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## Effects of Epidural Analgesia on Labor Course

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**Abstract:** To evaluate the effect of epidural analgesia on the progress of delivery and fetal outcome on nulliparous labor and delivery this study was designed. One hundred primiparous women randomly divided into two equal groups to receive either epidural analgesia (case group n = 50) or no any intervention for delivery (control group n = 50). In the case group epidural analgesia was done in 4-5 cm dilatation of cervix. Labor progress, length of labor stages, fetal heart patterns, oxytocin administration and dosage was checked by residents for each patient. Mean of active phase length, first and second stage length, rate of fetal distress, cesarean section, instrumental delivery and low Apgar score (Lower than 7 in first and fifth minute) were compared. The mean and maximal rates of oxytocin infusion were similar between the two study groups. First and second stages of labor were a little lengthened in woman who had epidural analgesia but this difference was not significant statistically. There were no any significant differences between two groups regarding rate of fetal distress and cesarean section. We concluded epidural analgesia did not affect length of labor or cesarean rate and has no effect on perinatal outcome and can therefore be recommended to mothers as a satisfying and effective method of pain relief for labor.

**Key words:** Epidural analgesia, labor duration, pain relief

### INTRODUCTION

Labor is painful for majority of mothers and extremely painful for some. The amount of pain experienced by a woman during labor and delivery can be influenced by many factors, including participation in child birth preparation classes, parity and use of oxytocin. A variety of analgesic techniques are available such as psychological techniques, systemic medication, inhalational anesthesia and regional anesthesia. (Miller, 2005).

Among various analgesic options, lumbar epidural analgesia is a safe and effective method and for most women provides unparalleled relief from the pain of labor and delivery (Cunningham *et al.*, 2005).

Perhaps one of the hotly debated topics in obstetric anesthesia relates to the possible effects of epidural analgesia on the progress of labor and incidence of operative delivery. Many studies have reported that epidural analgesia prolongs labor (Sienko *et al.*, 2005; Decca *et al.*, 2004; Alexander *et al.*, 2002, 1998; Avelin and Bonnet, 2001). Some studies also have reported that this type of analgesia increases rate of instrumental delivery (Decca *et al.*, 2004; Rojansky *et al.*, 1997), cesarean section (Lach *et al.*, 2003; Ramin *et al.*, 1995; Thorp *et al.*, 1993) and low Apgar score of neonates (Lach *et al.*, 2003; Vavrinkova *et al.*, 2005). Although other trials

observed the epidural analgesia is not associated with increase of labor duration (Rogers *et al.*, 1999), cesarean section (Sienko *et al.*, 2005; Decca *et al.*, 2004; Rogers *et al.*, 1999) and low Apgar score (Salim *et al.*, 2005; Alexander *et al.*, 1998; Tontisirin *et al.*, 1990).

Because of different reports and controversies about effects of epidural analgesia on labor status this study was designed.

### MATERIALS AND METHODS

This clinical trial study was conducted in Kashan Shahikhani gynecological hospital (IRAN) in 2003. The study protocol had received approval from ethical committee of research center of university before patient enrollment. Written informed consent was obtained before study participation. 100 primiparous women aged 20-42 year (mean = 22.25±9.07) were referred by gynecologist for labor randomly divided into two equal groups to receive either epidural analgesia (case group n = 50) or no any intervention for delivery (control group n = 50). All of cases had live singleton pregnancy, 37 weeks ≤ gestational age, cephalic presentation of fetus and lack of contraindication for vaginal delivery. They had no any important co-existing disease. Oxytocin administered equally and through a same method in both

groups. In the case group epidural analgesia was done in 4-5 cm dilatation of cervix, in sitting position after injection of 4 cc lidocaine 2% for local anesthesia at L2-L3 or L3-L4 area by anesthesiologist. Epidural catheter no.18 was used and 10 cc Lidocaine 5% with 0.1 mg epinephrine was injected, then needle was withdrawn and catheter was fixed there for later injection. Vital signs were checked every one minute for first 15 min and then every 10 min.

Labor progress, length of labor stages and fetal heart patterns and oxytocin administration and dosage was checked by residents for each patient.

Mean of active phase length, first and second stage length, rate of fetal distress, cesarean section, instrumental delivery and low Apgar score (Lower than 7 in first and fifth minute) were compared.

Results were analyzed by Fisher's exact test, Chi-square and t-Student tests.

### RESULTS AND DISCUSSION

Fifty parturient received epidural analgesia and 50 had normal vaginal delivery without any intervention for pain control during labor. The women did not differ in characteristics like age and gestational age (Table 1).

The mean and maximal rates of oxytocin infusion were similar between the two study groups.

First and second stages of labor were a little lengthened in woman who had epidural analgesia but this difference was not significant statistically. There were no any significant differences between two groups regarding rate of fetal distress and cesarean section (Table 2).

There was one case of instrumental delivery (vacuum assisted) and one low Apgar score neonate in each group which could not be statistically analyzed because of limited cases.

Table 1: Comparison of maternal and gestational age between epidural and control group

Variable	Case group	Control group
Age (year)	22.4±3.15	22.1±2.98
Gestational age (week)	39.4±2.07	39.28±0.91

\*p>0.05

Table 2: Frequency distribution of labor progress and outcome in case and control groups.

Groups	Labor course					
	Length of stage I (h)	Length of stage II (h)	Fetal distress N (%)	Cesarean section N (%)	Vacuum assisted N (%)	Low Apgar
Case						
N = 50	2.59±1.35	1.01±0.77	4(8)	6(12)	1(2)	1(2)
Control						
N = 50	2.32±1.66	0.85±0.66	2(4)	4(8)	1(2)	1(2)
p-value	0.38	0.38	0.8	0.5		

Many studies have reported that epidural analgesia prolongs labor and increases the need for oxytocin augmentation (Sienko *et al.*, 2005; Salim *et al.*, 2005, Decca *et al.*, 2004; Alexander *et al.*, 2002, 1998), while some trials observed diluted solutions of local anesthetics in labor maybe less likely to affect progress of labor or early epidural placement do not affect length of labor (Rogers *et al.*, 1999). In this study there was no statistically significant difference between labor progress in epidural and control group.

Study design, anesthetic technique and investigator bias all may contribute to the effects of epidural analgesia on the progress and outcome of labor.

In this study there was no significant difference between two groups of study regarding cesarean section rate. Multiple studies have shown an association between epidural analgesia and cesarean delivery. (Newton *et al.*, 1995; Ramin *et al.*, 1995; Thorp *et al.*, 1993,1989; Philipsen *et al.*, 1989), while some studies confirm that epidural analgesia has no effect on incidence of cesarean delivery (Sienko *et al.*, 2005; Decca *et al.*, 2004; Avelin and Bonnet, 2001; Rogers *et al.*, 1999; Naulty *et al.*, 1992).

There are controversies about the rate of instrumental delivery and epidural analgesia too. In our study among 100 parturient only 2 cases have vacuum assisted delivery (1 in each group) which we could not statistically analysis them. Some studies have shown epidural analgesia increases the rate of instrumental delivery (Decca *et al.*, 2004; Alexander *et al.*, 2002; Avelin and Bonnet 2001; Rojansky *et al.*, 1997), while recent study by Sienko *et al.* (2005) has shown no significant difference in the rate of instrumental vaginal deliveries in patients with and without epidural analgesia.

Different results about length of labor, rate of instrumental delivery and cesarean section maybe due to different study design. In some studies women do not choose epidural randomly. Parturient with sever pain are more likely to request epidural analgesia. Painful labor itself more likely to be abnormal long and complicated. Thus women with abnormal labors are more likely to request epidural analgesia and it should come as no surprise that these labors remain abnormal even after the induction of epidural block.

Many studies have considered the effect of epidural analgesia on Apgar score of newborn baby. Some of them believed that epidural analgesia can cause lower Apgar score directly during normal delivery (Vavrinkova *et al.*, 2005) or indirectly by increasing the rate of forceps delivery (Lach *et al.*, 2003), but many studies have showed neonatal outcomes were unaffected by the epidural analgesia (Fernandez *et al.*, 2005; Salim *et al.*,

2005; Decca *et al.*, 2004; Porozhanova and Bozhinova, 1998; Alexander *et al.*, 1998). In this study only 2 cases (1 in each group) had low Apgar score that we could not analysis them statistically. On the other hand we considered fetal heart rate as a criterion for neonatal outcome and we did not find any significant difference in fetal heart rate between two groups of study.

The opinion that epidural analgesia deleterious the normal labor progress and successful vaginal delivery was not confirmed in our study. Based on our findings epidural analgesia is a safe method either for mother or baby and can be offered to women without concerning about increasing chance of instrumental or operative delivery and fetal distress. On the other hand analgesia may encourage some women to choose vaginal delivery instead of cesarean section.

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