ORIGINAL ARTICLE

COMPARISON OF 0.0625% BUPIVACAINE WITH 0.0002% FENTANYL V/S 0.0125% BUPIVACAINE IN AMBULATORY LABOR EPIDURAL ANALGESIA

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ABSTRACT:

Introduction: Epidural analgesia is considered at present to be the most effective and innocuous technique of providing labor analgesia. The present study aimed to compare the efficacy of 0.0625% bupivacaine + 0.0002% fentanyl V/S 0.125% bupivacaine for the labor analgesia and motor blockade and also evaluated the two drug regimen for their effect on ambulation. **Material and Methods:** 40 ASA1 physical status female were divided into two groups. Group A comprised of 20 patients who received 0.0625% bupivacaine and 0.0002% fentanyl. Group B comprised of 20 patients who received 0.125% bupivacaine. **Results:** Mean time to effective analgesia was 35.71±13.84 min in group A and 18±8 min in group B and was significantly higher in group A than in group B (p value<0.005). Patients in group B had faster and excellent analgesia in 100% of cases. All the patients in group A could ambulate without support as compared to only two patients in group B. **Conclusion:** 0.125% bupivacaine provides excellent analgesia in 100% of cases, though it does not allow ambulation in all patients. Labor analgesia with 0.0625% bupivacaine + 0.002% fentanyl causes very minimal block and thus allows ambulation in 100% of cases, though it provides good quality of analgesia in 75% of the parturients. Quality of analgesia can be probably improved by increasing the concentration of bupivacaine in initial bolus, which further needs to be evaluated.

Key words: Walking epidural; ambulatory epidural; labor analgesia.

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INTRODUCTION

Experience of pain is a natural phenomenon during child birth. Labor pain has been described as the most intense pain experienced.[1] Fear pain tension syndrome is a perpetual problem associated with labor. Painless labor has been a cherish desire of every mother and constant aim of obstetrician and anaesthesiologists. Medical science has ventured into this aspect of female life to make her experience of bringing a new life to earth a more pleasurable one by providing the concept of labor analgesia.

John snow introduced labor analgesia in 1853 when chloroform was administered to Queen Victoria for the birth of her eighth child prince Leopeld.[2.] Since then various methods have been used for labor analgesia with variable success. Lumbar epidural analgesia, prevalent now a days, originated in the

work of page in 1926. Epidural analgesia is considered at present to be the most effective and innocuous technique of providing labor analgesia.[3-6]

The controversies regarding the maternal and foetal outcome due to the use of epidural analgesia include slowing or arrest of labor necessitating the use of oxytocin, paralysis of the pelvic and abdominal muscles resulting in lack of internal rotation, insufficient bearing down force, absence of Ferguson's reflex with a further delay in 2nd stage and an increase in mechanically assisted devices, chances of foetal acidosis, poor APGAR scar and the need for prolonged intensive monitoring.[7]

Most of the drawbacks can be minimized by inducing a differential block, a selective sensory analgesia with a minimal motor block by using low concentration of agents such as bupivacaine, fentanyl or a combination of the two drugs. [8-15] Ambulatory epidural analgesia has overcome the disadvantages of motor blockade, thus leading to increased intensity, decreased frequency of uterine contractions, good quality and prolonged analgesia, shorter first stage of labor, improved APGAR score, less need for augmentation, less instrumental deliveries and the patient enjoys to ambulate. [16-17] Thus, the present study aimed to further compare the effects of 0.0625% bupivacaine + 0.0002% fentanyl v/s 0.125% bupivacaine for ambulatory labor analgesia as regards the quality of analgesia, ability to ambulate, effect on progress of labor and neonatal outcome.

MATERIAL AND METHODS

The present study was carried out among 40 ASA1 physical status primigravida patients of the age group 15-30 years with full term pregnancy (gestation > 37 weeks) in active first stage of labor with good contractions and cervical dilatation 3-4 cm. The study was commenced after the approval from the ethical committee of the hospital and written informed consent was taken from patients. Patients not giving consent, allergic to local anesthetic, patients with bleeding diasthesis, on anticoagulant drugs, infection at the local site, heamodynamic instability or patients with preexisting neurological disease or spinal disease were excluded from the study.

A routine preanesthestic check up of patients including height, weight, routine haematological and biochemical investigation were carried out.

Patients were preloaded with 10ml/kg Ringer lactate. Epidural space was reached with a 17G Touhy needle at L3-4 interspace by using loss of resistance technique. An epidural catheter was introduced through the needle and advanced 3-4 cm cephalad. A test dose of 3ml of 1.5% lignocaine + 20 micrograms of epinephrine was injected through the catheter. At 5min, patient's received 5 ml of study drug (0.0625% bupivacaine + 0.002% fentanyl for group A and 0.125% bupivacaine for group B). At 10 min; a continuous epidural infusion of the study drug was started at the rate of 10ml/hr.

Uterine displacement was maintained continuously and patients were encouraged to turn from side to side every 30 minute interval. The cephalad dermatomal level of uterine displacement was determined by pin-prick method at 10 minutes interval. Rate of infusion was increased or decreased to maintain a sensory level at T10. Epidural infusion was stopped when the cervix was fully dilated.

Maternal blood pressure was recorded at 5 min interval for 20 min and subsequently at 10 minutes interval. Any fall in BP more than 20% was taken as significant fall in BP and was treated by uterine displacement and increasing the rate of IV fluids. Maternal HR was recorded at every 10 min interval. Visual analogue scale (VAS) was used to access the severity of pain where '0' represented no pain and 10 cm represented the worst possible pain. Pain was assessed initially at 10 min intervals for 30 min and then every 30 min. Sensory block was assessed at 15 min interval by pin prick and motor block was assessed at every 15 min using modified Bromage Scale.

Modified Bromage Scale:

Score 1- Complete blockade (unable to move feet or knee)
Score 2- Almost complete blockade (able to more feet only)
Scoe 3- Partial block (just able to more knees)
Score 4- Detectable weakness of hip flexion
Score 5- No detectable weakness of hip flexion when supine.
Score 6- Able to perform partial knee bend.

Other side effects like nausea vomiting, pruritus and hypotension were recorded. Statistical analysis was carried out by using student 't' test, Mann-whitney test, and Wilcoxon "W" test, chi square test and Fischer's exact test.

RESULTS

Table 1 shows demographic profile of the patients. Both the groups were comparable with respect to their age, height, weight and cervical dilatation (p value by student t test<0.005).

Table1: Demographic profile of the patients and time to effective analgesia

	Group 'A'	Group 'B'
Age	23.75± 2.68	22.95±2.46
Weight	56.16±7.93	54.4±6.245
Height	154±3.895	154.8±2.978
Mean time to effective analgesia	35.71±13.84 min	18±8 min

Time to effective analgesia was 35.71±13.84 min in group A and 18±8 min in group B and was significantly higher in group A than in group B (p value<0.005). Effective analgesia was observed within 20 min in all the patients of group B as compared to only 14 patients of group A. All the patients in group B had excellent analgesia as compared to 8 patients in group A (p value= 0.001, highly significant. 5 patients in group A had poor analgesia as compared to none in group B (p value=0.00, highly significant). Even obstetrician's view was taken to assess the quality of analgesia. Quality of analgesia was excellent in all cases in group B as compared to in 8 parturients in group A (p calculated by chi-Square test was 0.000 highly significant). Even at 60 min, 6 patients in group A did not had effective analgesia. Mean VAS_{60} in group A was 2.43±1.430 and in group B was 0.575±0.326 (p value calculated by Student 't' test was 0.00, highly significant.)

Table 2: Variation of mean Visual analogue scale (VAS) with Time (Pain was assessed initially at 10 min intervals for 30 min and then every 30 min)

	Group A	Group B	P value
VAS_{10}	8.050±2.0641	4.3±1.4179	0.00
VAS_{20}	5.20±2.308	0.85±0.875	0.00
VAS_{30}	3.225±1.867	0.575±0.326	0.00
VAS_{60}	2.43±1.430	0.575±0.3726	0.00

Leg strength was assessed by using a modified Bromage scale. Distribution of motor block among the two groups is given in table 3.

Bromage score	Groups A	Group B
1	-	-
2	-	-
3	-	-
4	-	-
5	-	4
6	20	16

In group A, all the patients had a Bromage scale score of 6 as compared to 16 cases in group B. In group B, 4 patients were not able to perform partial knee bend (Bromage score 5). However it was found to be statistically insignificant (p=0.106, NS). After assuring leg strength with Bromage score patients were allowed to ambulate. In group A, all the 20 cases were able to ambulate but in group B only 3 cases were able to ambulate (p=0.000, highly significant).

None of the cases in both the groups required instrumental delivery (p value by student 't' test was 0.00, not significant).

11 patients in group 'B' had fall in blood pressure (>10%) as compared to only 4 patients in group A (p value=0.013, significant). 13 patients in group B had a fall in HR>20% as compared to 5 patients in group 'A' (p value=0.00%, highly significant). Though the difference in fall in blood pressure and heart rate between the two groups was statistically significant but clinically insignificant because none of the patient had hypotension or bradycardia. In group A only one patient had nausea and vomiting. It was treated by giving injection perinorm 10mg IV. None of the cases had pruritus or respiratory depression.

DISCUSSION

Epidural analgesia is considered at present to be the most effective and innocuous technique for providing labor analgesia.[3-6] The availability of several techniques and the use of combination of local anesthetic and opioids, complication like incidence of instrumental deliveries, prolonged labor and adverse foetal effects have been minimized. Moreover many patients express the desire to walk during labor. Also ambulation is commonly believed to be of value in progress of labor. Purported advantages of ambulation and upright posture include enhancement of pelvic diameters, coordination of uterine contractions, less pain, shorter first stage of labor, less need for oxytocin infusion, greater maternal comfort and relaxation, fewer operative deliveries, improved APGAR score and maternal satisfaction [18-22]. Use of low concentration of local anesthetic with opioid provide selective sensory block while sparing motor block and has lead to the concept of walking epidural or ambulatory labor analgesia.

The present study compares 0.0625% bupivacaine + 0.0002% fentanyl V/S 0.125% bupivacaine for ambulatory labor analgesia. All the 20 parturients in group B and only 8 parturients in group A had

excellent analgesia. 4 parturients in group A had good quality of analgesia. 3 parturients had fair quality and 5 parturients had poor quality of analgesia. Better quality of analgesia in group 'B' was because of use of a higher concentration of the drug in group B.

The present study reported 100% parturients had excellent analgesia with 0.125% bupivacaine which are in consistency with the studies conducted by Rees Rosen[23] who reported effective analgesia in 100% and Bleyart etal[7] who reported 92% parturients respectively.

James Fernandez Cuisasola [24] showed an excellent analgesia in 82% of parturients with 0.0625% bapivacaine + 0.0002% fentanyl. Where as in our study, excellent analgesia was seen in only 40% of cases. The reason could be use of a longer bolus of 0.7% lignocaine to initiate the block and higher rate of infusion in their study.

Onset of analgesia was significantly delayed in group A as compared to group B. Mean time to effective analgesia was 35.71±13.84 minutes in group A as compared to 18±8 minutes in group B. This could be because of lower efficiency of 0.0625% bupivacaine + 0.0002% fentanyl and with increasing time more and more receptors became saturated leading to delayed analgesia.

Leg strength was assessed using modified Bromage scale. None of the patients in group A showed any motor weakness in contrast to 4 patients in group B (who could not perform partial knee bend). Motor block seen in our study was comparable to that seen in study conducted by James Fernandes et al.[24] Much higher motor block was seen in studies by Rees Rosen etal[23], Bleyart etal[7]. This was due to use of a very high concentration of local anesthetic to initiate the block and use of a higher rate of infusion leading to greater motor blockade.

After assuring no orthostatic hypotension, patients were allowed to ambulate, in group A, all 20 cases were able to ambulate, and 14 patients (70%) did not require support. But in group B only 3 cases (15%) were able to ambulate with support. Many of the patients in group (85%) could not ambulate inspite of good leg strength. The reason this could be a very good sensory block and thus loss for proprioception and somatosensory changes which the patients perceived as heaviness in legs and feet. Also the females had been without sleep for a long time, thus remained in bed and often slept once they became comfortable. Whereas in group A, VAS was slightly higher so the patients did not sleep and were comfortable walking around.

In our study, mean % fall in systolic blood pressure was 7.25 ± 6.325 in group 'A' as compared to 13.11 ±7.749 in group 'B'. Higher fall in group 'B' could be due to greater degree of sympathetic blockade and loss of anxiety due to better pain relief in the group. Fall in this blood pressure was not clinically significant because only two patients in each group had a fall in blood presence >20% and they responded very well to uterine displacement and iv fluids. Also the mean % fall in heart rate was significantly greater than in the group B. Greater fall in the HR could be due to excellent pain relief. However fall in heart rate was not clinically significant as only one patient in group 'B' had HR<60/min.

In the study by Chestnut etal[9], 27% of cases in group A had nausea and 21% of cases had vomiting. In our study only one case in group A had nausea/vomiting. None of the cases in group 'B' had nausea and vomiting. Lower incidence in our study could be due to lower concentration of fentanyl. None of the cases in our study had pruritus as compared to 22% of cases in Chestnut etal[9] study. Again this could be because of lower concentration of fentanyl in our study.

Thus in the end we would like to say that labor analgesia with 0.0625% bupivacaine + 0.002% fentanyl causes very minimal block and thus allows ambulation in 100% of cases, though it provides good quality of analgesia in 75% of the parturients. Quality of analgesia can be probably improved by increasing the concentration of bupivacaine in initial bolus, which further needs to be evaluated.

CONCLUSION

0.125% bupivacaine provides excellent analgesia in 100% of cases. Though it does not allow ambulation in all patients but causes only a minimal motor block with Bromage score 5 in only 20% cases. All the patients were comfortable in bed and could turn around.

0.0625% bupivacaine+ 0.0002% fentanyl provides effective analgesia in 70% of cases and permits good ambulation in 100% of cases. 70% of cases were able to ambulate even without support. 0.125% bupivacaine provides superior and faster onset analgesia than 0.0625% bupivacaine+ 0.0002% fentanyl.

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