



EPIDURAL ANALGESIA IN LABOR AND IT'S FETOMATERNAL OUTCOME

Obstetrics & Gynaecology

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ABSTRACT

Background: Epidural analgesia is a strategy that depends on central nerve blockage of painful impulses generated during labor; it is given by injection of local anesthetic into the lower region of the spine. The epidural analgesia induces changes in mothers which also have impact on the baby, these changes include beneficial effects such as reduced hyperventilation, maternal stress hormones, and uterine vasodilatation, it also results in adverse events Epidural analgesia was found to relieve pain during delivery and labor effectively.

Aims & Objective: The present study to aim to analyse the maternal and fetal outcome of study group with analgesia during labor and to compare with outcomes of those who did not receive analgesia and taken as control group.

Methodology: This was the Non-randomized trial, observational study. The study was done in Swaroop Rani Nehru Hospital and Kamla Nehru Memorial Hospital Prayagraj, Department of Obstetrics and Gynecology, August 2020 to July 2021. The study population was 132 pregnant women 66 who received epidural analgesia during labor and 66 pregnant women in control group. Data was analyzed with descriptive statistics using SPSS software version 23.

Result: Total 132 patients in labor were enrolled in one year in which 66 patients received epidural analgesia and 66 refused to receive epidural analgesia. The Mean $\pm$ SD of Age (Years) in the Epidural group was 21.95 ± 2.34 and Control group was 22.02 ± 2.39 . The 71.2% of the participants in the Epidural group had normal vaginal mode of Delivery and in 16.7% had LSCS and in 7.6% had Ventouse mode of Delivery and in 4.5% had Forceps mode. 75.8% of the participants in the Control group had Normal vaginal mode of Delivery and in 12.1% had LSCS and in 6.1% had Ventouse mode of Delivery and 6.1% had Forceps mode of Delivery. The Mean $\pm$ SD of APGAR (1 Minute) in the Epidural group was 7.62 ± 0.60 and in Control group was 7.61 ± 0.55 . The Mean $\pm$ SD of APGAR (5 Minutes) in the Epidural group was 8.62 ± 0.60 and in Control group was 8.61 ± 0.55 . There was no significant difference between the groups in terms of APGAR (5 Minutes) ($W = 2250.000, p = 0.695$).

Conclusion: This study showed that there was significantly more pain relieve in labor in patients with epidural analgesia than in control, because VAS score decreases significantly after epidural analgesia, and Effectiveness of pain relief in terms of maternal comfort satisfaction was very good. There was no any significant difference in terms of Mode of delivery spontaneous vaginal, and LSCS.

KEYWORDS

Epidural Analgesia, Apgar score, VAS Score, uterine contraction, (POG) period of gestation.

INTRODUCTION

Labor is a complex mixture of biological mechanisms with mixed emotions and pain. The mother should know well before term, how she will be accommodated during labor and what will be done to achieve a safe and pleasant delivery.⁽¹⁾ Epidural analgesia is a strategy that depends on central nerve blockage of painful impulses generated during labor; it is given by injection of local anesthetic into the lower region of the spine.⁽²⁾ The epidural analgesia induces changes in mothers which also have impact on the baby, these changes include beneficial effects such as reduced hyperventilation, maternal stress hormones, and uterine vasodilatation, it also results in adverse events such as fever, prolonged labor and delivery, hypotension, instrumental delivery, and increased need for oxytocin.

Epidural analgesia was found to relieve pain during delivery and labor effectively. Also, it was found that labor analgesia resulted in higher maternal satisfaction and lower pain.⁽³⁾ The optimal analgesic is the one that can provide pain relief throughout the entire labor process with no side effects on both mother and fetus, should provide immediate onset of pain relief, effective pain relief, with minimal motor block, intact airway reflexes, mother should be awake and responsive, with very minimal maternal and neonatal depression and should have no depressant effects on the progress of the labor and the urge to bear down. It should also provide some analgesia in the post partum period, and rapid recovery.⁽⁴⁾ A variety of anesthesia methods for delivery are used in different regions of the world. Epidural anesthesia is most frequently used method of pain control. It is reliable and preferred method of anesthesia for over 60% hospitalized women in developed countries. Epidural analgesia is associated with prolonged labour, which in turn leads to assisted vaginal birth.⁽⁵⁾

The present study to aim to analyse the maternal and fetal outcome of study group with analgesia during labor and to compare with outcomes of those who did not receive analgesia and taken as control group. And Effectiveness of pain relief in terms of maternal comfort satisfaction, Duration of labor its influence on all three stages and the initiation of

analgesia to delivery interval. Neonatal outcome in the form of APGAR scores, intrapartum, postpartum and early neonatal complications.

METHODOLOGY

This was the Non-randomized trial, observational study. The present study will be done in Swaroop Rani Nehru Hospital and Kamla Nehru Memorial Hospital, Department of Obstetrics and Gynecology, August 2020 to July 2021, Prayagraj. The study population was 132 pregnant women 66 who received epidural analgesia during labour and 66 pregnant women in control group. The inclusion criteria were primigravida patients who had gestational age of greater than 37 weeks (confirmed by ultrasound) without any risk factors, in established true labour (cervical dilatation >3 cm with regular uterine contraction) and with vertex presentation. The data was collected on a predesigned proforma. The variables noted were mode of delivery, Apgar scores of the newborns at one and five minutes, and pain perceived by the study subjects. Data was analyzed with descriptive statistics using SPSS software version 23.

RESULT

Total 132 patients in labor were enrolled in one year in which 66 patients received epidural analgesia and 66 refused to receive epidural analgesia.

Table 1: Association Between Group And Parameters

Parameters	Group		p value
	Epidural (n = 66)	Control (n = 66)	
Age (Years)	21.95 ± 2.34	22.02 ± 2.39	0.917 ¹
Parity			0.183 ²
G1P0+0	57 (86.4%)	51 (77.3%)	
G2P0+1	0 (0.0%)	4 (6.1%)	
G2P1+0	8 (12.1%)	10 (15.2%)	
G3P1+1	1 (1.5%)	1 (1.5%)	

POG (Weeks)	38.78 ± 0.65	38.63 ± 0.75	0.147 ¹
Height (cm)	154.89 ± 3.05	155.38 ± 3.97	0.433 ³
Weight (Kg)	59.47 ± 3.57	60.35 ± 4.10	0.273 ¹
BMI (Kg/m ²)	24.80 ± 0.81	25.06 ± 0.92	0.094 ¹
BMI			0.092 ²
18.5-22.9 Kg/m2	1 (1.6%)	1 (1.8%)	
23.0-24.9 Kg/m2	36 (56.2%)	22 (38.6%)	
25.0-29.9 Kg/m2	27 (42.2%)	34 (59.6%)	
Heart Rate (BPM)***	80.97 ± 5.22	78.18 ± 3.40	0.002 ¹
Systolic BP (mmHg)	117.06 ± 6.75	116.24 ± 6.89	0.665 ¹
Diastolic BP (mmHg)	76.39 ± 5.62	75.18 ± 6.25	0.149 ¹
Cervix Dilatation (cm)	4.24 ± 0.47	4.13 ± 0.34	0.107 ¹
Time Of Onset Of Analgesia (Minutes)	12.67 ± 1.80	-	-
Duration of Ist Stage (Minutes)	353.64 ± 61.69	351.72 ± 60.38	0.831 ¹
Duration of IInd Stage (Minutes)***	57.11 ± 13.92	50.29 ± 5.99	0.003 ¹
Duration of IIIrd Stage (Minutes)	6.51 ± 1.27	6.33 ± 0.78	0.861 ¹
Number of Topups	2.29 ± 0.63	-	-
VAS Score (0 Minutes)***	8.27 ± 0.71	7.37 ± 0.71	<0.001 ¹
VAS Score (15 Minutes)***	1.39 ± 0.49	7.67 ± 0.54	<0.001 ¹
VAS Score (30 Minutes)***	1.15 ± 0.36	7.78 ± 0.59	<0.001 ¹
VAS Score (60 Minutes)***	1.50 ± 0.54	8.09 ± 0.71	<0.001 ¹
VAS Score (120 Minutes)***	1.26 ± 0.44	8.36 ± 0.48	<0.001 ¹
VAS Score (180 Minutes)***	1.47 ± 0.68	8.86 ± 0.58	<0.001 ¹
Oxytocin (Yes)	60 (90.9%)	61 (92.4%)	0.753 ⁴
CTG			0.871 ²
No Abnormality	59 (89.4%)	61 (92.4%)	
Deceleration	6 (9.1%)	4 (6.1%)	
Late Deceleration	1 (1.5%)	1 (1.5%)	
Indication of LSCS			0.850 ²
Fetal Distress	6 (54.5%)	3 (37.5%)	
MSL	3 (27.3%)	3 (37.5%)	
NPOL	2 (18.2%)	2 (25.0%)	
Baby Weight (Kg)	2.83 ± 0.28	2.77 ± 0.23	0.186 ¹

The following table 1 variables were significantly associated ($p < 0.05$) with the variable 'Group': Heart Rate (BPM), Duration of IInd Stage (Minutes), VAS Score (0 Minutes), VAS Score (15 Minutes), VAS Score (30 Minutes), VAS Score (60 Minutes), VAS Score (120 Minutes), VAS Score (180 Minutes). (***Significant at $p < 0.05$, 1: Wilcoxon-Mann-Whitney U Test, 2: Fisher's Exact Test, 3: t-test, 4: Chi-Squared Test)

The Mean ± SD of Age (Years) in the Epidural group was 21.95 ± 2.34 and Control group was 22.02 ± 2.39. There was no significant difference between the groups in terms of Age (Years) ($W = 2155.000$, $p = 0.917$). The age 21-23 year female had in maximum number. The Mean ± SD of POG (Weeks) in the Epidural group was 38.78 ± 0.65 and Control group was 38.63 ± 0.75. There was no significant difference between the groups in terms of POG (Weeks) ($W = 2496.500$, $p = 0.147$).

The Mean ± SD of BMI (Kg/m²) in the Epidural group was 24.76 ± 0.81 and in Control group was 24.97 ± 0.90. There was no significant difference between the groups in terms of BMI (Kg/m²) ($W = 1501.000$, $p = 0.094$).

The Mean ± SD of Duration of Ist Stage (Minutes) in the Epidural group was 353.64 ± 61.69 and in Control group was 351.72 ± 60.38. The Mean ± SD of Duration of IInd Stage (Minutes) in the Epidural group was 57.11 ± 13.92 and in Control group was 50.29 ± 5.99. There was a significant difference between the 2 groups in terms of Duration of IInd Stage (Minutes) ($W = 2105.500$, $p = 0.003$), with the median Duration of IInd Stage (Minutes) being highest in the Epidural group.

The Mean ± SD of Duration of IIIrd Stage (Minutes) in the Epidural group was 6.51 ± 1.27 and in Control group was 6.33 ± 0.78. There was no significant difference between the 2 groups in terms of Duration of Ist and IIIrd Stage (Minutes).

The Mean ± SD of VAS Score (15 Minutes) in the Epidural group was 1.39 ± 0.49 in the Control group was 7.67 ± 0.54. VAS Score (30 Minutes) in the Epidural group was 1.15 ± 0.36 and in Control group was 7.78 ± 0.59. VAS Score (60 Minutes) in the Epidural group was 1.50 ± 0.54 and in Control group was 8.09 ± 0.71. VAS Score (120 Minutes) in the Epidural group was 1.26 ± 0.44 and in Control group was 8.36 ± 0.48. VAS Score (180 Minutes) in the Epidural group was 1.47 ± 0.68 and in Control group was 8.86 ± 0.58. There was a significant difference between the 2 groups in terms of VAS Score (180 Minutes) ($W = 0.000$, $p = < 0.001$), with the median VAS Score (180 Minutes) being highest in the Control group.

There was no significant difference between the various groups in terms of distribution of Oxytocin ($\chi^2 = 0.099$, $p = 0.753$). Strength of association between the two variables (Cramer's V) = 0.03 (Little/No Association).

Table 2: Association Between Group And Mode Of Delivery (n = 132)

Mode Of Delivery	Group			Fisher's Exact Test	
	Epidural	Control	Total	χ^2	P Value
VD	47 (71.2%)	50 (75.8%)	97 (73.5%)	0.820	0.869
LSCS	11 (16.7%)	8 (12.1%)	19 (14.4%)		
Ventouse	5 (7.6%)	4 (6.1%)	9 (6.8%)		
Forceps	3 (4.5%)	4 (6.1%)	7 (5.3%)		
Total	66 (100.0%)	66 (100.0%)	132 (100.0%)		

There was no significant difference between the various groups in terms of distribution of Mode of Delivery ($\chi^2 = 0.820$, $p = 0.869$). There was no significant difference between the various groups in terms of distribution of Indication of LSCS ($\chi^2 = 0.540$, $p = 0.850$). Strength of association between the two variables (Cramer's V) = 0.17 (Low Association).

Table 3: Comparison Of The 2 Subgroups Of The Variable Group In Terms Of APGAR (1 Minute) (n = 132)

APGAR (1 Minute)	Group		Wilcoxon-Mann-Whitney U Test	
	Epidural	Control	W	p value
Mean ± SD	7.62 ± 0.60	7.61 ± 0.55	2250.000	0.695
Median (IQR)	8 (7-8)	8 (7-8)		
Range	6 – 8	6 – 8		

Table 4: Comparison Of The 2 Subgroups Of The Variable Group In Terms Of APGAR (5 Minutes) (n = 132)

APGAR (5 Minutes)	Group		Wilcoxon-Mann-Whitney U Test	
	Epidural	Control	W	p value
Mean ± SD	8.62 ± 0.60	8.61 ± 0.55	2250.000	0.695
Median (IQR)	9 (8-9)	9 (8-9)		
Range	7 – 9	7 – 9		

The Mean ± SD of APGAR (1 Minute) in the Epidural group was 7.62 ± 0.60 and in Control group was 7.61 ± 0.55. There was no significant difference between the groups in terms of APGAR (1 Minute) ($W = 2250.000$, $p = 0.695$).

Table 5: Association Between Group And Complication (n = 132)

Complication	Group			Fisher's Exact Test	
	Epidural	Control	Total	χ^2	P Value
None	54 (81.2%)	55 (83.3%)	107 (82.3%)	8.522	0.202
Vomiting	5 (7.8%)	1 (1.5%)	6 (4.6%)		
PPH	1 (1.6%)	4 (6.1%)	5 (3.8%)		
Backache	2 (3.1%)	1 (1.5%)	3 (2.3%)		
Episiotomy extension	0 (0.0%)	3 (4.5%)	3 (2.3%)		
Fever	2 (3.1%)	1 (1.5%)	3 (2.3%)		
Headache	2 (3.1%)	1 (1.5%)	3 (2.3%)		
Total	66 (100.0%)	66 (100.0%)	132 (100.0%)		

There was no significant difference between the various groups in terms of distribution of Complication ($\chi^2 = 8.522$, $p = 0.202$). Strength of association between the two variables (Cramer's V) = 0.26 (Low Association).

DISCUSSION

In my study mean age group of pregnant female received epidural analgesia was 21.95 ± 2.34 and many studies showed most common age group was 20-30 year of age. In my study there was no significant difference between the various groups in terms of distribution of Parity ($\chi^2 = 4.556$, $p = 0.183$). Strength of association between the two variables (Cramer's V) = 0.19 (Low Association). *Tai-Ho Hung et al.*⁽⁶⁾ studied on 7260, in which 10,175 (71.4%) nulliparous and 2987 of 6677 (44.7%) multiparous parturient were administered epidural analgesia. In my study, in case group 86.4% were nulliparous and 13.6% and in control group 77.3% was nulliparous and 22.7% was multiparous and there was no any significant difference between case and control in terms of parity. In above study parity was different from my study; this was depending upon patient's selection, and on participant's participation. In my study duration of Ist stage of labor was not significantly different. It showed that there was no any impact of Epidural analgesia on Ist stage of labor. There was a significant difference between the 2 groups in terms of Duration of IInd Stage (Minutes) ($W = 2105.500$, $p = 0.003$), with the median Duration of IInd Stage being highest in the Epidural group. *Huifen Yin et al.*⁽⁷⁾ study showed that Epidural analgesia was associated with longer time of second stage (58.55 ± 33.75 vs 47.39 ± 28.36 min, $P = 0.001$) and longer total duration of labor (790.32 ± 433.71 vs 461.33 ± 270.39 min, $P < 0.001$). *Yusuke Naito et al.*⁽⁸⁾ showed that the durations of the first and second stages of labor were prolonged by the use of LEA in both primipara and multipara women. *M K Anupama et al.*⁽⁹⁾ studied on parturient women who opted for labor analgesia were taken as cases, Shortening of active phase was seen in cases ($P < 0.01$ from 2nd hour). Prolonged second stage of labor was seen in cases ($P = 0.001$) which is statistically significant. *VL. Deshmukh et al.*⁽¹⁰⁾ studied showed that there is no significant difference in the duration of first stage in both the study and control groups (p value > 0.05) and second stage of labor (p value $NS > 0.05$) and the need for oxytocin were compared. *Vasudha Sawant et al.*⁽¹¹⁾ studied showed that Second stage of labor is prolonged in epidural group than non-analgesia group. *Angeliki Antonakou et al.*⁽¹²⁾ study showed that with an epidural analgesia a longer first and second stage of labor. My study showed that duration of second stage of labor was significantly more in epidural group than control and it showed that epidural analgesia significantly prolonged the second stage of labor.

In my study, 71.2% of the participants in the Epidural group had NVD mode of Delivery and in 16.7% had LSCS and in 7.6% had Ventouse mode of Delivery and in 4.5% had Forceps mode. 75.8% of the participants in the Control group had NVD mode of Delivery and in 12.1% had LSCS and in 6.1% had Ventouse mode of Delivery and 6.1% had Forceps mode of Delivery. There was no significant difference between the various groups in terms of distribution of Mode of Delivery ($\chi^2 = 0.820$, $p = 0.869$). Strength of association between the two variables (Cramer's V) = 0.08 (Little/No Association). *Huifen Yin et al.*⁽⁷⁾ study showed that had no influence on mode of delivery, the amount of post-partum hemorrhage or hospital stay after delivery and all the neonatal outcomes they studied. *Yusuke Naito et al.*⁽⁸⁾ study showed that the percentage of assisted vaginal delivery increased by the use of LEA (11.5% in NEL group vs 25.7% in EL group; $p \square < 0.001$), but the rate of cesarean section was similar (12.8% vs 17.0%; $p \square = 0.23$). *Shital H et al.*⁽¹³⁾ study showed that the Mode of delivery was spontaneous vaginal in 46 patients (57.5%), forceps delivery in 4 patients (5%), ventouse in 14 patients (17.5%) and caesarean section in 16 patients (20%). Most of the above study showed that after the use epidural analgesia, In my study there was no significant instrumental delivery which was supported by few studies. There was no any impact of epidural analgesia on the requirement of cesarean section so this result was supported by all of the above study.

Obstetric analgesia is essential not only for patient's comfort but also for feto-maternal safety as pain associated physiological responses are potentially harmful for the fetus. The Mean $\pm$ SD of APGAR (1 Minute) in the Epidural group was 7.62 ± 0.60 and in Control group was 7.61 ± 0.55 . Mean $\pm$ SD of APGAR (5 Minutes) in the Epidural group was 8.62 ± 0.60 and in Control group was 8.61 ± 0.55 . There was no significant difference between the groups in terms of APGAR (1 Minute) ($W = 2250.000$, $p = 0.695$). *Shital H et al.*⁽¹³⁾ showed that one

minute majority of the babies (n 63, 78.75%) had Apgar score of more than 7, only 5 babies (6.25%) had Apgar score less than 4, and 12 babies (15%) had Apgar score between 4-7. *Vasudha Sawant et al.*⁽¹¹⁾ showed that both groups had normal APGAR score. My study showed that the APGAR score of (1 Minutes), was same in both group and there was no any significant impact of epidural analgesia on APGAR score of (1 Minutes). The cases of fetal distress seen were due to obstetrical causes like cord around the neck or strong uterine contractions and not as a direct result of epidural like maternal hypotension etc. Epidural anesthesia did not have any adverse effect on the fetal outcome.

In the Epidural group 81.2% of the participants had no Complication and in 7.8% had Vomiting and in 1.6% had PPH in 3.1% Backache in 0.0% had Episiotomy extension in 3.1% had Fever in 3.1% Headache. In the Control group, 83.3% had no complication, in 1.5% had Vomiting, in 6.1% had PPH and in 1.5% had Backache and in 4.5% had Episiotomy extension and in 1.5% had Fever and in 1.5% had Headache.

CONCLUSION

This study showed that there was significantly more pain relieve in labor in patients with epidural analgesia than in control, because VAS score decreased significantly after epidural analgesia, and Effectiveness of pain relief in terms of maternal comfort satisfaction was very good. There was no any impact of epidural analgesia on the duration of Ist and IIInd stage of labor and duration was almost same as in control. The duration of IInd stage of labor was significantly more in patients with epidural analgesia than Control group. There was no any significant difference in terms of Mode of delivery spontaneous vaginal, and LSCS.

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