



Comparison of Effect of Dexamethasone as an Adjuvant to Levobupivacaine (0.25%) Versus Levobupivacaine Alone In USG Guided TAP Block For Post Operative Analgesia in Lower Abdominal Surgeries

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Abstract

Background: The transverse abdominis plane (TAP) block is a regional anaesthetic technique designed to anesthetize the nerves supplying the anterior abdominal wall (T6 to L1) especially ilioinguinal, iliohypogastric and lower intercostal nerves. TAP block reduces pain, consumption of opioids and incidence of complication related to opioids after lower abdominal surgeries. It is used as part of the multimodal analgesia. Aim of the study is to determine the effect of dexamethasone to levobupivacaine(0.25) in ultrasound guided transversus abdominis plane (TAP) block for duration of post operative analgesia and visual analog scale(VAS) scale.

Material and Methods: A randomized prospective study was conducted in the department of Anaesthesiology at MGM Hospital Navi Mumbai. 50 patients of American society of anaesthesiologist (ASA) I/II aged 20-60yrs of either sex, scheduled for lower abdominal surgery under spinal were divided into two groups. Patients of group A were given levobupivacaine 0.25% 18ml with 0.9% normal saline 2ml and group B were given Levobupivacaine 0.25% 18ml with 2ml dexamethasone (8mg) ultrasound guided TAP block. Duration of post operative analgesia and VAS score were recorded till 12hrs.

Results and Conclusion: Duration of post operative analgesia was prolonged in group B when compared to group A(p<0.05). The VAS score of group B was lower compared to group A. It was observed that when dexamethasone is added to levobupivacaine it prolongs the block duration and the time before first additional analgesia dose. The total analgesia consumption was significantly lower in group B compared to group A.

Keywords: Levobupivacaine, Transverse Abdominis Plane block, Post operative Analgesia, Dexamethasone, Visual Analog scale (VAS)

Introduction

Post-operative pain in many surgeries is associated with the surgical stress response and outcome. Opioids and other analgesics are used widely for patient-controlled analgesia. But their side effects limit their efficacy. The transverse abdominis plane (TAP) block is regional anaesthesia technique designed to anesthetize the nerves supplying the anterior abdominal wall (T6 to L1) especially ilioinguinal, iliohypogastric and lower intercostal

nerves. Studies have shown that TAP block reduces pain, consumption of opioids and incidence of complications related to opioids after abdominal surgeries. To enhance the recovery, TAP block has been used as part of the multimodal analgesia. The performance and success rate is improved by ultrasound guided approach. The analgesics duration for 4 to 12 hours after surgeries is provided by single shot injection of local anaesthetics. Duration of

analgesia can be prolonged by using adjuvants such as midazolam, alpha 2 agonist or corticosteroids. It can also be increased by prolonged infusion of local anaesthetics by introducing perineural catheter. Levobupivacaine is a commonly used local anaesthetic (LA), but it has a limited duration of analgesia [6] Dexamethasone has been used as an adjuvant to local anaesthetics to improve the quality and the duration of analgesia. The action of dexamethasone is by attenuating the release of inflammatory mediators, reducing ectopic neuronal discharge, and inhibiting potassium channel mediated discharge of nociceptive C fibres. The aim of our study was to compare the duration of post-operative analgesia and visual analog scale (VAS) score after TAP block with drug levobupivacaine alone and levobupivacaine with addition of dexamethasone.

Materials And Methods

The study was conducted in Anaesthesiology department of MGM Hospital, Navi Mumbai

Inclusion Criteria

A total of 50 patients of ASA I/II between age group 20-60yrs of either gender were included in this study, scheduled for lower abdominal surgeries.

Exclusion Criteria

Patient with known allergy to local anaesthetics, opioid addiction, bleeding diathesis, any chronic systemic illness, anatomical abnormality, Infection at the regional site, Peripheral neuropathy any neurological deficits and refusal were excluded from the study.

Appropriate patients were selected after preoperative assessment by eliciting proper history, investigations and physical examination. Informed consent was taken after explaining the procedure to the patient. Patients were allocated into two groups randomly by using computer generated table ensuring allocation concealment into:

1. Group A: Patients were given TAP block with levobupivacaine 0.25% 18ml with 0.9% NS 2ml
2. Group B: Patients were given TAP block with levobupivacaine 0.25% 18ml with dexamethasone(8mg) 2ml

Patients is informed about the procedure and consent is taken and pre-operative evaluation done with necessary investigations.

After patient was shifted to operation-theatre, heart rate, systemic arterial blood pressure, pulse oximetry (SpO₂), echocardiogram (ECG) is monitored and the baseline parameters was recorded. 20G Intravenous Cannula was inserted in a peripheral vein. After securing intravenous line, infusion of Ringer lactate was started. Subarachnoid block was performed in sitting position with 25 G spinal needle in L3-4 space under all aseptic measures. 3ml of bupivacaine(hyperbaric) solution is injected. Time of intrathecal injection was noted and the patient was asked to lie supine. Sensory blockade was assessed by the loss of sensation to pinprick immediately after making the patient supine. It was assessed at two minute interval and highest sensory blockade achieved was noted. After that at every 15 minute interval, level of sensory blockade was noted. Motor blockade will be assessed by Modified Bromage score at 2 minute interval. It was done until complete motor blockade is achieved. Electrocardiogram, oxygen saturation and non invasive blood pressure was monitored throughout the surgery. After surgical procedure was completed, the patient was administered USG-guided TAP block. Under all antiseptic measures, followed by draping with sterile sheet. The Ultrasound probe was placed in the midaxillary line in a transverse plane to the lateral abdominal wall to obtain a transverse view of the abdominal layers. A 22G needle was inserted 1 cm medial to the probe and advanced using the in-plane technique with the help of USG. The injection site being between aponeurosis of internal oblique and transversus abdominis muscles. After the tip of needle was correctly placed, 2 ml drug was injected until tissue is dissected followed by injection of drug with frequent aspiration. Hypochoic enlargement on USG is observed while injecting local anaesthetics. The patient was then transferred to post-operative ward and VAS score was checked post operatively for 2, 4 , 6, 8 and 12 hourly.

1. VAS Score: 0 – no pain
2. 1-3 – mild pain
3. 4-7 – moderate pain
4. >7 – severe pain
5. 10 – Worst pain

Statistical Analysis: All the data of patients were analysed using unpaired t-Test $P < 0.05$ was considered as statistically significant.

Results:

The time of the first additional analgesic dose addition was prolonged significantly in the levobupivacaine with dexamethasone group in

comparison to levobupivacaine group ($p = 0.004$). The VAS pain scores was lower in the dexamethasone group. The difference in the pain score of dexamethasone group for deep pain was significant. The total additional post-operative analgesia was significantly lower in the dexamethasone group ($p = 0.001$).

	Group A	Group B	P Value
Time to the first rescue analgesia (h)	6.5 ± 2.4	18.7 ± 4.8	<0.001*
	6 (4–12)	18 (12–24)	
Total analgesic consumption (mg)	5.86 ± 3.6	1.14 ± 2.2	<0.001*
No. of patients who requested rescue analgesia (%)	19 (76%)	6 (24%)	0.001*

Table 1: Time to the rescue analgesia, the total analgesic consumption, and the number of patients needed rescue analgesia

The Data is in Mean ± SD (standard deviation), median (range), or patient number (percentage (%)). $P < 0.05$ so is considered as significant.

The time for first rescue analgesia was increased in the B group (18.7 ± 4.8 h) than that in the A group (6.5 ± 2.4 h). The total amount of rescue analgesia needed was less in the B group (1.14 ± 2.2 mg) in comparison to A group (5.86 ± 3.6 mg). Only six patients in the B group needed rescue analgesia whereas nineteen patients needed rescue analgesia in the A group (Table 1).

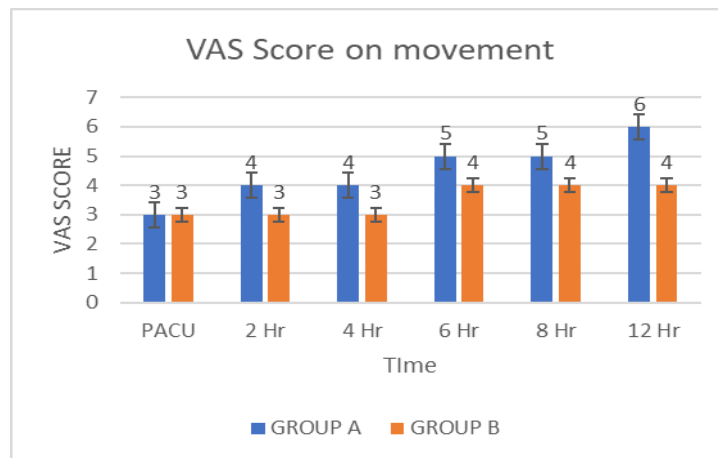


FIG 2: Visual analog Scale on movement

Visual analogue scale (VAS) was significantly lower in the B group at rest at 2, 4, 6, 8 and 12 h postoperatively compared to the A group. On movement, the VAS was significantly less at 2, 4, 6, 8 and 12hr postoperatively in the B group compared to the A group (Figure 1).

Discussion:

Any surgical procedure is associated with post operative pain and hence a lot of apprehension and stress. The aim of the present study was to relieve post operative pain with minimum side effects and prolong the pain free period. Analgesics were used for relief of post operative pain which were associated with many side effects, so regional blocks were a safer option. A significant proportion of pain experienced by patients undergoing abdominal surgeries is related to somatic pain signals derived from the abdominal wall.[1] This study shows that the addition of dexamethasone to levobupivacaine 0.25% for TAP block resulted in significantly lower VAS pain score postoperatively and reduction of postoperative additional analgesic requirements.

A variety of animal studies have reported the analgesic effect of corticosteroids by adding corticosteroids to local anaesthetics for peripheral nerve blockade.[10,11] Droger and colleagues have shown that dexamethasone incorporation into bupivacaine microspheres caused prolongation of the intercostal nerve blockade in sheep.[10] Castillo and coworkers reported that addition of dexamethasone microspheres to bupivacaine resulted in prolongation of sciatic nerve blockade in rats.[11]

Several mechanisms have been suggested to explain the analgesic effect of corticosteroids. A direct effect on nerve membrane rather than an anti inflammatory action has been suggested as the corticosteroids were able to inhibit ectopic neural discharge originating in experimental neuromas.[12] Triggering vasoconstriction and antiallergic activity of topical steroids have been suggested through action on specific glucocorticoid receptors.[13,14] It should be emphasized that a blockade is not produced if steroids are used alone for regional blocks, but steroids may potentiate the action of local anaesthetics through modulation of the function of potassium channels in the excitable cells.[14]

The performance of the TAP block with the guidance of ultrasound enhanced the quality of the block, allowed accurate positioning of local anaesthetics in

the correct plane, and decreased the incidence of complications [1].

The main finding of this study was addition of dexamethasone to levobupivacaine in the TAP block which resulted in significantly lower VAS in resting conditions at 2, 4, 6, 8 and 12 hr and on movement at 2, 4, 6, 8 and 12 h postoperatively in comparison to plain levobupivacaine group. Adding dexamethasone provides prolonged postoperative analgesia up to 12 hrs whereas 6 hrs in the levobupivacaine-only group and had reduced the requirement of postoperative additional analgesia (1.14 ± 2.2 versus 5.86 ± 3.6 mg). The number of patients who requested analgesia were increased in the group A (76%) when compared with the group B (24%).

Conflict of interest:

There are no conflicts of interest.

Conclusion:

In this study we concluded that by addition of dexamethasone to levobupivacaine in ultrasound guided TAP Block the duration of post-operative analgesia was prolonged with lower VAS score and requirement for additional analgesia was reduced post operatively.

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