such as heart rate, systolic and diastolic blood pressure were comparable between the two groups. We have found that II-IH nerve block with intramuscular diclofenac remarkably decreased the severity of pain both at rest and on movement, delayed postoperative first opioid analgesia request time and decreased total postoperative tramadol consumption during the first 24 h

of operation in parturients underwent CD under spinal anaesthesia. A previous study revealed a good analgesic effect of II-IH nerve block for parturients undergoing cesarean delivery under spinal [4,17,18] or general anaesthesia. [9,19,20] In our study, the pain was assessed using numeric rating scale and additional tramadol on request was given when the NRS ≥ 4 . The median NRS was low in the II-IH block group than the control group at all time intervals both at rest and on movement. The median NRS was found to be highly significant at all estimated time interval except at 0 h ($P < 0.001$).

The NRS pain severity scores were similar between II-IH block group and the control group immediately after the patient transferred to the ward. This could attribute to prolonged analgesic effects of spinal anaesthesia. Even though, pain severity in the II-IH block group and the control group were different at 4hr and 8 hour at rest, it was not clinically significant. This finding was supported a study carried out by Sakallı et al. the mean VAS was remarkably decreased in the intervention group than the control group at 6 h, 8 h, 12 h, 16 h and 24 h. [9] However, in their study, there was no difference in the mean VAS score at 0 h, 2 h. This could be due to the procedure was performed under GA and in fact the block may take time to produce analgesia.

Similarly, a study done in Jordan showed a significantly reduced mean VAS score by this nerve block using local anaesthetics when compared with placebo group in parturients underwent caesarean delivery under general anaesthesia. [20] Moreover, our finding was also consistent with a study conducted by Bunting et al. Bell et al. and Ganta et al., where the mean VAS score was low in those who received II-IH block compared with the placebo group in parturients underwent caesarean delivery. [19,21] In addition, in another study, VAS pain scores were decreased both at rest and upon coughing in block group compared to

the placebo group. [4] These might be due to the use of the same dose of local anaesthetics and techniques employed. Our finding was comparable with trials conducted by Yucel E et al. and Naghshineh et al., where postoperative analgesics consumption was significantly lower in the nerve block group compared with the control group. [22-24] This might be because Pfannenstiel incision is principally conducted by L1 and L2 dermatomes and depositing a local anaesthetic on the target nerves gives prolonged pain relief.

Furthermore, Sakallı et al. reported that, there was a significantly reduced pain score and amount of PCA tramadol consumption by the ilioinguinal-iliohypogastric nerve block group during the 24 h following caesarean delivery when performed after wound closure ($P < 0.05$). [9] In addition, Bell et al. found that pain score and PCA morphine use were significantly lower in the intervention group than the placebo group within 24 h of postnatal period when its performed after surgical intervention ($P < 0.05$). [4] In this study, the median first analgesia request time was significantly delayed in the block group than the control group ($P < 0.0001$). This finding was in accordance with a study conducted by Yucel et al. that in II-IH block group, the first analgesia request time was longer than the counter parts. [23,25]

Conclusion

Compared to no intervention, bilateral II-IH blocks in patients undergoing caesarean delivery with Pfannenstiel incision had significantly improved pain relief at rest and with movement and resulted in significantly less tramadol consumption in the first 24 h after surgery. These results support the use of bilateral II-IH blocks as part of a multimodal analgesic regimen.

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