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ORIGINAL ARTICLE

COMPARISON OF INTRATHECAL HYPERBARIC BUPIVACAINE AND HYPERBARIC BUPIVACAINE WITH FENTANYL: A CLINICAL STUDY

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ABSTRACT:

Background: Spinal anesthesia has a popular technique for caesarean delivery.This study was conducted to compare and determine the efficacy of spinal anesthesia with bupivacaine alone and bupivacaine with fentanyl. **Materials & Methods**: This study was conducted in department of anaesthesia in 2014. It included 100 women of ASA grade I and II posted for lower caesarean section. Patients were divided into 2 groups. Group I (Group B)- This group consisted of 50 women who received 1.5cc of 0.5% of heavy bupivacaine and 0.5cc of normal saline. Group II (Group BF)- This group consisted of 50 women who received 1.5cc of 0.5% of heavy bupivacaine and 0.5cc of fenatyl.2.0 cc of intrathecal drug was used in both the groups. **Results:** Out of 100 patients, 50 were in group I and 50 were in group II. The mean time required to reach peak sensory level was earlier in Group BF than Group B and this was statistically significant (P<0.05).Time to onset of sensory blockade, peak level of sensory analgesia, degree of analgesia and onset of motor blockade were comparable in both the groups. **Conclusion:** Author concluded that low dose fentanyl helps in reduction of the dose of bupivacaine for spinal anesthesia, and used as an adjuvant to intrathecal 0.5% hyperbaric bupivacaine.

Key words: Bupivacaine, fenatyl, spinal anesthesia

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INTRODUCTION

Caesarean section is one of the most common operations in the child bearing age of a woman. Spinal anesthesia has a popular technique for caesarean delivery. The choice of anesthesia for caesarean section depends on the reason for the operation, degree of urgency, the desires of the patient and the judgment of anesthesiologists. Spinal anesthesia is simpler to perform and the presence of cerebrospinal fluid provides a more certain end point, and consequently has higher degree of success than epidural anesthesia.[1]

Hyperbaric bupivacaine is most commonly used in subarachnoid block but effective calculated dose may be associated with high block and haemodynamic instability. Hyperbaric bupivacaine in 8% glucose is often used. Plain, or glucose-free, bupivacaine has been frequently referred to as "isobaric" in the literature, even after Blomqvist and Nilsson[2] demonstrated its hypobaricity. Adding adjunct (opioid or non opioid) allows reduction in dose of Bupivacaine and provides cardiovascular stability.

Although hyperbaric local anesthetic solutions have a remarkable record of safety, their use is not totally without risk. To prevent unilateral or saddle blocks, patients should move from the lateral or sitting position rapidly and after mobilization of the patients, extension or early return of the block may be seen. Hyperbaric solutions may cause sudden cardiac arrest after spinal anesthesia because of the extension of the sympathetic block.[3] Fentanyl, a phenyl piperidine derivative, is used as an adjuvant in spinal anaesthesia because of its rapid onset and short duration of action with lesser incidence of respiratory depression.

More recently, several studies have confirmed that plain bupivacaine is indeed hypobaric in comparison with human CSF.[4] Clinically, this manifests as an unpredictable median sensory block height with a large inter-individual spread and is occasionally associated with block failure when the spinal block has not spread high enough for surgery.[5] For this reason, hyperbaric bupivacaine is favored in obstetric anesthesia. The use of truly isobaric solutions may prove less sensitive to position issues. Hyperbaric solutions may cause hypotension or bradycardia after mobilization; isobaric solutions are favored with respect to their less sensitive to position issues properties.

This study was conducted to compare and determine the efficacy of spinal anesthesia with Bupivacaine alone and bupivacaine with fentanyl.

MATERIALS & METHODS

This study was conducted in department of anaesthesia in 2014. It included 100 women of ASA grade I and II posted for lower caesarean section. Patients were divided into 2 groups.

Group I (Group B) - This group consisted of 50 women who received 1.5cc of 0.5% of heavy bupivacaine and 0.5cc of normal saline.

Group II (Group BF) - This group consisted of 50 women who received 1.5cc of 0.5% of heavy bupivacaine and 0.5cc of fentanyl.

2.0 cc of intrathecal drug was used in both the groups.

After injecting anaesthesia, grading of motor block was done as per Bromage Scale.

GRADE	BROMAGE SCALE
0	No motor block
I	Inability to raise the extended leg
II	Inability to flex the knee, able to flex the ankle
III	Inability to flex the ankle

Pain was evaluated by using VAS scale, where 0 indicates no pain and 10 indicates severe pain. The duration of complete analgesia (time from subarachnoid injection to first reports of pain) (pain score greater than 0) and effective analgesia (time from subarachnoid injection to first dose of rescue analgesic) were recorded.

RESULTS

Table I indicates that out of 100 patients, 50 were in group I and 50 were in group II. Table II shows that mean age was 30±4 years and 30±5 in group I and group II respectively. The mean height in group I was 1.72 meters ± 0.04 and in group II was 1.82 meters ± 0.02. The mean weight in group I was 60± 2 Kgs in group I and 61± 4 Kgs in group II. The number of deliveries was 1.70 ± 1.02 in group I and 1.60 ± 1.06 in group II. The gestation time in weeks was 35.42 ± 0.24 in group I and 38.02 ± 0.14 in group II. The surgical time was 44± 1.0in group I and 43± 1 in group II. The difference was statistical non significant.

Table II shows the mean time required to reach peak sensory level was earlier in Group BF than Group B andthis was statistically significant (P<0.05).Time to onset of sensory blockade (sec) in group I was 85±5.41 and in group II was 81±4.41. Peak level of sensoryanalgesia (T) in group I was 6.5±1.1 and in group II was 7.2±0.15. Degree of analgesia was 4.0±0.8 and 3.75±0.4 in group I and group II respectively. Onset of motor blockade (sec) was 80±1.2 and 88±5.8 in group I and group II respectively. The difference was comparable in both the groups .(p>0.05).

The complete and effective analgesia is shown in figure I. The complete and effective analgesia in group I was 110.52 minutes and 100.7 minutes and in group II was 250.5 minutes and 150.6 minutes respectively. The difference was statistical significant (p-0.01).

The side effects in both the groups are shown in figure II. Side effects like hypotension, bradycardia, nausea and itching cases were more in group II as compared to group I. Number of vomiting, backache cases were comparable in both cases.

TABLE I: Distribution of patients

	TOTAL- 100	
GROUP	**GROUP I (GROUP B)**	**GROUP II (GROUP BF)**
NUMBER	50	50

TABLE II: Demographic data of patients

PARAMETERS	GROUP I	GROUP II	P VALUE
Age (Yrs)	30±4	30±5	1
Height (M)	1.72 ± 0.04	1.82 ± 0.02	0.8
Weight (Kgs)	60± 2	61± 4	1
No. Of Deliveries	1.70 ± 1.02	1.60 ± 1.06	0.9
Gestation Time (Week)	35.42 ± 0.24	38.02 ± 0.14	0.4
Duration Of Operation (Mins)	44± 1	43± 1	0.7

TABLE III: Comparison of sensory and motor blockage among both groups

	MEAN + 2SD		P VALUE
	GROUP I	GROUP II	
Time to onset of sensory blockade (sec)	85±5.41	81±4.41	0.6
Peak level of sensory analgesia (T)	6.5±1.1	7.2±0.15	0.8
Time to reach peak sensory level (min)	5.50±1.8	3.0±2.6	0.02
Degree of analgesia (grade)	4.0±0.8	3.75±0.4	0.4
Onset of motor blockade(sec)	80±1.2	88±5.8	0.1

FIGURE I: Comparison of complete and effective analgesia in both groups

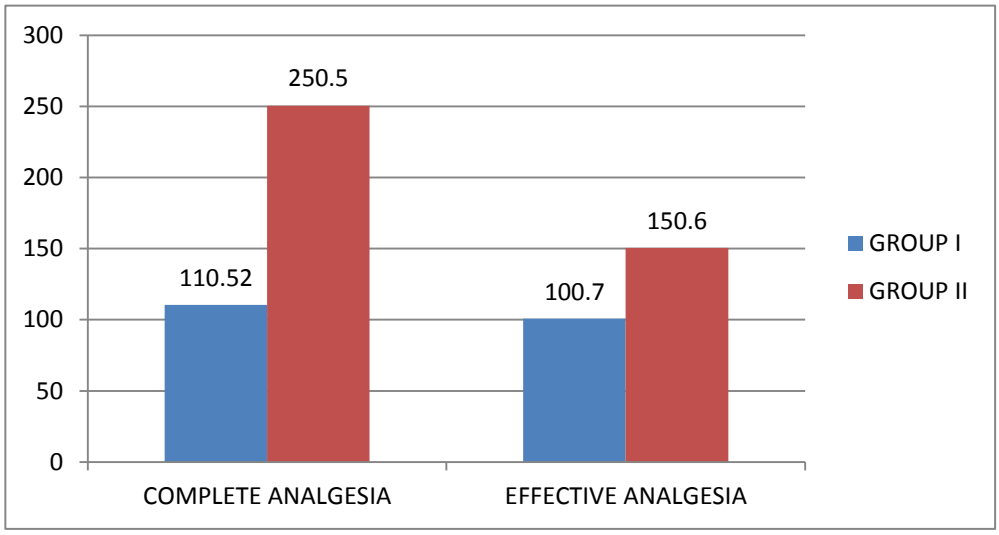
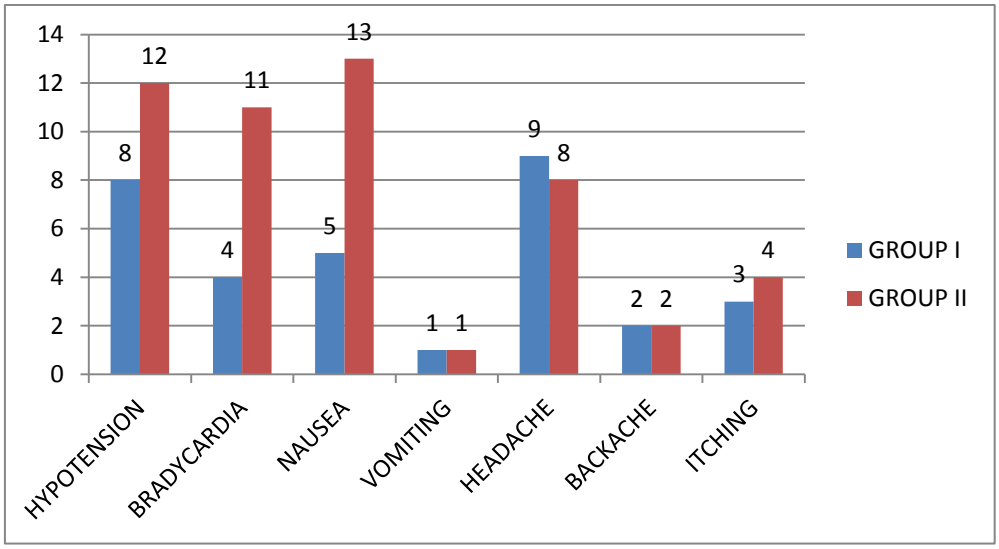


FIGURE II: Comparison of side effects in both groups



DISCUSSION

Different anaesthetic solutions have been tried in the caesarean cases. The usefulness of effective anaesthetic agent can be judged by its ability to induce effective and complete analgesia, lesser side effects and longer time of anaesthetic effects.[6] Administration of Fentanyl intrathecally is an established method for intraoperative anaesthesia and to supplement postoperative analgesia. The spread of Fentanyl after administration into cerebrospinal fluid includes, movement from the cerebrospinal fluid into the opioid receptors or other non-specific binding sites in the spinal cord and rostral migration via the cerebrospinal fluid to supra spinal sites.[7] Because of the high affinity of fentanyl with nonspecific binding sites on the lipid surface only a small proportion of the administered dose migrates to the cervical region. Jaishri bogra[8] et al found that mean time of onset of sensory blockade and peak level of analgesia were similar in both the groups and addition of Fentanyl to Bupivacaine did not alter the onset.

The present study was conducted to compare and determine the efficacy of spinal anesthesia with Bupivacaine alone and bupivacaine with fentanyl.

In present study, out of 100 patients, 50 were in group I and 50 were in group II. In our study, mean age of patients were30±4 years and 30±5 in group I and group II respectively. The mean height in group I was 1.72 meters ± 0.04 and in group II was 1.82 meters ± 0.02. The mean weight in group I was 60± 2 Kgs in group I and 61± 4 Kgs in group II. The number of deliveries was 1.70 ± 1.02 in group I and 1.60 ± 1.06 in group II. The gestation time in weeks was 35.42 ± 0.24 in group I and 38.02 ± 0.14 in group II. The surgical time was 44± 1.0 in group I and 43± 1 in group II. The difference was statistical non significant.

In our study, the mean time required to reach peak sensory level was earlier in Group BF than Group B and this was statistically significant (P<0.05).Time to onset of sensory blockade, peak level of sensory analgesia, degree of analgesia and onset of motor blockade were

comparable in both the groups. Dahlgren G et al[9] concluded that time to reach peak sensory level was earlier with group BF than group Bupivacaine alone. Ben-David[10] et al observed that patients with plain bupivacaine were more likely to require treatment for hypotension than patients with bupivacine - fentanyl. This is because of less dose of bupivacaine used in group BF as compared to group B.

The statistical significant difference was seen in complete and effective analgesia in both the groups. Side effects like hypotension, bradycardia, nausea and itching cases were more in group II as compared to group I. Number of vomiting, backache cases were comparable in both cases. Seyedhejazi M[11] found that there were significantly less number of patients who experienced nausea and vomiting in group BF, which is explained presumably due to their interaction with opioid receptors of the chemoreceptor trigger zone on the floor of the fourth ventricle.

CONCLUSION

Low dose fentanyl helps in reduction of the dose of bupivacaine for spinal anesthesia, and used as an adjuvant to intrathecal 0.5% hyperbaric bupivacaine.

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