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Review Article

Early vs late: Effect of epidural analgesia on labour

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Abstract:

Background: The purpose of this study was to know the effects of epidural analgesia when given early vs late in labour depending upon cervical dilatation in primigravida pregnant labouring women, on the phases of labour, interventional labour and the necessity for cesarean delivery.

Methods: Number of patients enrolled in the study were 100 which were divided into early epidural group (EEG) i.e.<=4cm and late epidural group (LEG) i.e. >4cm depending upon the cervical dilatation at which patients requested for painless delivery. Out of 100 patients, 68 patients were grouped under EEG and 32 patients were grouped into LEG.

Results: In the evaluation of obstetrical data, it was stated that the first phase of labour is longer in the EEG as compared to LEG but the difference was not significant statistically. The active phase is almost same and the second phase is significantly longer in the groups we provided epidural analgesia late in comparison with the early group. However, this statistically significant extension of time in the second phase was within acceptable limits for second phase. There was no significant difference regarding the mode of delivery between the two groups with almost similar incidence of caesarean and instrumental deliveries.

Conclusion: With the present study it was concluded that it is unnecessary to delay the epidural analgesia application waiting for the cervical dilatation to proceed, in case that the labour pain comes up the visual analog scale (VAS) values (≥3). Therefore maternal request is always a sufficient indication for providing epidural analgesia irrespective of cervical dilatation.

Key words: epidural analgesia, labour, cervical dilatation, early, late

Introduction

Epidural analgesia (EA) is the most effective treatment for pain control during labour and delivery and its intrapartum use has been increased substantially over the past two decades. The effect of regional analgesia on progress of labour and mode of delivery has often been debated.(1) A recent review concluded that epidural analgesia is neither associated with prolonging the duration of labour nor it increases the incidence of instrumental and caesarean deliveries.(2) An additional issue of controversy is the effect of the timing of epidural application on the duration of labour and mode of delivery. Some studies suggested an increased risk of caesarean sections in those who receive epidural analgesia before reaching cervical dilatation of 4 cm, while 2 randomized trials comparing early with late epidural analgesia administration reported similar rates of cesarean section (CS) regardless of the extent of dilatation.(3) It was not clear, however, whether early epidural increased the incidence of caesarean sections or it was related to factors other than the epidural (eg, dysfunctional labor, macrosomia, malpresentation).(4) Following an assessment of the conflicting data of several other meta-analysed studies, the ACOG committee revised their statements, no longer endorsing a delay and explicitly disavowing the consideration of fear of increasing the risk of caesarean delivery. The ACOG and the American Society of Anaesthesiologists (ASA) have also jointly emphasized that there is no need to wait arbitrarily till the cervical dilatation has reached 4-5 cm, and endorsed a statement that "*Maternal request is a sufficient indication for pain relief in labour."*(5)

The purpose of the present study was to determine, in nulliparous parturients, the effect of timing of initiation of epidural analgesia on obstetric outcome, in particular the duration of labour in terms of the lengths of first and second stage of labour and the mode of delivery in terms of incidence of instrumental and cesarean deliveries.

Materials and methods

The study was carried out on nulliparous patients demanding epidural analgesia at our hospital in the department of obstetrics and gynecology from 1st October 2011 to 30th April 2013. Following the Institutional Ethics Committee approval, the patients were given information and consent forms, necessary explanations were made, and then verbal and written consents were taken from the patients. 100 nulliparous pregnant women between ages 20 and 35 years, who were in their 37 to 41 gestational weeks, vertex presentation, and in spontaneous labour were involved in the study.

Cases with systemic diseases such as diabetes mellitus, hypertension, heart disease and history of coagulation

disorders and who had contraindication for regional technique were not involved. Cases involved in the study were divided into 2 groups based on the cervical dilatation at which the patients requested epidural analgesia. While Group I was the early epidural group (EEG) group, in which the epidural analgesia was applied when cervical dilatation was ≤4; Group II was regarded as the late epidural group (LEG), in which the epidural analgesia was applied when cervical dilatation was >4 cm.

In the early group, the epidurals were started immediately following the women's request before cervical dilatation reached 4 cm. In the late group, patients requested the epidural analgesia when cervical dilatation was at least 4 to5 cm, and until that time analgesia was provided by intravenous pethidine and promethazine, as clinically required. The obstetric management, apart from the timing of initiation of epidural analgesia, was similar in the 2 groups.

The epidural insertion followed intravenous prehydration with 500 mL of lactated Ringer's solution. The epidural space, at the L2-3 or L3-4 intervertebral space, was identified with use of the loss-of-resistance technique with a 17-gauge Tuohy needle. An epidural catheter was inserted 4 to 5 cm into the epidural space, and a test dose of 3 ml lidocaine 2% was followed 5 minutes later by a bolus injection of 15 mL of ropivacaine 0.15% and 2 µgm Fentanyl/ml of ropivacaine. Ropivacaine is an amino amide local anesthetic agent that is structurally similar to bupivacaine, but because of its greater selectivity for block of sensory fibers, it is associated with less motor block. Analgesia was maintained using a continuous infusion of 0.15% ropivacaine only (using 0.9% normal saline for dilution) at 6-8 ml/hr to be started 30 minutes after loading dose. Further boluses of 5 to 10 mL ropivacaine 0.15% were given upon request. Episodes of hypotension, defined as systolic blood pressure < 20% of baseline and < 100 mm Hg, were managed by rapid infusion of lactated Ringer's solution 5 mL/kg and intravenous boluses of inj. mephenteramine, as required. Automated maternal blood pressure and heart rate, tocodynamometry, and continuous fetal heart rate were monitored throughout labor. Besides, patients were observed in terms of nausea, vomitting, sedation, shivering, urinary retention and itching. Pain score was obtained at the time of contraction using a standard visual analog pain scoring system. Participants were asked to grade their pain from 0, ''no pain,'' at one end of the line, to 10, ''worst pain imaginable,'' at the other end.

Periods of the labour phases (1st stage: time between the beginning of contractions with 2-3 minutes frequency and complete cervical dilatation, 2nd stage: time between complete cervical dilatation and delivery), necessity for interventional labour such as vacuum and forceps, and cesarean delivery incidence were evaluated.

Statistical Package for Social Sciences (SPSS) for Windows 15.0 program was used for statistical analyses when assessing the findings obtained in the study. Chi-Square test was applied for both groups. The results were acknowledged by p<0.05 statistically significant.

Results

The study comprised of total 100 patients who were divided into two groups based on the cervical dilatation at which patients requested epidural analgesia into early epidural group (EEG) and late epidural group (LEG). Out of 100 patients, 68 patients requested epidural analgesia before 4cm cervical dilatation. Only 11 patients requested after 6 cm. (**table 1 and 2**).

Table 1

Cervical dilatation	No. of patients N = 100 (%)
3cm	30 (30%)
4cm	38 (38%)
5cm	21 (21%)
6cm&above	11 (11%)
TOTAL	100 (100%)

Table 2

GROUP	No. of patients N = 100 (%)
EARLY (<=4cm)	68 (68%)
LATE (> 4cm)	32 (32%)

No statistically significant differences were detected between groups in evaluation of demographical data concerning the cases such as age, height, weight and gestational age (**table 3**)

Table 3: Demographic features (P > 0.05).

Characteristic	EARLY (EEG) Mean ± SD	LATE (LEG) Mean ± SD
Mean age (years)	27.85 ± 2.94	25.81 ± 3.09
Mean height (cm)	163.1 ± 8.31	162.4 ± 8.33
Mean weight (kg)	61.06 ± 4.84	60.65 ± 5.46
Mean GA (weeks)	38.76 ± 1.24	38.10 ± 1.24

In the evaluation of obstetrical data, when comparing the stages of the labour, it was observed that the mean duration of 1st stage of labour in the early group (EEG) was more as compared to the late group (LEG) but the P value was 0.170, i.e, > 0.05 when calculated by t-test. Therefore, the difference is not statistically significant. It was further noticed that the mean duration of second stage in late group (LEG) was more as compared to the early group (EEG) (P = 0.04 by t-test, statistically significant) thus causing prolongation when the epidural is given late. However, this statistically significant extension of time in the second phase was within acceptable limits for second phase. (**table 4**)

Table 4: Duration of labour phases

Duration in hours	EARLY (Mean ± SD)	LATE (Mean ± SD)	*p* value

First stage (latent + active phase)	13.86 ± 7.55 hr	11.7 ± 4.19 hr	0.170
First stage (active phase)	4.29 ± 2.26 hr	4.53 ± 1.93 hr	0.6
Second stage	74.8 ± 28.02 min	89.5 ± 35.51 min	0.04

The mode of delivery is shown in **table 5**. The rates of cesarean section were not different significantly, being 20.5% in the early group (EEG) and 18.7% in the late group (LEG) (P = 0.8). The rates of instrumental vaginal deliveries in the EEG and LEG were 41.1% and 46.8%, respectively (P = 0.5) (**Table 5**).

Table 5: Outcome of labour

OUTCOME	EARLY N = 68	LATE N = 32	*p* value
FTND	26 (38.2%)	11(34.3%)	0.7
INSTRUMENTAL	28 (41.1%)	15(46.8%)	0.5
LSCS	14 (20.5%)	6 (18.7%)	0.8

In the late epidural group, 80% of subjects stated that in their next labor they would prefer to take the epidural early. In the early group, only 3% patients preferred to take the epidural late next time. This difference was statistically significant between the two groups (P < 0.0001). There was no statistically significant difference observed with respect to satisfaction with the epidural analgesia in both the groups as the level of satisfaction was more than 80% in both the groups.

Discussion

Epidural analgesia is today the best accepted method of labour analgesia, because it can provide the pain relief during labour and also enables the mother to get involved in birth process both physically and emotionally.[6]

In this study where we searched the effect of epidural analgesia when given early or late in labour, it was stated that the duration of first phase of labour was not significantly different when epidural was given early or late in labour, but the second phase was significantly longer in late group as compared to the early group. It was also stated that there was no significant difference in the interventional delivery incidence and the rate of cesarean delivery between the two groups.

During the last few years, many studies have been published about the effects of the timing of epidural analgesia on the progress and outcome of labour.

In a study done by Ohel et al[3], there was statistically shorter first stage of labour in the early group and the second stage was similar contrary to the results of our study. But the incidence of instrumental and caesarean delivery was similar in both the groups which were in accordance with our study.

Similarly, Wong et al[4] also showed that the overall duration of labour was shorter in early compared to the late group but there was no difference in the mode of delivery in both the groups similar to the results of our study.

In the two randomized studies of Chestnut et al[7,8], the timing of epidural analgesia did not have any effect on the duration of first stage of labour and both studies demonstrated a similar incidence of caesarean as well as instrumental deliveries as shown in our study.

In a systematic review of various RCTs and cohort studies done by Marucci et al[9] regarding the timing effects of the neuraxial analgesia on the mode of delivery demonstrated a similar rate of caesarean delivery (odds ratio [OR] 1.00, 95% CI 0.82–1.23) and instrumental vaginal delivery in the early epidural group and late epidural group (OR 1.00, 95% CI 0.83–1.21). Wassen et al[10] also showed similar results with no increased pooled risk of caesarean (pooled risk ratio 1.02, 95% CI 0.96–1.08) or instrumental vaginal delivery (pooled risk ratio 0.96, 95% CI 0.89–1.05) in nulliparous women at 36 weeks or more of gestation receiving early epidural analgesia at <4 cm dilatation in comparison with epidural analgesia given to women after 4 cm dilatation.

Similarly in a Cochrane review of 9 studies done by B. Sng et al[11], it was shown that there was no clinically meaningful difference in risk of caesarean section with early versus late initiation of epidural analgesia for labour (risk ratio (RR) 1.02; 95% confidence interval (CI) 0-96 to 1.08, nine studies, 15499 women, high quality evidence). There was also no clinically meaningful difference in risk of instrumental birth (RR 0.93; 95% CI 0.86 to 1.01, 8 studies, 15,379 women, high quality evidence) and the duration of second stage of labour also did not show significant difference between the two groups (mean difference -3.22 minutes; CI -6.71 to 0.27, 8 studies, 14,982 women, high quality evidence). There was significant heterogeneity in the duration of first stage of labour and the data were not pooled.

Conclusion:

ACOG recommendation[12] in 2000 recommends delaying epidural analgesia until the cervix is dilated to at least 4 cm. But it has been found that delaying the epidural have a negative effect on the women's perceived control during childbirth, while immediate compliance with the request for epidural would have a positive effect. Also the findings of various studies and our study also demonstrate that early initiation of epidural analgesia has no adverse obstetric effects, it becomes even more important to accommodate to the preferences of the laboring women. The patients of our study showed a high degree of satisfaction with the epidural analgesia, given at any stage of labor, but the patients of LEG suggested that they would prefer to take the epidural analgesia early in labour in their next pregnancy. Therefore, after the several metaanalysed studies, ACOG committee also revised their statement in 2006 and emphasized that maternal request for EA early in labour cannot be rejected on the grounds of its presumed adverse effects on the labour and mode of

delivery[13]. Consequently, the preference of the laboring women should be leading.

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