

## Comparative Study Between Low Dose Bupivacaine With Fentanyl & Bupivacaine Alone For Cesarean Section

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**Abstract: Objective:** The aim of the present study is to evaluate the efficacy of reducing the bupivacaine dose with addition of fentanyl in spinal anesthesia for cesarean section. **Patients and Methods:** This prospective study was done during a period started from January 2008 to Decemeber 2009. It was conducted on 40 patients in the age group of 20-35 years. They were divided randomly into two groups having 20 patients in each, group B received 2ml intrathecal hyperbaric bupivacain 0.5% (10mg) & group BF received 1.5ml (7.5mg) hyperbaric bupivacain 0.5% plus 25 µg fentanyl. The efficacy of anesthesia, patient satisfaction and neonatal affection were assessed. **Results:** Adequate sensory blockade (T6 or higher) was obtained in 75% of all cases. Two cases need general anesthesia & were excluded from the research. Two patients in groups BF need IV nalbuphine supplementation after delivery of the baby. Hypotension occurs in 80% of patients in group B & in 40% of patients in group BF. This difference in incidence of hypotension is significant. Number of ephedrine treatment & total dose of ephedrine were all significantly lower in group BF but the difference was not significant. There were no significant differences in quality of anesthesia between the tow groups. **Conclusion:** lowering bubivacaine dose to 1.5 ml instead of 2.0 ml (usual dose for cesarean section) and adding 25ug fentanyl is associated with a significant decrease in the incidence of hypotension and the number and total dose of ephedrine used

[Farouk G., El-Sokkary M. **Comparative Study Between Low Dose Bupivacaine With Fentanyl & Bupivacaine Alone For Cesarean Section.** Nature and Science 2011;9(6):14-17]. (ISSN: 1545-0740). <http://www.sciencepub.net>.

**Key Wards;** Bupivacaine - Fentanyl - Cesarean Section.

### 1. Introduction:

The combination of bupivacaine with fentanyl for cesarean section has been shown to improve the quality of spinal anesthesia but without unwanted effects. Decreasing the bupivacain dose can lead to decrease the maternal hypotension, ephedrine requirements, nausea, and time to discharge from the recovery room (1). Spinal anesthesia is preferred for caesarean section as it is simple, easy to perform, economical and produces rapid onset of anesthesia & complete muscle relaxation. In addition the mother is awake; hence the incidence of pulmonary aspiration is minimal. The incidence of neonatal depression is also very minimal. The main disadvantages include nausea & vomiting due to peritoneal traction, hypotension & bradycardia due to lesser control of the height of sensory & autonomic block & shorter duration of action requiring early postoperative analgesics (1).

The use of intrathecal fentanyl provided a more intense sensory block & allowed lower bupivacaine doses. Limiting the bupivacaine dose has been advocated with goals of decreasing maternal hypotension, vasopressor requirements, nausea & time of discharge from the recovery room & improvement of maternal satisfaction (2).

The aim of the present study is to evaluate the efficacy of reducing the bupivacaine dose with addition of fentanyl in spinal anesthesia for cesarean section. In this study mothers were allocated randomly to tow groups, either bupivacaine or low dose bupivacaine with fentanyl to compare the onset of action, intraoperative hemodynamics, quality of analgesia, degree of muscle relaxation, duration of analgesia & any adverse effect on the mother & newborn.

### 2. Patients and Methods:

The combination of bupivacaine with fentanyl for cesarean section has been shown to improve the quality of spinal anesthesia but without unwanted effects. Decreasing the bupivacain dose can lead to decrease the maternal hypotension, ephedrine requirements, nausea, and time to discharge from the recovery room (1). Spinal anesthesia is preferred for caesarean section as it is simple, easy to perform, economical and produces rapid onset of anesthesia & complete muscle relaxation. In addition the mother is awake; hence the incidence of pulmonary aspiration is minimal. The incidence of neonatal depression is also very minimal. The main disadvantages include nausea &

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**3. Results:**

Statistical analysis were performed with the use of SPSS 13.0 for windows (SPSS Inc. Chicago, IL). Student test was used to compare

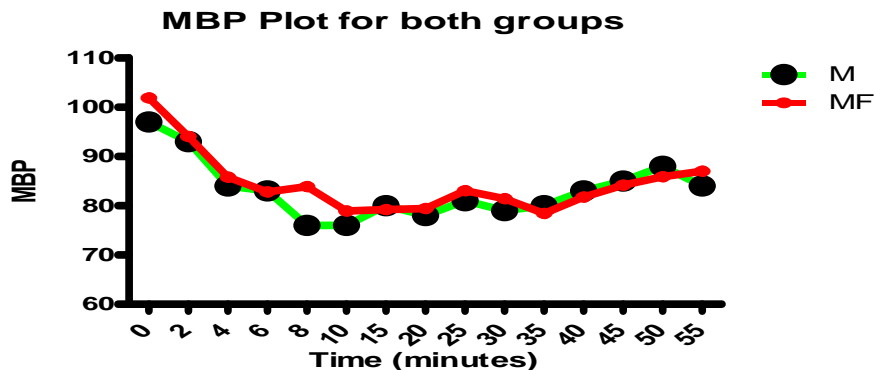
numerical variables. Data distribution & frequency differences were analyzed with the person chi-square test. The significance level was set at  $p < 0.05$  was used for all tests. The results was expressed as mean  $\pm$  SD.

Demographic data, duration of surgery, spinal block to delivery time (min) were comparable between the two groups (table 1). Adequate sensory blockade (T6 or higher) was obtained in 75% of all cases. Two cases need general anesthesia & were excluded from the research. Two patients in groups BF need IV Nalbuphine supplementation after delivery of the baby. Hypotension occurs in 80% of patients in group B & in 40% of patients in group BF. This difference in incidence of hypotension is significant (fig. 1). Number of ephedrine treatment & total dose of ephedrine were all significantly lower in group BF but the difference was not significant. There were no significant differences in quality of anesthesia between the two groups.

APGAR scores at 1&5 min were similar. The incidence of side effects such as nausea, vomiting & shivering was more in group B than group BF. The incidence of pruritis was two cases in group BF but did not require treatment (table 2).

**Table (1): Demographic data of patients undergoing spinal anesthesia for cesarean using 10mg or 7.5mg intrathecal bupivacaine combined with 25µg fentanyl**

	Group B Mean (SD)	Group BF Mean (SD)	P Value
Age (Years)	25.41 (3.83)	24.56 (3.16)	0.65
Weight (Kg)	75.4 (8.6)	75.8 (6.4)	0.87
Height (cm)	162.7 (1.8)	162.4 (2.1)	0.63
Primipara/Multipara	4/16	3/17	0.6
Gestational age (weeks)	38.5 (0.8)	38.2 (0.5)	0.16
Spinal block-to-delivery time (min)	9.0 (1.5)	8.75 (1.2)	0.7
Duration of surgery (min)	46.35 (9.87)	45.6 (5.26)	0.75



**Figure 1: Mean arterial blood pressure (MAP) in patients undergoing cesarean delivery using spinal anesthesia using 10mg hyperbaric intrathecal bupivacaine or 7.5mg hyperbaric intrathecal bupivacaine combined with 25µg fentanyl.**

**Table (2): The comparable parameters between the two groups**

	Group B	Group BF	P Value
Respiratory Rate	21.3 (2.6)	21.05 (3.59)	0.8
Onset of sensory (min.)	1.35 (0.59)	1.83 (1.2)	1
Bradycardia	3/17	1/19	0.29
Hypotension	16/4	8/12	0.02
Quality of anesthesia	19/1	19/1	1
Uterine tone	8/12	11/9	0.53
Nausea & vomiting	2/18	2/18	1
Pruritis	0/20	2/18	-

- P < 0.05 is significant and P < 0.001 is highly significant

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#### 4. Discussion

The prevention & treatment of maternal hypotension associated with spinal anesthesia for cesarean section remains a difficult problem with no consensus as to the optimal mode of management. This lack of consensus is probably due to the causes of hypotension. As hypotension is predominately due to venous, arterial & arteriolar vasodilatation secondary to sympathetic blockade, the dose of local anesthetic is an important part of the etiology of the hypotension (3).

It has been reported that increasing the dose of local anesthetic increased maternal hypotension. Intrathecal opioids enhance analgesia without altering the degree of sympathetic blockade when added to sub therapeutic dose of local anesthetic (4).

In our study the incidence of hypotension could not be reduced but the severity of hypotension & number of ephedrine injection are reduced in group BF than group B & even the dose of vasopressor ephedrine during hypotension episodes was decreased group BF. The administration of intrathecal opioid carries a risk of respiratory depression (5).

Varrassi et al, noted that administration of 25µg fentanyl during spinal anesthesia in non premedicated elderly patients did not alter respiratory rate end tidal carbon dioxide tension, minute ventilation, respiratory drive, respiratory timing or ventilatory response to carbon dioxide(6). This in agreement with our study as the respiratory rate & the oxygen saturation haven't changed from the base line rate. Also none of the new born had 5min APGAR score <7. Similar observations were made by Biswas indicating that the dose of fentanyl may not have significant effect on the newborn (7). The incidence of other side effects i.e nausea, vomiting was significantly lower in bupivacaine fentanyl group than bupivacaine only group.

Only two cases of group B suffer from nausea & vomiting. These data are consistent with the study of Manuallany & colleagues. They suggested that 20mg intrathecal fentanyl was superior to 4µg .for prevention of perioperative nausea during cesarean delivery performed with bupivacaine spinal anesthesia (8).

The most important of both successful surgical anesthesia & time until recovery is the dose of local anesthetic drug (9). Low dose of spinal anesthesia has advantage of providing cardiovascular stability & it is advocated that 8mg of 0.5% Bupivacaine heavy is the optimal dose for cesarean section (10).

This study demonstrate that C.S. can be completed with low dose bupivacaine (1.5) mg & fentanyl 25µg . The synergistic action of fentanyl & local anesthetics in central neuraxial block improves the quality of intraoperative analgesia and also prolongs the postoperative analgesia.

A number of studies have used 25µg of intrathecal fentanyl as adjunct to the anesthetic agent with good results .A few studies have used intrathecal fentanyl in <25µg, but most studies have shown that 25µg of fentanyl provides maximum duration of postoperative analgesia with minimal side effects (respiratory depression & pruritus)(11) . Another study on parturient for cesarean delivery ,found that the peak sensory level was higher and motor block more intense in patients receiving 5mg isobaric bupivacaine with fentanyl 25µg (2).

So in this study we give 7.5mg bupivacaine plus 25µg fentanyl &the result about quality of anesthesia. Level sensory & motor block were equal to 10mg bupivacaine. Atallah & colleague reported the incidences of clinically relevant bradycardia and hypotension were 8.5 % and 11% respectively in the whole study population. Similar results have been reported in previous investigations in which low dose spinal anesthesia has been shown to reduce the effects of spinal block on heart rate and blood pressure when small doses of hyperbaric bupivacain 0.5% are used (12).

In agreement with pervious investigations, bupivacaine–fentanyl combination produced good intra-operations &postoperative analgesia & better patient satisfaction without prolonging recovery room discharge (13).

In the study using levobupivacaine with fentanyl 15µg for spinal anesthesia in urological surgery, no single incidence of pruritis were reported and this agrees

with our study (14). The main concern about the low incidence of pruritis was the infrequent asking the patients about pruritis. In this study only two cases in group BF suffer from itching in the face but do not require treatment.

The level of sensory block & grade 3 of motor block was similar in both groups & this was satisfied by patients & obstetricians in all patients except two patients needed general anesthesia by thiopental in group BF & this may be due to the uncooperative patient. Kuusniemi et al studied the effect of adding fentanyl 25 µg to three different doses of bupivacaine (10, 7.5 & 5mg & compared with 10mg bupivacaine without fentanyl in spinal anesthesia for urological surgeries. They concluded that the addition of 25 µg of fentanyl to 5mg bupivacaine resulted in shorter lasting motor block but maintained the same level of sensory analgesia as with larger doses of bupivacaine (7.5, 10mg) with or without fentanyl.

Sellm Turhanoglu et al preferred a 4mg bupivacaine dose with fentanyl for cesarean section. But insufficient motor blockade is observed and reflected on satisfaction of the patient & obstetrician & this is a drawback for delivery. Lower motor blockade scores were reported in previous studies when fentanyl & bupivacaine were co-administered for spinal anesthesia (2,4).

## 5. Conclusions

It looks like lowering bupivacaine dose to 1.5 ml instead of 2.0 ml (usual dose for cesarean section) and adding 25 µg fentanyl is associated with a significant decrease in the incidence of hypotension and the number and total dose of ephedrine used. Other parameters as the level of sensory block & motor block, quality of anesthesia, uterine tone APGAR score and the incidence of complication have no significant difference.

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3/25/2011