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ORIGINAL ARTICLE

ASSESSMENT OF EFFECT OF BUPIVACAINE AND BUPIVACAINE PLUS FENTANYL FOR EPIDURAL LABOUR ANALGESIA: A COMPARATIVE STUDY

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ABSTRACT:
Background: labour pain is one of the most excruciating pain experienced by a woman during her childbirth. Had it not been intermittent probably it would have killed many of the women during her first childbirth. The labour pain serves no useful function in human being rather it adversely affects some physiological response in human body. When used alone epidural opioids have been unable to provide adequate analgesia throughout labour, but the addition of the short acting, lipid soluble opioid fentanyl to bupivacaine has been more successful. It remains unclear, however, whether combinations of opioids and bupivacaine appreciably reduce the incidence of operative deliveries and whether enhanced analgesia outweighs the inconvenience of using a controlled drug. Hence; we evaluated the effect of bupivacaine and bupivacaine in combination with epidural fentanyl for labour anaesthesia. **Materials & Methods:** The present study was conducted in the department of gynaecology of the institution and included all the patients reporting from 2013 to 2015. Ethical approval was taken from the ethical committee of the institution and written consent was obtained from all the subjects involved in the study after explaining them the entire research protocol. Group A comprised of patients who were topped up by either a midwife or an anaesthetist with 5 ml of 0-25% bupivacaine; this was repeated after five minutes unless the mother's pain had disappeared. On the other hand, group B included all those patients who received either 4 ml of 0 .25% bupivacaine for pain restricted to the abdomen, or 10 ml of 0-1% bupivacaine containing 50 µg fentanyl if they had perineal pain. All the results were analyzed by SPSS software. Chi-square test and student t test was used for assessment of level of significance. **Results:** Mean age of patients in group A and group B was 27 and 27.5 yuears respectively. Mean weight of the patient in group A and group B was 74.5 and 76.2 Kg respectively. Mean dilatation of cervix at initial time in group A and group B was 3.1 and 3 cm respectively. L2-3 lumbar space was used most of the times in both the groups. Mean time required from epidural to the point of delivery in group A and group B was 372 and 331 minutes respectively. Total amount of bupivacaine used in group A and group B was 95 mg and 60 mg respectively. Out of all patients in group A and Group B, 20 and 40 patients underwent normal non-surgical delivery respectively. In the surgical deliveries, delivery by the use of simple forceps was the most common in both the groups. Caesarean sections were performed in 20 and 14 cases respectively in both the study groups. While comparing the patient overall satisfactory and side-effect, significant difference was obtained. **Conclusion:** Epidural analgesia provides early encouraging results in patients thereby providing ultimate solution for optimum regimen.
Key Words: Bupivacaine, Fentanyl, Labour

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INTRODUCTION:

Labour pain is the most excruciating pain experienced by a woman during her lifetime. Various research works has been done to find out an effective way for adequate pain relief. Despite advances in knowledge of pathophysiology of pain, pharmacology of analgesics and development of effective techniques for pain control, many patients continue to experience considerable pain and discomfort. Some poorly educated woman wrongly believe that the pain is essential prerequisite for the process of delivery and some have religious misconception that without labour pain the bondage between mother and baby become weaker. When used alone epidural opioids have been unable to provide adequate analgesia throughout labour, but the addition of

the short acting, lipid soluble opioid fentanyl to bupivacaine has been more successful. It remains unclear, however, whether combinations of opioids and bupivacaine appreciably reduce the incidence of operative deliveries and whether enhanced analgesia outweighs the inconvenience of using a controlled drug.[4-6] Hence; we evaluated the effect of bupivacaine and bupivacaine in combination with epidural fentanyl for labour anaesthesia.

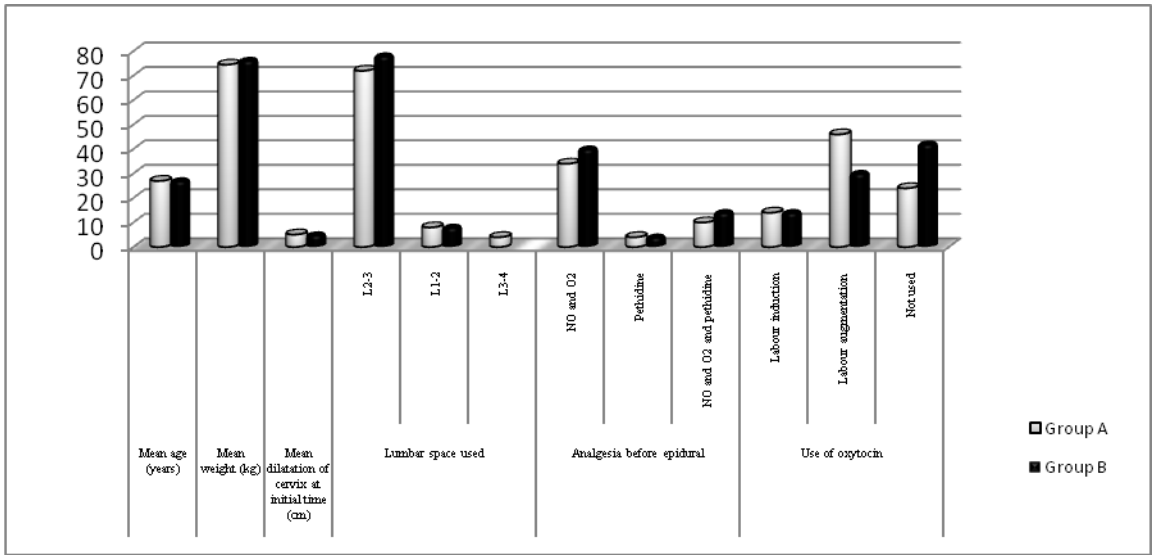
MATERIALS & METHODS

The present study was conducted in the department of gynaecology of the institution and included all the patients reporting from 2013 to 2015 Ethical approval was taken from the ethical committee of the institution and written consent was obtained from all the subjects involved in the study after explaining them the entire research protocol. Mothers were not recruited if they had previously experienced or had any contraindication to epidural analgesia or if they had an abnormal fetus or a degree of pre-eclampsia that required treatment. After setting up an intravenous infusion of Hartmann's solution an epidural catheter was inserted into a lumbar interspace using a 18 gauge Tuohy needle. Initially, 4 ml of 0 25% bupivacaine was given epidurally with the mother lying on her left side. All the patients were broadly divided into two study groups. Group A comprised of patients who were topped up by either a midwife or an anaesthetist with 5 ml of 0-25% bupivacaine; this was repeated after five minutes unless the mother's pain had disappeared. On the other hand, group B included all those patients who received either 4 ml of 0 25% bupivacaine for pain restricted to the abdomen, or 10 ml of 0-1% bupivacaine containing 50 µg fentanyl if they had perineal pain. Mothers were asked to lie on their sides until delivery. Both groups received intermittent top ups, on demand, throughout both stages of labour. Inadequate analgesia, resulting from either technique, was treated by the anaesthetist, who gave extra boluses of 4 ml of 0 25% bupivacaine at minimum intervals of five minutes. Baseline pain intensity, defined as the intensity of the pain assessed just prior to the block, has been measured with a 10 cm visual analogue pain scale (visual analogue score). The peak effect was defined as the first painless contraction. The duration of analgesia was assessed as the time of repeat injections. All patients were asked for the recurrence of pruritus. Evaluation of motor block was assessed with Bromage's criteria.[8] Total dose of bupivacaine used, number of additional doses, duration and quality of analgesia, length of labour and mode of delivery were recorded. Neonatal outcome was evaluated by Apgar scores, cord blood gas analysis and neurobehavioural testing, using the Neurologie and Adaptive Capacity Score (NACS) m at the 2nd and 24th hour.[9] All the results were analyzed by SPSS software. Chi-square test and student t test was used for assessment of level of significance.

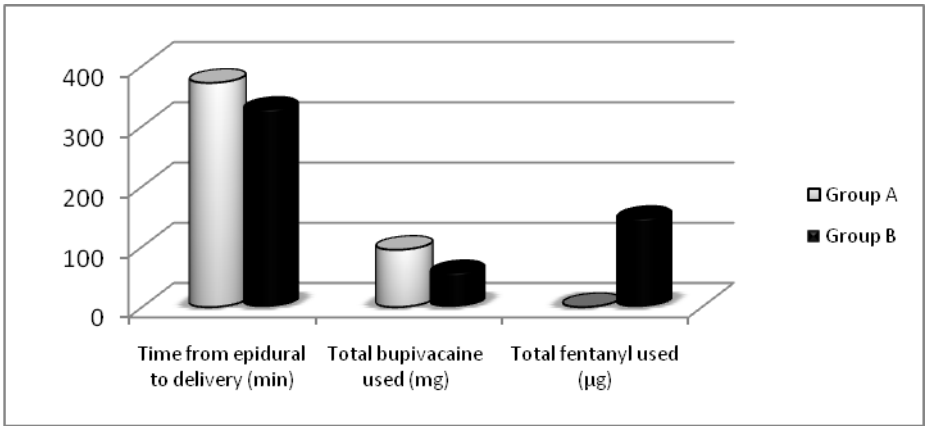
RESULTS

Graph 1 highlights the clinical details of the patients included in the study. Mean age of patients in group A and group B was 27 and 27.5 yuears respectively. Mean weight of the patient sin group A and group B was 74.5 and 76.2 Kg respectively. Mean dilatation of cervix at initial time in group A and group B was 5.1 and 4.9 cm respectively. L2-3 lumbar space was used most of the times in both the groups. **Graph 2** shows analgesic requirement of women included in the present study. Mean time required from epidural to the point of delivery in group A and group B was 372 and 331 minutes respectively. Total amount of bupivacaine used in group A and group B was 95 mg and 60 mg respectively. **Graph 3** shows the number of patients divided on the basis of mode of delivery. Out of all patients in group A and Group B, 20 and 40 patients underwent normal non-surgical delivery respectively. In the surgical deliveries, delivery by the use of simple forceps was the most common in both the groups. Caesarean sections were performed in 20 and 14 cases respectively in both the study groups. **Table 1** shows P-value or maternal satisfactions undergoing analgesia. While comparing the patient overall satisfactory and side-effect, significant difference was obtained.

Graph 1: Clinical details of the patients included in the study



Graph 2: Analgesic requirement of women included in the present study



Graph 3: Number of patients divided on the basis of mode of delivery

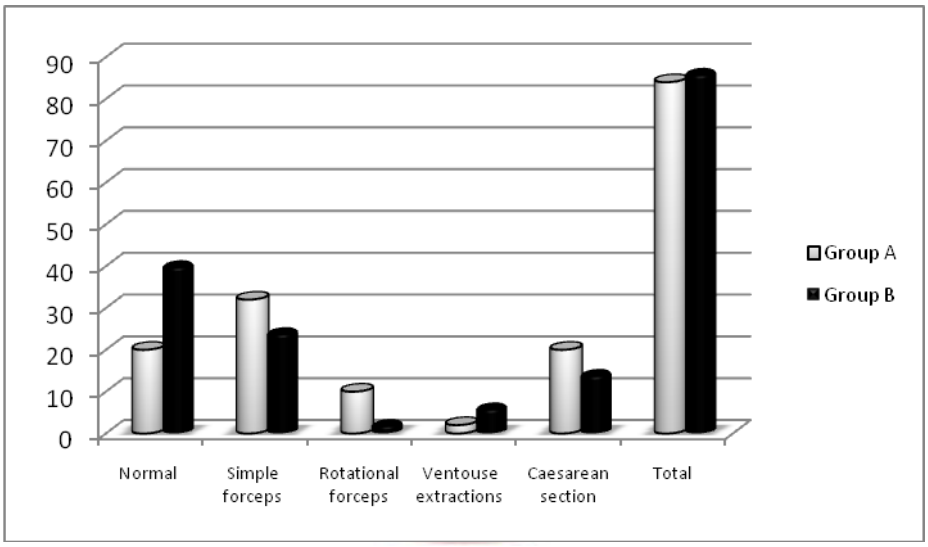


Table 1: P-value or maternal satisfactions undergoing analgesia

Parameter	p-value
Sensation	0.125
Side-effects	0.001
Psychological state	0.252
Overall satisfaction	0.014

DISCUSSION

In the anaesthesia for labour and delivery, the combination of epidural local anaesthetics and fentanyl has been demonstrated to have equal benefit.[5] Although inadequate as the sole agent, fentanyl has no effects on sympathetic or motor neurons and it provides certain advantages over local anaesthetics. [6] Bupivacaine 0.125 per cent has been reported to produce satisfactory analgesia for labour, There is evidence that diluted solutions of local anaesthetics in a larger volume are more effective than concentrated solutions in a small volume.[7,8] Moreover diluted concentrations of bupivacaine, having less motor effects, may be useful in reducing operative deliveries. [9, 10] On the other hand, when low concentrations of local anaesthetics are used alone, analgesia may be incomplete, especially in the second stage of labour.[11] Indeed, limited dosages of diluted local anaesthetics are sufficient to block the non-myelinated C-fibres in the first stage of labour, but may be inadequate to block the myelinated A-delta fibres in the second stage. The combination of bupivacaine with fentanyl has been shown to result in longer and more

effective analgesia. 3,s However, the studies performed to date have not documented the effect of varying the dosage of fentanyl added to 0.125 per cent bupivacaine as the sole local anaesthetic throughout labour.[12] Hence; we evaluated the effect of bupivacaine and bupivacaine in combination with epidural fentanyl for labour anaesthesia.

In the present study, using fentanyl with bupivacaine significantly reduced the requirement for bupivacaine without compromising analgesia (**Graph 1, 2**). Being less unpleasant for mothers, the lower dose of bupivacaine was associated with many of the recognised side effects of neural blockade. Although pain relief was similar in both groups, overall satisfaction was significantly higher in mothers in group B (**Graph 3, Table 1**). This higher satisfaction can reasonably be accounted for by other benefits that these mothers experienced, although they may also have had greater contact with their anaesthetist. It was ethically difficult to avoid this potential bias as neither anaesthetists nor midwives would have been available to give all top ups without more frequent delays before mothers received analgesia.[13- 15] Nikkola et al investigated whether patient-controlled epidural analgesia in labor with bupivacaine and fentanyl provides more satisfaction to mothers than intermittent bolus epidural analgesia or patient-controlled epidural analgesia with plain bupivacaine. They evaluated ninety mothers with term, uncomplicated pregnancies who were further randomized to receive intermittent bolus epidural analgesia (bupivacaine + fentanyl), patient-controlled epidural analgesia (bupivacaine + fentanyl), or patient-controlled epidural analgesia (bupivacaine). They observed that the intermittent bolus epidural analgesia group felt they could influence labor most ($p = 0.03$), and in the interview they expressed most satisfaction. From the results, they concluded that over intermittent bolus epidural analgesia, patient-controlled epidural analgesia has no advantages regarding maternal satisfaction.[16] Halonen et al tested the hypothesis that patient-controlled epidural analgesia for labor (PCEA) provides better analgesia and satisfaction than the intermittent bolus technique (bolus) without affecting the mode of delivery. They randomly evaluated 187 parturient to receive labor analgesia using either the PCEA or bolus technique. They observed that parturient in the PCEA group had significantly less pain during the first and second stages of labor. From the results, they concluded that the PCEA technique provided better pain relief.[17]

CONCLUSION

From the above results, the authors concluded that epidural analgesia provides early encouraging results in patients thereby providing ultimate solution for optimum regimen. Further research in this field is required for better exploration of results.

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