VOLUME - 13, ISSUE - 08, AUGUST - 2024 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Anaesthesiology

EFFECT OF ADDITION OF FENTANYL AS AN ADJUVANT TO HYPERBARIC ROPIVACAINE IN PATIENTS UNDERGOING SURGERY UNDER SUBARACHNOID BLOCK

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ABSTRACT **Background:** Subarachnoid block, integral in regional anesthesia, the low dose ropivacaine provides differential spinal block to reduce adverse hemodynamic effects. The present study was performed to evaluate effect of addition of fentanyl as an adjuvant with hyperbaric ropivacaine compared with hyperbaric ropivacaine alone in surgeries involving subarachnoid block. **Methods:** The study was conducted at Sri Aurobindo Institute of Medical Sciences Hospital, Indore,MP. Patients who underwent subarachnoid block were categorized into group A (plain hyperbaric ropivacaine) and group B (hyperbaric ropivacaine with fentanyl). Preoperative evaluation, assessment of sensory and motor blockade, hemodynamic monitoring, and recording of adverse events were observed. **Results:** There were no significant differences between the two groups for patients demographic data,intraoperative hemodynamic parameters and side effects. The highest level of sensory block was at T10 in group A and T9 in group B(p=0.001). Duration of motor block was longer in group B being 210.50+/-61.25 minutes than in group A being 286.25+/-55.65 minutes(p<0.001). **Conclusion:** The study demonstrated that the addition of fentanyl to hyperbaric ropivacaine has an advantage of increased hemodynamic stability and prolonged post operative analgesia without any significant side effects.

KEYWORDS : Subarachnoid Block, Regional Anesthesia, Hyperbaric Ropivacaine, Fentanyl Adjuvant, Patient Outcomes.

INTRODUCTION

Subarachnoid block is a form of neuraxial anaesthesia involving intrathecal injection of a local anaesthetics or opioids. It is a safe and effective form of anaesthesia used as an alternative to general anaesthesia commonly in surgeries involving the lower extremities and surgeries below umbilicus(T10 level dermatome). Ropivacaine is a long acting amide local anaesthetic providing adequate subarachnoid block. Ropivacaine is made hyperbaric by addition of dextrose is known to provide reliable subarachnoid block .

Adding adjuvant drugs to intrathecal local anaesthetics improves the quality and duration of the spinal blockade and prolongs post operative analgesia. With the addition of an adjuvant it is possible to reduce the amount of local anaesthetics and thus reduces the incidence of adverse effects.

The opioids continue to be the most commonly used adjuvants in clinical practice. Among opioids fentanyl is the most extensively used opioids in subarachnoid block, because of its potency, rapid onset, short duration of action with a reduced need for analgesia after surgery.

Ropivacaine is considered to be a safe choice as it is less cardio toxic than commonly used drug bupivacaine but is less potent. So addition of fentanyl to ropivacaine improves the quality of subarachnoid block.

Material and Method

After obtaining ethical committee approval of our institute and patients informed consent 60 patients of ASA grade I to II were included in a prospective randomised double blinded study. Patients with uncontrolled hypertension, diabetes, chronic obstructive pulmonary disease, infection at the injection site,coagulation disorder, ischaemic heart disease, history of headaches neurological disorders, pregnant women and those allergic to amide local anaesthetics or fentanyl were excluded.

No premedication was given, patients were randomly divided into two equal groups. After routine monitoring, infusion of 20 mL/ kg of Ringers Lactate fluid was given. The baseline hemodynamic parameters were recorded and patient was given spinal anaesthesia in sitting position using 25G Quincke's needle at L3 - L4 interspace in midline approach. In group A(n=30), 2 mL of 0.5% hyperbaric ropivacaine and in group B (n=30) , 1.8 mL of hyperbaric ropivacaine with 25 mcg fentanyl were administered via intrathecal injection. After free flow of cerebrospinal fluid with barbotage, anaesthetic solution was given. Immediately patient was placed supine position. Heart rate (HR), mean arterial pressure (MAP), oxygen saturation (SPO2), were recorded every 2 minutes for 15 minutes after intrathecal injection and then every 5 minutes.

The time to achieve sensory blockade of T10 highest level of sensory block and time to regression of sensory blockade to S1 were recorded. Motor blockade was assessed using Bromage scale (0= no motor block, 1= inability to raise extended leg, 2= inability to flex knees,3 = inability to flex ankle joints) were recorded. Complete motor block was defined as a bromage score of 3. Patients were observed until the level of sensory blockade was S1 and bromage score was zero. Adverse effects such as hypertension, bradycardia, nausea, vomiting, shivering, sedation, respiratory, depression, and pruritis were recorded. The patients were discharged from the recovery room after the motor blockade was completely resolved and when patient has stable vital signs. Difference in the duration of motor block between two groups were observed.

RESULTS

There were no significant differences between the two groups in demographic date, ASA type and duration of surgery.(p > 0.05) table 1.

Time taken to onset of sensory blockade at level T10 was 4.50+/- 1.62 in group A and 5.32+/- 1.50 in group B , there was no significant difference between the groups. The highest level of sensory blockade was T 10(T 8- T 10) in group A and

T9(T6- T10) in group B, there was significant difference(p< 0.001) (table 2) . In the time taken for two segment regression and regression of sensory block to S1, there was no significant difference (105.35+/- 12.30 and 276.25+/- 65.10 in group B, respectively (table 2). Onset time of motor block, maximum motor block and duration of complete motor block were similar in both groups (p > 0.05). On the other hand, duration of motor block was longer in group B than group A (p < 0.001) (table 2). Visual analogue scale (VAS) score, was higher in compared to group B and there was a significant difference (p < 0.05) (table 2).

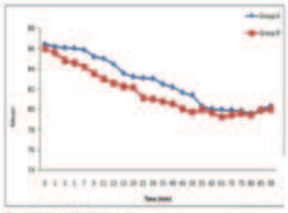

Figure 1: Heart rate (beat/min)

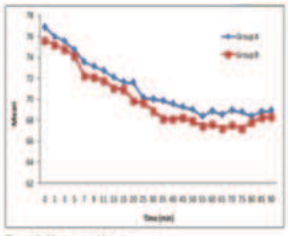

Figure 2: Mean arterial blood pressure

Table 1: Demographic and perioperative data

	Group A	Group B	P Value
Age (yr)	65.2±16.23	68.2±17.32	NS
Weight (kg)	68.15±10.82	70.92±10.12	NS
Height (cm)	160.52±7.24	165.15±5.73	NS
ASA Grade (I/II/III)	12/13/5	14/11/5	NS

Table 2: Characteristics of spinal anesthesia in two groups

	Group A	Group B	P Value
Sensory block			
Onset sensory level T10 (min)	4.50±1.82	5.32±1.50	>0.05
Highest level of sensory blockade (dermatome)	T10 (T8-T12)	T9 (T6-T12)	<0.001**
Time to two segment regression (min)	105.35±12.30	116.10±10.42	>0.05
Time to regression to S1 (min)	276.25±65.10	282.10±65.10	>0.05
Motor block			
Onset time of Bromage 1 (min)	3.90±1.35	3.30±1.17	>0.05
Maximum motor block (at Bromage Score 3/3)	13(1	18(1	>0.05
Duration of motor block (min)	186.25±55.65	210.35±61.25	<0.001**
Duration of complete motor block (min)	162.35±36.17	143.50±37.19	>0.05
Pain assessment			
Visual analog scale (VAS)	3.5±1.28	0.8±0.84	<0.05*

Data are mean±standard deviation, median (range) or number of patients. A=Ropivacaine, B=Ropivacaine plus fentanyl, *=P<0.05, **=P<0.001. A significant

Patients were haemodynamically stable, heart rate ,mean arterial pressure and SPO2 In both groups there was no significant difference (figure 1-3). No patient required supplemental oxygen, analgesia, or anxiolytics intraoperative. There were no significant differences between the two groups with respect to side-effects (table 3).

DISCUSSION

Researchers this prospective double blinded randomise study has ropivacaine and fentanyl, which provides pain, relief, and haemodynamic stability. Addition of 25 mcg fentanyl in plain ropivacaine provide similar sensory blockade, but short duration of motor block compared with plain ropivacaine . Reduction in dose of ropivacaine with less motor blockade was achieved with addition of fentanyl. It has been proved that combination of opioids to local anaesthetic has a synergistic action. The effect of plain ropivacaine Video and combination of fentanyl indicate similar onset and sensory blockade. It was reported total duration of sensory block , regression of sensory block and motor recovery were faster in plain ropivacaine group at T 10 and more rapid and shorter times to independent mobilisation in plain ropivacaine group . Intrathecal fentanyl.(25mcg) with hyperbaric ropivacaine Prolongs the analgesic effect compared with hyperbaric ropivacaine.

In our study, the highest sensory blockage, achieved and duration of motor blockage were higher in significantly group. B. There was no significant difference in time taken to T10, two segment regression, sensory regression to S1 onset time of bromage 1, maximum motor blockade, and duration of complete motor blockade. The analgesic effect was prolonged in group B as compared to group A.

CONCLUSION

Both regimes are effective and the addition of fentanyl to ropivacaine may offer the advantage of shorter duration of complete motor block , haemodynamic stability, and prolong post-operative analgesia. Hence, it can be used as an alternative alternative to pure Ropivacaine in spinal anaesthesia.