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Original research article

A comparative study of analgesic effect of intrathecal ropivacaine with fentanyl versus intrathecal levobupivacaine with fentanyl in elective infra umblical surgeries

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Abstract

Aim and Objectives: The study's goal is to compare how intrathecal isobaric 0.75% ropivacaine and fentanyl compare to intrathecal isobaric 0.5% levobupivacaine and fentanyl in terms of how long anesthesia lasts during elective infra umbilical surgeries. to evaluate the quality of subarachnoid blockade produced by 0.5% levobupivacaine and fentanyl versus 0.75% ropivacaine and fentanyl.

Material and Methods: A prospective comparative clinical study was conducted on eighty patients at Department of Anaesthesia, Andhra Medical College, Visakhapatnam, Andhra Pradesh, India, from June 2022 to November 2022. The study population was randomly divided into 2 groups using a sealed envelope method.

Results: There was no statistically significant difference between the mean weights of Group R (58.125 ±5.35 kg) and Group L (57.97 ±4.44 kg; Graph 3; p=.0.8919). The heart rates of the two groups did not differ in a statistically significant way. In Group L (3.280.96mins), sensory block began sooner than in Group R (3.831.43mins). In comparison to Group R (6.132.15mins), Group L had an earlier onset of motor block (5.181.88mins). Comparing Group L (114.3830.24mins) to Group R (101.1324.56mins), a prolonged regression of the sensory block to L1 was observed. In comparison to Group L (267.3857.53mins), the time required for the first rescue analgesia (321.8676.79mins) was longer in Group R.

Conclusion: According to the results of the current study, 0.75% ropivacaine produced better, longer-lasting sensory blockade with quicker motor recovery. Therefore, 0.75% ropivacaine is a better drug for encouraging early ambulation and can be used in quick surgeries.

Keywords: Ropivacaine, fentanyl, levobupivacaine, subarachnoid blockade.

Introduction

The subarachnoid block was first performed by August bier in 1898. Because of its dependability, economic viability, adequate analgesia, muscle relaxation, and prolonged postoperative analgesia, it is the technique most frequently used for infra umbilical surgeries [1]. Most surgeries are performed on a day-care basis [2]. So the agents used in spinal anesthesia should have decreased incidence of complications, adequate postoperative analgesia, early ambulation, and discharge [3]. Lignocaine was the local anesthetic of choice for the subarachnoid block for decades. It has the benefits of a quick onset of action, good motor block, and significant muscle relaxation. Because of its shorter duration of action, cauda equina syndrome and transient neurologic symptoms that appeared after intrathecal injection, its use was restricted [4, 5].

Lignocaine has a shorter half-life and is three to four times less potent than bupivacaine [6]. Because of the low cardiovascular collapse/central nervous system toxicity ratio (CC/CNS) of bupivacaine, fatal cardiotoxicity after accidental intravascular injection has increased [7]. Life-threatening arrhythmias developed in patients who were given bupivacaine three decades ago; those arrhythmias were refractory to treatment. When it was realized that bupivacaine had a potentially fatal cardiotoxicity, the search for newer, safer local anesthetics began [8]. The stereo-specificity of bupivacaine is a key factor in the cardiotoxicity, with the 'R' isomer having a higher potential for cardiotoxicity than the 'S' form (9). In

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comparison to bupivacaine, the new local anesthetic medications ropivacaine and levobupivacaine have significantly lower cardiotoxicity [9].
Daycare procedures have been performed using ropivacaine, a long-acting amide that was first created as a pure enantiomer [10]. It offers sufficient sensory blockade with rapid motor recovery.
It is well known that levobupivacaine, an alternative to bupivacaine, has a safer pharmacological profile with fewer adverse cardiac and neurotoxic effects [11, 12]. Intrathecal adjuvants, such as opioids, have grown in popularity recently with the goal of extending the block's duration, increasing success rates, patient satisfaction, and hastening recovery times [13]. The present study was initiated to compare the effects of intrathecal isobaric 0.75% ropivacaine with fentanyl versus intrathecal isobaric 0.5%levo-bupivacaine with fentanyl on duration of analgesia for elective infra umbilical surgeries.

Aim

The study's goal is to differentiate the outcomes of intrathecal isobaric 0.75% ropivacaine with fentanyl versus intrathecal isobaric 0.5% levobupivacaine with fentanyl on duration of analgesia for elective infra umbilical surgeries.

Objectives

To compare the quality of subarachnoid blockade obtained while using 0.75% ropivacaine with fentanyl versus 0.5% levobupivacaine with fentanyl in terms of,

- Onset of sensory blockade based on the pinprick method.
- Onset and duration of motor blockade based on the modified Bromage scale.
- Time to two-segment regression.
- Time to first rescue analgesia.
- Intra op hemodynamic changes (HR, SBP, DBP and MAP).
- Side effects and complication.

Methodology

After receiving approval from the institutional ethics committee and written informed consent, 80 patients between the ages of 18 and 60 who were of either sex and were scheduled for elective infraumbilical surgeries under spinal anesthesia were included in a prospective comparative clinical study. The study was conducted over the period from June 2022 to November 2022 at Department of Anaesthesia, Andhra Medical College, Visakhapatnam, Andhra Pradesh, India.
The study population was randomly divided into 2 groups using a sealed envelope method.
Group [R]: Received 0.5 ml (25 mg) of fentanyl and 3ml (22.5 mg) of 0.75% isobaric ropivacaine.
Group [L]: Received 0.5ml (25 mg) of fentanyl and 3ml (15 mg) of 0.5% isobaric levo-bupivacaine.

Inclusion criteria

- Patients aged between 18-60 years of both sexes.
- ASA grade 1&2.
- Elective cases undergoing infraumbilical surgeries.
- Duration of surgery <3hrs

Exclusion criteria

- Patient refusal.
- Duration of surgery >3hrs.
- Allergy to the local anesthetic.
- Coagulation and bleeding disorders.
- Infection at the site of injection of local anesthetic.
- Patients converted to general anesthesia after giving subarachnoid block.
- Pregnancy.

Results

Demographic Data

Table 1: Distribution of age, sex and weight

Parameters	Group R (n=40)	Group L (n=40)	P-value
Age (yrs)	42.43±11.72	44.73±10.85	0.3628^{NS}
Male	27	23	
Female	13	17	
Weight (kgs)	58.12±5.35	57.97 ±4.44	0.8919^{NS}

NS-not significant

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We compared demographic factors like weight, sex, and age. The mean age was 42.35±11.72 yrs in Group R and 44.30±10.39 yrs in Group L which was not statistically significant (p=0.3628) (Graph1). The mean weight in Group R was 58.125±5.35kgs and 57.97±4.44kgs in Group L (Graph3) which showed no statistical significant difference (p=.0.8919).

Hemodynamic parameters

Table 2: Mean HR changes in both groups

Time (Mins)	Group R	Group L	P-value
0	80.18±11.71	74.93±13.60	0.0681^{NS}
15	75.4±12.87	72.8±13.85	0.3916^{NS}
30	72.8±13.15	70.7±14.09	0.4876^{NS}
60	71.20±13.56	68.63±13.48	0.3970^{NS}
120	74±13.27	69.03 ±9.27	0.0563^{NS}
180	73.50±12.88	68.68±9.56	0.0608^{NS}

NS-Not significant

Between the two groups, there was no statistically significant difference in heart rate. but the trend graph showed a slight decrease at 60mins in both the groups.

Systolic blood pressure

Table 3: Mean SBP changes in two groups (in mmhg)

Time (mins)	Group R	Group L	P-value
0	125.73±15.16	127.18±24.47	0.7509^{NS}
15	120.85±12.09	120.3±19.41	0.8795^{NS}
30	116.8±15.13	117.07±17.66	0.9406^{NS}
60	112.23±13.82	116.03±15.80	0.2557^{NS}
120	113.13±13.70	113.13±13.44	0.9934^{NS}
180	110.13±14.73	111.73±13.59	0.6151^{NS}

NS-Not significant

Diastolic blood pressure

Table 4: Mean DBP changes in both groups

Time (mins)	Group R	Group L	P-value
0	76±14.03	77.3±13.04	0.6690^{NS}
15	74.23±13.22	74.98±12.40	0.7942^{NS}
30	71.6±11.62	70.53±12.14	0.6868^{NS}
60	67.73±14.74	68.6±11.98	0.7715^{NS}
120	67.83±10.93	69.98±12.12	0.4073^{NS}
180	68.55±12.31	71.73±11.08	0.2290^{NS}

NS-Not Significant

Mean arterial pressure

Table 5: Mean MAP in both groups

Time (mins)	Group R	Group L	P-value
0	94.63±12.63	93.1±19.89	0.6838^{NS}
15	89.43±12.09	89.68±12.86	0.9288^{NS}
30	87.1±11.45	85.38±13.07	0.532^{NS}
60	83.23±11.90	83.5±11.34	0.9160^{NS}
120	81.83±9.89	83.32±14.95	0.5225^{NS}
180	78.95±11.72	83.48±10.31	0.0705^{NS}

NS-not significant

The trend graphs of SBP, DBP, MAP were less in Group R compared to Group L. Between the groups, there was no statistically significant difference.

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Onset of sensory block

Table 6: Onset of sensory block

Group	Mean ± SD	P-Value
R	3.83±1.43	0.0469*
L	3.28±0.96	

* $p<0.05$ is significant

Earlier onset of sensory block was seen in Group L (3.28±0.96mins) compared to Group R (3.83±1.43mins). The difference in onset was found to be statistically significant (p=0.0469).

Onset of motor block

Table 7: Onset of motor block

Group	Mean ± SD	P-Value
R	6.13±2.15	0.0386^{S}
L	5.18±1.88	

S-Significant

In comparison to Group R (6.132.15mins), Group L had an earlier onset of motor block (5.181.88mins). It was determined that the difference was statistically significant (p=0.0386).

Duration of motor block

Table 8: Duration of motor block

Group	Mean ± SD	P-Value
R	214.38±60.09	0.0016^{S}
L	253.38±45.38	

Compared to Group R (214.3860.09mins), Group L's motor block lasted longer on average (253.3845.38 mins). With a p value of 0.0016, the difference was highly statistically significant.

Time to two-segment regression

Table 9: Two segment regression

Group	Mean ± SD	P-value
R	101.13±24.56	0.0346^{S}
L	114.38±30.24	

S-Significant

Prolonged regression of sensory block to L1 was noted in Group L (114.38±30.24mins) compared to Group R (101.13±24.56mins). The difference was found to be statistically significant (p=0.0346).

First rescue analgesia

Table 10: First rescue analgesia

Group	Mean ± SD	P-value
R	321.86±76.79	0.0008^{HS}
L	267.38±57.53	

HS-highly significant

The duration (321.86±76.79 mins) of first rescue analgesia was prolonged in Group R compared to Group L (267.38±57.53 mins). The two groups' differences were highly statistically significant (p=0.0008).

Side effects

Table 11: Side effects in both the groups

Side Effects	Group R	Group L
None	32(80%)	34(85%)
Shivering	2(5%)	3(7.5%)
Hypotension	3(7.5%)	4(10%)

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Pruritis	0	0
Bradycardia	2(5%)	0
Nausea & Vomiting	0	0

Hypotension and shivering were comparatively higher in Group L (10% &7.5%) vs Group R (7.5%& 5%) respectively. Bradycardia (5%) was noted in Group R. 85% of patients in Group L and 80% of patients in Group R had no side effects.

Discussion

A study entitled "A prospective, comparative clinical study of effect of 0.75% isobaric Ropivacaine with fentanyl and 0.5% of isobaric Levobupivacaine with fentanyl in patients undergoing elective infraumbilical surgeries under spinal anesthesia" was undertaken in Department of Anaesthesia, Andhra Medical College, Visakhapatnam, Andhra Pradesh, India, to evaluate the sensory and motor blocking properties along with duration of analgesia.

After informed consent, 80 patients of ASA class I and II, posted for various elective infra umbilical surgeries were grouped randomly using sealed envelope method, into either 0.75% Ropivacaine (R) group or 0.5% Levobupivacaine (L) group.

Subarachnoid block was given with 25 G Quincke's spinal needle with the patient in a sitting position. After the continuous and free flow of CSF, 3.5 ml of study drug either Ropivacaine with fentanyl or Levobupivacaine with fentanyl was given. Immediately patient was made to lie down with the operating table being flat. All the patients in our study were given spinal anesthesia in sitting posture, because of the comfort of the patients, and according to Greene "The major clinical virtue of isobaric spinal anesthetics lies in the fact that position of the patient has no effect on distribution of the anesthetic" [14].

Hypothesis made before the study was that 0.75% of Ropivacaine will produce better and prolonged surgical anesthesia than that of 0.5% Levobupivacaine for infraumbilical surgeries.

Type of surgeries selected for the study

Isobaric local anesthetics have been found to work best for procedures below the T10 level of block, while high volumes are needed for procedures above T10. Due to the need for a blockade below T10 in lower abdomen and lower limb surgeries, all of the patients chosen for our study were for those procedures [14].

Thus in our study we have selected two drugs with two different concentrations (0.75%&0.5%). Ropivacaine 22.5 mg and 15 mg of levobupivacaine and fentanyl 25µg keeping the volume constant at 3.5ml in order to blind both the observer and the patients.

Demographic data

Age, sex, and weight demographic comparisons between the two groups don't reveal any statistically significant differences.

Onset of sensory block

The current study considers the beginning of sensory loss as occurring at T10.

Compared to Group L, Group R experiences sensory block onset on average 3.83 times faster than 3.28 times faster. The statistical significance of this is 0.0469.

There was no statistically significant difference between the results of the present study (3.831.43mins) and those of Murali CH *et al*. [15]'s study (3.541.06mins) regarding the length of time it took for the sensory block to begin in the ropivacaine group.

In the study by KumKum Gupta *et al*. [16], where there was no statistically significant difference, early onset of the sensory block was observed in the ropivacaine group (3.51mins), which is in contrast to the current study. This is likely because a large volume of the drug was used.

The current study's findings regarding the 0.75% ropivacaine group (3.831.43mins) are not comparable to those of Sheetal Jagtap *et al*. [17] 's study (6.863.73mins). This is likely because the time of sensory block onset was determined at T10 in the current study as opposed to T6 in the previous one.

The current study's findings are comparable to those of A.P. Agarwal *et al*. 's [18] study, in which a statistically significant early onset of sensory block was observed in the levobupivacaine group.

A study done by Joginder Pal Attri *et al*. in100 patients undergoing infra umbilical surgeries comparing intrathecal 0.5% levo-bupivacaine with 25µg of fentanyl (LF) and levobupivacaine(L) alone [19], where early onset of sensory block was noted with levobupivacaine plus fentanyl group and it was statistically significant. The results are comparable to the present study.

Ashton Dionel D'Souza *et al*. compared intrathecal intrathecal Hyperbaric 0.5% Bupivacaine, intrathecal Isobaric 0.5% Levobupivacaine, and intrathecal 0.75% Ropivacaine in a study involving 60 patients undergoing elective lower abdominal surgeries [20]. In both the levobupivacaine and the ropivacaine groups, the median times for the onset of sensory block were similar and were around 2.5 minutes; however, they were not statistically significant. This study was not comparable to the present study as the study population used was less compared to the present study.

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When comparing isobaric bupivacaine and ropivacaine in a 3:2 ratio dose for 100 patients undergoing transurethral resection of prostate surgeries, Malinovsky *et al*., study was not comparable to the current study [21]. The onset was prolonged in this study (13±8 mins) compared to the present study (3.83±1.43 mins) may be because of use of less concentration of ropivacaine.

Onset of motor block

The time taken from the completion of injection of the study drug till the patient developed motor blockade of modified bromage scale 2.

The mean time it took for motor blockade to begin was 6.13±2.15mins and 5.18±1.88mins in ropivacaine with fentanyl group and levo-bupivacaine with fentanyl group respectively and the difference is statistically significant.

In a study by Vinodh Selvin *et al*., 60 patients undergoing urological procedures were given either 3ml (15mg) of 0.5% levobupivacaine or 3ml (22.5 mg) of 0.75% ropivacaine intrathecally [22]. The mean onset of motor block is prolonged in this study compared to the present study which was around 12.5±1.5mins and 13.4±1.2 mins, may be due to addition of adjuvant like fentanyl which may be responsible for early onset of motor block in the present study.

60 patients undergoing lower limb surgeries participated in a study by Gautam Singh *et al*. that compared the effects of 3ml (15mg) of 0.5% isobaric levobupivacaine and 3ml (15mg) of 0.5%ropivaciane [23]. The onset of motor blockade was similar to the current study, and it was determined that there was a statistically significant difference between the two. When compared to the ropivacaine group, the onset is earlier in the levo-bupivacaine group.

This observation is not comparable to the study conducted by Murali CH *et al* comparing 3ml (22.5mg) of 0.75%ropivacaine or 3ml (22.5mg) of 0.75% ropivacaine with 0.5ml (25µg) of fentanyl for lower abdominal and lower limb surgeries (15). The duration in their study was 5.12±0.6 mins, but in the present study it is 6.13±2.15mins.

This finding was comparable to the research done by Ajay Singh and colleagues in 100 patients undergoing inguinal surgeries receiving intrathecal 3ml (15mg) of isobaric levo-bupivacaine or 3ml (15mg) of 0.5% hyperbaric racemic bupivacaine [24]. The study was comparable with the present study and the mean time was 4.3±1.7mins in levobupivacaine group and the mean time in the present study was 5.18±1.88mins for levo-bupivacaine group.

A study conducted by Prem Swarup Vampugalla *et al*. in 60 patients undergoing lower abdominal and lower limb surgeries comparing intrathecal 3ml (22.5mg) of 0.75%ropivacaine with 25mcg fentanyl or 3ml (15mg) of 0.5% levo- bupivacaine with 25mcg fentanyl (25). The study results were increased onset time of motor block 13.9±2.9mins and 12.9±3.9mins in ropivacaine and levo-bupivacaine group respectively and it was not statistically significant. The study is comparable with the present study regarding early onset of motor blockade in levobupivacaine group compared to ropivacaine group.

The timing of the motor blockade was similar to the research conducted by Sheetal Jagtap *et al*. who compared intrathecal 15mg of 0.5%ropivacaine with 25µg fentanyl (group RF) or 15mg of 0.5%bupivacaine with 25µg fentanyl (group BF) for major lower limb orthopaedic surgery (17). It was found that the onset of motor block was similar which was around 3.92-8.12mins in ropivacaine group and 4- 8.28mins in the present study.

Duration of motor blockade

It measures how long it takes after intrathecal injection for motor block to regress to bromage score 1.

The current study's ropivacaine and levobupivacaine groups had mean motor block durations of 214.3860.09 min and 253.3845.38 min, respectively. The present study was comparable with the study conducted by Gautam singh *et al* which states that ropivacaine has lesser duration of motor blockade compared to levobupivacaine [23]. The duration of motor blockade in ropivacaine group was 138.0±31.6mins and in levobupivacaine was 169.3±18.2mins. Due to use of fentanyl the mean duration of motor block was prolonged in the present study, around 214.38±60.09mins and 253.38±45.38mins in ropivacaine and levobupivacaine group respectively.

The study conducted by Prem Swarup Vampugalla *et al* in 60 patients comparing intrathecal 3ml (22.5mg) of 0.75%ropivacaine with 25µg fentanyl or 3ml (15mg) of 0.5%levobupivacaine plus 25µg fentanyl [25]. The study concluded that duration of motor block is earlier with ropivacaine group compared to levobupivacaine group, which was comparable with the present study.

Murali Ch *et al* conducted a study comparing 3ml (22.5mg) of 0.75% ropivacaine or 3ml (22.5mg) of 0.75% ropivacaine plus 25mcg fentanyl in 100 patients undergoing lower abdominal and lower extremity surgeries [15]. The mean duration is 250.44±17.53mins compared to 214.38±60.09mins in the present study due to assessment of regression to bromage 0 with this study and bromage 1 in the present study.

A.P. Agarwal *et al* conducted a study comparing 3ml (15mg) of isobaric 0.5% levo-bupivacaine plus 25µg fentanyl or 3ml (15mg) of 0.5% ropivacaine with 25mcg fentanyl in 80 patients undergoing lower abdominal and lower limb surgeries [18]. The mean duration is 241.57±1.87mins in this study, comparable to the present study (253.38±45.38mins).

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The current study cannot be compared to the study performed by Malinovsky *et al*. in 100 patients undergoing transurethral resection of prostate surgeries in which isobaric bupivacaine and ropivacaine were contrasted at a dose ratio of 3:2 [21]. The duration was prolonged in the present study (214.38±60.09 mins) compared to their study (165±62 mins), because of use of less concentration of ropivacaine and without any adjuvant.

Time to two-segment regression

The interval between the beginning of a block at T10 and the time when sensation at the L1 dermatome returned.

In the groups receiving ropivacaine and levobupivacaine, the duration for two-segment regression was 101.1324.53 and 114.3830.24 minutes, respectively. The variation was statistically significant.

Prem Swarup Vampugalla *et al*.'sstudycomparing intrathecal ropivacaine with fentanyl and levobupivacaine plus fentanyl in lower abdominal and lower limb surgeries noted the time to two-segment regression 95.988.2mins in the ropivacaine group and 98.048.5mins in the levobupivacaine group, not statistically significant [25].

When administered intrathecally, Gautier *et al*. found that the time to two-segment regression was 98-30 minutes in the levobupivacaine group and 89-33 minutes in the ropivacaine group [26]. These results are consistent with the current study's finding that the ropivacaine group experiences regression more quickly than the levo-bupivacaine group.

The study conducted by Gautam singh *et al*. comparing intrathecal isobaric levobupivacaine 0.5% or isobaric 0.5%ropivacaine in lower limb surgeries [23]. The regression time was prolonged in levobupivacaine group similar to the present study and the results were comparable.

In the study by Ajay Singh *et al*. comparing intrathecal isobaric 0.5% levobupivacaine or 0.5% hyperbaric bupivacaine in patients undergoing inguinal surgeries, the result was 133.515.8mins in the levobupivacaine group [24] vs. 114.3830.24mins in the current study.

The study conducted by Kumkum Gupta *et al* in patients posted for infra umbilical surgeries receiving 0.75% ropivacaine alone and 0.75% ropivacaine with fentanyl observed that total regression of sensory to S1 and the result was 359.80±66.96mins, where as in the present study the regression time noted was up to L [16].

A study conducted by Ganpat Prasad and their colleagues in patients undergoing daycare perineal surgeries comparing three different concentrations of ropivacaine [27]. The two segment regression time was 207.60±22.37 mins and the study concluded that regression time was prolonged with 0.75%ropivacaine which was highly statiscally significant but it was not comparable to the present study as regression was noted till S1 whereas in the present study it was L1.

First rescue analgesia

Time between the start of sensory block and the patient's need for their first dose of rescue medication.

The average time needed for the first rescue analgesia was 267.38 minutes for the levo-bupivacaine group and 321.86 minutes for the ropivacaine group.

A study conducted by sheetal jagtap *et al* in 60 patients undergoing major lower limb orthopaedic surgery compared 0.5% ropivacaine with fentanyl vs bupivacaine 0.5% with fentanyl [17]. The time for first rescue analgesia was around 234.4±58.76mins in ropivacaine group. Due to use of high concentration that is 0.75% ropivacaine the duration in the present study was prolonged to 321.86±76.79mins.

Murali c.h *et al* conducted a study in 100 patients scheduled for elective lower abdominal and lower limb surgeries comparing 0.75% ropivacaine alone versus ropivacaine with fentanyl [15]. Time for first rescue analgesia in this group was prolonged with fentanyl which was around 462.41±38.42mins, compared to to the present study (321.86±76.79mins).

60 patients undergoing lower limb surgeries participated in a study by Prabhavathi Ravipati *et al*., in which they were given 2.5 ml of 0.75% ropivacaine with 20 g of fentanyl instead of dexmedetomidine [28]. In the fentanyl group, they discovered that the sensory block lasted roughly 139.90 minutes. Due to the dose being 3ml of 0.75% ropivacaine and 25mg of fentanyl in the current study, the duration was longer than in their study.

This finding was consistent with the research made by A.P. Agarwal and colleagues [18] on patients slated for lower abdominal and lower limb surgeries. Compared to 3ml of 0.5% ropivacaine with 25g of fentanyl, patients received 0.5% levo-bupivacaine infusions. In this study the duration is around 249.59±10.40mins vs. 267.38±57.53mins in the present study.

Hemodynamic parameters

The baseline hemodynamic parameters, i.e., mean heart rate, mean systolic blood pressure, mean diastolic blood pressure, and mean arterial pressure, were comparable in both ropivacaine and levobupivacaine groups at all intervals in the current study, and these results were not statistically significant with $p>0.05$.

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Total analgesic consumption in 24hours is less with ropivacaine group compared to levobupivacaine group

Side effects

Shivering occurred in 5% of cases in the ropivacaine plus fentanyl group and 7.5% of cases in the levobupivacaine plus fentanyl group, and was managed with Inj. Tramadol 25mg bolus in this study.

This observation was comparable to a study done by Kumkum Gupta *et al*. [16] comparing intrathecal 0.75%ropivacaine with fentanyl and ropivacaine alone in infraumbilical surgeries, which was 5% in this study as well.

In a study comparing isobaric ropivacaine alone and isobaric ropivacaine with fentanyl in lower abdominal and lower extremity surgeries, Murali C.H *et al* observed postoperative shivering in four patients, two in each group, compared to intraoperative shivering in the current study [15].

Hypotension was seen in 7.5% of ropivacaine with fentanyl cases and 10% of levobupivacaine with fentanyl cases, and was managed with an incremental dose of ephedrine.

According to the findings of A.P. Agarwal *et al*, who conducted a study comparing intrathecal isobaric 0.5% levobupivacaine with fentanyl and isobaric 0.5% ropivacaine with fentanyl in lower abdominal and lower limb surgeries, 12.5% and 5% hypotension cases were observed, respectively [18].

Jagtap *et al* conducted a study comparing intrathecal isobaric ropivacaine plus fentanyl or bupivacaine with fentanyl for major lower limb orthopaedic surgery where 3.3% hypotension cases noted [17], vampugalla *et al*., [25] conducted a comparative study of intrathecal ropivacaine with fentanyl and levo-bupivacaine with fentanyl in lower abdominal surgeries with 4% in ropivacaine group and 6% in levo-bupivacaine group had hypotension, and these results were similar with the present study and Kumkum gupta *et al* who conducted a study comparing intrathecal fentanyl as an adjuvant to 0.75%isobaric ropivacaine for infra umbilical surgeries with 7.5% of hypotension cases seen [16].

Bradycardia seen in 5% of cases in ropivacaine with fentanyl group, and managed with 0.6mg of Inj. Atropine, and none of the cases in levo-bupivacaine group had bradycardia.

This finding is in line with those of Kumkum Gupta *et al*. [16], who noted almost 7.5% bradycardia in patients receiving 0.75% ropivacaine with fentanyl. Similar to the current study, McNamee *et al*. observed bradycardia in three patients in their study using various concentrations of ropivacaine in patients undergoing hip arthroplasty [29].

In contrast to the current study, where bradycardia was only observed in the ropivacaine plus fentanyl group, Gautam singh *et al*.'sstudycomparing isobaric 0.5% levo-bupivacaine or isobaric 0.5% ropivacaine found 6.67% and 30% of bradycardia, respectively.

In the study by Kallio H *et al*. using intrathecal plain ropivacaine doses of 20 mg or 15 mg compared to 10 mg bupivacaine, bradycardia was noted in the ropivacaine group [30]. In a study by Prabhavathi Ravipati *et al*. with 0.75% ropivacaine and fentanyl in lower limb surgeries, significantly more cases of bradycardia were noted than in the current study [28].

Limitations of the study

The onset of pain at the site of the surgical incision may not be a reliable indicator of the length of analgesia because different surgeries were included in this study.

Conclusion

A statistically significant difference in the onset of sensory block was found, according to the results of the current study. Levobupivacaine 0.5% achieves early onset whereas Ropivacaine 0.75% does not. In each group, the onset of motor block differed in a statistically significant way. Levobupivacaine 0.5% achieves early onset whereas Ropivacaine 0.75% does not. Levobupivacaine 0.5% extends the duration of the motor blockade statistically significantly more than Ropivacaine 0.75%. It was statistically significant that 0.75% Ropivacaine had a faster two segment regression time for the sensory block than 0.5% levobupivacaine. When compared to 0.5% levobupivacaine, first rescue analgesia is statistically significantly prolonged with ropivacaine 0.75 percent. Both medications had similar hemodynamic effects and very few side effects. In light of this, we deduce that 0.75% Ropivacaine produced better and more durable sensory blockade with quicker motor recovery. As a result, 0.75% ropivacaine is a better drug for encouraging early ambulation and may be used in minimally invasive procedures.

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References

1. Casey WF. Spinal Anaesthesia –a practical guide. In update in Anaesthesia. 2000;12(8):7.
2. Hadzic A, Karaca PE, Hobeika P, Unis G, Dermksian J, Yufa M, *et al*. Peripheral nerve blocks result in superior recovery profile compared with general anesthesia in outpatient knee arthroscopy. Anesth

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 01, 2023

analog. 2005 apr;100(4):976-81.
3. Redmond M, Florence B, Glass PS. Effective analgesic modalities for ambulatory patients. Anesthesiology Clinics of North America. 2003 Jun 01;21(2):329-346.
4. Corby MP, Bach AB. Transient radicular irritation (TRI) after spinal anaesthesia in day-care surgery. Acta Anaesthesiol Scand. 1998 Apr;42(4):425-9.
5. Henderson DJ, Faccenda KA, Morrison LM. Transient radicular irritation with intrathecal plain lignocaine. Acta Anaesthesiol Scand. 1998 Mar;42(3):376-8.
6. Casati A, Putzu M. Bupivacaine, Levobupivacaine and Ropivacaine: are they clinically different? Best Practice and Research Clinical Anaesthesiology. 2005 Jun;19(2):247-68.
7. Hansen TG. Ropivacaine: A pharmacological review. Expert Rev Neurother. 2004 Sep;4(5):781-91.
8. Whiteside JB, Wildsmith JAW. Developments in local anaesthetic drugs. Br J Anaesth. 2001;87(1):27-35.
9. Vanhoutte F, Vereecke J, Verbeke N, Carmeliet E. Stereoselective effects of the enantiomers of bupivacaine on the electrophysiological properties of the guinea-pig papillary muscle. Br J Pharmacol. 1991;103(1):1275-1281.
10. Gautier P, De Kock M, Huberty L, Demir T, Izydorczic M, Vanderick B. Comparison of the effects of intrathecal ropivacaine, levobupivacaine, and bupivacaine for Caesarean section. Br J Anaesth. 2003;91(5):684-9.
11. Bajwa SJ, Kaur J. Clinical profile of levobupivacaine in regional anesthesia: A systematic review. J Anaesthesiol Clin Pharmacol. 2013;29(4):530-9.
12. Burlacu CL, Buggy DJ. Update on local anesthetics: Focus on levobupivacaine. Ther Clin Risk Manag. 2008;4(2):381-92.
13. Varun S, Srivastava M, Maurya I, Garg R, Dhama V, Manik YK. A clinical prospective, randomized study to compare intrathecal isobaric bupivacaine fentanyl and isobaric ropivacaine–fentanyl for lower abdominal and lower limb surgeries. Anaesth Pain & Intensive Care. 2012;16(3):237-42.
14. Greene N. Distribution of local anaesthetic solutions within the subarachnoid space. Anesth. Analg. 1985 Jul;64(7):715-30.
15. Murali CH, Laxmi Narasaiah G. Effects of fentanyl on isobaric ropivacaine in subarachnoid anaesthesia for lower abdominal and lower extremity surgeries. Int. J Res Med Sci. 2016 Jul;4(7):2850-2855.
16. Kumkum Gupta, Surjeet Singh, Deepak Sharma, Prashant K Gupta, Atul Krishan, Pandey MN. Intrathecal fentanyl as an adjuvant to 0.75% isobaric ropivacaine for infraumbilical surgery under sub arachnoid block: A prospective study. Saudi J Anaesth. 2014 Jan-Mar;8(1):64-68.
17. Sheetal Jagtap, Anita Chhabra, Sunny Dawoodi, Ankit Jain. Comparison of intrathecal ropivacaine-fentanyl and bupivacaine-fentanyl for major lower limb orthopaedic surgery: A randomised double-blinded study. 2014 58(4);442-446.
18. Agrawal AP, Mehvish Khan, Malti Agrawal, Rampal Singh, Gopal Krishan, Subhro Mitra. DOI: 10.21276/aimdr.2018.4.3.AN1 A Comparison of the Intrathecal Isobaric 0.5% Levobupivacaine with Fentanyl and Isobaric 0.5% Ropivacaine with Fentanyl for Lower Abdominal and Lower Limb Surgeries: A Prospective Randomised Double Blind Controlled Studyfeb. 2018;4(3):1-5.
19. Joginder Pal Attri, Gangandeep Kaur, Sarabjit Kaur, Ravneet Kaur, Brij Mohan, Kamal jyoti Kashyap. Comparison of levobupivacaine and levobupivacaine with fentanyl in infraumbilical surgeries under spinal anaesthesia. Anesth Essays Res. 2015 May-Aug;9(2):178-184.
20. D'Souza AD, Saldanha NM, Monteiro AD. Others. Comparison of Intrathecal Hyperbaric 0.5% Bupivacaine, Isobaric 0.5% Levobupivacaine and Isobaric 0.75% Ropivacaine for Lower Abdominal Surgeries. Int. J Health Sci Res IJHSR. 2014;4(1):22-29.
21. Malinovsky JM, Charles F, Kick O, Lepage JY, Malinge M, Cozian A, *et al*. Intrathecal anesthesia: ropivacaine versus bupivacaine. AnesthAnalg. 2000;91(6):1457-1460.
22. Vinod Selvin, Thirumaaran UG, Selvakumaran. Comparison of 0.5% levobupivacaineand 0.75% ropivacaine in spinal anaesthesia for urological surgeries-Randomised double blinded study.Medplus. 2019 Feb; 9(2).
23. Dr. Gautam Singh, Dr. Vasanti Kelkar, Dr. Sanhita Kulkarni, Dr. Prabha Nayak, Dr Anshul Udiavur, Dr Tejas Warkari. Comparison of isobaric Levobupivacaine 0.5% and isobaric ropivacaine 0.5% for spinal anaesthesia in lower limb surgeries. Wjpmr. 2017;3(1):448-453.
24. Ajay Singh, Anshu Gupta, Priyankar Kumar Datta, Maitree Pandey. Intrathecal levobupivacaine versus bupivacaine for inguinal hernia surgery: a randomized controlled trial.korean J Anesthesiol. 2018 Jun;71(3):220-225.
25. Prem Swarup Vampugalla, Venkata Ramana Vundi, Kamala Subhashini Perumallapalli, Ch.Vinod Kumar, Chandrakala Kambar, Mallika Mahalakshmi P, Raja Sulochana Pisipati. A comparative study of intrathecal ropivacaine with fentanyl and Levo bupivacaine in lower abdominal and lower limb surgeries, IJBCP. 2015 Nov-Dec;14(6):1147-55.
26. Gautier E, De Kock M, Van Steenberge. A comparison between intrathecal bupivacaine and ropivacaine for kneearthroscopy. Anaesthesiology. 1999;91(5):1239-45.

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 01, 2023

27. Ganpat Prasad, Vansh Priya, Krishna Pratap mall Comparative evaluation of three different doses of spinal isobaric ropivacaine in patients undergoing day care perineal surgeries: A randomized double-blind study. Anesthesia essays and researches. 2018;12(2):392-395.
28. Prabhavathi Ravipati, Anand Isaac G, Narasimha Reddy P, Leela Krishna, Upritha T. A comparative study between intrathecal isobaric ropivacaine 0.75% plus dexmedetomidine and isobaric ropivacaine 0.75% plus fentanyl for lower limb surgeries. Anesth Essays Res. 2017 Jul-Sep;11(3):621-626.
29. McNamee DA, Parks L, McClelland AM, Scott S, Milligan KR, Gustafsson U, *et al*. Intrathecal Ropivacaine for total hip arthroplasty: double-blind comparative study with isobaric 7.5 $mg.ml^{-1}$ and 10 $mg.ml^{-1}$ solutions. Br J Anaesth. 2001; 87(5):743-7.
30. Kallio H, Snall EV, Suvanto SJ, Tuomas CA, Iivonen MK, Pokki JP, *et al*. Spinal hyperbaric ropivacaine-fentanyl for day-surgery. Reg Anesth Pain Med. 2005;30(1):48-54.