



**COMPARISON OF 0.25% ROPIVACAINE AND 0.25%
LEVOBUPIVACAINE IN TRANSVERSUS ABDOMINIS PLANE BLOCK TO
PROVIDE POST-OPERATIVE ANALGESIA IN PATIENTS UNDERGOING
CESAREAN SECTION- A RANDOMIZED CONTROLLED STUDY**

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ABSTRACT

INTRODUCTION: Pain is the most disturbing and feared factor during and after surgery. Many drugs are used to provide post-operative analgesia and none are free of side effects. Newer among the analgesic technique is transversus abdominis plane block (TAP block) with comparatively lesser side effects and better efficacy and simplicity in procedure than pharmacological agents.

MATERIALS AND METHODS: 90 female patients of ASA grade 1 and 2 undergoing cesarean section after taking ethics committee approval were randomly divided into three groups with N=30 in each group. In group R- 20 ml of 0.25% Ropivacaine hydrochloride, in group L- 20 ml of 0.25% levobupivacaine and in group S- 20ml of normal saline was given through TAP block after completion of surgery. VAS score, time of rescue analgesia and total drug consumption was assessed in all the patients at 5min, 10min, 15min, 30min, 1 hour, 4 hr, 8hr, 12 and 24 hour.

RESULTS: VAS score in Group L was 5.04 ± 0.24 , in group R was 5.69 ± 0.08 and in group S was 6.78 ± 0.28 . Similarly time of rescue analgesia in group L, R and S was 220 ± 15.00 , 148 ± 56.73 and 17 ± 10.14 respectively. Total amount of analgesic consumption in group L, R and S was 234 ± 44.98 , 324 ± 12.66 and 402 ± 21 respectively. Above results showed analgesia efficacy of levobupivacaine and ropivacaine as analgesic when used in TAP block and also showed levobupivacaine to be better analgesic than ropivacaine.

CONCLUSION: levobupivacaine is better than ropivacaine for post-operative analgesia when used in TAP block.

KEYWORDS: Analgesia, Levobupivacaine, Ropivacaine, Transversus abdominis plane block.

INTRODUCTION

“Pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage [1]”. Most feared complication of any surgery to the patient is pain. Untreated pain results in various complications like discomfort, hypertension, tachycardia, myocardial ischemia, angina, inability to cough, reduced mobility, increased chances of peripheral venous thromboembolism, increased morbidity and post-surgical stay of the patient concerned[2]. Polypharmacy like opioids, gabapentin, ketamine, nonsteroidal anti-inflammatory drugs, alpha-2 agonists and paracetamol or regional procedures like epidural catheterization, local anaesthetic infiltration in the incision are used traditionally for post-operative pain relief [3]. Transversus abdominis plane (TAP) block is newer, effective and comparatively simpler to perform. It along with ilioinguinal nerve and hypogastric block also blocks the lower intercostal (T7 – T11) thus provides better and denser pain relief [4]. In TAP block, nerves of anterior and lateral abdominal wall are desensitized by injecting long acting local anesthetic solution between internal oblique and transverses abdominis muscle via lumbar triangle of Petit. Thus it is very useful for patients inguinal hernia repair, abdominoplasty, caesarean section, proctectomy and colorectal surgery [5, 6].

Levobupivacaine and Ropivacaine are long acting amide type local anaesthetic agents with chemical properties similar to that of bupivacaine but they are less toxic than bupivacaine. This study is aimed to assess the effects of Levobupivacaine and Ropivacaine in transversus abdominis plane block for post-operative analgesia patients undergoing caesarean section under subarachnoid block.

MATERIALS AND METHODS: After obtaining approval from the ethical committee and well informed written patients’ consent, the present study was done on 90 female patients of ASA grade I & II of age group 18-40 years scheduled for caesarean section.

Exclusion Criteria

1. BMI <18 or >35kg/m²
2. Preoperative opioid or nonsteroidal anti-inflammatory drug treatment for chronic pain
3. Chronic hepatic, renal failure, cardiac and neurological disease.

4. Known allergy to local anaesthetic.
5. PIH, eclampsia, chronic hypertensive
6. Alcohol /drug abuse.
7. Infection at the injection site.

Patients' grouping 90 female patients of ASA grade I & II scheduled for caesarean section under spinal anaesthesia were divided into 3 groups (n=30 each) randomly using envelope technique depending upon the drug given through TAP block after completion of surgery as below:

Group L(n=30) 0.25% levobupivacaine hydrochloride (20ml)

Group R (n = 30) 0.25% Ropivacaine hydrochloride (20ml)

Group S (n = 30) 20 ml of normal saline

Preparation of the patient

Preoperative assessment: A thorough preoperative evaluation was done including history, general physical examination, systemic examination, airway and spine. Counseling was done and informed consent was taken. Anesthetist giving the drug was blinded for the study.

Pre-medication: Intradermal sensitivity test was performed and inj. Glycopyrolate 0.01 mg/kg IV 30 minutes before the induction of anaesthesia. Upon arrival of the patient in the operation room, intravenous access with 18G cannula established and ringer lactate 15ml/kg infusion started. All the baseline vital parameters like heart rate, SBP, DBP, MAP, ECG and SPO₂ were monitored. Under all aseptic precautions, cleaning, painting, draping is done in sitting position and Sub-arachnoid block is induced with 25 gauge spinal needles. After confirmation of free flow of cerebrospinal fluid, 2.0ml-2.2ml of 0.5% Bupivacaine (heavy) is injected intrathecally, patient was made supine and effect was checked up to desired level for caesarean section. All the vital parameters like heart rate, SBP, DBP, MAP, ECG and SPO₂ were monitored. After accomplishment of the procedure, under all aseptic precautions cleaning and painting was done. Nerve stimulator with insulated needle at 1 milliampere current is used. Firstly, needle is advanced through triangle of Petit at right angles to the skin in coronal plane until resistance was encountered. Further advancement of the needle results in first pop-up feel indicating lying of needle plane between external and internal oblique fascial layers.

Further traversing resulted in a second “pop” indicative of entry into transversus abdominis plane. Twitching of external oblique muscle was appreciated externally as confirmation of the space and current was reduced down to 0.3-0.4 milli ampere and then 20ml of 0.25% Levobupivacaine, 0.25% Ropivacaine or saline was injected after aspiration according to the study group. Readings of vital parameters i.e. heart rate, BP, DBP, MAP and ECG were recorded throughout the peri-operative period till 24 hours after the surgery.

Time of first rescue analgesia and total dose of analgesic consumption for 24 hour postoperatively along with pain visual analogue scale (VAS) were measured and compared.

Adverse effects such as hypotension, bradycardia, nausea, vomiting, headache, dizziness, constipation and cardiovascular instability were also recorded.

The observations were recorded and subjected to statistical analysis using student’s “t” test and for qualitative variables chi-square test was used. The observations recorded in both the groups were tabulated and statistical analysis was carried out by using SPSS version 17 statistical software. For intergroup comparison, $p > 0.05$ and $p < 0.05$ were considered as insignificant & significant respectively. $p < 0.01$ was considered as highly significant.

RESULTS

Data obtained from the patients involved in study were analyzed. The mean age, weight, sex were comparable in the three study groups and duration of surgery as shown in table 1.

Table-1: Showing demographic variables in three groups

VARIABLES	GROUP L	GROUP R	GROUP S
AGE	26±2.65	25±.88	27±12.8
WEIGHT	55±4.34	58±.13	56±2.78
ASA GRADE 1 & 2	23±75.09	21±4.98	20±5.14
DURATION OF SURGERY	54±3.22	60±0.69	57±2..40

Preoperative heart rate, systolic, diastolic and mean blood pressure level were comparable in all the three groups. Intra operatively, vitals like heart rate, BP, DBP and MAP were measured at various time intervals with insignificant statistical difference in value($p>0.05$).

Table-2: Mean (\pm SD) time for first rescue analgesia in three groups

GROUPS	GROUP L	GROUP R	GROUP S
TRA	220 \pm 15.00	148 \pm 56.73	17 \pm 10.14

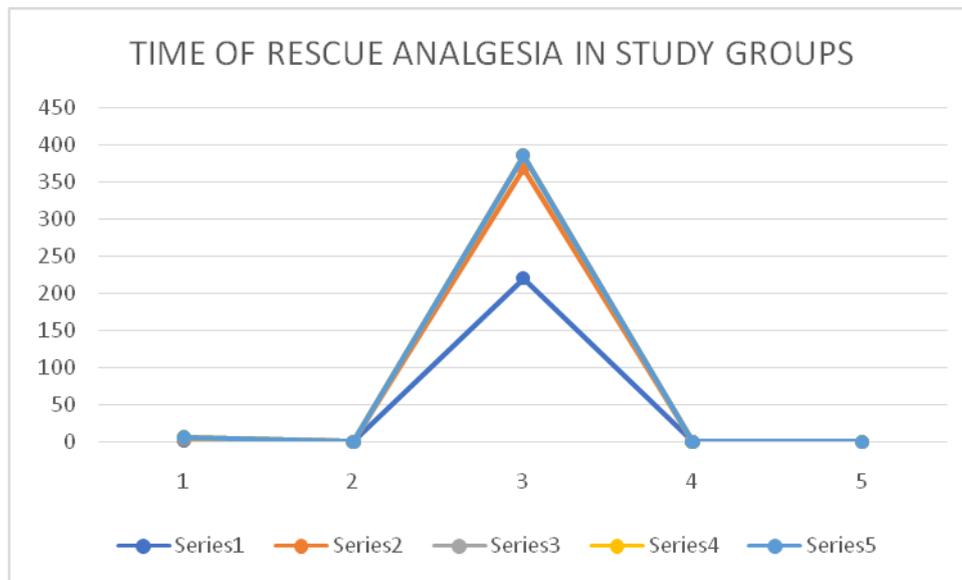
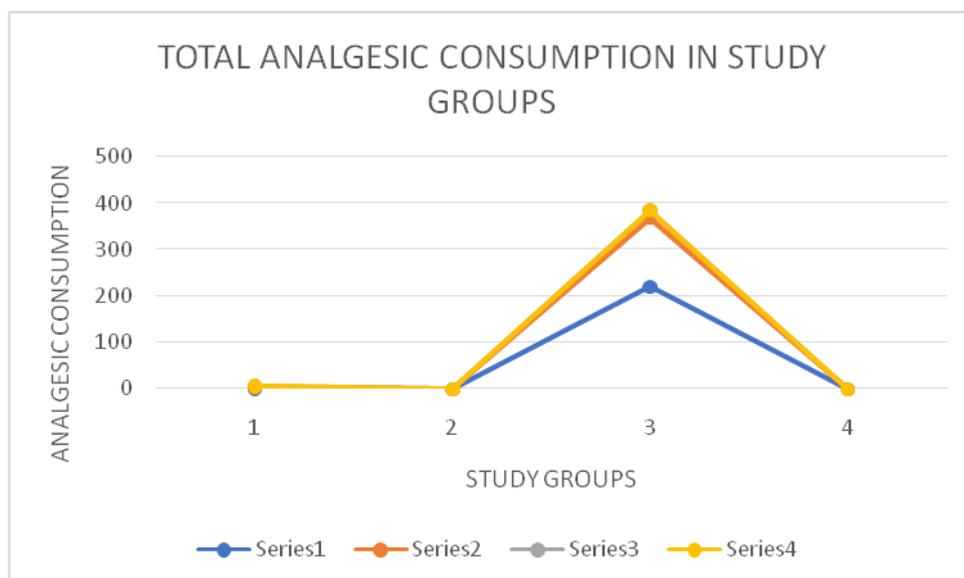
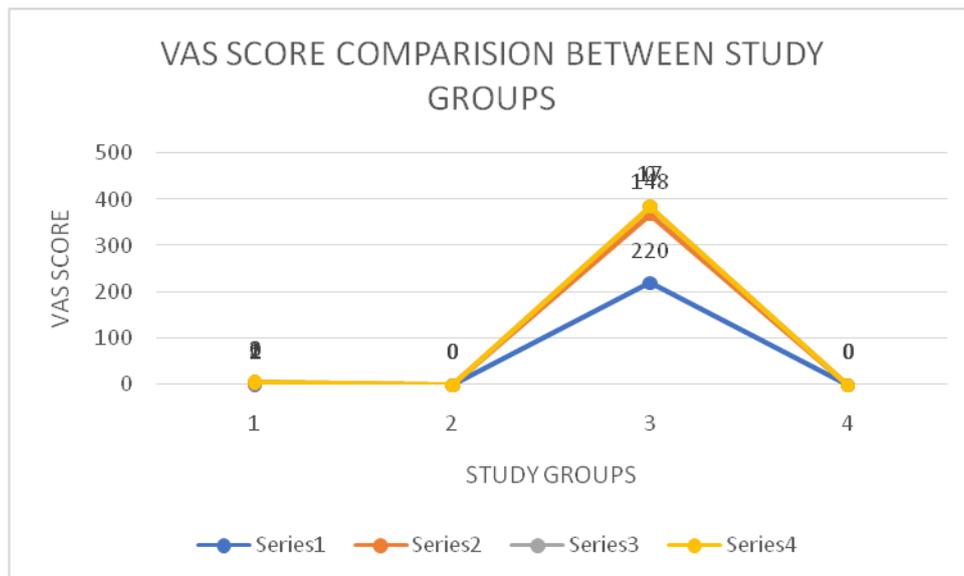


Table-3: Total analgesic (tramadol) consumption in 24 hr (mg) and VAS score mean (+sd) in three groups

GROUPS	GROUP L	GROUP R	GROUP S
VAS score	5.04 \pm 0.24	5.69 \pm 0.08	6.78 \pm 0.28
Total analgesic consumption	220 \pm 15.00	148 \pm 56.73	17 \pm 10.14



DISCUSSION

Pain is the most feared factor related to the surgery for patient. Unrelieved pain after surgery can interfere with sleep and physical functioning and can negatively affect a patient's well-being on multiple levels [7]. Inadequate pain control may result in increased morbidity or mortality [8]. Despite this overwhelming rationale for effective postoperative pain control with pharmacological agents and epidural catheterization, clinically the results are not satisfactory [9]. TAP block is a regional nerve block in which local anesthetic is injected through lumbar triangle of Petit into the plane between the transversus abdominis and internal oblique muscle to provide anterior and lateral abdominal wall analgesia [10].

Levobupivacaine and Ropivacaine are local anaesthetics structurally related to Bupivacaine but with reduced potential toxicity and improved relative sensory and motor block profiles.

Study groups were comparable for the demographic variables like age and weight parameters, type and duration of surgery and sex with $P > 0.05$. Heart rate, SBP, DBP and MAP were comparable in all the study groups throughout the peri-operative period.

Nanze Y et al. [11] found no significant change in HR, SBP, DBP and MAP peri-operatively in three study groups at various time interval ($p > 0.05$).

Bhattacharjee S et al. [12] in their study with TAP block in patients undergoing total abdominal hysterectomy found no significant changes in HR, SBP, DBP and MAP in study groups postoperatively.

Kabariety R E et al. [13] & **Venkatraman R et al.** [14] observed that no significant change in HR, SBP, DBP and MAP post-operatively among all the three groups they took in their study at various time intervals ($p > 0.05$). The time for first rescue analgesia in group R was significantly more as compared to group C ($p < 0.05$) thus, Ropivacaine hydrochloride (0.25%) seems to provide longer duration of analgesia as compared to the control group.

Saxena A et al. [15] concluded that patient given saline made their first request for analgesics significantly sooner than the levobupivacaine group ($p < 0.05$).

Cansiz K H et al. [16] concluded that time for first rescue analgesic dose was earlier in control group as compare to Levobupivacaine group ($p < 0.05$). Thus the above studies did earlier show result in favour of our study. Also, total analgesic consumption at 24 hours between two groups was significantly less in group L as compared to control group ($p < 0.05$).

Papagiaunopoulou P et al. [17] showed lesser consumption of analgesics in Levobupivacaine group and Ropivacaine group ($p < 0.01$) in comparison of control ($p < 0.001$) group.

Peterson P L et al. [18] **Sinha et al.** [19] & **Mankikar M G et al.** [20] concluded with less VAS score in drug group when compared to the control group thus, all shows result in accordance with our study.

Gupta et al(21) compared levobupivacaine and ropivacaine both 0.25% in fascia iliaca block for smooth positioning prior to sub-arachnoid block in old aged patient and found both the drugs equally effective in terms of efficacy and duration. More studies are required to prove the efficacy of the drugs used as which one can be used as better analgesic.

CONCLUSION

This study was carried out to study effect of transversus abdominis plane block using Levobupivacaine and Ropivacaine to provide post-operative analgesia in patients undergoing caesarean section.

We conclude that TAP block using 0.25% Levobupivacaine and 0.25% Ropivacaine when given at the end of caesarean section, results in better analgesia when compared to the control group. Levobupivacaine provided better analgesia than ropivacaine when used in same concentration and dilution.

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