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EFFECT OF ADDITION OF FENTANYL TO LOW DOSE BUPIVACAINE IN CESAREAN SECTION UNDER SPINAL ANESTHESIA.

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ABSTRACT

Aims and objectives: The aim of this study was to know the reduction in spinal side effects by reducing the dose of bupivacaine with the addition of fentanyl to it, in caesarean section. We also compared duration of anesthesia and analgesia with standard dose of bupivavacaine for cesarean section under spinal anesthesia. **Materials and methods:** This is a prospective randomized controlled, double blinded study. Institutional ethical committee approval was obtained, sixty parturients with singleton pregnancy scheduled for cesarean section were randomly allocated into two groups of 30 each. Group C received 2.0ml(10mg) of 0.5% hyperbaric bupivacaine and Group F received 1.5ml(7.5mg) 0.5% hyperbaric bupivacaine plus fentanyl 0.5ml(25µg). Following parameters were recorded- blood pressur, heart rate, SPO_2 along with sensory and motor blockade throughout the surgery. Complications like frequency of hypotension, bradycardia, nausea, vomiting were studied. **Results:** There was no significant difference in onset time of sensory and motor blockade between the two groups. Time to regression of sensory block to T10 in Group C was 153±19 min Vs Group F 178±11min and duration of analgesia in Group C was 133±19 min and Group F was 202±21min, which is clinically and statistically significant. There was no significant difference in duration of motor block between the two groups. The fall in blood pressure was significant in C group in comparison to F group (97.7±4.5 mmHg and 113.4±11.5 mm Hg) with a p value (<0.0001). The incidence of nausea and vomiting was also considerably low in F group. **Conclusion:** By reducing the dose of intrathecal bupivacaine with the addition of adjunctives like opioids, we can reduce common complications of spinal anesthesia. Addition of fentanyl to bupivacaine prolongs duration of analgesia in cesarean section, but it has no effect on onset time.

KEYWORDS: Cesarean section, Bupivacaine, Fentanyl.

INTRODUCTION

Spinal anaesthesia is the most common method of regional block in caesarean section[1] compared to epidural anaesthesia. The hormonal and mechanical factors make pregnant women require less local anesthetic than nonpregnant women to attain the same level of spinal anesthesia.[2] Spinal anaesthesia should ideally last the duration of procedure without incurring maternal and fetal adverse effects. The common problems associated with spinal anaesthesia are hypotension, visceral pain, nausea and vomiting. Hypotension after spinal anesthesia is caused due to the enhanced sympathetic segmental block due to higher doses of local anesthetic.[3] Many adjunctives have been used to local anesthetic for spinal anesthesia. Local anaesthetic plus opioids administered together intrathecally have been shown to have a synergestic analgesic effect. Studies have shown that the combination of isobaric bupivacaine and fentanyl produce less hypotension.[4] Intrathecal opioids increase the quality of analgesia and reduce the local anaesthetic requirements. Therefore it may be possible to achieve spinal anaesthesia with less hypotension by using a reduced dose of local anaesthetic in combination with fentanyl.

We carried out our study with 25µg of fentanyl added to 7.5mg of 0.5% hyperbaric bupivacaine and comparing it with standard dose of 10mg of hyperbaric bupivacaine, in terms of common side effects like hypotension, bradycardia, nausea, vomiting along with onset time and duration of block, in caesarean section under spinal anesthesia.

MATERIALS AND METHODS

This study was conducted at the Basaveshwara Teaching and General Hospital, attached to Mahadevappa Rampure Medical College, Kalaburagi.

After obtaining ethical committee approval and written informed consent, 60 patients were randomly allocated into two groups of 30 patients each, as Group C, control group and Group F, fentanyl group. This study was done in a prospective double blinded randomized manner. All patients belonging to age group 18-45 years, weighing 50-90 kg with ASA grade 1 and grade 2 undergoing elective caesarean section under spinal anaesthesia were included. Patients with multiple pregnancy, Pregnancy induced hypertension, Patients belonging to ASA grade 3 and 4, Weight <40kg or >90kg or height <145cm or >165cm were excluded.

60 patients were randomly allocated into two groups. Group-C received 10mg (2 ml) of 0.5% of hyperbaric bupivacaine intrathecally. Group-F received 7.5mg (1.5 ml) of 0.5% of hyperbaric bupivacaine plus 25µg (0.5ml) fentanyl intrathecally.

Spinal anaesthesia was performed with the patient in lateral position using a 25 gauge Quincke needle at the L3-L4 interspaces. Patient was turned gently and placed supine with left uterine displacement. The time for intrathecal injection was considered as 0 and the following parameters were observed – sensory blockade, motor blockade, duration of analgesia, side effects.

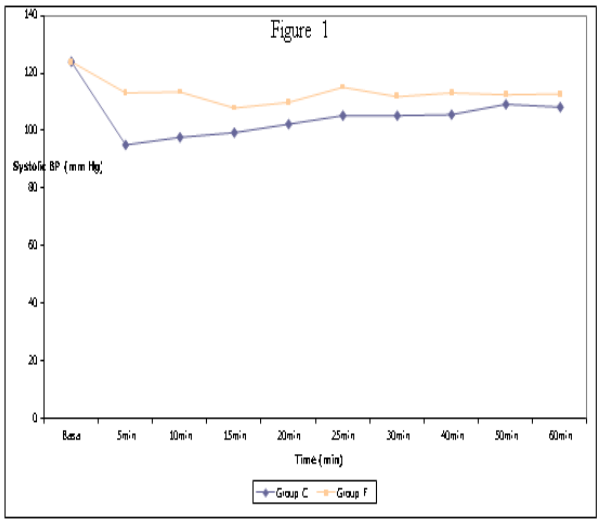
Patients were monitored for heart rate(HR), non invasive blood pressure (NIBP), SPO_2 every 2 min for 10 min and then every 5 min throughout the intraoperative period and then every 15 min in the postoperative period. Fall in systolic blood pressure(SBP) more than 30% from baseline or mean arterial pressure(MAP) less than 60mm Hg was treated with Mephenteramine 6mg in increment doses. HR less than 60/min was managed with Inj Atropine 0.01mg/kg IV. Patients were also assessed regarding the occurrence of side effects such as nausea and vomiting.

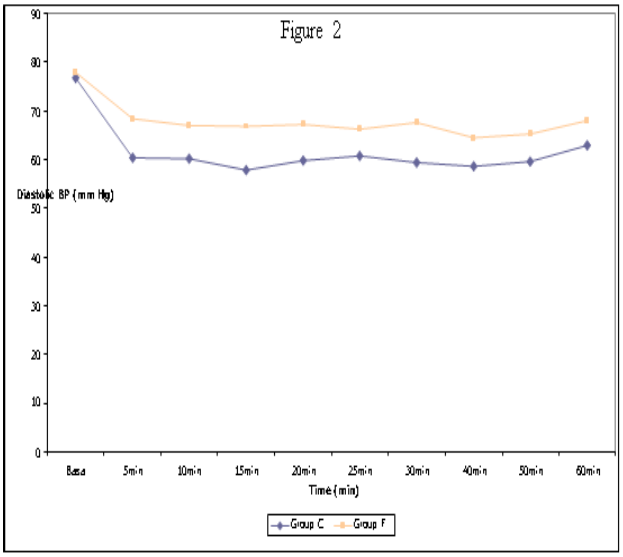
Sensory block was assessed by loss of sensation to pinprick every 15sec till loss of pinprick sensation upto T8 level. Onset of sensory block was taken as time from intrathecal injection to loss of pinprick sensation at T8. Motor block was assessed using the Bromage score. Assessment of motor block was started immediately after the intrathecal injection. It was tested every 15sec. Onset of motor block was taken as time taken to achieve Bromage score 2 from subarachnoid block. Thereafter, motor block regression was noted and duration of motor block was taken as time from initiation of intrathecal injection to return of Bromage Score to 1.

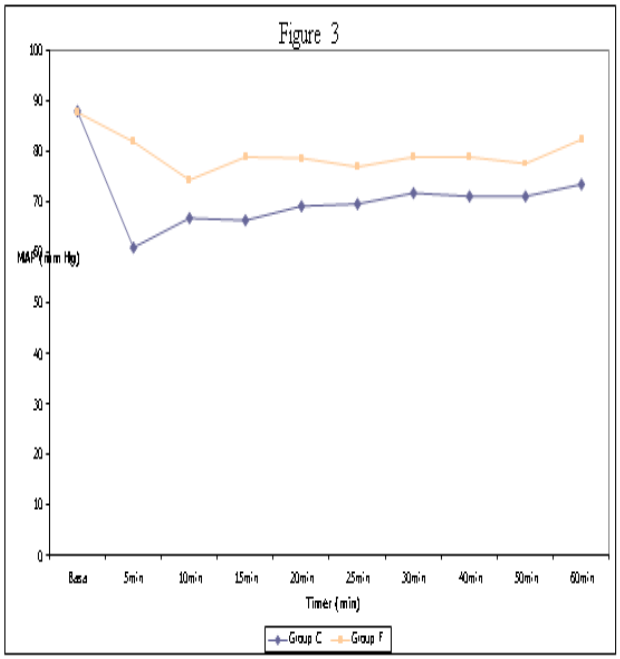
Statistical analysis was done using MS Excel, and SPSS 16 version software for determining the statistical significance. Chi-square test was used for analysis. Analysis of variance was used to study the significance of mean of various study parameters. The p-value taken for significance is <0.05. A p-value <0.001 was considered to be highly significant.

RESULTS

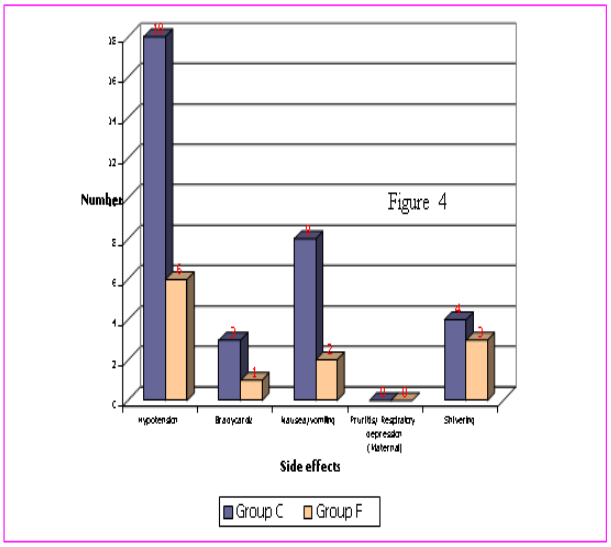
There was no significant difference between the two groups in terms of age, weight and height. There was significant difference in fall of systolic blood pressure (SBP) between the two groups. The maximum difference in fall was observed at 10th min with a mean SBP of 97.7±4.5 mmHg in C group and 113.4±11.5 in F group which was clinically and statistically significant (P<0.05). Fig. 1. The difference in diastolic blood pressure(DBP) between the groups at different time intervals studied was statistically significant (P<0.05). The maximum fall was seen at 15 min with a mean of 57.9±8.1in group C and 66.9±8.04 in group F. Fig. 2. The difference in MAP between the two groups was statistically significant with a p value <0.05. The maximum fall was seen at 10 min with mean of 61.1±19 in group C and 82.1±12.5 in group F. Fig. 3. There was no statistically significant difference between the two groups in heart rate.



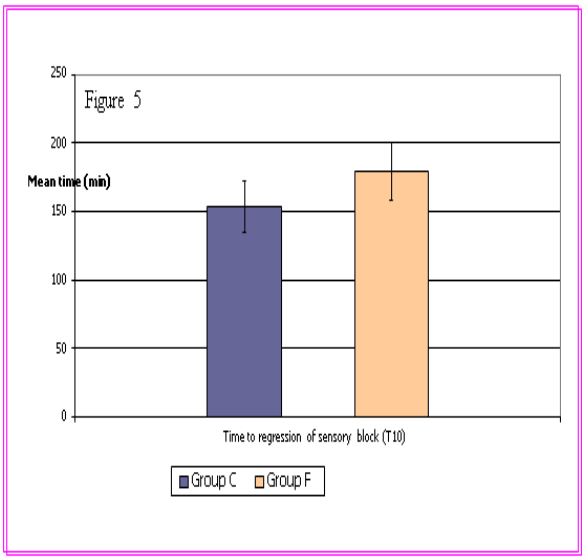




Incidence of hypotension was 60% in group C as compared to 20% in group F which was statistically significant. 10% of patients had bradycardia in Group C and 33% in group F which is not significant. 26% of patients had nausea/vomiting in group C and 6% in group F which was statistically significant. Fig. 4.



The mean time to onset of sensory block is 2.7±0.16 min in Group F and is 2.71±0.35 min in Group C, which is statistically not significant. The mean time for onset of motor blockade was 5.65±0.41min in C group and 5.46±0.41 secs in group F and was clinically and statistically not significant. The mean time to regression to T10 level was 153±19min in C group and 178.8±11.9 min in F group. This was clinically and statistically significant with a p-value (p<0.05). Fig. 5.



There is no significant difference between the groups in the duration of motor block with group F having a mean time of 149±19min and group C having 148±11.9 min (p>0.05).

DISCUSSION

The mean onset time of sensory block, that is upto T8 level, was almost similar in both the groups. The mean time to onset of sensory block is 2.7±0.16 min in Group F and is 2.71±0.35 min in Group C. This was clinically and statistically not significant. Our findings are similar with the findings observed by Gopichand K, et al[5], who found that the mean time of sensory block was 2.32±0.34min in bupivacaine alone group and 2.28±0.29 min in bupivacaine plus fentanyl group.

In a study by Gandham et al[6], they observed that the time required for the onset of sensory blockade up to T6 was faster in the bupivacaine and fentanyl group than in the plain bupivacaine group and found statistically significant. However, it differs from the observations of Randall's et al.[7] which states that the onset of sensory block to T6 gets faster with increasing bupivacaine dose.
The mean time to onset of Bromage 2 motor block is 5.65±0.41 min in group C and 5.46±0.41min in group F. There was no statistically significant difference among the two groups. It correlates with the study conducted by Biswas[8] and colleagues. In their study mean time to reach Bromage 3 scale was 5±1 min in Bupivacaine group and 5±1.1 min in bupivacaine and Fentanyl group. F Sheikh et al.[9] also observed the similar findings in their study that onset of motor blockade is similar and statistically not significant in bupivacaine and bupivacaine plus fentanyl group.

The mean time of regression of block to T10 in F group was 178±11.59min and in C group was 153.2±19.51min which is statistically significant(P<0.0001). Gopichand K et al[5] also observed in their study that mean time to regression of sensory block to T10 was 181.3±10.5min in fentanyl group and 160±11.45min in bupivacaine

alone group which was statistically significant. F Sheikh et al[9] found the mean time to regression to T12 level was 209.9±11.6min in fentanyl group and 162.6±10.5min in bupivacaine group in their study which was statistically significant, but they observed regression from T6 to T12.

The mean time of duration of motor blockade in Group C is 149±13min and in Group F is 148±11.9min which is almost similar and statistically not significant (p>0.05). It correlates with the study conducted by Mustafa MD et al[10] in which the mean duration of motor block was 130.6±15.6min in bupivacaine group and 135.5±13 min in bupivacaine plus fentanyl group which was statistically not significant.(p>0.05). F Sheikh et al[9], observed that the duration of motor block was 170±19 min in bupivacaine group and 170±13min in bupivacaine plus fentanyl group.

In our study, 18 patients had hypotension in Group C and 6 patients had hypotension in Group F. The mean SBP at 10 min in Group C was 97.7±4.5mmHg and in Group F was 113.4±11.5 mmHg with a p value <0.0001 which is statistically highly significant. The mean DBP at 15 min in Group C was 57.9±8.1mmHg and Group F was 66.9±8.04mmHg with p <0.0001 which is statistically highly significant. The mean MAP at 10 min in Group C was 61±19mmHg and Group F was 82.1±12.5 mmHg (p<0.0001) being statistically highly significant. S. Rasooli MD et al[11] also found that the lowest recorded systolic, diastolic and MAP as function of baseline pressures were 71.2%, 64.5% and 70% versus 59.9%, 55.5% and 60.2% respectively for bupivacaine plus fentanyl group and bupivacaine group.

We observed that the systolic and DBP were decreased significantly (P < 0.001) after 3 min and 5 min of spinal anesthesia in the control group when compared to the study group, mostly due to more sympathetic blockade by higher doses of bupivacaine in the control group. Similar findings were observed by Bogra et al.[12] and also by Seyedhejazi and Madarek,[13] wherein they studied by using 8 mg of bupivacaine and 10 µg of fentanyl for spinal anesthesia in caesarean section.

In our study 8 patients had nausea/vomiting in C group as compared to 2 patients in F group which corroborated with observations of Manullang et al[14] and Dahlgren et al.[15] Similar findings were observed by M. Seyedhejazi and E Madarek.[13] There was no significant difference in the incidence of shivering in both groups. Pruritis and respiratory depression was not seen in either group.

In our study, none of the newborn babies had 5 min Apgar score <7. Similar observations were made by Belzarena[16] and Biswas[8] indicating that the dose of fentanyl used may not have a significant effect on the newborn.

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