



Anesthesiology

COMPARATIVE STUDY OF 0.5% H. BUPIVACAINE AND 0.5% H. BUPIVACAINE WITH KETAMINE 50MG FOR NEURAXIAL BLOCKADE IN LOWER ABDOMINAL AND LOWER LIMB SURGERIES.

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ABSTRACT **BACKGROUND:** A clinical study was undertaken in 100 patients belonging to ASA 1 and 2 scheduled for lower abdominal and lower limb surgeries with 0.5% Bupivacaine and 0.5% Bupivacaine with Ketamine 50mg to compare sensory and motor block in view of onset, level, degree, duration and hemodynamic changes. **METHODOLOGY:** They are allocated randomly into two groups; Group B and Group BK, 50 members each to compare the effectiveness of 0.5% Bupivacaine and 0.5% Bupivacaine with 50mg Ketamine. In Group B 50 patients received intrathecal 0.5% Bupivacaine 2.5ml(12.5 mg) with 1.0ml normal saline, total volume of 3.5ml. In Group BK, 50 patients received intrathecal 0.5% Bupivacaine 2.5ml (12.5 mg) with 50mg Ketamine (total volume of 3.5ml) **RESULT:** The onset of sensory blockade was faster in Group BK than compared to Group B. Duration of sensory block and analgesia was significantly prolonged in Group BK. Haemodynamic parameters were comparatively more stable in Group BK. **CONCLUSION:** Ketamine 50mg with 12.5mg H.Bupivacaine when given intrathecally hastened sensory onset, prolonged the sensory block and improve the quality of analgesia in the early postoperative period.

KEYWORDS : Spinal anesthesia, Ketamine, Bupivacaine.

INTRODUCTION

Pain is an extremely agonizing experience. Various methods have been tried since time immemorial to alleviate this pain. Attempts had been made even in ancient times to alleviate 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 subarachnoid 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 opioids 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 adding ketamine to 0.5% hyperbaric bupivacaine with 0.5% bupivacaine in intrathecal procedures.

AIMS AND OBJECTIVES :- To evaluate the efficacy of spinal anaesthesia with ketamine added to hyperbaric bupivacaine compared to only hyperbaric bupivacaine in lower abdomen and lower limb surgeries.

METHOD

Our clinical study on spinal anaesthesia for elective lower limb , lower abdominal surgeries is to compare effectiveness of 0.5% bupivacaine (12.5mg) and 0.5% bupivacaine(12.5mg) with 50 mg ketamine. A total number of 100 patients were studied . These patients were divided into two groups randomly.

Group B: Total number of patients 50. This group received intrathecal bupivacaine 12.5mg(2.5ml)+ 1.0ml normal saline(total volume of 3.5ml).

Group BK: Total number of patients 50. This group received intrathecal bupivacaine 12.5mg(2.5ml)+ 50mg ketamine(total volume of 3.5ml)

Preoperative assessment of all patients was done such that the patients having associated disease like hypertension, heart disease, diabetes mellitus were excluded from the study. Hematological parameters including hemoglobin level, clotting time, bleeding time and biochemical parameters like blood sugar, blood urea, serum creatinine were noted and were within the normal limits.

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 and Blood pressure were recorded before providing spinal anaesthesia. 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. Vital parameters
2. Onset and highest level of sensory blockade
3. Duration of motor blockade
4. Duration of analgesia

RESULTS:

The demographic data with respect to age, gender and statistical data with respect to onset, duration and analgesia significantly faster and prolonged in group BK. Haemodynamic parameters were comparatively more stable in group BK.

Parameter	Bupivacaine		Ketamine		Mean Difference	P * Value Sig
	Mean	SD	Mean	SD		
Onset of action (Sensory) (min)	4.0	00.2	3.44	0.7	0.677	<0.0001 HS
Onset of action (Motor) (min)	5.4	55.3	5.00	0.3	0.422	0.557 NS

The mean time onset of sensory block in group BK was 3.4 + 0.7 min whereas in group B was 4.0 + 0.2 min. The onset of sensory block in group BK was faster compound to group B and significant with p<0.001. The mean time of onset of motor block in group BK was 5.0 min where as group B was 5.4 min (p>0.05). Though motor blockade was clinically faster it was not statistically significant. The highest level of sensory blockade in group BK 96% achieved T6 level, 4%

achieved T4 level. In group B 94% achieved T6 where as 3% achieved T8 level.

Table 2: Recovery parameters.

Parameter	Bupivacaine		Ketamine		Mean Difference	P* Value, Sig
	Mean	SD	Mean	SD		
Two segment Regression Time (min)	58.7	14.7	62.5	10.1	3.760	0.13NS
Time for full motor Recovery(min)	157.0	13.6	160.7	7.7	3.680	0.1 NS
Time for full sensory Recovery(min)	212.4	13.7	306.8	28.8	94.380	<0.001 HS

The two segment regression time in group BK was 62.5min and in group B was 58.7 min. The mean duration of Motor blockade in group BK was 160.7min and in group B was 157.0min ($p>0.05$). There was no statistical difference. The mean duration of sensory blockade in group BK was 306.8 min and in group B was 212.4 min ($p<0.001$). There was highly significant statistical difference.

TABLE 3: Duration of analgesia

Parameter	Bupivacaine		Ketamine		Mean Difference	P* Value, Sig
	Mean	SD	Mean	SD		
Time to First pain medication	222.7	15.6	322.8	299.4	100.12	<0.0001 HS

The time to first pain medication in group BK was 322.8 min and in group B was 222.7 min. This was statistically significant ($p<0.001$). In group BK patients had no pain during surgery, where as in group B 79% had no pain and 22% had mild discomfort during surgery.

The groups did not differ significantly. The fluctuations in the HR were less in group BK when compared to group B. Systolic and diastolic blood pressure decreased from base line in group B than group BK in the first 20 min. After which they were comparable.

DISCUSSION:

In our study onset of sensory block in group BK was 3.4 min and in group B was 4.0 min. H. Unlugenc et al., found that onset of sensory block in group K was 2.8 min significantly shorter than groups 3.6 min. T. Togaletal 10 concluded that sensory block in group K was 3.4 min and in group B was 4.7 min. Thus our study was comparable and concluded that onset of sensory block in group BK was faster than group B with onset of motor blockade in group BK was 5.0 min and in group B was 5.4 min. There was no significant statistical difference. S. Kathirvel et al also concluded that the onset of motor blockade was not significant statistically. Hamed sanad et al., kathirvel et al., concluded that number of segments blocked time for 2 segment regression and time for complete motor sensory block recovery in both groups were similar. Therefore, our results correlates with the above study. All patients in group BK had no pain during intra operative period and the time to first pain medication was 322.8 min where as in group B 78% had pain and the time to first pain medication was 222.7 min. Hamad sanad et al said that the quality of analgesia and time for the first pain medication was more with Ketamine group. S. kathirvel et al., T. Togat et al., concluded that HR increased and SBP and DBP significantly lower in bupivacaine group than in ketamine group in first 20 min. Thus we can conclude that the hemodynamic parameters in our study were comparable to the above studies and the BK group has more stable blood pressure after spinal anesthesia.

CONCLUSION:

On basis of our clinical comparative study, we can conclude that the addition of 50mg Ketamine to 0.5% H. Bupivacaine 12.5mg in spinal anesthesia decreases the onset and prolongs the duration of sensory blockade. It also prolongs the duration of analgesia and improves the quality of analgesia in the early postoperative period with better hemodynamic stability as compared to bupivacaine alone. Ketamine can be used as a beneficial additive for prolonging spinal anesthesia.

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