ORIGINAL ARTICLE

Labour Epidural Analgesia on Maternal and Neonatal Outcome: A Retrospective Observational Study

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Abstract

Background: Modern obstetrics uses several methods to relieve pain in pregnant women during labour and childbirth. Labour epidural analgesia (LEA) is an increasingly recognized and accepted method for pain relief. A pain free mother giving birth of a healthy child is the main focus of labour analgesia. The objective of the current study was to assess the effects of labour epidural analgesia on maternal and neonatal outcome.

Methods: This retrospective observational study was conducted in labour suit of BRB Hospital Limited, Panthapath, Dhaka, Bangladesh from January, 2020 to June, 2021. A total of 200 parturient received labour epidural analgesia at first stage of labour/s. Continuous epidural infusion of 0.0625% bupivacaine with fentanyl 2µg/ml @ 10ml/hour was given after 15-20 ml bolus of 0.1% bupivacaine and continued upto second stage of labour. The duration of labour, mode of delivery and the APGAR score, NICU admission of neonate were measured.

Results: Out of 200 parturient, 166 (83%) were primigravidae and 34 (17%) were multigravidae. The average age of patients was 25 years (median, IQR 20-34 years). Average gestational age of parturient was 38.56 ± 1.25 weeks. The duration of labour was within normal range in 99% of patients. The rate of normal vaginal delivery, instrumental delivery and caesarean section were 171 (85.5%), 19 (9.5%) and 10 (5%) respectively. APGAR score (>7) in 1st and 5th minute were 186 (93%) and 197 (98.5%) respectively. NICU admission was not reported.

Conclusion: Labour epidural analgesia has no effect on progression of labour and does not alter the mode of delivery. It is associated with better APGAR score of the newborn.

Keywords: Labour analgesia, Epidural analgesia, Duration of labour, Mode of delivery, APGAR score.

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Introduction

Natural childbirth is a beautiful experience. It is a distinctive and joyous moment in every mother's life. Studies suggest that labour pain is the most severe pain experienced by a mother. This pain become worse especially at the advance time of labour. Nervousness and anxiety can make the situation worse as well making it almost unbearable[1]. Previously, it was thought that any human intervention in the miracle of childbirth was a sin against the will of God and women should suffer this divine punishment from God[2].

Several harmful effects of labour pain on mother and foetus have been demonstrated. Painless labour is justifiable not only from humanitarian perspective but has medical reasons as well[3]. The maternal stress response to intense pain leads to increased release of corticotropin, cortisol, norepinephrine, β-endorphins and epinephrine. These neuroendocrine changes result in increased maternal cardiac output, systemic vascular resistance and oxygen consumption during the period of labour[1,3]. Untreated labour pain has got several side effects on foetus as well. In the postpartum period, postnatal depression and development of post-traumatic stress disorder are more common when analgesia is not used[3,4].

Several methods have been described to alleviate the labour pain which includes non-pharmacological and pharmacological approaches, and regional anaesthesia techniques[3]. There is evidence that neuraxial local anaesthetics and opioids yield superior and more reliable analgesia[5]. Neuraxial techniques are considered as gold standard for labor analgesia. In addition to analgesia, the physiological benefits for mother and foetus are well documented. Neuraxial analgesia has been shown to improve maternal cardiovascular and pulmonary physiology and acid base status of the foetus[6].

Four different types of technique are used for initiation of neuraxial labour analgesia. Most commonly used practices are epidural technique and combined spinal epidural technique (CSE). Another two techniques are spinal technique and dural puncture epidural technique (DPE). Among these technique, the most commonly practiced technique is epidural analgesia[5,7].

Epidural analgesia came into light in early 1946. Since then it's now more common especially in developed countries. It is estimated that in the United Kingdom 20% women preferred it while 58% of women in the United States of America use it to relieve their labour pain[8,9].

Previously higher concentration of local anaesthetics were used for epidural analgesia, but lower concentration of local anaesthetics have shown to establish satisfactory analgesia in labour[4,10]. Different formulations of local anaesthetics along with adjunct has been used for neuraxial block. The use of epidural opioids have synergistic effect thus reducing dose of local anaesthetics improve analgesia, also reducing side effects of motor block[11,12]. Bupivacaine which is most extensively used in obstetric anaesthesia because of its long duration of action, good motor/sensory separation, limited placental transfer and minimal neonatal effect[13].

Despite the fact that epidural analgesia can result into effective pain relief during labour, it's been reported that sometimes it can contribute to inadequate analgesia and some side effects like hypotension, itches, urinary retention[14,15]. Considering all the facts, epidural analgesia as a method of relieving pain during labour is best to be recommended if the expecting mother has no contraindications[16]. This study was designed to assess the effects of epidural analgesia on duration of labour, mode of delivery and neonatal outcome.

Methods

This retrospective observational study was conducted at BRB Hospital Limited, Panthapath, Dhaka, Bangladesh from January, 2020 to June, 2021. All data were taken from record book at the labour suit of BRB hospital. Parturient in first stage of labour receiving epidural analgesia were included in this study. Demographic and clinical data including age, weight, height, gestational age and cervical dilatation were recorded for all parturient.

Epidural analgesia procedure

After establishment of epidural catheter, a bolus of 15-20 ml solution containing 0.1% bupivacaine with fentanyl 2µgm/ml was given. Then continuous epidural infusion of 0.0625% bupivacaine with fentanyl 2µgm/ml @ 10ml/hr through epidural catheter was started via syringe pump and continued upto second stage of labour.

Monitoring of labour progression

Progress of labour, cervical dilatation and foetal monitoring of all parturient were followed up until delivery on a partograph by an obstetrician. Prolonged first stage of labour was considered when the duration was 12 hours or more and prolonged second stage was defined as failure to deliver a foetus after the start of pushing for 1 hour.

Study measures

The total duration of first and second stage and mode of delivery were assessed. Mode of delivery was assessed as normal vaginal delivery, instrumental delivery and caesarean section delivery[17]. Assessment of neonate was done by APGAR score in 1st and 5th minute after delivery as more or less than seven[18]. If APGAR score was below 7 and initial management failed, then the neonates were transferred to the neonatal intensive care unit.

Statistical analysis

Statistical analyses were carried out by using the Statistical Package for Social Sciences version 20.0 for Windows (SPSS Inc., Chicago, Illinois, USA). Qualitative variables of this study were expressed as percentage. Quantitative variables were expressed as mean ± standard deviation. P value <0.05 is considered as statistically significant.

Results

Two hundred patients were included in this study. The median age of parturient was 25 years (IQR, 20-31 years). Among the parturient, 166 (83%) were primigravidae. Average height and weight of patients was 151.67 ± 3.78 cm and 61.45 ± 7.51 kg/m2. Gestational age of parturient was 38.56 ± 1.25 weeks and average cervical dilation before epidural analgesia was 4.05 ± 0.89 cm. The demographic characteristics are shown in **(Table I)**.

Table I: Demographic characteristics of the parturient

Characteristics	Value (n = 200)
Age in years (Median, IQR)	25 (20 – 31)
Gravid status	
Primigravidae	166 (83%)
Multigravidae	34 (17%)
Height in cm	151.67 ± 3.78
Weight in kg	61.45 ± 7.51
Gestational age in weeks	38.56 ± 1.25
Cervical dilatation(cm)	4.05 ± 0.89

Values are expressed as Mean ± SD, Median with IQR and absolute number, within parenthesis percentage over column total.

Total time duration of first stage after epidural analgesia in primigravidae was 6.41 ± 1.31 hours, whereas in multigravidae was 3.91 ± 1.08 hours. The total time duration of the second stage of labour in primigravidae was 43.27 ± 15.37 min and in multigravidae was 40.07 ± 13.03 min. **Table II** shows the duration of labour in first and second stage.

Table II: Duration of labour of the parturient

Duration of labour	Value
First stage in hours	
Primigravidae	6.41 ± 1.31
Multigravidae	3.91 ± 1.08
Second stage in minutes	
Primigravidae	43.27 ± 15.37
Multigravidae	40.07 ± 13.03

Values are expressed as Mean ± SD

The number of normal vaginal delivery was 171 (85.5%). Instrumental delivery was required in 19 (9.5%) patients. Eight patients were subjected to caesarean section due to foetal distress and deep transverse arrest. Two patients have undergone caesarean section as a result of prolonged labour.
Fig 1 shows the mode of delivery of patients.

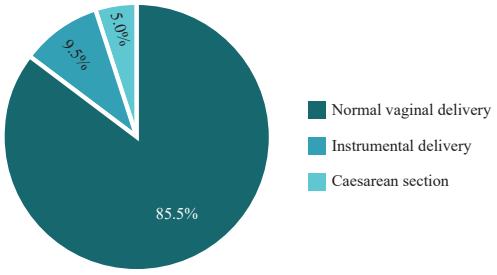

Fig. 1: Mode of delivery of the parturient

Neonatal outcome by APGAR score is shown in **Table III**. At the 1st minute, more neonate 186 (93%) had APGAR score > 7. At 5th minute, APGAR score > 7 was present in 197 (98.5%) neonate. No NICU admission was reported among the neonate.

Table III: Distribution of APGAR score of newborns

APGAR score	Value (n = 200)
At 1 minute	
≤7	14 (7%)
>7	186 (93%)
At 5 minute	
≤7	3 (1.5%)
>7	197 (98.5%)

Data is presented in absolute number, within parentheses are percentages over column total.

Discussion

Neuraxial techniques are the most effective methods for intrapartum labour analgesia. The use of labour epidural analgesia has progressively increased over the past three decades due to superior analgesia and maternal–fetal benefits as well as improved safety.

The demographic characteristics of the patients were indeed comparable to other studies. In this current study, no inadequate block or block failure was reported.

The duration of labour was in concordance with the study done by Papalker et al. [19], Mohammad et al.[20] and Shen et al.[21]. Agarwal et al. [22], observed short duration of first stage in epidural group and explained by factors such as having used ropivacaine which reduced inhibitory effect of catecholamines on uterine and even contractility thereby causing rapid cervical dilatation. Another study done by Hincz et al.[23] has found prolonged first stage in the epidural group due to use of high dose of local anaesthetics that may contribute to this findings. In our study, bupivacaine 0.1% was used during bolus and 0.0625% was used during continuous infusion. This may be attributed to preserve motor function which can result into effective maternal pushing and involuntary bearing down reflex.

In our study, most of the parturient experienced vaginal delivery. Only nine patients undergone caesarean section in total. In comparison to other studies, caesarean sections were carried out mostly as a result of foetal distress due to meconium stained liquor and deceleration of cardiotocography[19,20].

In this current study, APGAR score of the neonate was high both in 1st and 5th minute. NICU admission was not required to any neonate. Regarding neonatal outcome, our findings are indifferent from other studies[19,20,22]. Nonetheless, Hincz et al.[23] has found a lower APGAR score of the neonate at 1st min in the epidural group.

Conclusion

We observed that epidural analgesia has no effect on duration of labour. Labour epidural analgesia neither increases the rate of instrumental delivery nor the rate of caesarean section. Better APGAR score proves the safety of this technique. In order to provide better obstetric care, it is very much needed to increase awareness, acceptability and availability of labour epidural analgesia in the community.

Declaration

Ethics approval:

Not applicable.

Author contributions:

Conception and development of the idea *MMK, MKUK*
Data collection *MM, KD, MSH*
Data analysis *MMK, MAU, SA*
Writing - Original Draft Preparation *MMK, SA*
Writing – Review & Editing *MMK, MKU*K

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