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Original Research

Effect of intrathecal fentanyl with hyperbaric Bupivacaine on the quality of subarachnoid blockade in cesarean section

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ABSTRACT:

Background: Fentanyl has been used as an adjunct to bupivacaine for spinal anaesthesia for elective caesarean section. The present study was conducted to compare the effect of intrathecal fentanyl with hyperbaric bupivacaine on the quality of subarachnoid blockade (SAB) in cesarean section (CS). **Materials & Methods:** 60 patients with ASA physical status grade I, scheduled for elective cesarean section under spinal anesthesia were randomly divided into two groups. Group I was given 2 ml (10 mg) of 0.5% hyperbaric Bupivacaine plus 0.5 ml (25 µg) of fentanyl intrathecally and group II was given 2ml (10 mg) of 0.5% hyperbaric Bupivacaine plus 0.5ml NS intrathecally. Parameters such as onset of sensory analgesia (min), time for maximum cephalic spread (min), maximum analgesic block (segment), onset of motor block (min), time for complete motor block (min), time for two segment regression (min) and mean duration of analgesia (min) was recorded. **Results:** Onset of sensory analgesia was 2.23 minutes in group I and 2.25 minutes in group II. Time for maximum cephalic spread was 12.4 minutes in group I and 11.8 minutes in group II. Onset of motor block was 3.51 minutes in group I and 3.57 minutes in group II. Time for complete motor block was 6.2 minutes in group I and 7.24 minutes in group II. Time for two segment regression was 89.8 minutes in group I and 125.1 minutes in group II. Mean duration of analgesia was 194.1 minutes in group I and 204.2 minutes in group II. The difference was significant (P< 0.05). **Conclusion:** Addition of fentanyl to 0.5% hyperbaric bupivacaine for sub arachnoid blockage improved the quality of SAB in Cesarean section and markedly improves the quality of intraoperative analgesia.

Key words: Fentanyl, bupivacaine, Cesarean

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INTRODUCTION

Fentanyl has been used as an adjunct to bupivacaine for spinal anaesthesia for elective caesarean section as it has been shown both to improve the quality of block and reduce the need for intraoperative supplementation of opioids. The use of either fentanyl intrathecally as adjuncts to bupivacaine for spinal anaesthesia in caesarean deliveries is common place.[1]

In cesarean section (CS), subarachnoid blockade (SAB) is mostly preferred than general anesthesia. SAB is a simple technique, has rapid onset, dense neural blockade and also associated with negligible maternal and fetal risk.[2] As CS requires traction of peritoneum and handling of intraperitoneal organs, which causes intraoperative visceral pain which can be overcome by achieving the higher block upto thoracic level 4 by using higher dose of bupivacaine.[3] The use of higher dose of bupivacaine may cause higher incidence of maternal arterial hypotension resulting in maternal and neonatal morbidity. Therefore, several additives like opioids are given intrathecally with local anesthetic mainly to improve the quality and duration of SAB and to minimize the dose of local anesthetic, to reduce the extent and effects of sympathetic blockade.[4]

The unmatchable reliability and simplicity of subarachnoid block has made spinal anesthesia a very useful and successful technique in managing all surgical cases undergoing infraumbilical procedures.[5] Currently it has become more popular because of addition of opioids to local anesthetics in centroneuroaxial blockade which provides better intraoperative analgesia and early postoperative analgesia.[6]This study was conducted to compare the

effect of intrathecal fentanyl with hyperbaric bupivacaine on the quality of subarachnoid blockade (SAB) in cesarean section (CS).

MATERIALS & METHODS

This study was conducted on 60 patients with ASA physical status grade I scheduled for elective cesarean section under spinal anesthesia. All agreed to participate in the study.

After recording baseline parameters, detailed history was recorded. The patients were randomly divided into two groups. Group I was given 2 ml (10 mg) of 0.5% hyperbaric Bupivacaine plus 0.5 ml (25 µg) of fentanyl intrathecally and group II was given 2ml (10 mg) of 0.5% hyperbaric Bupivacaine plus 0.5ml NS intrathecally.

Standard monitoring included pulse oximetry, non-invasive blood pressure (NIBP) and electrocardiography (ECG) were attached to the patient in the operation theatre. Pulse, heart rate, systolic blood pressure, diastolic blood pressure and mean arterial blood pressure were noted and regarded at baseline. Parameters such as onset of sensory analgesia (min), time for maximum cephalic spread (min), maximum analgesic block (segment), onset of motor block (min), time for complete motor block (min), time for two segment regression (min) and mean duration of analgesia (min) was recorded. Results were assessed statistically. P value less than 0.05 was considered significantly.

RESULTS

Table I Distribution of patients

Groups	Group I (30)	Group II (30)
Drug	2ml (10 mg) of 0.5% hyperbaric Bupivacaine plus 0.5 ml (25 µg) of fentanyl intrathecally	2ml (10 mg) of 0.5% hyperbaric Bupivacaine plus 0.5ml NS intrathecally

Table I shows that group 1 (n= 30) was given 2ml (10 mg) of 0.5% hyperbaric Bupivacaine plus 0.5 ml (25 µg) of fentanyl intrathecally. Group 2 (n=30) was given 2ml (10mg) of 0.5% hyperbaric Bupivacaine plus 0.5ml NS intrathecally.

Table II Baseline characteristics

Parameters	Group I	Group II	P value
Age (years)	35.54 ± 3.4	36.14 ± 3.7	1
Height (cms)	165.4± 5.3	161.1± 4.2	0.91
Weight (Kgs)	63.4± 4.6	65.1± 5.3	0.84
Duration of surgery (mins)	122.6± 25.2	121.8± 22.3	0.72

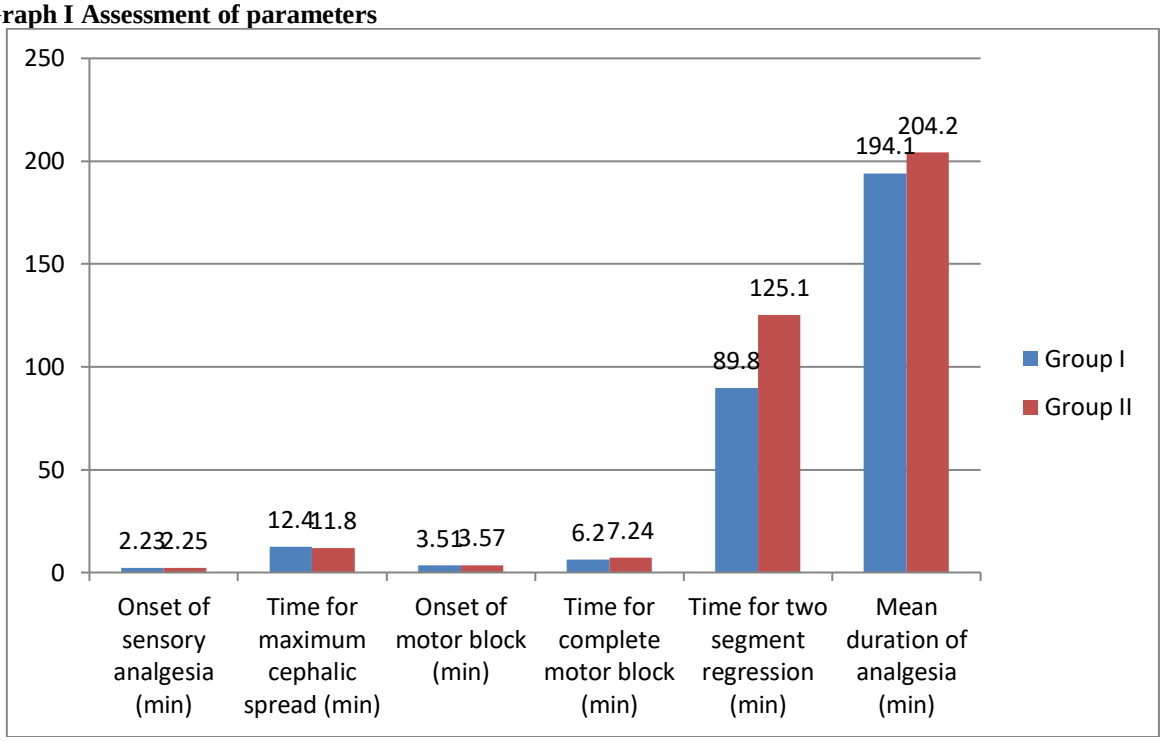
Table II shows that mean age in group I was 35.54 ± 3.4 years and in group II was 36.14 ± 3.7 years. Mean height in group I was 165.4± 5.3 cms and in group II was 161.1± 4.2 cms. The mean weight was 63.4± 4.6 Kgs and 65.1± 5.3 kgs in group I and II respectively. Duration of surgery in group I was 122.6± 25.2 minutes and in group II was 121.8± 22.3 minutes. The difference was non- significant (P> 0.05).

Table III Assessment of parameters

Parameters	Group I	Group II	P value
Onset of sensory analgesia (min)	2.23	2.25	0.98
Time for maximum cephalic spread (min)	12.4	11.80	0.17
Onset of motor block (min)	3.51	3.57	0.95
Time for complete motor block (min)	6.2	7.24	0.92
Time for two segment regression (min)	89.8	125.1	0.01
Mean duration of analgesia (min)	194.1	204.2	0.05

Table III, graph I shows that onset of sensory analgesia was 2.23 minutes in group I and 2.25 minutes in group II. Time for maximum cephalic spread was 12.4 minutes in group I and 11.8 minutes in group II. Onset of motor block was 3.51 minutes in group I and 3.57 minutes in group II. Time for complete motor block was 6.2 minutes in group I and 7.24 minutes in group II. Time for two segment regression was 89.8 minutes in group I and 125.1 minutes in group II. Mean duration of analgesia was 194.1 minutes in group I and 204.2 minutes in group II. The difference was significant (P< 0.05).

Graph I Assessment of parameters



DISCUSSION

Bupivacaine was introduced by Eckenstam in 1957 and used clinically by Telivno in 1963. Currently hyperbaric bupivacaine is being used with opioids for almost all surgical cases.[7] Bupivacaine an amide type of local anesthetic has high potency, slow onset and long duration of action. Although intrathecal bupivacaine alone offers good sensory blockade, a substantial number of patients experiences some pain and discomfort and may require analgesic supplements intraoperatively.[8] Addition of fentanyl not only improves quality of intraoperative analgesia but it also extends to early postoperative period.[9] The subarachnoid block (SAB) is popularly known as a spinal block. There can be confusion when the term "spinal anaesthesia" is used as some anaesthetists include subarachnoid block and epidural block under the classification of spinal anaesthesia. Subarachnoid block is most versatile regional block commonly employed for infraumbilical surgeries. The use of neuroaxial opioids has gained widespread popularity as they potentiate the analgesia produced by local anesthetics.[10] This study was conducted to compare the effect of intrathecal Fentanyl with hyperbaric Bupivacaine on the quality of SAB in CS.

We found that mean age in group I was 35.54 ± 3.4 years and in group II was 36.14 ± 3.7 years. Mean height in group I was 165.4± 5.3 cms and in group II was 161.1± 4.2 cms. The mean weight was 63.4± 4.6 Kgs and 65.1± 5.3 kgs in group I and II respectively. Duration of surgery in group I was 122.6± 25.2 minutes and in group II was 121.8± 22.3 minutes. Thornton et al[11] in their study women undergoing elective caesarean deliveries received intrathecal fentanyl plus morphine with bupivacaine (Group 1) or intrathecal morphine with bupivacaine alone (Group 2). Patients were assessed at 4 hours for pain at rest and on movement using the visual analog scale (VAS), time taken for sensory block to T6 and side effects. Fifty patients were randomized into Group 1 (n = 25) and Group 2 (n = 25). There was no difference in the mean VAS scores at rest or on movement between the two groups. At 4 hours, the mean (SD) VAS scores at rest were 13.2 (13.7) mm and 12.0 (11.5) mm in Group 1 and 2, respectively (P = 0.739). The mean (SD) VAS scores on movement in Group 1 were 38.0 (18.2) mm, and in Group 2 were 28.4 (12.4) mm (P = 0.349). Group 1 took 7.34 hours to the first request for postoperative opioid analgesia while Group 2 took 7.08 hours (P = 0.749). Correspondingly, patient satisfaction ratings were comparable for both groups, the mean rating in Group 1 at 84.4 compared to Group 2 at 87.6 (P = 0.269). Patients in both groups had similar onset of T6 block. The incidence of side effects was higher in Group 1 than Group 2.

We observed that onset of sensory analgesia was 2.23 minutes in group I and 2.25 minutes in group II. Time for maximum cephalic spread was 12.4 minutes in group I and 11.8 minutes in group II. Onset of motor block was 3.51 minutes in group I and 3.57 minutes in group II. Time for complete motor block was 6.2 minutes in group I and 7.24 minutes in group II. Time for two segment regression was 89.8 minutes in group I and 125.1 minutes in group II. Mean duration of analgesia was 194.1 minutes in group I and 204.2 minutes in group II. Bogra et al[12] in their study 120 cesarean section parturients divided into six groups, identified as B8, B10 and B 12.5 8.10 and 12.5 mg of bupivacaine mg and FB8, FB10 and FB 12.5 received

a combination of 12.5 µg intrathecal fentanyl respectively. The parameters taken into consideration were visceral pain, hemodynamic stability, intraoperative sedation, intraoperative and postoperative shivering, and postoperative pain. Onset of sensory block to T6 occurred faster with increasing bupivacaine doses in bupivacaine only groups and bupivacaine -fentanyl combination groups. Alone lower concentrations of bupivacaine could not complete removed the visceral pain. Blood pressure declined with the increasing concentration of Bupivacaine and Fentanyl. Incidence of nausea and shivering reduces significantly whereas, the postoperative pain relief and hemodynamics increased by adding fentanyl. Pruritis, maternal respiratory depression and changes in Apgar score of babies do not occur with fentanyl.

The limitation of the study is small sample size.

CONCLUSION

Authors found that addition of fentanyl to 0.5% hyperbaric bupivacaine for sub arachnoid blockage improved the quality of SAB in Cesarean section and markedly improves the quality of intraoperative analgesia.

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