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Comparison of bilateral ilioinguinal/iliohypogastric nerve block versus transverses abdominis plane block for postoperative pain relief for parturient undergoing caesarean section under spinal anaesthesia

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Abstract
Introduction: Caesarean section is one of the common lower abdominal surgeries in young females with significant postoperative pain. Caesarean delivery and subsequent manipulation performed through Pfannenstiel incision are associated commonly with a significant degree of pain in the postoperative period.
Aim: This study aims to compare TAP block versus II/IH block for post-caesarean delivery analgesia.
Materials and Method: Study was conducted with 56 Pregnant women aged between 18-35yr scheduled for caesarean section under spinal anaesthesia were randomized to either TAP block (Inj. Bupivacaine plain 0.25%20cc bilateral) or II/IH block (Inj. Bupivacaine plain 0.25%20cc bilateral) given for postoperative pain management at the end of surgery. Pain score, Total tramadol consumption, time to first analgesic request was assessed during the first 48 h postoperatively.
Result: The cumulative median tramadol consumption over 48 h were 16.96+/-32.66mg for TAP group and 56.25+/-567.98mg for II/IH. Pain score was statistically significantly lower in group TAP compared to group IIIH at 8hr, 12hr, 24hr and 48hrs (p=<0.05). Time for first request for rescue analgesia was also prolonged in the TAP block compared to IIIH block.
Conclusion: TAP block was superior over IIIH block for post caesarean delivery pain management via Pfannenstiel incision.

Keywords: Ilioinguinal iliohypogastric nerve block, post operative analgesia, TAP block, Tramadol consumption

1. Introduction

Postoperative analgesia is one of the major importance to prevent various undesirable side effects such as respiratory complication, increased hospital stays, patient discomfort. Pain is one of the most common causes of perioperative distress. Pain is defined as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage" [1]. Caesarean section is one of the common lower abdominal surgeries in young females with significant postoperative pain. 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 [2].

The development of chronic pain, prolonged hospitalization, and compromised breastfeeding were among the consequence of untreated acute pain [3, 4]. The key to facilitating early postoperative mobilization, better neonate care, and reduction of postoperative complication was significantly relied on effective postoperative management.

The idyllic form of postoperative analgesia is unknown, but many procedures are carried out under spinal anaesthesia, 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 [5, 6]. Although opioids are available to be administered via the spinal or systemic route, they had adverse effects such as nausea, vomiting, sedation, itching, and risk of delayed maternal respiratory depression, all of which reduce overall patient satisfaction.

These side effects can produce other problems for new mothers such as delayed commencement of breastfeeding and impairment of mother/infant bonding.

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 new born. Many scholars have been studying to find the safest and effective way of interventions for postoperative CD pain management, and they suggest methods like opioid or local anaesthetic skin infiltration, epidural analgesia, intrathecal or intravenous opioids, and abdominal field blocks like TAP and II-IH. Among the above-listed ways of pain management, intravenous opioids and regional nerve blocks are the mainstay of treatment for post caesarean pain here in the study area.

Abdominal field blocks like TAP and II-IH are the backbone of treatment for postcaesarean pain for both the midline and Pfannenstiel incision because of the opioid sparing effect, prolonged pain relief, and technical simplicity, and also, it does not need repeated injection for optimal pain relief.

There are lots of controversies regarding the efficacy of the TAP and IIIH nerve block. So, we decided to compare both the block for post caesarean analgesia.

2. Aims and Objectives

The aim of the study was to compare efficacy of TAP block versus IIIH block for post cesarean delivery analgesia by compare following between two groups: Total tramadol consumption, Pain score, First time to analgesic requirement.

The practice of ultrasound guided nerve block in resource limited is difficult so we used landmark guided technique to demonstrate TAP BLOCK and II-IH BLOCK.

3. Material and Methods

A prospective observational study was conducted between March – August 2021. After obtaining written informed consent total of 56 patients of ASA II pregnant women between age group of 18-35 years included in the study. Pregnant female with ASA physical status III and IV, hypertensive disorders, neurological disorders, other comorbidities, allergic to test drug, Spinal anaesthesia converted to general anaesthesia excluded from the study. All the patients were randomly divided into two groups with 28 patients in each group. Sample size was calculated by using mean rescue analgesia time by openepi 3.0.

In preoperative assessment general examination, systemic examination, airway assessment done. Preoperative fasting of minimum 6 hrs ensured before surgery. Patients pulse rate, blood pressure, and spo2 on air were recorded preoperatively. IV line secured with 18-gauge cannula. Preloading with iv ringer lactate 8-10ml/kg done in recovery room. Then patient shifted to operative room.

In operative room, baseline monitors such as ECG, pulse oximeter, noninvasive blood pressure (NIBP) were attached and parameter were recorded. Premedication with Inj. Glycopyrrolate 0.2 mg iv and Inj. Ondansetron 4 mg iv was given. Spinal anaesthesia given with all aseptic and antiseptic precautions using quincke's needle in sitting position with midline approach. Inj bupivacaine Heavy (0.5%) 2cc given intrathecally after free flow of clear CSF. Immediately after the spinal anaesthesia patients were positioned on a supine position and a pillow inserted under the shoulder. The level of block was checked (pinprick for sensory & modified Bromage scale for the motor) and incision was allowed after sensory level T6 reached. Only patients with successful spinal anaesthesia were included in the study.

Patients' hemodynamic (SpO_2, HR, ECG, and BP) were measured and recorded every 10 min. If the mean arterial pressure of the patient dropped below 65 mmHg, & was not responding for fluids, a bolus of 6mg Mephentermine was given & with repetition as needed up to a maximum of 30 mg. Oxygen was delivered using a nasal prong at flow rate 2L/min during the intraoperative and recovery periods.

Following the closure of the skin and applying antiseptic solutions over the needle puncture sites, either TAP or II-IH nerve blocks were performed based on which intervention they were randomized. As patients were under the influence of residual spinal anaesthesia, they would not be aware of sensation to the needle insertion area. The screen was applied above the umbilicus to blind the study participants from the area of nerve blocks.

For group TAP a blind landmark technique TAP block was performed as described by McDonnell *et al*. [7]. The block aims at the lumbar triangle of Petit which is bounded superiorly by the costal margin, inferiorly by iliac crest, anteriorly by the external oblique muscle, and posteriorly by the latissimus dorsi. The needle insertion point was 2 cm cephalad to the iliac crest. A 22G blunted needle is inserted until there was a feeling of double pops (loss of resistance) as it passed through the external oblique and internal oblique muscles, which signified the correct location of the needle, following which a 20 ml of local anaesthetic (0.25% bupivacaine) is deposited in the fascial plane between the internal oblique and transversus abdominis muscle. This was repeated similarly for the other side.

For group, II-IH, 20 ml of local anaesthetic (0.25% bupivacaine) per each side was injected at a needle entry point 2 cm medial to the anterior superior iliac spine (ASIS). A 22G blunted needle was used and upon insertion of the needle an initial pop or a loss of resistance was felt as the blunt needle passes through the external oblique muscle sheath and 10 ml of 0.25% Bupivacaine was injected in a fanwise fashion to block the ilioinguinal nerves. The needle was further advanced and another pop or loss of resistance is felt upon passing the internal oblique muscle sheath and an additional 10 ml volume of local anaesthetic is injected similarly to the previous one, to block the ilio-hypogastric nerves. This procedure was repeated on the opposite side of the lower abdomen in the same manner [8]. To avoid intravascular injection aspiration of the syringe for blood was performed every 5 ml injection of the local anaesthetic or following change in the direction of the needle.

Tramadol consumption, vas recorded at 4hr, 8hr,12hr, 24hr, and 48hr. First rescue analgesic requirement time was recorded. Rescue analgesia given with Inj. tramadol 25 mg iv. Visual analogue scale is used as below.

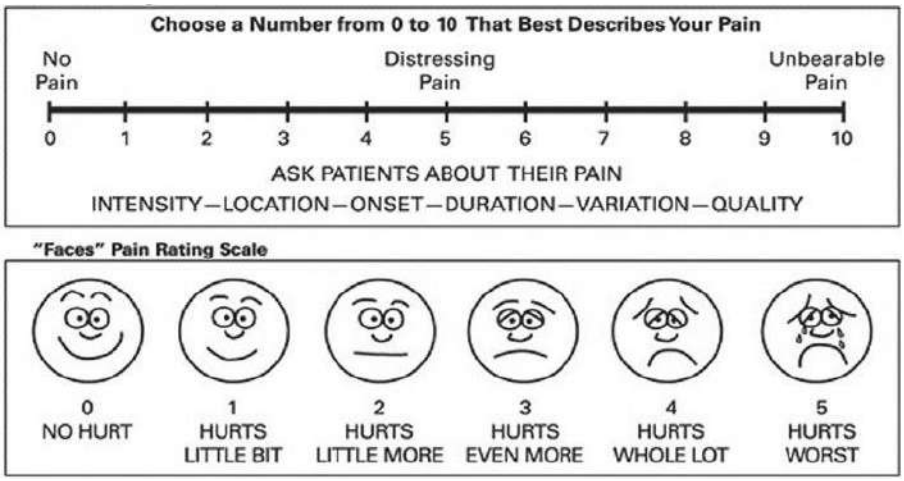

Fig 1: Tools commonly used to rate pain visual analogous scale

4. Observation and Results

After obtaining written informed consent, total 56 were patients included after fulfilling inclusion and exclusion criteria. Pre structured proforma was used for data collection and for data analysis Microsoft excel open Epi 3.0 and statistical software SPSS version 20 was used and data were analysed with the help of mean, SD, percentage in the form of table, diagrams and test of significance (Independent t-test for intergroup comparison, Chi square test for demographic data) were applied. Significance of P value was suggested as follow: P value > 0.05 was insignificant, P value < 0.05 was significant, P value = 0.000 was highly significant.

Demographic data including age and weight were comparable between both groups and statistically insignificant.

4.1 VAS Score

Vas score measured at 4hr, 8hr, 12hr, 24hr and 48hrs. VAS was lower in group TAP compared to group IIIH. The difference was statistically significant at 8hr, 12hr, 24hr and 48hrs (p=<0.05). The difference was insignificant at 4hr (p=>0.05).

Table 1: VAS score

TIME	TAP	IIIH	P-VALUE
4HR	0.07	0.00	.322
8HR	0.39	1.00	.025
12HR	0.54	1.39	.009
24HR	1.07	2.14	.038
48HR	0.79	1.96	.005

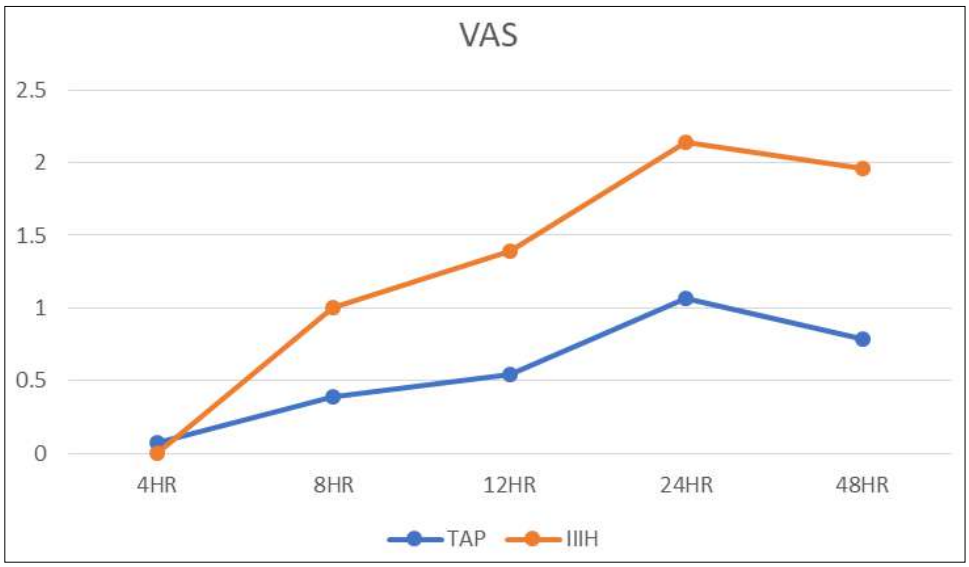

Fig 2: VAS

4.2 Tramadol Consumption

Cumulative tramadol consumption during first 48hrs were recorded.

In TAP block cumulative tramadol consumption was 16.96+/-32.669 mg, while in IIIH block it was 56.25+/-57.985 mg. There was decreased tramadol consumption in TAP block compared to IIIH block and the difference was statistically significant (p=0.003).

Table 2: Tramadol consumption

Group	Tramadol consumption		P- Value
	Mean	STD. DEV	
Tap	16.96	32.669	0.003
IIIH	56.25	57.985	

4.3 Time to first rescue analgesia

In TAP block 2 patients requested for rescue analgesia,

while in IIIH block 7 patients requested for analgesia at 12hrs. At 24hrs, 5 patients in TAP block and 6 patients in IIIH block requested for first rescue analgesia. At 48hrs, 5 patients requested for first rescue analgesia in IIIH block while in TAP block no one requested for first rescue analgesia.
In TAP block 7 patients and in IIIH block 18 patients required tramadol for analgesia.
TAP block significantly increased time for first request for rescue analgesia compared to IIIH block (p=<0.05).
Hemodynamic parameters such as Spo2, Pulse rate, MAP monitored over post operative period and they were statistically insignificant.
There was no incidence of any adverse reaction and no patient required antiemetic following tramadol administration.

5. Discussion

LSCS is one of the most common lower abdominal surgeries in young females. The efficient care of the new born requires adequate pain relief in the mother. LSCS is performed by Pfannenstiel incision which lies on L1–L2 dermatomes. Sensory innervation of L1–L2 dermatomes is by the ilioinguinal and Iliohypogastric nerves. Dermatome T10-L1 can be blocked by TAP block. The blockade of these nerves enables somatic pain relief in LSCS.
In our study, there was no significant difference between age and weight of patient. VAS was lower in group TAP compared to group IIIH. The difference was statistically significant at 8hr, 12hr, 24hr and 48hrs (p=<0.05). The difference was insignificant at 4hr (p=>0.05). In TAP block cumulative tramadol consumption was 16.96+/-32.669 mg, while in IIIH block it was 56.25+/-57.985 mg. In TAP block 2 patients requested for rescue analgesia, while in IIIH block 7 patients requested for analgesia at 12hrs. At 24hrs, 5 patients in TAP block and 6 patients in IIIH block requested for first rescue analgesia. At 48hrs, 5 patients requested for first rescue analgesia in IIIH block while in TAP block no one requested for first rescue analgesia. At 4hr and 8hr no patient required analgesia.
Similarly, S. Abiy *et al.* [9] observed in their study, that cumulative tramadol consumption was lower in the TAP group compared to II/IH group during 48 h follow up period. Pain scores were similar between TAP & II/IH groups until the first 24 h both at rest and purposeful movement. However, at 36 & 48-h intervals pain score was lower in the TAP group with a statistically significant result. Differences in time to first analgesic request, the proportion of pruritus, nausea vomiting, and sedation score were not statistically significant.
Paul, *et al.* [10] noted that, Postoperative VAS scores in TAP block were significantly reduced at 2 h (1.8 ± 1.3 in Group A vs. 2.24 ± 0.8; P = 0.047) and 4 h (2.41 ± 0.3 in Group A vs. 3.12 ± 0.8; P = 0.019) as compared to those of wound infiltration. The VAS score of TAP block at 6, 12, and 24 h was found to be clinically lower than those of Infiltration (P ≥ 0.05) but statistically insignificant. Time for the first demand of analgesics was significantly increased in TAP block (mean 421 ± 118.8 min) in comparison to wound infiltration (mean 187 ± 148.3 min), (P = 0.001).
In contrast to our finding, a retrospective study by Yulu Jin *et al.* [12] and a prospective cohort by Seid *et al.* [11], found that cumulative morphine consumption was lower in the II-IH group at 24 and 48 h with $p < 0.05$. The differences in the study design, the use of ultrasound in the former study might contribute to the variance.
In contrast to our finding Seid *et al.* [12] and Bessmertnyj AE *et al*. [13] found that time to first analgesic requests was longer in II/IH group compared to the TAP group for post-cesarean delivery patients.
There was no incidence of any adverse reaction in any patient and there was no need for antiemetic in any patient following tramadol administration.

6. Conclusion

From our study we conclude that, there was statistically significant decrease in postoperative pain score and reduced cumulative tramadol consumption in TAP block compared to IIIH block. Time for first request for rescue analgesia was also prolonged in the TAP block compared to IIIH block. So, we recommend the Transversus Abdominis Plane block over Ilioinguinal Iliohypogastric Nerve block for post caesarean delivery pain management via Pfannenstiel incision.

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