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Impact of epidural analgesia on the duration and outcomes of labour

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Abstract

Background & objectives: Epidural analgesia has the highest rate of satisfaction regarding labour pain relief. The aim of this study was to compare the progress and outcomes of low-risk deliveries with and without the use of epidural analgesia.

Methods: A retrospective analysis of low-risk deliveries were conducted at the Department of Obstetrics and Gynecology of the Lithuanian University of Health Sciences in the period of 2017–2018. The need for pain relief in low-risk deliveries, duration of labor, anhydrous period, and neonatal condition was evaluated and compared between two groups: delivery with and without epidural analgesia.

Results: There were 864 deliveries of low-risk during the study period, of which 13% received epidural analgesia. There were no significant differences in the mean age of women and duration of gestation in the groups. Women who gave birth with EA had a significantly longer duration of 1st and 2nd stage of labor and longer total duration of labor (11 hr 24 min vs. 5 hr 40 min; 1 hr 4 min vs. 31 min; 12 hr 37 min vs. 6 hr 12 min, respectively), $p < 0.05$). The duration of anhydrous period was also significantly longer in the group with EA (7 hr 16 min vs. 2 hr 49 min, $p < 0.05$). There were no significant differences in the distribution and frequency of delivery wound complications. Neonates born in both groups were in good condition and without any significant differences.

Conclusions: The incidence of epidural analgesia in low-risk deliveries was 13%. Epidural analgesia was associated with longer 1st and 2nd stage of labor, longer anhydrous period and total duration of labor. Anesthesia during labor did not affect the incidence of delivery wound complications and condition of neonates.

Keywords: epidural analgesia, labor pain, outcomes, neonate.

Introduction

Labor is one of the most painful experiences women encounter (1). All women are perceiving pain of labor differently while they have distinct pain barrier and reaction (2). Every woman's experience is different, thus method of pain relief depends on competence of a specialist, availability of a technique, as well as patient and care giver consensus. The optimal measure of pain management during labor should be effective, secure and without adverse consequences for both mother and child (2). Epidural analgesia (EA) is used to relieve painful stimuli, caused by the contractions of the uterus, by injecting a local anesthetic into the epidural space of the lumbar vertebra (3,4). There is a variety of medication used for labor pain management including: local anesthetics, opioid analgesics, anticholinergic agents, etc. On the technical side, to perform epidural for women in labor is more difficult, it is also associated with greater risk compared with non – pregnant patients. Parturient women's request is an indication for EA, if contraindications is not found (2). EA is viewed as the most effective type of pain relief, compared with inhaled analgesia, opioids and non – pharmacological methods of pain relief. It also has the highest rate of satisfaction regarding pain relief amongst maternal women (5). The use of epidural analgesia escalated adequately in the past two decades (6). According to Cambic et al. number of women giving birth with neuraxial analgesia including EA increased from 21% to 77% in the period of 1981 – 2001 (7). It is now considered that approximately half of parturient women receive epidural analgesia as a main mean of pain management worldwide (6). Relieving pain of labor in parturient women contributes to their well – being and therefore averts negative effects of stress (8) by reducing the escalation of stress hormones (cortisol, epinephrine, etc.) (9) Regardless increased prevalence and advantages of EA, it is also related to inadvertent consequences. Numerous studies have reported associations between epidural analgesia and both maternal and neonatal outcomes (5,6,10,11). According

to Reynolds et al., medications that laboring women are presented with might have direct and indirect effect on neonate (9).

Furthermore, EA is linked with prolonged duration of labor and higher rates of instrumental delivery (2,7).

In conclusion, even though it is an effective method of pain relief, epidural analgesia can have negative impact on the outcomes of labor. In this study we assessed whether there could be any unfavorable outcomes associated with epidural analgesia in low-risk deliveries.

Material and methods

A retrospective analysis was performed in Kaunas Hospital of Lithuanian University of Health Sciences, Obstetrics and Gynecology Delivery department. All low-risk births were selected during the period from 2017-01-01 to 2018-12-31. Low-risk deliveries (normal pregnancy, low-risk, natural birth) were selected and incidence of anesthesia during labor were assessed. Furthermore, low-risk deliveries were divided in two groups: delivery with epidural analgesia (EA) and without epidural analgesia. Women, who had received EA during labor, were assigned to the study group “with EA”. 99 cases with EA were analyzed and twice as much women without epidural analgesia (“without EA”, n = 198) were selected for data comparison. Maternal age, gestation during labor, total duration of labor, duration of stages of labor and anhydrous period, delivery wound complications (perineum, vagina, cervix) and neonatal condition (Apgar scores of 1st and 5th minute, weight and gender) were analyzed and compared between two groups.

Statistical analysis and calculations were performed with Microsoft Excel and Statistical Package for Social Sciences (SPSS) version 26.0 (SPSS Inc., Chicago, IL, USA) software package. Descriptive statistics are given as percentages and mean \pm standard deviation (M \pm SD). Values of quantitative variables whose distributions did not meet the

normality assumption were compared using the non-parametric Man-Whitney criterion. Categorical outcome variables and group differences of qualitative features were assessed using the nonparametric Chi-squared (χ^2) criterion. Two-sided p values less than 0.05 were considered statistically significant.

Results

There were 864 deliveries of low-risk during the study period, of which 13% received epidural analgesia. There were no statistically significant differences in the

maternal mean age and the duration of gestation between the groups. Women who gave birth with EA had a significantly longer

duration of 1st and 2nd stage of labor and longer total duration of labor. The duration of the anhydrous period was also significantly longer in the EA group. There were no statistically significant differences in the distribution and frequency of delivery wound complications between the groups (p>0.05) (table 1).

Maternal characteristic	With EA n = 99	Without EA n = 198	p value
Maternal age, y, mean (SD)	29 (5)	31 (5)	> 0.05
Gestational age at delivery, weeks; mean (SD)	39 (1)	39 (1)	> 0.05
Total duration of labor, min, median (min.; max.)	740 (180; 1430)	340 (50;1066)	< 0.05
Length of 1st stage, min, median (min.; max.)	660 (130;1400)	315 (30;930)	< 0.05
Length of 2nd stage, min, median (min.; max.)	53 (3;188)	16 (2;420)	< 0.05
Duration of anhydrous period, min, median (min.; max.)	277 (5;2976)	76 (2;1120)	< 0.05
Wound complications, n (%)	62 (63)	124 (63)	> 0.05

Table 1. Maternal characteristics in groups with and without epidural analgesia (EA)

Neonates born in both groups were in good condition. In groups of parturients that gave birth with and without epidural analgesia significant differences while evaluating Apgar scores after 1 min. and after 5 min. were not found ($p > 0.05$). Mean birth weight of neonates was similar in both groups. Gender distribution between groups with and without EA did not differ significantly either ($p > 0.05$) (table 2).

Newborn characteristics	With EA n = 99	Without EA n = 198	p value
1 - min Apgar score, median (min.; max.)	9 (8;10)	9 (8;10)	> 0,05
5 - min Apgar score, median (min.; max.)	10 (8;10)	10 (9;10)	> 0,05
Birthweight, g (SD)	3494 (440)	3531 (379)	> 0,05
Newborn male, n (%)	42 (47,2)	105 (53)	> 0,05

Table 2. Newborn characteristics in groups with and without epidural analgesia (EA)

Discussion

Epidural analgesia is a commonly chosen method of labor pain management for women, consequently it is important to evaluate its outcomes. In this study, we aimed to analyse a retrospective data of low risk deliveries and evaluate if epidural analgesia is associated with unfavorable outcomes for women and newborn. Present study did not found significant difference between age of women who gave birth with and without EA. Accordingly, Sitras and colleagues reported that age was not a significant agent determining whether delivery occurred with or without EA (12). Our study demonstrated that epidural analgesia prolonged both 1st and 2nd stages of labor. Total duration of labor for women with EA was also nearly twice longer. Many studies have found that for women that gave birth with EA compared with those without EA, both stages of labor were longer (13,14). Just few studies presented that EA

shortens first stage and prolongs the second one (1), while another reported just about the prolonged second stage in cases of delivery with EA (4). In contrast, few studies concluded that associations between epidural analgesia and longer duration of labour were not found (15,16). There are not enough studies reporting about the distinction of anhydrous period duration comparing women with EA and without labor pain management using EA. This study exclusively identified that anhydrous period was almost three times longer for women who were delivering with EA compared with group without EA.

To define the possible collateral effects on neonates the Apgar score after 1 and 5 minutes was evaluated as well as the weight of the newborns. No significant differences between groups were found in this study. The results of this study are consistent with those of other authors (6,17). In our study the epidural analgesia was not associated with perineal lacerations. Similarly, Garcia-Lausin et al. concluded that there is no significant

association between EA and perineal tears. Likewise results are demonstrated in a variety of different studies (18–21).

However, some potential limitations should be noted. Access to some of the important data, for example, umbilical cord pH for further neonatal evaluation, were limited as a conducted study was retrospective. Evaluation of the condition of newborns, especially due to possible infection needs to be performed in the group of perinurients that gave birth under EA. It is important because of the prolongation of anhydrous period, which increases the risk of newborn infection. This might be the part of an extensive future research.

In summary, in this study the incidence of epidural analgesia in low risk deliveries was 13%. Epidural analgesia was associated with longer 1st and 2nd stage of labor, longer anhydrous period and total duration of labor. Anesthesia during labor did not affect the incidence of perineal lacerations and condition of newborns.

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