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A COMPARITIVE STUDY BETWEEN EPIDURAL LEVOBUPIVACAINE 0.125% WITH FENTANYL AND ROPIVACAINE 0.125% WITH FENTANYL FOR POST OPERATIVE PAIN RELIEF FOR HEMODYNAMIC STABILITY IN PATIENTS WHO UNDERWENT ABDOMINAL AND LOWER LIMB SURGERIES.

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ABSTRACT **INTRODUCTION** The most common type of acute pain we anesthesiologists come across in daily life is postoperative pain with resultant neuroendocrine stress response causing protein catabolism, hyperglycaemia, poor wound healing, decreased respiratory function, and increase in myocardial oxygen demand.[1] Pain relief could be provided by use of systemic opioids, non-opioid analgesics, regional neuraxial, peripheral analgesic techniques, and epidural route. The epidural being safer resulting in better pain relief and shorter Intensive Care Unit stays.[2]Addition of opioids to local anaesthetics has several benefits such as improved dynamic pain relief, limited regression of sensory blockade, and decreased dose of local anaesthetic.3Use of lipophilic opioid (fentanyl) is preferred to hydrophilic as it provides rapid onset of action, rapid clearance, and prevents delayed respiratory depression.[4] To compare and to monitor VAS score0-10 of postoperative analgesia, the hemodynamic stability and To assess for motor blockade with Bromage score and sensory blockade with Hollmen scale between two groups for 24hours after start of epidural infusion. **AIMS AND OBJECTIVES** To compare the hemodynamic stability between the two groups **MATERIALS AND METHODS:** This study is a double blinded randomised control trial was conducted for a period of 18 months on 60 patients undergoing abdominal or lower limb surgeries under the assistance and guidance of Department of anaesthesiology at shridevi institute of medical sciences and research hospital ,tumkur. The patient satisfying eligibility criteria were started with postoperative epidural infusion for analgesia using syringe pump with the study drug group A patients who received ropivacaine with 0.125% with fentanyl 1ug/ml and group B patients received levobupivacaine with 0.125% with fentanyl 1ug/ml and continuously assessed and monitored for 24 hours for hemodynamic stability with variables like heart rate , systolic blood pressure , mean arterial pressure and diastolic blood pressures with adequate pain relief and recorded . **RESULTS:** The both study groups studied were compared for hemodynamic stability Which showed similarity in hemodynamic variables like HR, SBP. MAP, DBP in the present study. **CONCLUSION** Use of either local anaesthetics ropivacaine or levobupivacaine will have equivalent hemodynamic stability.

KEYWORDS : LEVOBUPIVACAINE , ROPIVACAINE , FENTANYL, EPIDURAL INFUSION , PAIN, VAS SCORE , SYSTOLIC BLOOD PRESSURE , DIASTOLIC BLOOD PRESSURE, MEAN ARTERIAL PRESSURE , HEART RATE .

BACKGROUND

Pain in post-operative period forms an acute category of non-malignant pain. Uncontrolled postoperative pain may produce range of detrimental effect both acute and chronic. Pain management is necessary due to humanitarian grounds as well as for the therapeutic reasons like good hospital stay and early easy recovery; Failure to relieve pain might cause tachycardia, hypertension, hypoxia, restlessness, nausea and vomiting. It also effects like increase in metabolism and sleep disturbances in postoperative patients. Postoperative epidural analgesia is an effective and well accepted modality of pain relief technique after abdominal and lower limb surgeries. Postoperative epidural analgesia improves patient outcome and lesser hospital stays. Optimization provided in post-operative period as analgesia improves the patient's ability to fully participate in rehabilitative sessions. Uncontrolled postoperative pain can have a variety of negative acute and chronic effects. Adequate pain control is critical and has been identified as a top priority for anaesthesiologists.[1]

Early mobilization and ambulation accelerate postoperative recovery. Analgesia delivered through indwelling catheter is a safe and effective method for management of acute postoperative pain. Epidural infusion of local anaesthetics alone or combined with opioids may be used for postoperative analgesia. The location of action of local anaesthetics in the epidural space includes spinal nerve roots, dorsal root ganglion or spinal cord itself. Ropivacaine was introduced in India in 2009. It is the monohydrate of the hydrochloride salt of 1-propyl2′,6′-pipecoloxylidide and is prepared as pure S-enantiomer. Levobupivacaine being introduced more recently in India in 2012. It is the pure S-enantiomer of racemic Bupivacaine. Ropivacaine, structurally closely related to bupivacaine is a pure S (-) enantiomer with lower cardiac and central nervous system toxicity. The latest advance in local anaesthetics has been levobupivacaine, the pure S (-) enantiomer of racemic bupivacaine. Levobupivacaine has better safety profile compared to racemic bupivacaine.[2]

Pain relief can be provided by systemic opioids and non-opioid analgesics, regional neuraxial and peripheral analgesic techniques, and epidural route being safer resulting in shorter Intensive Care Unit stays. Addition of opioids to local anaesthetics has several benefits such as improved dynamic pain relief, limited regression of sensory blockade and decreased dose of local anaesthetic and rapid onset of action. To study levobupivacaine, which has not been studied adequately and on which limited literature is available and its advantage over ropivacaine and bupivacaine. To assess the clinical safety of Levobupivacaine with fentanyl and ropivacaine with fentanyl through epidural route.

Use of lipophilic opioid (fentanyl) is preferred to hydrophilic as it provides rapid onset of action, rapid clearance, and prevents delayed respiratory depression. Both ropivacaine and levobupivacaine are equally potent and equi-analgesic effect, but limited number of studies with levobupivacaine unlike ropivacaine which has short duration of action.[1]

The application of epidural analgesia can reduce postoperative gastrointestinal, pulmonary, and possibly cardiac complications. Postoperative thoracic epidural analgesia can facilitate the return of gastrointestinal motility without contributing to anastomotic bowel dehiscence by inhibiting sympathetic outflow, lowering the total opioid dose, and attenuating spinal reflex inhibition of the gastrointestinal tract. Thoracic epidural analgesia using a local anaesthetic-based regimen reduced pulmonary infections and complications. [1]

Postoperative epidural analgesia may reduce the risk of postoperative myocardial infarction, possibly by dampening the stress response and hypercoagulability, improving postoperative analgesia, and providing favourable redistribution of coronary blood flow. The advantages of epidural analgesia over systemic analgesia includes decrease in respiratory depression, nausea, vomiting and constipation . It also includes early ambulation with good patient's satisfaction as advantage. Epidural analgesia is one of the safest methods of analgesia used mainly for the upper abdominal, lower abdominal and safest methods of analgesia used mainly for the upper abdominal, lower abdominal and lower limbs surgeries.[2]

In a recent systemic review where the comparison between the lumbar epidural blockade with the systemic opioid analgesia for laparotomy revealed that the lumbar epidural blockade had better dynamic pain scores. The discovery of opioid receptors has opened up a new chapter in the treatment of pain. Small doses of opioids administered in the epidural space provide profound analgesia by bypassing the blood and blood brain barrier. It is undeniably a breakthrough in pain management. Studies have shown the effectiveness of opioids like morphine, fentanyl and sufentanil as adjunct to bupivacaine for epidural anaesthesia while, the use of tramadol has not been explored extensively.[3]

In the postoperative period, epidural analgesia with local anaesthetics alone or in combination with opioids provides adequate pain relief. The addition of opioids to local anaesthetic solutions in the epidural space improves analgesia.

MATERIALS AND METHODS

After obtaining institutional ethical committee clearance and scientific committee clearance the study was conducted. The patients written and informed consent was obtained before initiation of study in each of the study subjects.

AREA OF STUDY: department of anaesthesia shridevi institute of medical sciences and research hospital tumakuru.

DURATION OF STUDY: Between January 2021 –June2022 for a duration of 18 months.

SOURCE OF DATA: Patients admitted to Shridevi institute of medical sciences and research hospital, Tumakuru and underwent elective or emergency surgeries of abdominal or lower limb region.

STUDY DESIGN: double blinded Randomized Clinical Trial

SAMPLING METHOD: Patients satisfying the eligibility criteria will be enrolled in the study after obtaining written informed consent.

METHOD OF COLLECTION OF DATA: with simple random sampling the patients who are satisfying the eligibility criteria will be allocated into 2 groups A and B a total of 60 patients were included in the study. And each group with 30 patients. A prospective randomised controlled trial, double blinded study.

Group A:30 patients will be receiving 0.125% ropivacaine with Fentanyl 1 microgram per ml at the rate of 8 ml per hour infusion for 24 Hours epidurally.

Group B:30 patients will be receiving 0.125% Levobupivacaine with fentanyl 1 microgram per ml at the rate of 8 ml per hour for 24 hours epidurally.

Patients satisfying the eligibility criteria were enrolled in the study after obtaining written informed consent. A prospective randomised control trial, double blind study was performed on a total of 60 patients of ASA grade 1 and 2 of either sex undergoing abdominal and lower limb surgeries. 30 patients were allocated to each group.

The sample size was calculated according to the local statistics and groups were divided later using the below formula

$N = (\sigma z1-\alpha/2+z1-\beta\mu A-\mu B)^2$
Where,
N - sample size
σ is standard deviation
u is the expected mean
α is Type I error
β is Type II error, meaning 1−β is power
N =57 ~~60 using above formula

Results were compiled and subjected to statistical analysis using R software. One-way analysis of variance (ANOVA), unpaired 't' test, chi-square test was applied where deemed appropriate. p >0.05 was considered as statistically significant.

INCLUSION CRITERIA:

- Patients aged between 18-60 years.
- Patients under ASA (American society of anaesthesiologists) grade1 and grade 2.
- atients undergoing elective or emergency abdominal surgery.
- Patients undergoing elective or emergency lower limb surgeries.

EXCLUSION CRITERIA:

- Patients with allergy for ropivacaine, levobupivacaine and fentanyl
- Patients with contraindications for epidural catheter placement.Patients with BMI (body mass index) of <18 or >35 kg/m^2.

METHODOLOGY

The monitors were connected to the patients including non-invasive BP (NIBP) , pulse-oximeter ,3 lead ECG. Baseline PR, BP, SPO2 will been recorded. Three lead ECG with standard Lead II was used when necessary. After proper positioning and under strict aseptic precautions parts painted and draped. The lumbar interspace in the midline was identified using bony landmarks. The space is local infiltrated with Injection Lignocaine 2% 2 ml at the puncture site was given. After which 18 gauge Tuohy needle was inserted into the lumbar inter spinal epidural space. Epidural space was confirmed by the loss of resistance to air method by 10 ml L.O.R. syringe and the epidural catheter was inserted and fixed to skin. After negative aspiration for CSF and blood patients were administered the test dose of Injection lignocaine with adrenaline 2% 3ml. Subarachnoid injection was ruled out. The case was proceeded. After the surgery was completed the patient shifted to postoperative ward and connected to standard ASA monitors.

Post-operatively the patient's vital signs were monitored continuously. Pain was assessed and as the patient complained of pain >3 from VAS or motor blockade assessed using bromage scale of 0. Following which all patients received an initial loading dose of 5 ml of the study drug. This was followed by an infusion of 8 ml/h for 24 hours using a syringe pump. If patient complained of any breakthrough pain the patients were given with top ups of 5 ml of the same study drug as required by syringe pump.

PREPARATION: The preparation of drug was made using of 12.5 ml of Inj ropivacaine 0.5% 20 ml ampule (neon) and 1 ml of Inj fentanyl 50mcg/ml 2ml ampule (verve) was diluted to 50 ml using normal saline and was filled into a 50 ml syringe which was connected to the syringe pump in group A. The preparation of drug was made using of 12.5 ml of Inj levobupivacaine 0.5% 20ml vial (neon) and 1 ml of Inj fentanyl 50mcg/ml 2ml ampule was diluted to 50 ml using normal saline and was filled into a 50 ml syringe which was connected to the syringe pump in group B. The study drug was re filled following the emptying of the syringe timely for 24 hours.

Post 24 hours the infusion of the study drug ended and discontinued. The patients were monitored for 24 hours after the start of infusion in postoperative ward. The hemodynamic variables like heart rate, systolic blood pressure, diastolic blood pressure, mean arterial pressure, the VAS score were documented as soon at 0min, 5min,15min,30min, 1 hours, 3hours, 12 hours, 18 hours, 24hours using the visual analogue scale (VAS) (0-no pain to 10-maximum pain), heart rate (beats per minute), blood pressure (in mm of Hg) after the start of epidural infusion. Rescue analgesia was given if patients complained of any breakthrough pain after the top up of the study drug 5ml and not reduced Injection tramadol 50mg iv was given to the patients and keep them pain free . patients were asked to report any pain, nausea ,vomiting , giddiness, pruritis, or any side effects during the infusion and the respective treatment was given and if required even the epidural infusion was discontinued and the study was stopped and reported the same .

RESULTS

The results obtained from both the groups of patients are entered in Excel. Both the study groups were compared for variation between HR, SBP, MAP, DBP between group A and group B

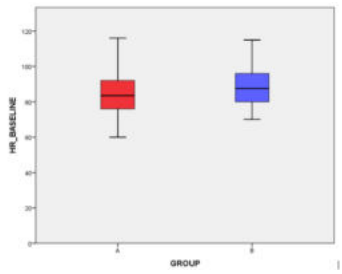
Table 1: Baseline clinical parameters of comparative study groups

Parameter	Group A (n=30)	Group B (n=30)	P value[a]
BMI (kg/m^2 , mean ± SD)	22.44 ± 2.54	23.12 ± 2.88	0.33
ASA Grade (%)			
I	12 (40.0%)	10 (33.3%)	0.59

II	18 (60.0%)	20 (66.7%)	
Baseline HR (beats/min, mean ± SD)	84.2 ± 13.24	87.43 ± 10.52	0.30
Baseline SBP (mmHg, mean ± SD)	127.03 ± 18.29	127.37 ± 12.25	0.93
Baseline DBP (mmHg, mean ± SD)	79.67 ± 11.02	80.00 ± 17.17	0.90
Baseline MAP ((mmHg, mean ± SD)	95.38 ± 12.5	95.38 ± 13.5	0.90
Baseline SPO2 (%)	97.67 ± 1.56	97.67 ± 1.42	1.00

BMI- Body mass index, ASA- American Society of Anesthesiologists, HR-Heart rate, SBP-Systolic blood pressure, DBP-Diastolic blood pressure, MAP-Mean arterial pressure, SPO2- Oxygen saturation, a- independent sample t-test

Figure 1: Baseline Heart rate of both the groups



Heart rate

Effect of ropivacaine and levobupivacaine on heart rate of patient post-operative was assessed at various interval. The average heart rate was 84.2 for group A and 87.43 for group B initially which deeps down at an hour, following which there is a brief rise in heart rate and then again a decrease in heart rate. The mean heart rate and its change over time among the groups varied over time but none of this difference was statistically significant. (Table 5 and figure 11

Table 2: Comparison of heart rate at various time interval between the two study groups

Time	Group A (n=30) Mean ± SD	Group B (n=30) Mean ± SD	P valuea
Baseline	84.20 ± 13.2	87.43 ± 10.5	0.30
5 mins	84.47 ± 13.4	86.70 ± 10.9	0.48
10 mins	83.27 ± 12.1	83.30 ± 17.4	0.99
15 mins	82.27 ± 12.7	85.13 ± 11.8	0.36
30 mins	82.57 ± 12.9	84.37 ± 11.8	0.57
1 hour	81.36 ± 11.4	83.00 ± 10.2	0.56
3 hours	83.80 ± 12.5	84.33 ± 13.3	0.87
6 hours	84.20 ± 12.1	83.37 ± 10.9	0.78
12 hours	82.60 ± 19.2	83.50 ± 10.9	0.82
18 hours	85.10 ± 14.1	83.30 ± 11.0	0.58
24 hours	83.00 ± 12.8	81.80 ± 10.2	0.69

a- independent sample t-test

Figure 2: Comparison of heart rate at various time interval between the two study groups

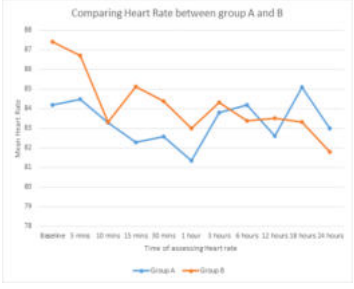
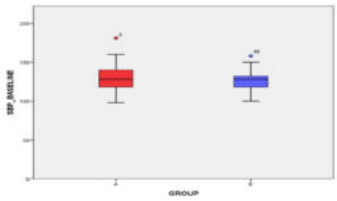


Figure 3: Baseline systolic pressure of both groups



Blood pressure

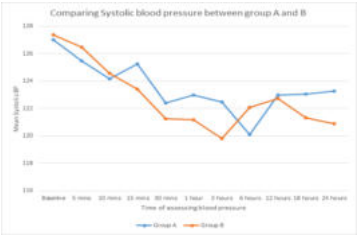
The mean systolic blood pressure was same for both the group at baseline. The systolic BP dipped to the minimum at 3 hours for group B and 6 hours for group A. Following this there was a slight rise in BP in group. The difference in mean systolic pressure was not statistically significant. (Table 6 and figure 12)

Table 3: Comparison of Systolic Blood Pressure at various time interval between the two study groups

Time	Group A (n=30) Mean ± SD	Group B (n=30) Mean ± SD	P valuea
Baseline	127.03 ± 18.2	127.37 ± 12.2	0.93
5 mins	125.47 ± 17.9	126.47 ± 11.3	0.79
10 mins	124.17 ± 15.1	124.57 ± 10.1	0.90
15 mins	125.27 ± 14.8	123.43 ± 10.6	0.58
30 mins	122.40 ± 11.6	121.27 ± 9.5	0.68
1 hour	123.00 ± 11.1	121.17 ± 10.0	0.50
3 hours	122.47 ± 8.2	119.80 ± 20.7	0.51
6 hours	120.10 ± 22.4	122.07 ± 10.1	0.66
12 hours	122.97 ± 8.3	122.73 ± 9.9	0.92
18 hours	123.07 ± 7.7	121.33 ± 10.1	0.46
24 hours	123.27 ± 7.9	120.90 ± 10.8	0.34

a- independent sample t-test

Figure 4: Comparison of Systolic Blood Pressure at various time interval between the two study groups



DIASTOLIC BLOOD PRESSURE

The mean diastolic pressure was 79.57 mmHg and 80 mmHg for group A and B respectively. This values decreased gradually over 24 hour to 75.73 and 75.33 in group A and B. This change in diastolic value was similar in both group with no statistically significant difference. (Table 7 and figure 13)

Figure 5: Baseline diastolic pressure of both groups

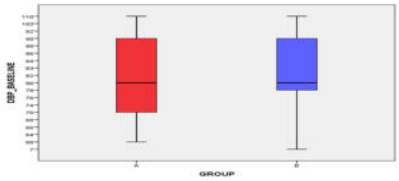


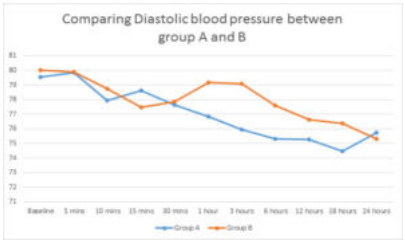
Table 4: Comparison of Diastolic Blood Pressure at various time interval between the two study groups

Time	Group A (n=30) Mean ± SD	Group B (n=30) Mean ± SD	P value[a]
Baseline	79.57 ± 11.0	80.00 ± 17.1	0.90
5 mins	79.83 ± 10.4	79.90 ± 8.4	0.97
10 mins	77.93 ± 9.6	78.73 ± 9.3	0.74
15 mins	78.63 ± 8.8	77.47 ± 8.4	0.60
30 mins	77.63 ± 8.4	77.87 ± 6.9	0.90

1 hour	76.83 ± 7.2	79.17 ± 7.8	0.23
3 hours	75.93 ± 7.7	79.10 ± 6.9	0.10
6 hours	75.30 ± 8.0	77.60 ± 7.0	0.51
12 hours	75.27 ± 8.4	76.63 ± 6.3	0.48
18 hours	74.47 ± 6.8	76.37 ± 6.4	0.27
24 hours	75.73 ± 6.7	75.33 ± 6.5	0.81

a- independent sample t-test
b-

Figure 6: Comparison of Diastolic Blood Pressure at various time interval between the two study groups



MEAN ARTERIAL PRESSURE

The mean arterial pressure (MAP) for both groups was around 95 mmHg at the baseline. This value gradually decreased to 90.53 in both the group in 24 hours. There was not statistically significant difference in the mean value of MAP between both groups any time of observation. (Table 8 and figure 14)

Table 5: Comparison of Mean arterial Pressure (MAP) at various time interval between the two study groups

Time	Group A (n=30) Mean ± SD	Group B (n=30) Mean ± SD	P value[a]
Baseline	95.38 ± 12.5	95.78 ± 13.5	0.90
5 mins	95.04 ± 12.1	95.42 ± 8.6	0.89
10 mins	93.34 ± 10.5	94.01 ± 8.7	0.79
15 mins	94.17 ± 10.0	92.78 ± 8.4	0.56
30 mins	92.55 ± 8.7	92.33 ± 6.8	0.91
1 hour	92.22 ± 7.5	93.16 ± 7.1	0.62
3 hours	91.44 ± 6.7	92.66 ± 9.5	0.57
6 hours	90.90 ± 11.5	92.42 ± 6.6	0.63
12 hours	91.16 ± 7.2	92.00 ± 6.2	0.67
18 hours	90.66 ± 6.2	91.35 ± 6.6	0.30
24 hours	90.53 ± 6.7	90.53 ± 7.1	0.54

Figure7: Comparison of MAP at various time interval between the two study groups

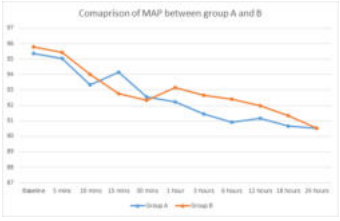
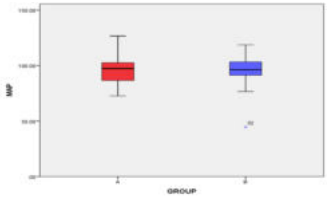


Figure 8: Baseline MAP of both the groups



DISCUSSION

Post-operative pain relief is a huge challenge that faces the surgeon. Search for the ideal local anesthetic agent has always been arduous. The ideal drug is one which balances between good analgesia with minimum effect on cardiovascular and nervous system.[32] Option of drugs available are local anaesthetic (LA), opioids and combination of both. Randomized control trials have shown that combination of LA with opioids is most effective than the used of either alone. Despite this fact, the right combination of LA and opioids has not been studied extensively. Concentration of both the LA drugs used in the present study was 0.125%. [33]A study by Patil et. al , Jayalekshmi et. Al and Shanthiraj also used the same concentration for comparing the effect of post-operative analgesia. [34,35,36] A study by Murdoch et. al. on the concentration levobupivacaine documented that quality of analgesia is better with 0.25% 6ml/hour than with diluted solution of 0.125% or 0.0625% of the same volume at the cost of prolonged motor blockade.[37] Lee et.al in their study found 0.1% of ropivacaine with or without fentanyl to be an effective pain relief agent with low motor block.[38] Saroa et. al. compared the efficacy of 0.2% ropivacaine with 0.2% levobupivacaine for post –operative analgesia following percutaneous nephrolithotomy and found both to have the same effect. [39]Bhasin et.al. compared the effect of 0.125% bupivacaine with 0.1% and 0.2% ropivacaine for post-operative pain relief in total knee replacement surgery. The study found 0.2% ropivacaine to have better analgesic effect over 0.1%.[40]

Top-up analgesic dose were required among 2 patient on ropivacaine and 5 patients on bupivacaine in the present study. But the mean duration of first analgesic requirement was shorter among ropivacaine group (4.3 ± 3.2 hours) than bupivacaine (7.37 ± 3.4 hour). Similar results were also documented by Saroa et. al. in their study.[39] The amount of bolus dose required for levobupivacaine was slightly more than ropivacaine in our study. Even Jayalakshmi et. al. documented the same finding but the difference was not statistically significant.[35]

The present prospective randomised controlled study, with double blinding was conducted to test the efficacy of ropivacaine (0.125%) versus levobupivacaine (0.125%) when used along with fentanyl for post –operative analgesia. Levobupivacaine and ropivacaine are comparatively new long acting analgesic drugs used as alternate to Bupivacaine, after its toxicity was known. Both, levobupivacaine and ropivacaine are pure left isomer due to their three dimensional structure and have lesser toxic effect on the systemic system [41]. Several studies have compared their effects with Bupivacaine but only few studies have compared efficacy of levobupivacaine and ropivacaine.[42,43] More over contradicting results have been obtained regarding their effect of analgesia. Thus, the present study has made an attempt to identify which of the two has better post-operative pain relief, haemodynamic stability, oxygen saturation and need of top-up dose.

The two study groups were randomly allotted to receive levobupivacaine with fentanyl and ropivacaine with fentanyl. Our study found the effects of levobupivacaine and ropivacaine to be similar on all aspects as the difference in various parameter such as blood pressure, heart rate and oxygen saturation was not statistically significant. All the mean baseline parameter such as age, sex, body mass index, ASA grade, heart rate, blood pressure and oxygen saturation were similar thus making valid comparison between the groups.

Several studies have compared the duration of operational analgesia and found levobupivcaine to have greater duration of analgesia than ropivacine[44,45,46]. This is attributed to the greater lipid solubility of levobupivaine [47]. But when used as post-operative epidural analgesia, they were considered to have equianalgesic efficacy[35,36]. Subramaniam et. al compared the post-operative analgesic effect in laparoscopic appendisectomy with ropivacaine and bupivacaine in combination with morphine and document their efficacy to be similar. These study support the findings in our study.[42]

Post-operative pain in the present study was assessed using VAS score which assess the pain experience on a scale of 0 to 10 in which higher the number greater the pain. In our study the mean VAS score at 5 mins in group A and B was 4.01 ± 1.7 and 4.16 ± 1.2 respectively. This mean score reached zero at 3 hours for both the group and showed a downward trend in 24 hours. There was no significant difference in VAS among the two group. A study by Patil et. al found the VAS score to have a gradual decline in pain from baseline to 3 hour following which there was a mild rise in VAS score and then decrease at 8th hour and remained constant. This difference in score could be due to the fact that the study included patients undergoing major abdominal surgery.[34] Pain assessment is difficult since it is subjective in nature with different pain threshold among patient. Moreover, age, sex, type of surgery, psychological or pharmacological factors can also affect the pain score. [48]

The mean values of hemodynamic parameter were same in both with no statistically significant difference between the groups. However, 2 patients from group B (levobupivacaine) developed hypotension and none from group A (ropivacaine). High blood pressure was recorded among 3 patients of group A and 2 from group B. Bradycardia was reported in one patient of group A and none from group B. One case of tachycardia was document in both the group. There was no fatality due to these hemodynamic changes (withholding of infusion needed or not needed). Patil et. al in their study similar to ours, documented one and four patients from group ropivacaine and bupivacaine group with hypotension.[34] These difference were not statistically significant. Stewart et. al. studied the central nervous system and cardiovascular effects of levobupivacaine and ropivacaine on healthy volunteers and concluded that both produce similar effects on CNS and Cardiovascular system. [49]

There was a mild fluctuation in oxygen saturation from 95 to 92% among 6 patients i.e. 3 from each ropivacaine and levobupivacaine. Change in this parameter at various time interval was minimal with no significant difference between the two groups. Andrew et. al. compared the effect of 0.1% versus 0.2% of ropivacaine on the pulmonary function test in post-operative period. They found no oxygen desaturation (SPO2 <93%) during the post-operative period but a significant decrease in forced vital capacity (FVC) and forced expiratory volume (FEV1) in 0.2% group than 0.1%. [50]

The mean Bromage score to assess level of motor block and also the mean sensory score was zero throughout the observation period for both the group. Alessandro et. al. compared the effect of 0.125% versus 0.0625% levobupivacaine in postoperative management for total knee and hip replacement. Their study found residual motor block in both the group with a mean Bromage score of 1.36 ± 0.87 in 0.125% and 1.61 ± 1.19 in 0.0625% group at 4hour post-surgery but this difference was not statistically significant. The mean bromage score reduced drastically only after 7hours post-surgery and remained stable after that. Mean sensory block was assessed using Hollmen score which was 1.31 ± 0.79 and 1.19 ± 0.91 at 4 hour post-surgery in 0.125% and 0.0625% group respectively. The sensory block in both group decrease gradually in 24 to 30hours post-surgery. This study had used sufentanil as the opioid drug while in our study fentanyl was used which could probably be a reason for difference in sensory and motor block.[51]

To summarize the findings of our study, the efficacy of ropivacaine and levobupivacaine is equianalgesic with minimal effect on haemodynamic parameter, oxygen saturation, motor and sensory block. The cost of levobupivacaine is much lesser when compared to ropivacaine and bupivacaine. A study by Ulrikh et. al. reported that replacement of bupivacaine and ropivacaine with levobupivacavine can reduce the average cost by 29.6 %. Keeping these factors in mind according decision can be taken on the use of levobupivacaine over ropivacaine. [52]

CONCLUSION

In conclusion our study showed that the epidural infusion had better pain relief and no use of any other pain medications and good postoperative stay. We propose that the use of epidural infusion with the above drugs is a wonderful analgesic in postoperative period with patients comfort.

We conclude that the infusion with levobupivacaine 0.125% with fentanyl 1mcg/ml is equal with ropivacaine 0.125% with fentanyl 1mcg/ml for postoperative analgesia with good hemodynamic stability.

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