

## Compare Second Stage of Labour with or without Epidural Analgesia

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### ABSTRACT

**Background:** Epidural analgesia involves the injection of a local anesthetic agent into spinal cord. Delayed pushing has found association between epidural analgesia, instrumental deliveries and prolongation of second stage of labour.

**Objective:** To compare second stage of labour with or without epidural analgesia at Aga Khan University Hospital.

**Study Design:** Cohort study

**Setting:** The Department of Obstetrics and Gynaecology, Aga Khan University Hospital, Karachi.

**Duration:** From 1<sup>st</sup> March, 2020 to 1<sup>st</sup> August, 2020

**Material and Methods:** Total 80 patients were included and equally divided into group who received epidural analgesia and group who did not get epidural analgesia. Dependent variable was epidural analgesia and Independent variables are labor outcome as prolonged 2<sup>nd</sup> stage of labour with or without epidural analgesia. Stratification was done. Post stratification chi-square test was applied. P-value  $\leq 0.05$  was taken as significant.

**Results:** The mean mother's age in epidural and non-epidural groups was 29.48 $\pm$ 4.38 years and 28.08 $\pm$ 4.68 years. Prolonged second stage of labour was observed in 12.5% patients of epidural group and 5% patients of non-epidural group. The results showed significant association of prolonged second stage of labour with exposed and unexposed groups.

**Conclusion:** Our study results showed that, prolonged second stage of labour was observed more among women in epidural group as compared to them women in non-epidural group.

**Keywords:** Second Stage Labour, With or Without Epidural Analgesia

### INTRODUCTION

Labour is a physiological process and causes severe pain which requires proper pain management for better pain relief.<sup>1</sup> Labour pain is a visceral pain associated with a birth of baby, although it is frequently positive and empowering for the parturient to deliver a baby. Women's experiences of childbirth and labour pain vary greatly from person to person.<sup>2,3</sup>

There are different ways for pain relief in labour like parenteral pethidine, inhalational analgesia, and epidural analgesia etc. According to survey by the UK National Birthday Trust (NBT), pethidine was helpful in 16% of women while in 25% it didn't work. However, midwives use pethidine frequently, than other analgesics in labour and considered sedation as analgesia.<sup>4</sup> A 50:50 mixture of oxygen with nitrous oxide as inhalational analgesia is also used in tertiary care hospitals of the United Kingdom. However it is not a potent analgesic combination if used for shorter period during labour but it is safe for laboring women and their babies.<sup>5</sup> Epidural analgesia is a central nerve blockade technique that involves the injection of a local anesthetic agent into the spinal cord thus blocking the lumbosacral nerves roots at L2-3/L3-L4 in epidural space, hence painful impulses which are generated from the nerves of the contracting uterus during labor are blocked. It is commonly used for intra-partum pain management in approximately 60% of women in the United States<sup>6</sup> while 20% of women in UK utilizing this technique as a form of pain relief.<sup>7</sup> Epidural analgesia gained popularity worldwide as a result of its ability to provide analgesia and is more effective method of pain relief.<sup>8</sup>

Epidural analgesia is administered by a team of an experienced anesthetist, an obstetrician and trained midwife, this may convert the painful labour into a less stressful event for a woman. Its advantages of pain free labour, and better psychological outcome outweighs its drawbacks.<sup>9</sup>

Whereas epidural analgesia reduces the uterine activity and eliminates the desire to push down by blocking the nerves supplying pelvic floor, both of these effects will delay the rotation of head, increase the need for oxytocin administration, prolongation of second stage of labour and instrumental delivery<sup>10</sup>, which itself leads to complication like perineal tears and infection. Neonatal outcomes include: low Apgar score, birth trauma, admission to neonatal intensive care unit.<sup>11</sup>

According to comparative study done by Bushra et al in April, 2013 that epidural analgesia causes a significant prolongation of 2<sup>nd</sup> stage of labour, they found that 27% of the patients with epidural analgesia were delivered with maximum time duration in 2<sup>nd</sup> stage of labour while 11.4% with parenteral opioids and risk of instrumental vaginal delivery in group of patient with epidural analgesia was 10.55% comparing 2.78% in controls group.<sup>12</sup> In other study prolong second stage of labour with non-epidural 10% and with epidural analgesia prolong 2<sup>nd</sup> stage of labour was 36%.<sup>13</sup>

Another study deny these risks as there results showed statistically non-significant difference of second stage of labour and instrumental deliveries with epidural, 11% and Non-epidural 16% group. However, the incidence of cesarean section in epidural group is slightly higher, 16% versus non-epidural group 15%, which was also statistically non-significant. Similarly Neonatal outcome in terms of Apgar score of less than 7 at 1 and 5 min was similar in both groups.<sup>8</sup>

Thus we aim to compare labour outcome with and without epidural analgesia in our local settings. This will help in counseling of the patients about the risk associated with epidural analgesia and to tell them about better pain relief during labour.

Over the past few years the use of epidural analgesia has been progressively increased. Yet there is need to better understand the risks associated with epidural analgesia as vacuum or forceps vaginal deliveries and prolongation of second stage of labour. This will assist in adapting better pain relief technique during labour.

### MATERIALS AND METHODS

This cohort study was conducted at Obstetrics and Gynaecology Department, Aga Khan University Hospital, Karachi, Pakistan. Six months from 1<sup>st</sup> March, 2020 to 31<sup>st</sup> August, 2020. The sample size was calculated on the basis of previous research study where: Prolong second stage labour in non-epidural group= 10%<sup>13</sup>, prolong second stage labour in epidural group= 36%.<sup>13</sup> Calculation; Power of the study= 80%, type 1 error= 5%, calculated sample size in each group=40, total sample size= 80.

#### Inclusion Criteria:

- All pregnant women (age 20-40 Years)
- (Primigravida/multigravida) with a singleton pregnancy
- Cephalic presentation

- c) 36 weeks or more of gestation
- d) Patient taking epidural analgesia
- e) Patient not taking epidural analgesia

**Exclusion Criteria:**

- a) Patients with Previous caesarean section
- b) Short maternal stature (height less than 148 cm)
- c) Good size baby (more than 4 kg).
- d) Presence of medical complications (preeclampsia, eclampsia, Diabetes)
- e) Presence of contraindications for epidural analgesia.

**Data Collection Procedure:** After Approval of synopsis from Ethical review board of Aga Khan University and College of Physician and Surgeon Pakistan, all pregnant ladies (20 to 40 years) admitted to Labor ward at Aga khan hospital for delivery, fulfilling inclusion criteria and giving consent were enrolled in this study. In this study women were divided in to two groups, Exposed group who received epidural analgesia and Non exposed Group were get analgesia other than epidural as per hospital protocol. Patient demographics, age, gestational age, parity, stages of labor, partogram, and CTG were recorded in a register by investigator. Dependent variable is epidural analgesia and Independent variables are labor outcome as prolonged 2<sup>nd</sup> stage of labour with or without epidural analgesia. All information were taken from the medical records of the included participants and confidentiality were maintained by keeping record in lock and key.

**Data Analysis Procedure:** Data were analyzed by Statistical Package for Social Sciences (SPSS) version 17.0. Results were described in term of mean and standard deviation for quantitative variable including maternal age, maternal weight, gestational weeks at time of delivery, birth weight of baby. Categorical variables that is parity and outcome prolong second stage of labour were described in term of frequencies and percentages. Comparison between epidural and non epidural analgesia with respect to prolonged second stage of labour was done using chi square test, P value equal to or less than 0.05 was taken as significant and relative risk was calculated. Effect modifiers were controlled through stratification of age, maternal weight, gestational age, parity, birth weight of baby, to see effect of these on outcome variables.

**RESULTS**

The mean mother's age of patients in epidural and no-epidural groups was 29.48±4.38 years and 28.08±4.68 years respectively. The descriptive statistics of age are presented in Table-1. Frequencies of patients in age groups are presented in Figure-1. Out of 80, 3 (14.3%) patients with age >30 had prolonged second stage of labour while 18 (85.7%) had not in epidural group. While in non-epidural with age > 30 have 1(3.4%) had prolonged second stage of labour and not in 28(96.6%) patients. Out of 80 2(10.5%) patients with age <30 had prolonged second stage of labour while 17(89.5%) had not in epidural group. While in non-epidural with age <30 have 1(9.1%) had prolonged second stage of labour and not in 10(90.9%) patients. The age was further stratified in two groups as < 30 or > 30 years with P- values 0.29 and 1.000 which not show significant increase in two groups.

The mean parity of patients in epidural and no-epidural groups was 0.68±0.85 and 0.73±0.87 respectively. The descriptive statistics of parity are presented in Table-1. The parity was further stratified in two groups. Frequencies of patients in parity groups are presented in Figure-2. Out of 80 patients primi gravida 2(9.5%), Para1 2(15.4%), and >2 1(16.7%) had prolonged second stage of labour while primi gravida 19(90.5%), para 1 11(84.6%) and >2 5(83.3%) had not in epidural group. While in non-epidural primi gravida 0(0%), Para 1 1(6.7%), and >2 1(16.7%) had prolonged second stage of labour and not in primi 19(100%), para 1 14(93%), para >2 5(83.3%) patients. The parity was stratified in two groups as primi gravida, para 1, para >2 with P- values 0.480, 0.58 and 1.000 which not show significant increase in two groups.

The mean height of patients in epidural and no-epidural groups was 154.65±9.33 cm and 156.07±9.69 cm respectively. The descriptive statistics of height are presented in Table-1.

The mean body mass index (BMI) of patients in epidural and no-epidural groups was 21.26±2.82 kg/m<sup>2</sup> and 20.58±4.63 kg/m<sup>2</sup> respectively. The descriptive statistics of BMI are presented in Table-1. The BMI was further stratified in two groups. Frequencies of patients in BMI groups are presented in Figure-3. Out of 80, patients with BMI >24kg/m<sup>2</sup> 2(100%) had prolonged second stage of labour while 3 (50%) had not in epidural group. While in non-epidural with 0(0 %,) had prolonged second stage of labour and not in 3(50%) patients. Out of 80 patients with BMI < 24kg/m<sup>2</sup> 13(72.2%) had prolonged second stage of labour while 22(40.7%) had not in epidural group. While in non-epidural have 5(27.8%) had prolonged second stage of labour and not in 32(59.3%) patients. The BMI was further stratified in two groups as >24kg/m<sup>2</sup> or <24kg/m<sup>2</sup> with P- values 0.206 and 0.02 which not show significant increase in prolonged second stage of labour in two groups.

The mean gestational age of patients in epidural and no-epidural groups was 38.45±0.90 weeks and 38.20±1.13 weeks respectively. The descriptive statistics of gestational age are presented in Table-1. The gestational age was further stratified in two groups. Frequencies of patients in gestational age groups are presented in Figure-4. Out of 80, patients <38 weeks gestation 3(37%) had prolonged second stage of labour while 8 (40%) had not in epidural group. While in non-epidural with 5(62.5 %,) had prolonged second stage of labour and not in 12(60%) patients. Patients with gestational age>38 weeks 12(100%) had prolonged second stage of labour while 17(42.5%) had not in epidural group. While in non-epidural no patient had prolonged second stage of labour observed. The gestational age was further stratified in two groups with P- values 0.90 and 0.000 which not show significant increase in prolonged second stage of labour in two groups.

The mean baby birth weight in epidural and no-epidural groups was 2.77±0.79 kg and 2.74±0.80 kg respectively. The descriptive statistics of baby birth weight are presented in Table-1. The baby birth weight was further stratified in two groups as >2.5kg or <2.5kg. Frequencies of patients in birth weight groups are presented in Figure-5.

Out of 80, patients baby birth weight <2.5kg 7(63.6%) had prolonged second stage of labour while 12 (46.2%) had not in epidural group. While in non-epidural with 4(36.4 %,) had prolonged second stage of labour and not in 14(53.8%) patients.

Baby weight >2.5kg 8(88.9%) had prolonged second stage of labour and 13(38.2%) had not in epidural group. While in non-epidural have 1(11.1%) had prolonged second stage of labour and not in 21(61.8%) patients. The baby weight was further stratified in two groups with P- values 0.331 and 0.007 which show significant increase in prolonged second stage of labour in two groups.

Table 1: Descriptive Statistics of Prolonged Second Stage of Labour in Epidural Group Versus Non Epidural Group (n=80)

Variable	Group A Mean±SD	Group B Mean±SD
Age (years)	29.48±4.38	28.08±4.68
Height(cm)	154.65±9.33	156.07±±9.69
Bmi(kg/m <sup>2</sup> )	21.26±2.82	20.58±4.63
Gestational age (weeks)	38.45±0.90	38.20±1.13
Parity	2.00	2.00
Birth weight(kg)	2.77±0.79	2.74±0.80

In our study, prolonged second stage of labour was observed in 12.5% patients of epidural group and 5% patients of nonepidural group, as presented in Table-2. Out of 80, patients with BMI >24kg/m<sup>2</sup> 2(100%) had prolonged second stage of labour while 3 (50%) had not in epidural group. While in non-epidural with 0(0 %,) had prolonged second stage of labour and not in 3(50%) patients. Out of 80 patients with BMI < 24kg/m<sup>2</sup> 13(72.2%) had prolonged second stage of labour while 22(40.7%) had not in epidural group. While in non-epidural have 5(27.8%) had

prolonged second stage of labour and not in 32(59.3%) patients. The prolonged second stage of labour was further stratified in two groups with P- values 0.206 and 0.02 which not show significant increase in prolonged second stage of labour in two groups.

In instrumental delivery cases, Poor maternal effort was observed in 9(22.5%) patients of epidural group and 2(5%) patients of nonepidural group. Fetal distress was observed in 4(10%) patients of epidural group and 3(12.5%) patients of nonepidural group. Had no instrumental delivery in 13(32.5%) patient in epidural group and 35(87.5%) in non-epidural group. The detailed reason of instrumental delivery is presented in Table-6

In cesarean delivery cases, Non decent of head was observed in 4(12.5%) patients of epidural group and 2(5%) patients of nonepidural group. Mal position head was observed in 1(2.5%) patients of epidural group only. Fetal bradycardia was observed in 1(2.5%) patients of nonepidural group only. Had no caesarian deliveries in 34(85%) in epidural group and 37(92%) in non-epidural group. Which show no significant change in both groups. The detailed reason of cesarean delivery is presented in Table-6

The two groups were compared by using chi-square test for prolonged second stage of labour. P value ≤0.05 was considered as significant. Stratification was also done for maternal age, parity, BMI, gestational age and birth weight to compare two groups for prolonged second stage of labour.

Table 2: Frequency Distribution of the Study Group A (Epidural) Verses Group B (Non Epidural) (n=80)

Prolonged Second Of Labour	Group A		Group A		P- value
	<2 hrs.	>2hrs	<2hrs	>2hrs	
	35 (87.5%)	5 (12.5%)	38 (95%)	2 (5%)	

P-value ≤0.05 considered as Significant. Significant at 0.05 levels

Table 3: Frequency of Study Group According to Prolonged Second Stage of Labour for Parity (n=80)

Parity	Prolonged Second stage Of labour Group a		Prolonged Second stage Of labour Group b		P-value
	>2 hours	<2 hours	>2hours	<2 hours	
	Primi	2 (9.5%)	19 (90.5%)	0 (0%)	
1	2 (15.4%)	11 (84.6%)	1 (6.7%)	14 (93.3%)	0.58
>2	1 (16.7%)	5 (83.3%)	1 (16.7%)	5 (83.3%)	1.000

P-value ≤0.05 considered as Significant.

\* Significant at 0.05 levels

Table 4: Frequency of Prolonged Second Stage of Labour According to Study Group for Patient with Maternal Age (Years) (n=80)

Age (years)	Prolonged second stage Of labour Group A		Prolonged second stage of labour group B		P value
	>2hr	<2hr	>2hr	<2hr	
	>30	3 (14.3%)	18 (85.7%)	1 (3.4%)	
<30	2 (10.5%)	17 (89.5%)	1 (9.1%)	10 (90.9%)	1.00

P-value ≤0.05 considered as Significant.

\* Significant at 0.05 levels

Table 5: Frequency of Study Group According to Prolonged Second Stage of Labour for Gestational Age (n=80)

Prolonged second stage of labour	Prolonged Second stage Of labour Group A		Prolonged Second stage Of labour Group B		P-value
	>2 hours	<2 hours	>2hours	<2 hours	
	<38 weeks	3 (37%)	8 (40%)	5 (62.5%)	
>38 weeks	12 (100%)	17 (42.5%)	0 (0%)	23 (57.5%)	0.000

P-value ≤0.05 considered as Significant. Significant at 0.05 levels

The results showed insignificant association of prolonged second stage of labour with epidural and nonepidural groups (p=0.432) as presented in Table-2. The results of instrumental deliveries with epidural and non-epidural groups (p=0.615) as presented in Table-6, and caesarian deliveries with epidural and non-epidural groups (p=0.40) as presented in Table-6. Stratification was also done for stratified categories of maternal age, parity, BMI, gestational age and birth weight. Detailed results of stratified categories are presented from Table-2 to Table-6 which show no significant increase in prolonged second stage of labour and mode of delivery in both groups.

Table-6: Frequency Distribution Of The Study Group A (Epidural) Verses Group B (Non Epidural) (n=80)

	Group A		Group B		P- value
	Yes	No	Yes	No	
Instrumental (Poor maternal effort/Fetal distress)	9/4 (22.5%/10%)	13 (32.5%)	2/3 (5%/12.55%)	35 (87.5%)	0.615
Caesarian deliveries Non decent of head/Mal position/Fetal bradycardia	4/1/1 (12.5%/2.5%/2.5%)	34 (85%)	2/0/1 (5%/0%/2.5%)	37 (92%)	0.40

P-value ≤0.05 considered as Significant. Significant at 0.05 levels

## DISCUSSION

This study was conducted to compare prolonged second stage of labour with or without epidural analgesia. The results showed that prolonged second stage of labor in women with epidural was more as compare for women without epidural analgesia.

Using the definitions of prolonged second stage of labor [14] approximately 31% of nulliparous and 19% of multiparous women with epidural anesthesia in a study cohort would be identified as having a prolonged second stage of labor. Although the passage of time is not an indication for operative intervention,<sup>14</sup> women receiving an epidural during labor remained at higher risk for operative vaginal delivery.<sup>15-16</sup>

It was observed in studies that women with an epidural analgesia in comparison to those without had a significantly greater maternal age and a higher BMI. A survey showed that increasing maternal age was a significant factor associated with a woman's preference to have an epidural analgesia during labour.<sup>17</sup> A more recent, however, large-population based study demonstrated that distributions of age were similar between epidural users and nonusers.<sup>18</sup>

Instrumental deliveries in epidural group were 35% and non-epidural were 12.5%, and caesarean section with epidural were 15% and non-epidural were 7.5% in cohort study.

In our study the results showed that women with a higher BMI may have also had a reduced response to induced labour, the increasing BMI was associated with a greater use of oxytocin in labour which could explain the higher rate of epidural usage due to a more painful labour. Our study also demonstrated that women with induced labour and an epidural analgesia as compared with those without had a significantly greater percentage of oxytocin usage and a longer first and second stage of labour.

A recent Cochrane review<sup>19</sup> reported that epidural analgesia was associated with an increased rate of oxytocin administration. There is evidence that induced labour may be less efficient than spontaneous labour,<sup>20</sup> and for this reason oxytocin administration may be necessary, thus rendering labour more painful and therefore requiring the use of pain relief. The Cochrane review in 2011<sup>17</sup> also reported that epidural analgesia was associated with a longer second stage of labour (mean difference=13.66 mins; 95% CI:6.67–20.66) but showed no clear effect on the duration of first stage. On review of the literature there is conflicting evidence regarding the effect of epidural analgesia with reports of either prolonging<sup>21</sup> or shortening<sup>22</sup> the first stage of labour.

In a study, second stage of labour was prolonged in those women who had an epidural analgesia. The neonates of women with epidural analgesia in our study when compared to those without had significantly lower Apgar scores at 1 minute but similar Apgar scores at 5 minutes. Cochrane review also reported that there were no significant differences in neonatal Apgar scores at 5 minutes in babies born to women with epidural analgesia. They also found that the use of an epidural analgesia after adjusting for multiple confounding factors was independently associated with the odds of an instrumental vaginal delivery.<sup>17</sup>

Previous studies however have shown that the rate of instrumental vaginal delivery depends on several other confounding factors such as the dose and concentration of the epidural solution used, the degree of analgesia during second stage, and obstetric factors.<sup>23-24</sup> It has been reported that the motor block which is the chief complication of labour epidural analgesia might result in prolonged labour and therefore increase the rates of instrument-assisted delivery.<sup>25</sup>

Cochrane review of 2011<sup>19</sup> indicating that there is no significant difference in the risk of CS delivery overall. Previous studies have contemplated that the degree of motor block achieved by an epidural analgesia may result in a prolonged labour and therefore increase the rates of a CS delivery.<sup>25</sup>

Other studies<sup>23,26</sup> however have demonstrated that epidural analgesia is unlikely to affect the chances of a normal delivery and there are many other factors that may contribute to a CS delivery such as the increased birth weight.<sup>24</sup>

**Limitation of the Study:** The small sample size of this study does limit its applicability. The main limitations of the present study include a single-center experience and nonrandomized study design. It was conducted with small sample size and in urban environment therefore, the results might not be generalizable to larger populations.

## CONCLUSION

Our study results showed that, prolonged second stage of labour was 12.5% in epidural group and 5% in non-epidural group. Hence it can be concluded that, prolonged second stage of labour was observed more among women in epidural group as compared to them women in non-epidural group. Further, an epidural analgesia is a risk factor for an assisted vaginal birth and the effect on the caesarian delivery rates and the observed increase is due to the presence of confounding factors.

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