

Research Article

Prolongation of action of 5% Lignocaine for Spinal anesthesia by using Fentanyl

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Abstract: Spinal anesthesia with lignocaine heavy has been popular for short surgical procedures as it has predictable onset and provides dense sensory and motor block of moderate duration. To evaluate efficiency of fentanyl for prolonging action of 5% Lignocaine for Spinal anesthesia. Total 60 patients are included in this study and they are divided in to 2 group. Each group consist of 30 participants. Among them one group (Group 1) has given 2 ml 5% Lignocaine plus 1 ml normal saline while second group has given 2 ml 5% Lignocaine plus 1 ml Fentanyl (20 microgm) intrathecally to see efficiency and side effects. The mean onset time of sensory block noted at T6 level was 4.25 min in group 1 and 2.5 min in group 2. Mean duration of pain relief in group 1 was 71.10 minutes while in group 2 it was 113.6 minutes and the difference between them is found to be highly significant. We conclude that the addition of 20 microgm fentanyl to hyperbaric lignocaine spinal anesthesia results in quicker onset of sensory and motor block without prolonging duration of motor block recovery.

Keywords: Spinal anesthesia, fentanyl, Lignocaine

INTRODUCTION

It is well documented that combination of small dose of opioid with local anesthetics administered intrathecally has a synergistic analgesic effect. Fentanyl is short acting opioid and by itself is inadequate to provide neural blockade adequate for performing surgery. The addition of fentanyl might potentiate and prolong the afferent sensory blockade by local analgesic so as to provide acceptable surgical anesthesia. It is to be seen whether the combination of fentanyl with lignocaine prolongs the sensory block without prolonging recovery.

MATERIAL AND METHODS

This study was conducted at AMC MET medical college, Sheth L.G Hospital ahmedabad, Gujarat from Jan 2008-Dec 2009.

Sixty adult patients of either sex, belonging to ASA grade I or II who had undergone lower abdominal and lower limb surgery were chosen at random.

The patients were randomly allocated to 2 group of 30 each.

In all patients a 16G epidural catheter was introduced at L2-3 space as part of the anesthetics technique to prolong anesthesia in case it wore off before the operation finished.

Patients in Group 1 has given 2 ml 5% Lignocaine plus 1 ml normal saline while second group has given 2 ml 5% Lignocaine plus 1 ml Fentanyl (20 microgm) intrathecally in L3-4 interspace. Patients were observed for the onset of motor block (Bromage 3) and sensory block at T6 level from the time of injecting the study solution.

Duration of sensory block was determined by noting the time from administration of the first dose till patients complained of pain to surgical stimulus.

Patients were observed for Pulse (ECG), Blood pressure (NIBP), Oxygen saturation (pulse oximetry) at 5, 10, 15, 30, 45, 60, 75, 100 mins after subarachnoid injection and were observed for any side effects like nausea, vomiting, sedation and pruritus. Onset times of sensory block, duration of sensory and motor block and mean changes in pulse, BP and O2 saturation in the 2 groups were compared.

RESULT

The mean onset time of sensory block noted at T6 level was 4.25 min in group 1 and 2.5 min in group 2. (Table 1).

Duration of surgical anesthesia was prolonged with addition of fentanyl. (Table 2).

Table-1: Showing mean onset of sensory and motor block and mean duration of sensory block in both group(In minutes) and comparison between them

| Variable | Group 1(n=30) | Group 2(n=30) | P-value |
|---------------------------------------|---------------|---------------|------------|
| Onset of sensory block at T6 level | 4.25 ± 0.71 | 2.51±0.72 | <0.05*** |
| Onset of motor block Bromage scale 3 | 2.85 ± 0.49 | 3.2±0.56 | >0.05 (NS) |
| Duration of sensory block | 71.10 ± 21.23 | 113.6 ± 0.71 | <0.05*** |
| Mean blood pressure(mmHg)(at 5 min) | 110 ± 10 | 90 ± 5 | <0.05*** |
| Mean blood pressure(mmHg)(at 100 min) | 95 ± 10 | 98 ± 8 | >0.05 (NS) |

Mean duration of pain relief in group 1 was 71.10 minutes while in group 2 it was 113.6 minutes and their difference between them is found to be highly significant.

There was no difference in onset of motor block with the addition of fentanyl as shown in Table 1.

None of the patients in any group complained of urinary retention requiring catheterization.

The variation in pulse rate between group 1 and group 2 was insignificant.

Oxygen saturation variation in group 2 was significant.

Change in mean blood pressure (Table 1) within group 1 and group 2 was significant. This change was statistically significant at 5 min after injecting the solution intrathecally which became non significant at 100 mins after injecting the solutions. There was no significant variation in mean blood pressure between group 1 and 2.

Incidence of side effects was higher in fentanyl group as shown in table 3 but these were mild and easily treated.

Table-2: Incidence of side effects among participants

| Side effects | Group 1 | Group 2 |
|--------------|---------|-----------|
| Vomiting | - | 4(13.33%) |
| Pruritus | - | 5(16.66%) |
| Drowsiness | - | 21(70%) |

DISCUSSION

Synergism was observed with fentanyl and lignocaine probably by inhibition of synaptic transmission in nociceptive afferent pathways [1] by opening presynaptic potassium release and thus reduces calcium influx.

There is also post synaptic effect with hyperpolarization and reduced neuronal activity [2] and yet they do not inhibit conduction in sympathetic or somatosensory evoked potentials. Local anesthetic works primarily by causing blockade of voltage gated

sodium channels in the axonal membrane and possibly a future effect on presynaptic inhibition of calcium channels[3].

Our study quantitatively demonstrates that addition of fentanyl does not affect onset, quality or duration of motor blockade thus recovery of ambulation should not be delayed. There was no complaint of urinary retention by subjects in this study, while previous studies observed that central neuronal opioid may inhibit bladder function. This discrepancy may be due to dose dependant bladder inhibition by spinal opioids [4].

Pruritus occurred in 5 of 30 patients when fentanyl was added. However it was mild and well tolerated. Previous studies suggest that side effects of intrathecal fentanyl are dose related [5]. Addition of epinephrine to lignocaine fentanyl spinal solution has been shown to nullify the pruritic effect of the fentanyl [6]. All opioid agonists produce dose related respiratory depression by decreasing the sensitivity of medullary respiratory center to hypercapnia. Lipophilic drugs bind rapidly to the nervous tissue, so if injected in lumbar region their ability to reach medullary respiratory center is dose dependant [7,8]. A higher peak CSF concentration of fentanyl can produce an early depression of ventilation [9]. This explains the drowsy state of the patients and the decreased oxygen saturation in the patients received fentanyl in our study.

CONCLUSION

We conclude that the addition of 20 microgm fentanyl to hyperbaric lignocaine spinal anesthesia results in quicker onset of sensory and motor block without prolonging duration of motor block recovery.

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