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EFFICACY OF 0.5% HYPERBARIC BUPIVACAINE WITH NALBUPHINE HYDROCHLORIDE AND 0.5% HYPERBARIC BUPIVACAINE WITH DEXMEDETOMIDINE IN NEURAXIAL BLOCKADE FOR LOWER ABDOMINAL AND ORTHOPEDIC SURGERIES

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ABSTRACT

BACKGROUND: A clinical study was undertaken in 60 patients belonging to ASA 1 & 2 scheduled for lower abdominal and orthopedic surgeries with intrathecal Nalbuphine hydrochloride 0.8mg and Dexmedetomidine 10µg as an adjuvant to 0.5% hyperbaric bupivacaine 15mg to compare sensory and motor block in view of onset, level, degree, duration and adverse effects.
METHODOLOGY: They are allocated randomly into two groups: GROUP D and GROUP N, 30 members each to compare the effectiveness of intrathecal Nalbuphine hydrochloride 0.8mg and Dexmedetomidine 10µg as an adjuvant to 0.5% hyperbaric bupivacaine 15mg.
In Group D, 30 patients received Inj. Bupivacaine (15mg) + Inj.Dexmedetomidine (10µg) intrathecally.
In Group N, 30 patients received Inj. Bupivacaine (15mg) + Inj. Nalbuphine (0.8mg) intrathecally.
RESULT: In group D , onset, duration and level of sensory and motor blockade, duration of analgesia were superior compared to group N. Hemodynamics were preserved both intraoperatively and postoperatively in group D.
CONCLUSION: Dexmedetomidine 10mcg with 0.5% hyperbaric bupivacaine 15mg when given intrathecally hastened sensory and motor onset, prolonged the sensory and motor block and improved the quality of analgesia with preserved hemodynamics.

KEYWORDS : Spinal anesthesia, Nalbuphine, Dexmedetomidine, Bupivacaine..

INTRODUCTION

Pain is an extremely agonizing experience. Various methods have been tried since time immemorial to alleviate this pain.

The aim of an anesthesiologist is to render the patient pain free during a surgical procedure.

Spinal anaesthesia defined as regional anaesthesia obtained by blocking nerves in the sub arachnoid space, was introduced in clinical practice by Karl August Bier in 1898. Spinal anaesthesia using local anaesthetics like hyperbaric bupivacaine is one of the most popular techniques for both elective and emergency surgical procedures.

One disadvantage with spinal anaesthesia using hyperbaric bupivacaine alone is relatively shorter duration of action which means that early analgesic intervention is needed in post operative period. Intrathecal narcotics have been used since 1971 to relieve pain and provide post operative analgesia. However , their use has been hampered by their potential to cause respiratory depression. Thus other drugs have been tried that have the advantage of opiods but not their drawbacks. A number of adjuvants have been used to improve post operative analgesia, along with bupivacaine. These are epinephrine , clonidine, ketamine, neostigmine and midazolam. This study aims to compare the efficacy of 0.5% bupivacaine (15mg) with nalbuphine hydrochloride 0.8mg and 0.5% bupivacaine(15mg) with dexmedetomidine 10mcg in intrathecal procedures

AIM & OBJECTIVE

Study is aimed at evaluating efficacy of 0.5% bupivacaine in combination with nalbuphine and dexmedetomidine in lower abdominal and lower extremities surgeries in the age group of 20 -50 years.

METHOD

Our clinical study on spinal anaesthesia for elective lower limb , lower abdominal surgeries is to compare effectiveness of 0.5% bupivacaine (15mg) with nalbuphine hydrochloride 0.8mg and 0.5% bupivacaine (15mg) with dexmedetomidine 10mcg. A total number of 60 patients were studied .

These patients were divided into two groups randomly.

Group D - Patients in this group were given Inj. Bupivacaine (15mg) + Inj. Dexmedetomidine (10µg) intrathecally.
Group N - Patients in this group were given Inj. Bupivacaine (15mg) + Inj. Nalbuphine (0.8mg) intrathecally

Inclusion criteria:- • ASA I & ASA II patients. • Patients in the age range 20-50 years. • No known history of allergy, sensitivity or other form of reaction to local anesthetics. • Patient willing to sign informed consent

Exclusion criteria:- • Patients with medical complications like anemia, heart disease, severe hypovolemia, shock, septicemia, hypertension. • ASA grade III and above. • Patients with coagulation disorders or on anticoagulant therapy. • Local infection at the site of proposed puncture for spinal anaesthesia, spinal deformities • Known allergy to the trial drug. • Patient refusal.

Pre operative preparations consisted of overnight fasting, Injection ranitidine 50mg,injection ondansetron 4mg. No sedatives or analgesic medication was administered to any patient before surgery.

Pre operative blood pressure, pulse rate, and sp02 were recorded.

MATERIALS

1. 23G Spinal Needle
2. 2cc and 5cc disposable syringes
3. 0.5% bupivacaine ampoule
4. Nalbuphine ampoule
5. Dexmedetomidine ampoule
6. Antiseptic solution and spinal towel.

PROCEDURE:

All the patients were explained the procedure of the technique and written informed consent was obtained. The patients were thoroughly evaluated and examined. Pulse rate, Blood pressure were recorded before providing spinal anesthesia. 18G Intravenous cannula was started and all the patients were preloaded with 500ml of Ringer Lactate.

After proper scrubbing and draping, lumbar puncture was performed in LLDP by midline approach by using 23G

Quincke's spinal needle at L3-L4 intervertebral space. Patients were

monitored continuously using NIBP, Pulse oximeter and ECG

PARAMETERS OBSERVED:

1. Onset of sensory and motor blockade
2. Duration of sensory and motor blockade.
3. Highest level of sensory blockade
4. Duration of analgesia
5 Hemodynamics

OBSERVATION AND RESULTS

The demographic data with respect to age, gender, height and weight are not significant.

Statistical data with respect to onset, duration and analgesia significantly faster and prolonged in group D. Haemodynamic parameters were comparatively more stable in group D.

Table -1

DRUG	ONSET OF SENSORY BLOCK (min)		
	MEAN	S.D	
NALBUPHINE	4.4667	1.00801	t value = -6.151 & p-value = 0.000
DEXMEDITOMIDINE	3.0000	.83045	

The mean time of onset of sensory blockade in group -N (nalbuphine)is 4.4667 mins, and in group D (dexmedetomidine group) is 3.0000 mins. There is a statistically significant difference between group N and group D (p=0.000).

Table -2

DRUG	DURATION OF SENSORY BLOCK(min)		
	MEAN	S.D	
NALBUPHINE	268.9333	23.67588	t value = 8.231 & p-value = 0.000
DEXMEDITOMIDINE	323.1333	27.20894	

The mean duration of sensory regression to S1 is 268.9333 mins in group-N(nalbuphine group), 323.1333 mins in group D (dexmedetomidine group). There is a statistically highly significant difference between group N and group D (p=0.000).

Table -3

DRUG	ONSET OF MOTOR BLOCK (min)		
	MEAN	**S.D**	
NALBUPHINE	6.5667	1.00630	t value = -6.181 & p-value = 0.000
DEXMEDITOMIDINE	5.0667	.86834	

The mean time taken for the onset of motor blockade is 6.5667 mins in group N(nalbuphine group) and in group D (dexmedetomidine group) is 5.0667 mins. There is a statistically significant difference between group N and group D. (p=0.000). The quality of motor blockade is similar in all the groups (Bromage Scale Grade3).

Table -4

DRUG	DURATION OF MOTOR BLOCK (min)		
	MEAN	**S.D**	
NALBUPHINE	240.5333	23.45463	t value = 8.458 & p-value = 0.000
DEXMEDITOMIDINE	294.5333	25.93591	

The mean duration of motor blockade is 240.5333 mins in group N-(nalbuphine group), 294.5333 mins in group D (dexmedetomidine group).The minimum duration of motor block is 205 mins in group N, 231 mins in group D. The maximum duration of motor block is 293 mins in group N, 330 mins in group D.There is a statistically highly significant difference between group N and group D (p=0.000).

DISCUSSION

Robin M Michel al performed a comparative study to evaluate the onset and duration of sensory and motor blockade with 0.4mg nalbuphine and 10mcg dexmedetomidine nd concluded that the duration of sensory and motor blockade was significantly prolonged in dexmedetomidine group than in nalbuphine group. The results were comparable to our study with onset and duration of sensory and motor block increasing as the dosage of nalbuphine is increased to 0.8 mg.

Kanaziet al(2006) showed that the combination of 12mg of hyperbaric bupivacaine with 3 mcg of dexmedetomidine significantly shortened the onset of sensory and motor block, in comparison with bupivacaine alone.

Dubey Rashmi and bisht swati(2014) conduted a randomized study and concluded that nalbuphine provides better quality of block as compared to bupivacaine alone. It also prolongs post operative analgesia when used as a adjuvant to spinal bupivacaine in elderly.

The results of our study was corresponding to the above mentioned studies reiterating the fact that Dexmedetomidine when used as an adjuvant to Bupivacaine decreases mean onset of sensory and motor block, but prolongs the mean duration of sensory and motor block. The mean time of two segment regression was significantly longer in Group D as compared to Group N.The mean duration of analgesia was found to be statistically significantly higher in Group D, as compared to Group N. ($p < 0.001$)

CONCLUSION

From the present study it can be concluded that efficacy of intrathecal Dexmedetomidine in the dose of 10µg or Intrathecal Nalbuphine in the dose of 0.8mg along with 3 ml 0.5% Heavy bupivacaine, in patients undergoing elective lower abdominal and orthopedic surgeries,

- Decreases the onset time for sensory blockade and motor blockade
- Produces higher level of sensory blockade
- Produces prolonged postoperative analgesia
- Produces prolonged sensory blockade
- Produces prolonged motor blockade
- Produces sedation in which patients were asleep and easily arousable

Minimal haemodynamic changes which could be easily managed It was not associated with cardiovascular side effects change in rate and rhythm, respiratory depression and hence can be an attractive alternative for opioids for prolonging spinal analgesia. Since dexmedetomidine and Nalbuphine when used intrathecally along with Bupivacaine significantly prolonged the duration of analgesia and there was also clinically significant difference between Nalbuphine and dexmedetomidine on spinal block characteristics, intrathecal dexmedetomidine was better than Nalbuphine with regards to onset and duration of both sensory and motor blockade as well as duration of analgesia. Hence dexmedetomidine is a better neuraxial adjuvant compared to nalbuphine for providing early onset of sensory and motor blockade, adequate sedation and prolonged post operative analgesia.

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