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Feto-Maternal Outcome of Labour with Epidural Analgesia

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ABSTRACT

Introduction: Epidural anesthesia along with an experienced anaesthetist, a dedicated obstetrician and a trained midwife has ability to convert the painful and extensively stressful labour labour event into a less stressful event. The purpose of this study was to compare feto-maternal outcome of labour with epidural analgesia to those without epidural analgesia.

Methodology: The prospective, comparative and interventional study was conducted among primigravida with full term pregnancy admitted to maternity ward. Study group were given epidural analgesia which was compared with control group who did not give any labour analgesia. Maternal and foetal outcome were assessed.

Results: Difference in mean duration of first stage and second stage of labour was statistically non-significant between two groups ($p>0.05$). Before the analgesia (basal) mean VAS was 8.45 and 8.32 in women who received epidural anesthesia and cases who didn't receive epidural anesthesia respectively. The mean VAS was significantly less in women who received epidural anesthesia ($p<0.001$).

Conclusion: Use of epidural analgesia during the later stage of labour, when cervical dilatation was more than 4 cm, provides better analgesic effect with minimal side effect and almost equivalent duration of labour. Epidural analgesia doesn't unnecessarily increase operative delivery rate and had no adverse effect on APGAR score of newborns.

INTRODUCTION

Experiencing labour pains and giving birth to infant is normal physiological process. Though it is a natural phenomenon, it produces severe pain which requires analgesia to relieve pain during labour.[1]

Cervix region and lower uterine segment are the primary area from where the pain of first stage of labour originates. This led to progressively increased pressure of the foetus on the vaginal wall and perineal region. This increasing pressure become additional sources of increasing pain.[2] Referred pain to the lower lumbar and sacral portions is mainly due to stimulation of root base of the lumbo-sacral plexus structures. [3]

Complete analgesia for both first and second stages of labour is provided by epidural and intrathecal blockade (neuraxial blockade). Epidural anaesthesia along with an experienced anaesthetist, a dedicated obstetrician and a trained midwife has ability to convert the painful and extensively stressful labour labour event into a less stressful event. [4] Most widely used method of analgesia for control of pain during labour is epidural anaesthesia. It is very reliable and most preferred method of anesthesia. It

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is used for over 60% hospitalized women in developed countries. [5]

The intensity of the labour pain and duration of suffering depend upon many factors including physical as well as psychological factors. Physical factors include age of the women, parity, and physical condition of the mother, the cervical condition at the beginning of the labour, and the size of the birth canal in comparision with the size of the foetus as well as the position of the foetus. Many of these, anatomical, physiological and psychological, factors are interrelated. Generally, elderly nulliparas experience longer and more painful labours than younger nulliparas. [6]

Epidural analgesia is associated with prolonged labour, which in turn leads to assisted vaginal birth. [7] Some factors are associated with no pain relief or block failure with epidural such as, obesity, multiparity, cervical dilation of more than 7 cm at insertion, history of previous failure of epidural anaesthesia etc. [8]

Epidural analgesia may cause foetal bradycardia. This is due to the hypotension in the mother uring labour which is one of the side effects of the epidural anesthesia. This fall in blood pressure is due to vasodilatation of the peripheral blood vessels. Vasodilatation in the peripheral blood vessels is due to decrease sympathetic tone of the peripheral blood vessels. Fall in blood pressure temporarily redirection of maternal blood away from the uterus and causes foetal bradycardia.

With this background, the purpose of this study was to compare feto-maternal outcome of labour with epidural analgesia to those without epidural analgesia.

METHODOLOGY

The prospective, comparative and interventional study was conducted among primigravida with full term pregnancy admitted to maternity ward in tertiary care center, Maharashtra from the year 2019 to 2021

Nullipara women with age between 20 to 35 year, less than 80 kg of body weight, gestational age at least 36 wk and not more than 42, singleton pregnancy, fetus in vertex position, 4 cm or more cervical dilatation, and voluntarily requested for analgesia (study group) or voluntarily desired not to have epidural analgesia (control group) were included in the study.

Multipara, age below 20yr or above 35 years, gestation age less than 36 week or more than 42 week, cephalopelvic disproportion, malpresentation, cervical dilatation of < 4 cm, medical complications (preeclampsia, eclampsia, diabetes, etc), any contraindications for epidural analgesia (coagulopathy, marked hypovolemia, neurological disorders, allergies to local anesthetics, etc), or patients' denial or inability to cooperate for epidural analgesia were excluded from the study.

Sample size: Group 1: Study group: Nulliparous women fulfilling the above criteria and who desired epidural analgesia were allocated in the Group I (epidural group) (n=80),

Group 2: Control group: Women who did not desire any labour analgesia were allocated in the Group II (Control or non-epidural group) (n=80).

Study Procedure: After proper selection of case, and obtaining well informed written consent from patient and the relatives, 20-gauge cannula is secured in patient and preloading with 500ml of Ringer Lactate is done. Pain compliance is marked over VAS before administration. Prophylactic single dose of antibiotic (Inj. Taxim 1gm iv) is given. Patient is then shifted to operation theater and is placed in left lateral position. A17 Tuohy needle is inserted into the second or third lumbar interspace with orifice of needle pointing towards the head. Epidural puncture is made using loss of resistance technique. A vinyl plastic catheter is inserted through the needle which is removed over catheter. A test dose of 2-3 ml of local anesthetic agent is given and patient is observed for any signs of systemic hypersensitivity. Rest of the anesthetic agent (4-6ml) is then given.

Patient is then mobilized to labor room. pain compliance is marked over VAS at this point of time. Pulse, blood pressure, FHS and uterine contractions are monitored every 15 minutes in first 2 hours and every 30 minutes then onwards. Per vaginal examination is done as and when required (mostly every 4 hourly in latent phase and every 3 hourly in active phase of labor). Once the effect of epidural starts vanning off, top up dosages are administered by anesthesiologists. Increments or derangements in pain compliance are noted timely.

Any maternal side effects such as headache, hypotension, motor paralysis etc. are noted. Augmentation of labor is done, if necessary, by using Inj. Pitocin with titrating doses. Duration of first and second stage of labor is noted with the help of partogram. In the end, mode of delivery, indication of instrumental delivery/cesarean section, neonatal outcome in terms of APGAR scores at 1 minute, 5 minutes and 10 minutes observed. Epidural catheter is removerd on first postnatal/postoperative day.

Similarly, in control group, analgesics such as Inj. Tramadol Hydrochloride (50mg/Ml), Inj. Drotin (40MG/ml) was given timely by intramuscular route and similar findings as above are noted.

Analysis: All collected information was entered in to excel sheet and analysed using software Epi Info™ For Windows version 7.2. All qualitative data were presented by frequency and percentage. All quantitative data were presented by mean and standard deviation. Initially baseline profile were compared between study group and control group. This was followed by comparison of outcome variable between study group and control group. Statistical difference between two groups were assessed using chisquare for study variable was qualitative and unpaired t test when study variable was quantitative. P

value less than 0.05 was considered as statistically significant.

Ethical Consideration: Study was conducted only after approval of institutional ethical committee. All the subjects were explained about the study in the vernacular language. Participation in the study was purely voluntary and all women were informed about their write to withdraw at any stage of the study. A informed written consent was obtained from all participants before the study. Data were analysis and presented without direct identifier of the cases.

RESULTS

Total 80 women were included in epidural group and another 80 women in control group. The difference in mean age, height and weight of the women who received epidural anesthesia and who were in control group were non-significant (p>0.05) (Table 1).

Mean duration of first stage of labour in women who received epidural anesthesia was 6.76 hours while mean duration of first stage of labour in cases who didn't receive epidural anesthesia was 7.16 hours. (p>0.05).

Table 1: Comparison of basic profile of women between of Epidural group and control group

Variables	Epidural Group (n=80)	Control Group (n=80)	P value
Age (year)(mean ± SD)	23.18 ± 3.75	23.80 ± 3.89	0.306
Weight (kg) (mean ± SD)	58.06 ± 5.26	57.65 ± 4.98	0.613
Height (cm) (mean ± SD)	152.1 ± 6.22	151.3 ± 7.03	0.5057
Gestation age (weeks) (mean ± SD)	37.76 ± 1.11	37.81 ± 0.98	0.763

Table 2: Comparison of progress of labour and quality of analgesia between of Epidural group and control group

Variables	Epidural Group (n=80)	Control Group (n=80)	P value
Duration of first stage(min) (Mean±SD)	6.76 ± 1.96	7.16 ± 1.82	0.512
Duration of second stage (min)(Mean±SD)	46.04 ± 13.28	42.93 ± 12.10	0.436
VAS at various stage of labor			
Before epidural **(Mean ± SD)**	8.45± 2.01	8.32± 1.89	0.674
1st stage **(Mean ± SD)**	1.46± 1.17	6.84± 1.73	<0.0001
2nd stage **(Mean ± SD)**	2.02± 1.26	8.00± 2.12	<0.0001
Quality of analgesia (VAS)			
Excellent (0-2)	35 (43.8)	4 (5)	<0.001
Good (3-4)	27 (33.8)	3 (3.8)	
Satisfactory (5-6)	8 (10)	10 (12.5)	
Inadequate (7-8)	6 (7.5)	50 (62.5)	
Failure (9-10)	4 (5)	13 (16.3)	

Table 3: Comparison of maternal and foetal outcome between of Epidural group and control group

Variables	Epidural Group (n=80) (%)	Control Group (n=80) (%)	P value
Mode of delivery			
Normal vaginal	57 (71.3)	63 (78.8)	0.547
Instrumental vaginal	7 (8.8)	5 (6.3)	
Caesarean section	16 (20)	12 (15)	
Total	80 (100)	80 (100)	
Indication for operative delivery			
for instrumental delivery			
Fetal distress	2 (2.5)	2 (2.5)	1
Prolong 2nd Stage	5 (6.3)	3 (3.8)	0.4703
for caesarean section			
Fetal distress	3 (3.8)	1 (1.3)	0.3159
Prolong 2nd Stage	5 (6.3)	2 (2.5)	0.2413
Maternal request	1 (1.3)	7 (8.8)	0.0303
Non progress of labour	6 (7.5)	2 (2.5)	0.1468
APGAR Score			
At 1 Min			
<7	5 (6.3)	4 (5)	0.9999*
7-10	75 (93.8)	76 (95)	
At 5 min			
<7	0 (0)	0 (0)	
7-10	80 (100)	80 (100)	

Mean duration of second stage of labour in women who received epidural anesthesia was 46.04 minutes while mean duration of second stage of labour in cases who didn't receive epidural anesthesia was 42.93 min. (p>0.05) (Table 2).

Caesarean sections were 20.0% and 15.0% in women who received epidural anesthesia and in cases who didn't receive epidural anesthesia respectively. (p>0.05). At 1 min mean APGAR epidural anesthesia and cases who didn't receive epidural anesthesia. However, the difference was statistically not significant (p>0.05) (Table 3).

Before the analgesia (basal) mean VAS was 8.45 and 8.32 in women who received epidural anesthesia and cases who didn't receive epidural anesthesia respectively. During the first stage of labour mean VAS was significantly less in women who received epidural anesthesia (1.46) compared to cases who didn't receive epidural anesthesia (6.84) (p<0.001). Similarly, during the second stage also the mean VAS was significantly less in women who received epidural anesthesia (2.02) compared to cases who didn't receive epidural anesthesia (8.00) (p<0.001) (Table 3).

Hypotension & tachycardia was found in 2 (2.5%), Urinary retention was found in 1 (1.3%), Backache was found in 2 (2.5%), Headache was found in 3 (3.8%), Pyrexia was found in 2 (2.5%), and Motor Paresis was found in 1 (1.3%).

DISCUSSION

In the present study, mean duration of first stage of labour and second stage of labout were statistically didn't differe in both the group (p>0.05).

In a study done by Agrawal D et al [9], mean duration of first stage of labour was less in epidural group, i.e. 4.83 ± 1.59 hours, compared to the non-epidural group in which the mean duration was 5.48 ± 1.56 hours. Mean duration of first stage of labour in the present study was higher to the study done by Agrawal D et al. [9] In a study done by Sawant V et al. [10], average length of first stage of labour in the study group (epidural group) was 381.16 minutes with standard deviation of 61.75 minutes and in control group (non-epidural group) the mean duration was 370.03 minutes with standard deviation of 79.33 minutes. Mean length of first stage of labour in epidural group was higher in their study.

In the present study, average time of second stage of labour was 46.04minutes with standard deviation of 13.28min in study (epidural) group while average time of second stage of labour was 42.93min with standard deviation of 12.10min in women who didn't control group. There was no statistical difference between the mean duration of second stage of labour in both the study groups (p>0.05).

In a study done by Agrawal D et al. [9], mean duration of second stage of labour in women who received epidural anesthesia was 33.13 ± 12.78 minutes and in cases who didn't receive epidural anesthesia it was 27.53 ± 11.73 minutes (p 0.0137) Mean duration of second stage of labour in the present study was lower to the study done by Agrawal D et al. In a study done by Sawant V et al. [10], mean duration of second stage of labour in women who received epidural anesthesia was 71.63 ± 10.11 minutes and in cases who didn't receive epidural anesthesia was 23.0 ± 10.30 minutes. Mean duration of second stage of labour in women who received epidural anesthesia was much higher in their study. (p <0.01) This finding is differs from the present study.

In the present study, Caesarean sections were 20.0% and 15.0% in women who received epidural anesthesia and in cases who didn't receive epidural anesthesia respectively. There was no statistical difference between the mode of delivery in both the study groups (p>0.05).

In a study done by Agrawal D et al. [9], caesarean sections were 6 (10 %) and 4 (6.67 %) in women who received epidural anesthesia and in cases who didn't receive epidural anesthesia respectively. (p>0.05) In a study done by Sawant V et al. [10], Caesarean sections were 2 (6.67 %) and 3 (10.0 %) in women who received epidural anesthesia and in cases who didn't receive epidural anesthesia respectively. (p>0.05)

In a study done by Gawandi PS et al. [11] Caesarean sections were 4 (8.0 %) and 6 (3.0 %) in women who received epidural anesthesia and in cases who didn't receive epidural anesthesia respectively. (p>0.05) For instrumental delivery, foetal distress was responsible for 1 case and prolonged second stage was in 2 cases in women who received epidural anesthesia, however there was no statistical difference in indication of instrumental delivery in both the study groups (p>0.05).

In the present study, at 1 min mean APGAR epidural anesthesia and cases who didn't receive epidural anesthesia. However, the difference was statistically not significant (p>0.05). In a study done by Agrawal D et al. [9], at 5 min mean APGAR score was less than 7 in 8 (13.3%) and 6 (10.0%) babies respectively in women who received epidural anesthesia and cases who didn't receive epidural anesthesia. The APGAR scores at 5 min were also statistically similar in both groups in their study (p-value = 0.569). In a study done by Gawandi PS et al. [11], at 1 min mean APGAR score was less than 7 in 2 (4.0%) and 1 (2.0%) baby respectively in women who received epidural anesthesia and cases who didn't receive epidural anesthesia.

Visual analogue scales (VAS) are psychometric response scales used to measure subjective characteristics or attitudes and have been used in the past for a multitude of disorders, as well as in market research and social science investigations, among others. VAS were first described in 1921 and referred to at the time as a "graphic rating method". The initial publication, which covered no more than one page, was presented as a new method for management personnel to evaluate the workers assigned to them.[12]

Until the 1940s, only a handful of sociomedical and psychological publications addressed the topic of VAS. It was not until the 1960s that the literature showed rekindled interest in the use and study of VAS.[13]

VAS are, therefore, effectively classless, meaning that, theoretically, they permit an infinite number of gradations between endpoints—the variable is a latent continuum. [14]

VAS scores may also be classified retrospectively, by forming value groups. So for example in an Allergy Diary APP—those with VAS > 5 = uncontrolled AR, VAS 2–5 = partly controlled AR and VAS score < 2 = well-controlled AR. The process of linear category reduction, for example, may find application to this end.[15]

One of the major advantages of VAS is that they are perceived as a continuum, meaning that their data are considered interval-scaled. Two equally sized intervals on a VAS are always interpreted as two equally sized differences by respondents. This makes it possible to calculate the arithmetic mean.

Data obtained from categorical scales, on the other hand, can only be interpreted in terms of their dissimilarity and rank; as such, the data are ordinal-scaled. Although the categories reflect a hierarchy, no statement can be made on how large the differences between the individual categories are for a respondent. Therefore, here it is only permissible to give median values.

In the present study, the difference in VAS score between both the study groups was statistically significant (p <0.001) indicating that pain was significantly less in women who received epidural anesthesia.

In a study done by Gawandi PS et al. [11], in women who received epidural anesthesia 30 (60.0%) women had excellent VAS, 19 (38.0%) had good/satisfactory VAS, 1 (2.0%) had inadequate VAS while failure of analgesia was not seen in any case.

In the present study, before the analgesia (basal) mean VAS was 8.45 and 8.32 in women who received epidural anesthesia and cases who didn't receive epidural anesthesia respectively. During the first stage of labour mean VAS was significantly less in women who received epidural anesthesia (1.46) compared to cases who didn't receive epidural anesthesia (6.84) (p<0.001). Similarly, during the second stage also the mean VAS was significantly less in women who received epidural anesthesia (2.02) compared to cases who didn't receive epidural anesthesia (8.00) (p<0.001).

In a study done by Gawandi PS et al. [11], before the analgesia (basal) mean VAS was 8.88 in women who received epidural anesthesia. During the first stage of labour mean VAS was significantly less in women who received epidural anesthesia (1.70) in comparison to before analgesia VAS. Similarly, during the second stage also the mean VAS was significantly less in women who received epidural anesthesia (2.13).

In the present study, hypotension & tachycardia was found in 2 (2.5%), Urinary retention was found in 1 (1.3%), Backache was found in 2 (2.5%), Headache was found in 3 (3.8%), Pyrexia was found in 2 (2.5%), and Motor Paresis was found in 1 (1.3%).

In a study done by Gawandi PS et al [11], hypotension & tachycardia, urinary retention, Backache and Motor Paresis was found in 1 (2.0%) each. Headache and Pyrexia was not found any of the cases. Incidence of side effects was higher in my study in comparison to study done by Gawandi et al.

CONCLUSION

Based on the current study results and review of the similar published study we conclude that use of epidural anesthesia very effective in reducing labour pain. The currently used analgesic agents in epidural analgesia minimal complications. Use of epidural analgesia during the later stage of labour, when cervical dilatation was more than 4 cm, provides better analgesic effect with minimal side effect and almost equivalent duration of labour. Similar labour duration indicates minimal motor blockage of epidural analgesia which enable the women to actively participate in fetus expulsion. Epidural analgesia doesn't unnecessarily increase operative delivery rate and had no adverse effect on APGAR score of newborns.

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REFERENCES

1. Beigi NM, Broumandfar K, Bahadoran P, Abedi HA. Women's experience of pain during childbirth. Iranian journal of nursing and midwifery research. 2010;15(2):77.
2. ADAPTE Collaboration. ADAPTE manual for guideline adaptation, version 1.0. Canada: Guidelines International Network. 2007.
3. Labor S, Maguire S. The pain of labour. Reviews in pain. 2008 Dec;2(2):15-9.
4. Javed L, Salick A, Farooqi NJ. Epidural analgesia in labour in relation to the rate of instrumental deliveries. Ann K E Med J 2005; 11:307-10.
5. Poole JH. Analgesia and anesthesia during labor and birth: implications for mother and fetus. J Obstet Gynecol Neonatal Nurs 2003; 32:780-93.
6. Dutta DC. Textbook of Obstetrics. 13th edition. New Central Book Agency (P) Ltd. Kolkata; 2013:113-25.
7. Zhang J, Yancy MK, Klebenoff MA. Does epidural analgesia prolong labor and increase risk of caesarean delivery? A natural experiment. Am J Obstet Gynecol. 2001; 85:128-34.
8. Agaram R, Dougles MJ, McTaggart RA, Gunka V. Inadequate pain relieve with labour epidurals. a multivariate analysis of associated factors. Int J Obstet Anesth. 2009; 18:10-4.
9. Agrawal D, Makhija B, Arora M, Haritwal A, Gurha P. The effect of epidural analgesia on labour, mode of delivery and neonatal outcome in nullipara of India, 2011-2014. Journal of clinical and diagnostic research: JCDR. 2014 Oct;8(10):OC03.

10. Sawant V, Kumbhar A. Labour with low dose epidural analgesia: maternal perception and fetal outcome. Int J Reprod Contracept Obstet Gynecol. 2018 Feb;7(2):689-693

11. Gawandi PS, Jadhav AC. Maternal and Neonatal Outcome in Patients with Epidural Analgesia with Compare to Patients without Epidural Analgesia. Research And Reviews: Journal Of Dental Sciences. 2014;4(2):78-85.

12. Flynn D, van Schaik P, van Wersch A. A comparison of multi-item likert and visual analogue scales for the assessment of transactionally defined coping. Eur J Psychol Assess. 2004;20:49–58. doi: 10.1027/1015- 5759.20.1.49.

13. Aitken RC. Measurement of feelings using visual analogue scales. Proc R Soc Med. 1969;62:989–993.

14. Baur N. Bivariate Statistik, Drittvariablenkontrolle und das Ordinalskalenproblem : eine Einführung in die Kausalanalyse und in den Umgang mit zweidimensionalen Häufigkeitsverteilungen mit SPSS für Windows. Bamberg: Otto-Friedrich-Universität; 2003.

15. Brunier G, Graydon J. A comparison of two methods of measuring fatigue in patients on chronic haemodialysis: visual analogue vs Likert scale. Int J Nurs Stud. 1996;33:338–348. doi: 10.1016/0020-7489(95)00065-8.