

Comparative Study of Small Dose Bupivacaine-fentanyl vs. Normal Dose of Bupivacaine in Spinal Anaesthesia for Patient Above 60 Years Old Undergoing Surgery

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Abstract

The purpose of the study was to compare small dose bupivacaine - fentanyl and normal dose of bupivacaine in spinal anaesthesia for patient above 60 years old undergoing femoral and tibial surgery 80 elderly patients of either sex belonging to ASA I, II & III undergoing elective orthopedic lower limb surgeries under spinal anaesthesia were studied in this prospective, randomized double blinded study. First group A (n=40) was given inj. Bupivacaine hyperbaric 3 ml (15mg) & group B (n=40) was given inj. Bupivacaine (2 cc) + 25 mcg fentanyl. Parameters like time for adequate level of analgesia (T9), peak sensory level reached, beginning of motor block to recede to L3-L4 level (modified Bromage scale), how long sensory block continues and number of complications are noted in both groups. Result: The time of adequate level of sensory block to be started (T9) was longer for group B than group A. How long of sensory block to be started was slightly more for group A. The time of motor block continues to work was more in A than group B. It is concluded that subarachnoid block with 2cc bupivacaine 0.5% H and 25mcg fentanyl is a more safer and better option for patient above 60 years of age undergoing femoral and tibial surgeries.

Keywords: Spinal anaesthesia, patient, bupivacaine-fentanyl, bupivacaine.

Introduction

Universally agreed that best type of anaesthesia for fracture fixation of tibia and femur surgery is subarachnoid block producing less postoperative loss of memory and hallucination than general anaesthesia.¹ However spinal block has got its own inherent complications, especially related to cardiovascular stability². Perioperative hypotension may affect postoperative recovery and also the large number of coronary disease, put patient at risk of ischemia secondary to hypotension³. Vasopressor and IV fluids are used to treat or prevent hypotension. Another technique is by using very low titrated dose of local anaesthetic but it may not provide acceptable time for sufficient anaesthesia and better time for surgery. Studies have established that fentanyl and Marcaine anaesthetics administered together intrathecally have very strong synergistic analgesic effect, enhancing spinal blockade without affect the degree of sympathetic blockade ensuring better hemodynamic stability⁴. The purpose of this study was to COMPARE hemodynamic and sensory effect of small dose bupivacaine_ fentanyl in

regional anaesthesia versus ordinary dose of bupivacaine in patients undergoing surgical correction of lower limb tibial and femoral⁵.

Materials and Method

After approval of institutional ethical committee and informed consent 80 patients of ASA I, II, & III with age > 50 years of both sexes undergoing elective lower limb orthopedic surgeries were included in this double blind randomized trial. Patients with history of allergy to local anaesthetics, severe cardiac or respiratory diseases and uncontrolled hypertension were excluded. After routine and special investigations (if required) are done, patients were randomly allocated to group A (Bupivacaine-15mg, 3ml) & group B (Bupivacaine-10mg, 2ml + 25 mcg [1ml] fentanyl). Demographic data were comparable in age, height and duration of surgery (Table-1). Patients were fasted 8-10 hours and in operation theatre preloading with 8 ml/kg Ringer lactate done and standard monitors applied. From previous studies, low dose of bupivacaine and fentanyl was

identified. Those studies are as below. Diana Fernander 2., Monterrat Rue et al (1996) 12.5 mg1. Plus saline or 25 mcg fentanyl. Ben David, frankel et al (2000) 4mg bupivacaine plus 3.20 Mcg fentanyl4. Atallah et al (2006) .Under full sterilized and antiseptic precautions lumbar spinal Block was done in sitting position in L3-L4 space by 22 Quincke needle both group were given respective drugs and sensory level of T6- T8 was achieved . patients were given oxygen by ventimask of 4 L/MINUTES .pulse rate, blood pressure, spo2 were measured every 5 minutes for first 20 minutes and then every 10 minutes for next 1 hour and then every hour for the next 24 hours postoperatively hypotension was defined as SBP \leq 90 or mean arterial BP 30% lower than baseline decline of greater than 30% from normal mean arterial pressure which must treated with an incremental IV bolus of phenylephrine 50 Mic, Bradycardia defined as Heart Rate below 60 BPM must treated with IV Atropine other parameter like time for adequate level of analgesia peak sensory level reached, Time for Motor block to recede To L3-L4 level, duration of sensory block (Table-2) and incidence of complications like Nausea, vomiting, pruritus, sedation, shivering were assessed and compared .Motor block was assessed using modified Bromage scale 0 no paresis – full movement of lower limb

- 1-- Partial paresis – flex knees and ankles
- 2-- Partial paresis – flex ankles .
- 3-- Full paresis – no movement

Sedation status was assessed using

- 0 –Awake and alert
- 1-- Respond to voice
- 2-- Respond to painful stimuli
- 3-- No response

Results

The study was done in double blinded, prospective randomized manner in 80 patients in al diwaniya teaching hospital and al furat private hospital scheduled to undergo elective orthopedic lower limb surgeries under spinal anaesthesia . the demographic data (age, weight . sex, and ASA grading) were comparable and statically non significant (table 1) ALL surgeries was lasted from 110 to 180 minutes equal distribution of

mens and womens in both groups was done and most of them were ASA II – III students T-test was used for statistical Analysis .

- The BEGINNING of adequate level of sensory block (T9) was little late for group B (128+/- 8 sec) than A (95 +/- 10 sec) and was statically significant (table 2)
- HOW long motor block was continued in group A1 (162 +/- 7 min) comparing to B2 (129 +/- 9) and was statistically significant .
- Lower pulse rate less drop in blood pressure was noted in group B2 than group A1, thus there is better haemodynamic stability in group B2
- Incidence of drop in BP and use of vasopressors WAS much larger in group A1 and was found to be statically significant
- Latency of sensory block was slightly more for group A1 but was not found to statically significant
- Boutes of bradycardia Or pruritus was common in group B2.
- No one of the patients in both groups had reergutation Or vomiting Or respiratory depression .
- Shivering was higher in group A
- RASS score was used to assess sedation intraoperative and postoperative. (rantigon agitated sedative score)

Discussion

Maintenance of body physiology as near normal as possible during anaesthesia is one of the primary goals of anaesthesiologist . Marked hemodynamic derangement are often seen following subarachnoid block especially in trauma and elderly patients. Neuraxial opioids are not associated with sympathetic nervous system denervation, muscle power weakness or loss of speech . they predominantly act at the MU receptor present in substantia gelatinosa of spinal cord to exert its synergistic effect more specifically for visceral pain. The recommended level of regional anaesthesia for lower limb surgery is T9 . standard recommended dose of 0.5% hyperbaric bupivacaine is 3cc (15 mg) In our present study, we have added 25 Mcg fentanyl, a highly lipophilic opioid to lower doses of 0.5% bupivacaine hyperbaric and COMPARED hemodynamic parameters like blood pressure, heart rate changes, side effects of fentanyl and motor and sensory profiles of block.

In our study 16 patient of group A developed hypotension and needed vasopressors compared 4 patients of group B2 . these finding are in agreement with finding of Ben David et al (2000), Ben David, Frankel (2000), Matyr (2001). There were high increase in the beginning of adequate block in group B2 (128+/-8.3 sec) as compared to group A1 (95+/-10.32 sec). Addition of fentanyl reduces the PH of hyperbaric bupivacaine .this may be reason for delay in onset of adequate block (table 2) The total duration of sensory block for group A was 227.6 +/- 9.8 min while group B was 211.5 +/- 14.2 min . the difference between two groups were statically insignificant as per Boucher et al (2001) and Rajesh Mahayan V K Grover et al (2005) addition of fentanyl enhances duration of sensory block in which dose of Bupivacaine –H was same . But in our study dose of

Bupivacaine in fentanyl group is much lower which can be the reason for slightly lower duration of sensory block

MOTOR BLOCKED LAST LONGER in group A1 than group B2 and none of the patients required any supplementary anaesthetic interventions during surgery

There was no incidence of sedation or respiratory depression in 2 groups Fentanyl abolishes shivering by central mechanism in group B .pruritus is most common side effect of intrathecal opioid in our study 4 among 40 in group B had pruritus which was treated by ondansetron . Nausea and regurgitation were not seen in any Of these groups . adjuvant drug like fentanyl reduces the PH of hyperbaric bupivacaine . It may be the reason for the delay in onset of adequate block .

Table 1. Data were comparable in age, height and duration of surgery

Group B2	Group A1	Parameters
68+- 7	65+- 6	Age
163+- 5.5	164+- 5.8	Height
128+- 32	135+- 30	Duration of surgery (min)
25: 15	25 : 15	Male : Female
24 : 16	25: 15	ASA Grade II: III

Table 2: Characteristics of spinal block.

Group B	Group A	
127 +/- 7.3	96 +/- 10	Time of onset of adequate block – T10 (sec)
129 +/- 9	163 +/- 7	Duration of motor block (min)
211.5 +/- 14.5	227.6 +/- 9	Duration of sensory block (min)

Table 3. Complications: Group A and Group B

Group B	Group A	
4 (10%)	16 (40%)	Hypotension
2.4 (6%)	1 (3%)	Bradycardia
4 (10%)	0	Pruritus
0	0	Sedation
0	0	Nausea and regurgitation
0	4 (10%)	Tremors
0	0	Total spinal

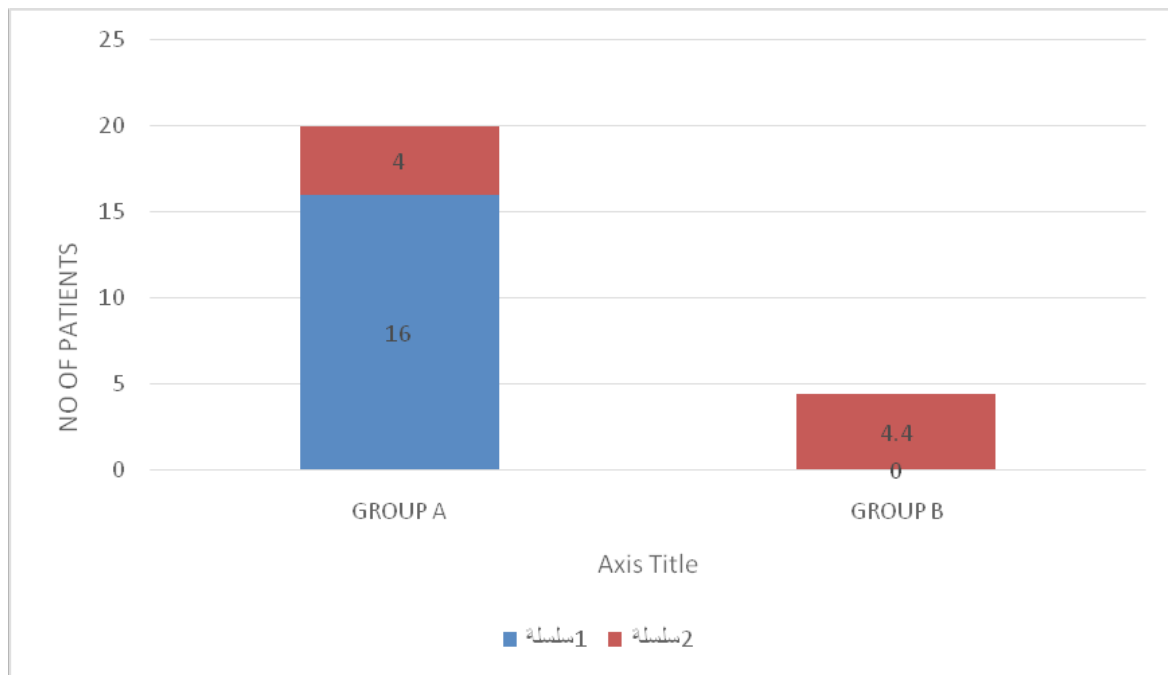


Figure 1. VASOPRESSORS Used

Conclusion

From current study it was concluded that subarachnoid block with 2 cc bupivacaine 0.5% H and 25 Mcg fentanyl is more safer study, both in terms of maintaining hemodynamic stability and lower incidence of complications without compromising the surgical condition for patients undergoing femoral and tibial surgeries. B+F can be a safer alternative to conventional dose of bupivacaine, which can be reduced after adding fentanyl in low dose bupivacaine, after completing this study, we will study for other doses.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Aldewaniya teaching hospital and all experiments were carried out in accordance with approved guidelines.

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