



Research Paper

## Spinal Anesthesia for Emergency Cesarean Section: Role of Fentanyl

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### ABSTRACT

**Background and aim:** Low dose of fentanyl is found to provide better quality of analgesia. The present study compared the effectiveness of different doses of bupivacaine with or without fentanyl regarding the quality of the analgesia. **Methods:** The present prospective, double-blind, randomized study included 72 pregnant women scheduled for emergency caesarean section. Inclusion criteria were age equal to or above 18 years; ASA (American Society of Anesthesiologists) physical status II; BMI less than 30 kg/m<sup>2</sup>; pregnancy equal to or above 38 weeks. The two groups included a 10 mg (2 mL) dose of 0.5% hyperbaric bupivacaine [Group I; n=36] and 10 mg (1.8 mL) dose of 0.5% hyperbaric bupivacaine + 20 µg (0.2 ml) fentanyl [Group II; n=36]. **Results:** Onset of sensory (1.73 ± 0.76 vs. 2.13 ± 0.89 min; P=0.044) and motor block (2.13±0.33 vs. 2.97 ± 0.34; P<0.001) was significantly faster in group I in comparison to group II. Quality of analgesia was non-significantly better in group II in comparison to group I (P=0.134). Duration of sensory (178.2 ± 16.13 vs. 151.7 ± 19.6min; P<0.0001) and motor block (92.5 ± 9.12 vs. 83.1±8.34; P<0.0001) was significantly higher in group II in comparison to group I. **Conclusion:** Fentanyl in combination with bupivacaine provide a longer duration of sensory and motor block, and a better quality of analgesia.

**Key words:** Spinal, Anaesthesia, Caesarean section, bupivacaine, fentanyl

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### I. Introduction

Spinal anesthesia with hyperbaric bupivacaine is the most commonly used anesthetic technique for emergency cesarean section due to its simplicity and ease of performance, low cost and quick installation of anesthesia, providing adequate analgesia and muscle relaxation for the surgery.<sup>1,2</sup> Doses of local anesthetics can be reduced to avoid the spinal anesthesia-related hemodynamic adverse events.

The association of low doses of bupivacaine with fentanyl, a lipophilic opioid, has been proposed to improve the quality of the blockade, prolong duration of analgesia, and reduce the incidence of intraoperative nausea and vomiting.<sup>1</sup>

Several doses of fentanyl have been described in the literature for spinal block for cesarean section, and the 25 µg dose was used in most studies.<sup>1</sup> However, intrathecal fentanyl has been associated with increased postoperative opioid requirements, possibly due to a fast-onset opioid tolerance or opioid-induced hyperalgesia. In addition, a ceiling effect was observed with intrathecal doses above 0.25 µg/kg, revealing that high doses of intrathecal fentanyl do not improve the quality of analgesia and increase adverse effects.<sup>1</sup>

The present study evaluated pregnant women undergoing emergency cesarean section under spinal anesthesia and aimed to compare the effectiveness of different doses of bupivacaine regarding the quality of the analgesia.

**II. Methods**

The present prospective, double-blind, randomized study included 72 pregnant women scheduled for emergency caesarean section. Inclusion criteria were age equal to or above 18 years; ASA (American Society of Anesthesiologists) physical status II; BMI less than 30 kg/m<sup>2</sup>; pregnancy equal to or above 38 weeks. Exclusion criteria were pregnant women with psychiatric disorders; history of drug addiction; diagnosis of acute or chronic fetal distress; contraindication for regional anesthesia; history of hypersensitivity to the study drugs; previous administration of opioids and/or other central nervous system depressants during current hospital admission.

The two groups included a 10 mg (2 mL) dose of 0.5% hyperbaric bupivacaine [Group I; n=36] and 10 mg (1.8 mL) dose of 0.5% hyperbaric bupivacaine + 20 µg (0.2 ml) fentanyl [Group II; n=36].

**Statistical analysis**

Categorical data were expressed as frequency, percentages, and compared using Chi square test. Quantitative data were expressed as mean, standard deviation, and compared using Student t-test. P<0.05 was considered statistically significant.

**III. Results**

**Baseline characteristics**

In this study, the patients in both groups were comparable in terms of age (P=0.801), BMI (P=0.769), and duration of surgery (P=0.263) (Table 1).

Table 1: Baseline characteristics

	Group I	Group II	P value
Age (Years)	26.12±5.21	25.75±7.04	0.801
BMI (Kg/m <sup>2</sup> )	23.78±4.96	24.13±5.13	0.769
Duration of surgery (min)	73.14±8.39	75.47±9.11	0.263

**Spinal anaesthesia characteristics**

In this study, onset of sensory (1.73 ± 0.76 vs. 2.13 ± 0.89 min; P=0.044) and motor block (2.13±0.33 vs. 2.97 ± 0.34; P<0.001) was significantly faster in group I in comparison to group II (Table 2).

Table 2: Spinal anaesthesia characteristics

	Group I	Group II	P value
Onset of sensory block	1.73 ± 0.76	2.13 ± 0.89	0.044
Onset of motor block	2.13±0.33	2.97 ± 0.34	<0.001

**Quality of analgesia**

In this study, quality of analgesia was non-significantly better in group II in comparison to group I (P=0.134) (Figure 1).

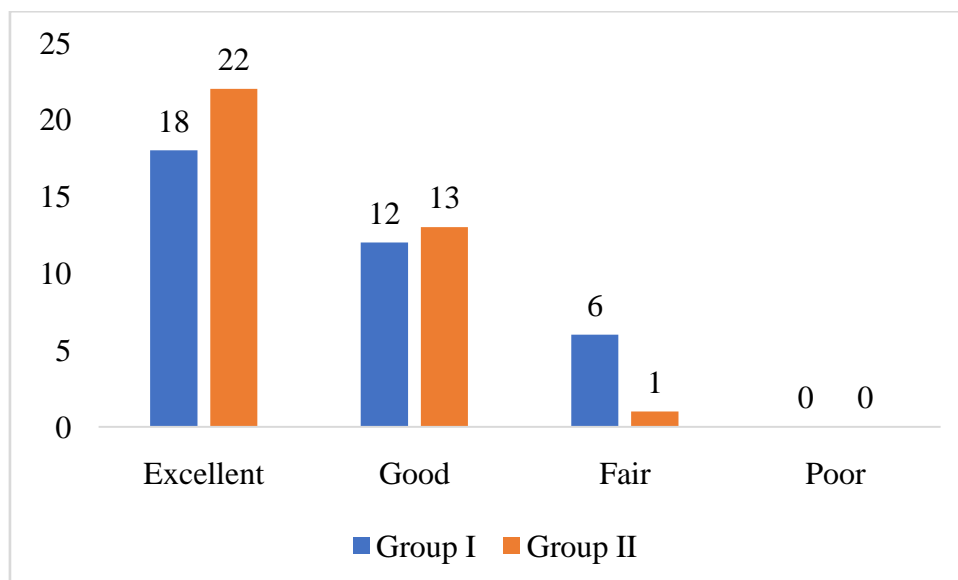


Figure 1: Quality of analgesia

Duration of sensory and motor block

In this study, duration of sensory (178.2 ± 16.13 vs. 151.7 ± 19.6min; P<0.0001) and motor block (92.5 ± 9.12 vs. 83.1±8.34; P<0.0001) was significantly higher in group II in comparison to group I (Table 3).

Table 3: Duration of sensory and motor block

	Group I	Group II	P value
Duration of sensory block	151.7 ± 19.6	178.2 ± 16.13	<0.0001
Duration of motor block	83.1±8.34	92.5 ± 9.12	<0.0001

#### IV. Discussion

It is very important to provide adequate and safe maternal-fetal anesthesia by choosing the anesthetic technique for cesarean section. Typically, C-section is performed under spinal anesthesia and several combinations of local anesthetics and analgesics are used. As this study was performed at a teaching hospital, where surgeries are often performed by training physicians and have longer surgical times.

Although several studies have evaluated the benefits, risks and adequate doses of fentanyl associated with bupivacaine in spinal anesthesia for obstetric procedures, their results are still controversial. Adding opioids to bupivacaine administered intrathecally may show clinical advantages, such as improving the quality of intraoperative analgesia and prolonging postoperative analgesia. However, the potential disadvantages of opioid, such as pruritus, sedation, urinary retention and respiratory depression should be considered.<sup>1,3</sup>

As previously found by other authors, fentanyl proved to be significantly important to improve the quality of anesthesia, as well as to prolong the time of analgesia in all patients in which it was used.<sup>1,2</sup> The best quality of anesthesia in patients who received opioids, as described by other authors, may result from synergism between the two drugs by acting at different sites. Opioids, when administered intrathecally, in addition to acting on specific spinal cord receptors, have weak local anesthetic activity, but can increase local anesthetics' antinociceptive activity.<sup>4</sup>

#### V. Conclusion

The results of this study demonstrate that fentanyl at a dose of 2 µg associated with 10 mg of hyperbaric bupivacaine intrathecally for patients submitted to C-section was effective, providing adequate anesthesia with superior quality of analgesia.

#### References

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