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A COMPARATIVE ANALYSIS OF INTRATHECAL NALBUPHINE HYDROCHLORIDE WITH HYPERBARIC BUPIVACAINE 0.5% AND HYPERBARIC BUPIVACAINE 0.5% ALONE IN PATIENTS UNERGOING LOWER ABDOMINAL SURGERIES

Anaesthesiology

Dr Trilokchand Professor, Department Of Anaesthesia, S. N.M.C, Agra.

Dr Apurva Abhindndan Mittal* Associate Professor, Department Of Anaesthesia, S.N.M.C, Agra. *Corresponding Author

Dr Arpita Saxena Assistant Professor , Department Of Anaesthesia, S. N.M.C, Agra.

Dr Alok Kumar MD (Anaesthesia And Critical Care) Department Of Anaesthesia , S. N.M.C, Agra.

ABSTRACT

INTRODUCTION: Spinal anaesthesia is one of the most commonly used techniques for lower abdominal surgeries. Most common drugs used in neuraxial blockade are Lignocaine and Bupivacaine. Nalbuphine is a κ receptor agonist, μ receptor antagonist opioid whose intrathecal administration has found to deliver a good intraoperative and post operative analgesia eliminating the side effects of μ receptors.

MATERIALS AND METHODS: The patients were randomly divided in to two groups of 40 patients each. Group B (control group): patients receiving 3 ml of 0.5% Bupivacaine heavy with 0.5ml of normal saline. Group BN (Nalbuphine group): patients receiving 3ml of 0.5% Bupivacaine heavy with 0.5ml (1mg) Nalbuphine

RESULTS: In our study the onset of sensory effect was nearly same in both the groups which is consistent with Patwa A et al and Mukerjee A et al. The duration of sensory block was more in Group BN than Group B in our study showing that the addition of nalbuphine increases the duration of sensory block as shown by Patwa A et al and Tiwari et al. In our study the highest level of sensory level varies between the groups which may be due to the effect of the drugs and the patient profile also. There was no significant difference in the duration of motor blockade between the 2 groups.

CONCLUSION: In our study we concluded that intrathecal use of 1mg of nalbuphine with 0.5% hyperbaric Bupivacaine in patients undergoing lower abdominal surgeries prolongs the duration of sensory blockade, two segment regression time and effective duration of analgesia with minimal side effects.

KEYWORDS

Hyperbaric Bupivacaine, nalbuphine hydrochloride

INTRODUCTION:

Spinal anaesthesia is one of the most commonly used techniques for lower abdominal surgeries. Spinal anaesthesia results in sympathetic block, sensory analgesia and motor block after injecting the drug in the neuraxis. Neuraxial blockade has certain advantages in conditions such as pre-existing pulmonary disease, metabolic and electrolyte disturbances or in remote places. Most common drugs used in neuraxial blockade are Lignocaine and Bupivacaine. Later many additives were studied and used in order to provide a superior quality of analgesia by recruitment of action on different receptors giving a synergistic and cumulative effect. Nalbuphine is a κ receptor agonist, μ receptor antagonist opioid whose intrathecal administration has found to deliver a good intraoperative and post operative analgesia eliminating the side effects of μ receptors. This randomised study is to evaluate the effects of intrathecal Nalbuphine 1 mg added to 0.5% Hyperbaric Bupivacaine in comparison with 0.5% Hyperbaric Bupivacaine alone in patients undergoing lower abdominal surgeries.

MATERIALS AND METHODS:

After clearance from the ethical committee of the hospital a single blind randomised study was conducted on 80 patients undergoing lower abdominal surgeries.

Inclusion Criteria:

ASA grade I and II, patients of age group 30-60 years, patient willing to give informed and written consent and understand test regarding assessment of pain.

Exclusion Criteria:

any contraindication to spinal anaesthesia, those with respiratory disease requiring treatment, prior history of opioid and other substance abuse, history of drug allergy to testing drug, patients unwilling to participate in the study. Explanation and consent: All the procedures and possible risks pertaining to the study were explained to the patients and their Written was obtained. They were instructed for the use of visual analogue score of pain (VAS).

The patients were randomly divided in to two groups of 40 patients each. Group B (control group): patients receiving 3 ml of 0.5% Bupivacaine heavy with 0.5ml of normal saline. Group BN (Nalbuphine group): patients receiving 3ml of 0.5% Bupivacaine heavy with 0.5ml (1mg) Nalbuphine.

Anaesthetic Procedure:

patients were premedicated with tab.Ranitidine 150mg and tab.Diazepam 10mg orally the night before surgery and inj.Glyccopyrolate 0.2mg and inj.Palanosetron 0.75mg iv half an hour before surgery. Preloading will be done with ringer lactate 6-8ml/kg 20 minutes before surgery. Preparation of drug –An ampoule of 1ml contains 10mg of nalbuphine. Of this 0.5ml is taken and diluted to 2.5ml, thus making 1mg in 0.5ml. Intrathecal anaesthesia was given under strict aseptic precautions with a 25G Quinke's type spinal needle with patient in the sitting position after ascertaining free flow of CSF.

OBSERVATION:

Vital parameters like pulse rate, blood pressure, respiratory rate and oxygen saturation were recorded before the procedure and then every 5 minutes after intrathecal injection until patient was shifted to the recovery room.

Sensory level was assessed by pin prick method and motor paralysis was determined by modified bromage scale at 2, 5, 10, 15 and 20 minutes after intrathecal injection of drug. Sensory testing was from caudal to cephalad and analgesic level was defined as the cephalad most dermatome at which the patient has decreased sharp pain sensation.

1.Onset of sensory block- defined by loss of pin prick sensation at L1 dermatome after intrathecal injection. Time taken will be the onset of sensory block

2.Highest sensory level achieved.

3.Two segment regression time- time interval between highest sensory level achieved to two segment regression of sensory block

4.Duration of sensory block- time interval from onset of sensory block to regression of sensory level to L1 dermatome.

Motor block was assessed by bromage scale as follows

Grade 0 – no muscular weakness

Grade 1 – unable to flex hip

Grade 2 – unable to flex knee

Grade 3 – unable to flex ankle

Following things were observed in motor block

1.onset of motor block – time interval from intrathecal injection to motor block of bromage grade 1

2.Maximum motor block achieved
3.Duration of motor block – time interval from onset of motor block to regression to bromage grade 0)

In the post operative period vital parameters were monitored every 30 minutes for the first 6 hours. Pain was assessed using visual analogue scale(VAS).duration of analgesia is the time between the onset of analgesia to first demand of analgesia in the post operative period. Patients were monitored for complications like nausea, vomiting, hypotension, bradycardia, etc were noted and treated according.

Statistical Methods:
The results of the study were tabulated and statistically compared. Student t test was used for parameter data. Chi square test for non parameter data. P-value considerations were
1.p>0.05 not significant
2.p<0.05 significant
3.p<0.001 highly significant

RESULTS:
The two groups were comparable to each other in terms of age, height, weight, gender and ASA grade. The mean time of onset of sensory block was 142.95±51.40 seconds in Group BN and 159.45±66.45 seconds which was not statistically significant(p-value=0.2173).

Mean Duration (Min.) Of Sensory Block

DRUG	NO.	MEAN	SD	T-VALUE	P-VALUE
BN	40	243.00	17.21	19.23	<0.0001*
B	40	153.18	24.01		

Mean Two Segment Regression Time (MIN)

Drug	No.	Mean	SD	t-value	p-value
BN	40	101.48	10.25	3.5103	0.0008*
B	40	90.30	17.34		

Mean Duration Of Effective Analgesia (Min)

Drug	No.	Mean	SD	t-value	p-value
BN	40	250.03	17.11	19.2914	<0.0001
B	40	160.20	23.97		

Total Dose (1.5 mg/kg BODY WT)

Drug	No.	Mean	SD	t-value	p-value
BN	40	165.19	50.70	-2.8656	0.0054
B	40	202.28	64.27		

The mean time if onset of motor blockade was 145.95±51.34 seconds in Group BN compared to 161.68±66.39 seconds in Group B which was statistically significant(p=0.2397). The mean duration of sensory block was 243.0±17.21 minutes in Group BN compared to 153.18±66.39 seconds in Group B which was statistically significant(p=0.2397). The mean duration of sensory block was 243.0±17.21 minutes in Group BN compared to 153.1824.01 minutes in Group B which is statistically significant(p<0.0001). The mean duration of motor block was 199.45±31.46 minutes in Group BN, while it was 200.78±31.45 minutes which was statistically significant(p=0.085). In Group BN; 80% of the patients attained Bromage scale 3 while only 20% of the patients obtained Bromage scale 2. At the same time ; 75% of the patients in Group B had Bromage scale 3 and 25% of the patients had Bromage scale 2. Motor block was satisfactory in majority of the patients. The highest level of sensory block was T6 in both groups. Range of highest sensory block was T6-T8 in Group BN and T6-T4 in Group B respectively. There was significant difference in the two segment regression time with mean duration of 101.48±10.25 minutes in Group BN and 90.30±17.34 minutes in Group B(p=0.0008). The mean duration of effective analgesia was 250.03±17.11 minutes and 160.20±23.97 minutes in Group BN and Group B respectively(p<0.0001). Nausea/vomiting occurred in only 1 patient in Group BN and in 3 patients in Group B. hypotension was seen in only 2 patients in Group BN compared to 5 patients in Group B. There was no statistically significant variation in pulse rate, systolic and diastolic blood pressure, respiratory rate and SpO2 between the two groups.

DISCUSSION:
The present study was designed to compare the relative efficacy of the opioid drug nalbuphine, when used in combination with Bupivacaine heavy for intrathecal administration. Addition of opioid not only reduces the severity of undesired sideeffects but also offers additional advantages like increased duration of sensory blockade, increased duration of 2 segment regression time,etc.

In our study the onset of sensory effect was nearly same in both the groups which is consistent with Patwa A et al and Mukerjee A et al. The duration of sensory block was more in Group BN than Group B in our study showing that the addition of nalbuphine increases the duration of sensory block as shown by Patwa A et al and Tiwari et al. In our study the highest level of sensory level varies between the groups which may be due to the effect of the drugs and the patient profile also. There was no significant difference in the duration of motor blockade between the 2 groups. The two segment regression time was prolonged in the opioid adjuvant group, Group BN as compared to Group B which is in line with studies of Kumkum et al, tiwari et al and Spate et al. Duration of post operative analgesia and duration of effective analgesia was more in the opioid group, which may be due to the synergistic analgesic effect of opioid by their action on the spinal opioid receptors.

CONCLUSION:
In our study we concluded that intrathecal use of 1mg of nalbuphine with 0.5% hyperbaric Bupivacaine in patients undergoing lower abdominal surgeries prolongs the duration of sensory blockade, two segment regression time and effective duration of analgesia with minimal side effects.

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