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ORIGINAL ARTICLE

Compare the Analgesic Efficacy of Dexmedetomidineand Fentanyl as an Adjuvant to Bupivacaine for Lower Limb Surgery

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ABSTRACT

Objective: To compare the analgesic effectiveness of Dexmedetomidine and Fentanyl as an adjuvant to 0.5% Bupivacaine in spinal anaesthesia for patients undergoing lower limb surgery.

Study Design: Randomized controlled trial.

Place & Duration: The study was conducted at department of Anesthesia, Shaheed Mohtarma Benazir Bhutto Institute of Trauma, Karachi for duration from 15thJuly2020 to 15thFebruary 2021.

Methods: In this study 52 patients of both genders undergoing lower limb surgeries were included. Patient's ages were ranging from 20 to 70 years. All the patients were divided into two Groups. Group A included 26 patients and received Inj. Dexmedetomidine 10 µg in 0.5ml normal saline with 12.5mg of 0.5% hyperbaric bupivacaine, Group B had 26 patients and received 25mg fentanyl with 12.5mg of 0.5% hyperbaric bupivacaine. Time to achieve T10 blockade, time to first rescue analgesia were examined and compare between both groups. All the statistical data was analyzed by SPSS 24.0. P-Value <0.05 was significantly considered.

Results: Mean age of group A was 40.52±12.28 years and in group B it was 40.14±13.34 years. There were 18 (69.23%) male patients and 8 (30.77%) females in group A while in Group B 19 (73.08%) patients were male and 7 (26.92%) were females. No significant difference was observed between both groups regarding time to T10 blockade with p-value >0.05. A significant difference was found regarding time to rescue analgesia, in Group A it was 426.58±92.44 minutes and in Group B, it was 206.44±48.47 minutes (p-value <0.0001). Patients' satisfaction was high in dexemedetomidine group as compared to fentanyl group.

Conclusion: Dexmedetomidine 10 µg with 0.5% bupvicaine showed better effectiveness regarding time to first rescue analgesia as compared to fentanyl. No significant difference was observed regarding time to sensory blockade between both medications.

Keywords: Dexmedetomidine, Fentanyl, Spinal Anaesthesia, Lower Limb Surgery, Sensory Block, Analgesia.

INTRODUCTION

For lower limb surgeries, spinal anaesthetic techniques are frequently used. Depending on the approach used[1, 2], they have the main potential benefits of reducing blood loss, lowering deep vein thrombosis and improving early postoperative pain control. Good pain management is capable of providing early hospital discharge and improving the patient's tolerance of physical treatment. Adjuvants including morphine, fentanyl and clonidine are utilized in intrathecal local anaesthetics, offering potential benefits such as retarded pain intakes and lowered treatment requirements. The duration of both spinal and postoperative analgesia is extended by clonidin,[3-5] at the cost of dose-dependent hypertension and therapeutic sedation, 150-300 µg [6-7].

The extraordinary specific α2 agonist, dexmedetomidine, quickly ascends as an option for spinal sedation, after the major effects of pain failure and keeps the patient wakeful with firm haemodynamics without respiratory misery [5].

Dexmedetomidine in measurements of 3 µg, 5 µg, 10 µg and 15 µg and a few alternative doses in several after-effects of various exams relate additionally to extending engine border speed with increasing terrible impacts of dexmedetomide, including brady cardiac hypotension [6-7]. Fentanyl is a central action synthetic opioid frequently used for pain management. Other local anesthesia are frequently supplemented by intrathhecal fentanyl, which has improved the spinal anesthesia and decreased the side effects associated with anesthetic, including itching, nausea and vomiting[8].

In many procedures, dexmedetomidine and fentanyl were utilized as adjuvants to local anesthetics to give superior analgesics and increase block duration [9-11]. A trial of lower limb operation demonstrated improved dexmedetomidine efficacy [12]. In this study, we examine the efficacy and safety of Dexmedetomidine10ug with 0.5% Bupivacaine in spinal anaesthesia for patients undergoing lower limb surgeries.

MATERIALS AND METHODS

This randomized control trial was conducted at department of Anesthesia, Shaheed Mohtarma Benazir Bhutto Institute of Trauma, Karachi for duration from 15thJuly2020 to 15thFebruary 2021. In this study 52 patients of both genders undergoing lower limb surgeries were included. Patient's ages were ranging from 20 to 70 years. Patients who were not interested to participate and those who were un-cooperative, patients with un-controlled diabetes were excluded.

All the patients were divided into two Groups. Group A included 26 patients and received Inj. Dexmedetomidine 10 µg in 0.5ml normal saline with 12.5mg of 0.5% hyperbaric bupivacaine, Group B had 26 patients and received 25mg fentanyl with 12.5mg of 0.5% hyperbaric bupivacaine. Time to achieve T10 blockade, time to first rescue analgesia were examined and compare between both groups. All the statistical data was analyzed by SPSS 24.0. P-Value <0.05 was significantly considered.

RESULTS

Mean age of group A was 40.52±12.28 years and in group B it was 40.14±13.34 years. There were 18 (69.23%) male patients and 8 (30.77%) females in group A while in Group B 19 (73.08%) patients were male and 7 (26.92%) were females. Mean body mass index in group A was 25.56±1.34kg/m^2 and in group B it was 24.08±2.86kg/m^2. (Table 1)

No significant difference was found with respect to the time to reach T10 sensory blockade in group A and group B 4.02+0.38 Vs 5.36+0.71 minutes (p-value 0.09). A significant difference was found regarding time to rescue analgesia, in Group A it was 426.58±92.44 minutes and in Group B, it was 206.44±48.47 minutes (p-value <0.0001). (table 2)

Table 1: Baseline details of patients in both groups

Characteristics	Group A (n=26)	Group B (n=26)
Mean Age (yrs)	40.52±12.28	40.14±13.34
Gender		
Male	18 (69.23%)	19 (73.08%)
Females	8 (30.77%)	7 (26.92%)
Body Mass(kg/m)	25.56±1.34	24.08±2.86

Table 2: Comparison of T10 sensory block and time to rescue analgesia

Variable	Group A (n=26)	Group B (n=26)
Time to achieve sensory block T10 (min)	4.02+0.38	5.36+0.71
Time to first rescue analgesia(min)	426.58±92.44	206.44±48.47

We found no significant difference between both groups regarding hemodynamic stress response.

No significant difference was observed between both groups regarding adverse effects with p-value >0.05.

Table No 3: Comparison of Adverse Effects between both groups

Side effects	Group A	Group B	P-value
Headache	3 (11.54)	3 (11.54)	>0.05
Nausea	0	0	
Hypotension	1 (3.85)	2 (7.70)	N/S
Bradycardia	1 (3.85)	3 (11.54)	>0.05
Sedation	1 (3.85)	2 (7.70)	>0.05

DISCUSSION

In our investigation, 10ug of dexmedetomidine was found to be safe and efficacious with 0.5% hyperbaric bupivacain and 100% shown to have no negative effects on leg and feet movement. We found also that post-operative analgesia with dexmedetomidine were substantially longer than fentanyl. These results demonstrate resemblance to some other trials in which dexmedetomidine was very useful and effective without any negative effects with 0,5% hyperbaric bupivacaine. 10-12

56 patients were included in this study and 26 patients in each group were separated into two groups. Group A average age was 40.52±12.28, and Group B age 40.14±13.34. The group A consisted of 18(69.23%) male and 8(30.77%) female, while group B consisted of 19(73.08%) male and 7 (26.92%) female. The mean index for body mass was 25.56 ± 1.34 kg/m2 for Group A and 24.08 ±2.86 kg/m2 for Group B. The Chattopadhyay et al. [13] reported that the faster onset and longer duration of sensory and motor block sensory and long perioperative analgesic diseases without significant haemodynamic alteration than bupivacaine alone was 3 µgdexmedetomidine added into 6 mg bupivacaine for patients who suffered. The mean time taken in their study was considerably reduced in Group II to attain the T10 sensory block (10.72 ± 3.50 min) compared to Group I (12.72 ± 3.90 min) (P=0.041). In all groups (P = 0.418), peak sensory block levels were similar, and in both groups the median sensory block peak level was T9. Duration of sensory two-segment regression in Group II was 130.80 ± 15.20 min, compared to Group I 116.40 ± 20.12 min (P = 0.003)

Two parameters were identified in both groups in our investigation. Time until T10, and the time to first rescue analgesia. The results were similar in terms of time to sensory blokade between the two groups. These results demonstrate no substantial difference compared to the study by Abaid-ur-Rehman et al[14]. Group I consists of 19 (73.08%) males and 7 (26.92%) females; group II consists of 21 (80.7%) males and 5 (19.23%) females. As regards the time to approach the sensory blockade T10, the results were same. However, a substantial variation in time to first rescue analgesia was observed between both groups. In Group A it was 426.58±92.44 minutes, in group B 206.44±48.47 minutes (p-value <0.0001). The time of rescue analysis had significantly differed. The time to reverse sensory level and time to first dose of analgesically was extended by Group D for in addition to the study by SS Nethra et al. [15], compared with Group N (301.10 ± 94.86 min, 321.85 ± 95.08 min), respectively (430.05 ± 89.13 min, 459.8 ± 100.9 min). In Group D (323.05 ± 54.58 min, 329.55 ± 54.06 min, 422.30 ± 87.59 min) the length of engine blockade, time of ambulation and time of vacuum were similarly considerably prolonged (220.10 ± 18.61 min, 221.60 ± 63.84min, 328.45 ± 113.38 min). In the study by Yousefi H et al [16], sedation score (Ramsay sedation section) in the BVD group was cured at the lowest values from 0-3 and 1-4, but was delayed in the BVD group in postoperative pain. Liu L et al [17] reported that, in the Dex group and in the Control Group for 70,5 ± 34,5 minutes, respectively, sensory block durations were 120.5 ± 37.0 minutes. The duration of analgesia for Dex groups was 230.5 ± 40.5 minutes and for Control Group (P<0.001) 145.1 ± 28.5 minutes. The consumption in the Dex Group was significantly lower than in the Control Group (56.3 ± 9.4 vs. 65.9 ± 10.7 µg) for the post- operative recovered sufentanil. The patient satisfaction with analgesia did not differ greatly, however the dexemeditomidine group was more satisfied. The medication's adverse effects between the two groups were similar.

CONCLUSION

We concluded that Dexmedetomidine 10 µg with 0.5% bupvicaine showed better effectiveness regarding time to first rescue analgesia as compared to fentanyl. No significant difference was observed regarding time to sensory blockade between both medications.

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