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Original Research Article

Epidural analgesia in labour and its obstetric outcome

Srujana S. N. Lakshmi[1]*, Sheela S. R.[1], Kiran N.[2]

[1]Department of Obstetrics and Gynecology, [2]Department of Anesthesiology, Sri Devaraj Urs Medical College. Kolar, Karnataka, India

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***Correspondence:**
Dr. Srujana S. N. Lakshmi,
E-mail: dr.srujana2k10@gmail.com

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ABSTRACT

Background: Labour is a natural phenomenon which produces intolerable pain that requires effective methods for pain relief which is often challenging and complex task without regional analgesia. Epidural analgesia is most widely accepted method used to reduce labour pain. Aims and objectives were assessment of epidural analgesia in pain relief during labour, duration of different stages of labour, maternal and foetal outcome.
Methods: This study was a prospective observational study conducted at RL Jalappa Hospital, Kolar from January 2020 to June 2021. 40 women admitted for normal vaginal delivery opting labour analgesia were studied. Data collected was entered in Microsoft excel spread sheet and results were analysed.
Results: The mean duration of first stage of labour was 153 minutes, mean duration of second stage was 30 minutes, and mean duration of third stage was 12 minutes. During first stage of labour, 20 women (52%) had no pain, 12 women (31%) had mild pain and 6 women (15%) had moderate pain. During second stage of labour, 16 women (42%) had mild pain, 15 women (39%) had no pain and 7 women (18%) had moderate pain. During third stage of labour, 30 women (78.9%) had no pain and 8 women (21%) had mild pain. The mean Apgar score of all babies at 1 minute was 7/10 and 5 minute was 9/10.
Conclusions: Epidural analgesia is a safe and effective technique during labour and provides significant pain relief with excellent patient satisfaction.

Keywords: Epidural analgesia, Mode of delivery, Pain relief

INTRODUCTION

Labour is a physiologic process during which foetus, membranes, umbilical cord, and placenta are expelled from uterus. Many factors are involved in labour and are associated with unique experience by every woman. Pain during labour is highest ranked among all other pains experienced in life.[1] Untreated labour pain leads to chronic pain, post-partum stress syndrome, and psychological and physiological consequences which are undesirable. Pain and anxiety cause release of adrenaline which results in prolonged labour and the increase in the level of noradrenaline by 25%, uterine blood flow decreases by 50%. Maternal cardiac output, systemic vascular resistance and oxygen demand will be increased.[2] Labour is a natural phenomenon which produces intolerable pain that requires effective methods for pain relief which is often challenging and complex task without regional analgesia.[3] Labour pain management during delivery plays an important role in woman's satisfaction.[4] Pain is originated from cervix during first stage of labour .The pressure on perineum by the descending foetus causes additional pain during late first stage. It causes stretching, distension and tearing of pelvic fascia, subcutaneous tissues and muscles of the perineum.[5] Painful stimuli from cervix and lower uterine segment are transmitted to tenth, eleventh, and twelfth thoracic and first lumbar spinal portions via sympathetic nerve fibres after entering the

spinal cord.[8] Sensory impulses from vagina and perineum carried to second, third and fourth spinal segments via pudental nerves. Additionally, pressure on a single or more root base of the lumbo sacral plexus causes hurting, burning, or distress in the lower limbs and back.[9] Lumbar epidural analgesia is most widely accepted method used to reduce labour pain. This involves blocking of painful senses by injecting local anaesthetic into lower region of spine.[10,11] It is usually very effective and very safe.

Aims and objectives

Assessment of epidural analgesia in pain relief during labour by using visual analogue scale. Assessment of epidural analgesia on duration of different stages of labour. Assessment of foetal outcome by using APGAR score.

METHODS

Study site

This study was carried out at RL Jalappa Hospital, department of obstetrics and gynecology, Kolar.

Study population

Pregnant women admitted to labour room in RL Jalappa Hospital during the period of study formed the study population.

Study design and period

It was a prospective observational study that took place from January 2020-June 2021.

Inclusion criteria

Age between 20 to 35 years and gestational age between 37-40 weeks, singleton pregnancy, clinically adequate pelvis, cephalopelvic disproportion ruled out. Subjects included were non-smokers, non-alcoholics, and not suffering from any acute infections or chronic illnesses.

Exclusion criteria

Elderly primigravidae, gestational diabetics, chronic hypertensives, multiple gestation, preeclampsia. previous caesarean section women, cardiac disorders, spinal deformities, coagulation disorders were excluded.

Methodology

Pregnant women admitted to labour room of RL Jalappa Hospital were the study population. At the time of enrolment, an informed written consent was obtained from the patients. After the onset of true labour pains, epidural catheter was inserted and epidural analgesia was activated with adequate dose of 0.125% bupivacaine and subsequent top ups given as required. Maternal heart rate, blood pressure, foetal heart rate were monitored following insertion of epidural catheter. Each woman was followed up until delivery and the outcome was recorded and parameters involved with pain perception, duration of labour were noted. Maternal pain severity assessed by visual analogue scale. Patient was asked to place a finger over the scale, according to the intensity of pain felt by her: no pain- 0 to 4 mm, mild pain-5-44 mm, moderate pain-45-74 mm, severe pain-75-100 mm.

Sample size calculation

40 female patients who were admitted for normal delivery opting labour analgesia are studied. Data collected was entered in Microsoft excel spread sheet. The results were analysed.

RESULTS

Data analysis

VAS score, duration, APGAR score etc., were considered as primary outcome variables. Descriptive analysis was carried out by mean and standard deviation for quantitative variables, frequency and proportion for categorical variables. Data was also represented using appropriate diagrams like bar diagram and pie diagrams. The association between quantitative outcomes at different time period was assessed by comparing the median values. Mean differences along with their 95% CI were presented. Paired t-test was used to assess statistical significance. The association between categorical outcomes at different time periods was assessed by cross tabulation and comparison of percentages. Mcnemar test was used to test statistical significance. P value <0.05 was considered statistically significant.

Table 1: Descriptive analysis of age in study population (N=40).

Parameter	Mean±SD	Median	Min.	Max.
Age	24.7±3.13	25.00	19.00	30.00

Out of total 40 study population, the mean age group was 24 years.

Table 2: Descriptive analysis of obstetric score in study population (N=40).

Obstetric score	Frequency	Percentage
Primi	20	50.00
Multi	20	50.00

In this study, 20 (50%) women were primigravidae and 20 (50%) were multigravidae.

The mean gestational age was 39 weeks to 40 weeks 6 days in 28 women (70%) out of 40 women. The gestational age in 11 women was between 37 weeks to 38 weeks 6 days and gestational age of 1 woman was more than 40 weeks.

Table 3: Descriptive analysis of period of gestational age in study population (N=40).

Period of gestational age	Frequency	Percentage
37 to 38 weeks 6 days	11	27.50
39 to 40 weeks 6 days	28	70.00
>40 weeks	1	2.50

Table 4: Descriptive analysis of duration at different stages in study population (N=38).

Duration (minutes)	Mean±SD	Median	Min.	Max.
1st stage	153.29±98.62	125.00	40.00	540.00
2nd stage	30.92±11.62	30.00	15.00	60.00
3rd stage	12.42±4.32	11.00	6.00	20.00

The mean duration of first stage of labour was 153 minutes, mean duration of second stage was 30 minutes, and mean duration of third stage was 12 minutes.

Table 5: Descriptive analysis of VAS at first stage in study population (N=38).

VAS at first stage	Frequency	Percentage
Mild	12	31.58
Moderate	6	15.79
No	20	52.63

During first stage of labour, 20 women (52%) had no pain, 12 women (31%) had mild pain and 6 women (15%) had moderate pain.

Table 6: Descriptive analysis of VAS at second stage in study population (N=38).

VAS at second stage	Frequency	Percentage
Mild	16	42.11
Moderate	7	18.42
No	15	39.47

During second stage of labour, 16 women (42%) had mild pain, 15 women (39%) had no pain and 7 women (18%) had moderate pain.

During third stage of labour, 30 women (78.9%) had no pain and 8 women (21%) had mild pain.

Out of 38 women who had normal vaginal delivery, 1 participant (2.6%) had postpartum hemorrhage (Table 8).

Table 7: Descriptive analysis of VAS at third stage in study population (N=38).

VAS at third stage	Frequency	Percentage
Mild	8	21.05
No	30	78.95

Table 8: Descriptive analysis of PPH in study population (N=38).

PPH	Frequency	Percentage
Yes	1	2.63
No	37	97.37

Table 9: Descriptive analysis of patient satisfaction in study population (N=38).

Patient satisfaction	Frequency	Percentage
Average	1	2.63
Good	21	55.26
Excellent	16	42.11

21 women (55%) experienced good satisfaction; 16 women (42%) had excellent satisfaction with epidural analgesia.

Table 10: Descriptive analysis of APGAR scores in study population (N=40).

Parameter	Median	Min.	Max.
Apgar at 1 minute	7.00	7.00	7.00
Apgar at 5 minutes	9.00	9.00	9.00

The mean APGAR score of all babies at 1 minute was 7/10 and 5 minute was 9/10.

There was no blood transfusion reported in the study population, no puerperal complications reported as well and no death had occurred in the study participants.

Table 11: Descriptive analysis of mode of delivery in study population (N=40).

Mode of delivery	Frequency	Percentage
Normal vaginal delivery	38	95.00
LSCS	2	5.00

Table 12: Comparison of mean duration at different stages (N=38).

Follow-up periods (minutes)	(Mean± SD)	Mean difference	95% CI of mean difference		P value
			Lower	Upper	
Duration (1st stage)	153.29±98.62	(Base line)			
Duration (2nd stage)	30.92±11.62	122.37	91.56	153.17	<0.001
Duration (3rd stage)	12.42±4.32	140.87	108.49	173.25	<0.001

Out of 40 study population, 38 women (95%) had normal vaginal delivery and 2 women (5%) underwent caesarean delivery.

The mean difference between first and second stages of labour was 122 minutes and mean difference between first and third stages of labour was 140 minutes. P value was <0.001 which was statistically significant.

DISCUSSION

Labour is a natural phenomenon which produces intolerable pain that requires effective methods for pain relief. Labour pain management with epidural analgesia during delivery plays an important role in woman's satisfaction.

This study was a prospective observational study conducted at RLJ Hospital, Kolar from January 2020 to June 2021.40 woman admitted for normal vaginal delivery opting labour analgesia were studied.

Age, parity, gestational age

Out of total 40 study population, the mean age group was 24 years.

20 (50%) women were primigravidae and 20 (50%) were multigravidae. The mean gestational age was 39 weeks to 40 weeks 6 days in 28 women (70%) out of 40 women.

Mode of delivery

Out of 40 study population, 38 women (95%) had normal vaginal delivery and 2 women (5%) underwent caesarean delivery. P value (less than 0.05) was statistically significant. Gribble et al in their study demonstrated that availability of on-demand epidural analgesia in labour did not increase the primary caesarean rate.[22] In a review article by Wassen et al, there was no increased risk of caesarean delivery or instrumental vaginal delivery for women receiving early epidural analgesia at cervical dilatation of 3 cm or less when compared to late epidural analgesia.[25]

Patient satisfaction

21 women (55%) experienced good satisfaction, 16 women (42%) had excellent satisfaction with epidural analgesia.

In a study conducted by Hitzeman et al, concluded Epidural analgesia is effective in reducing pain during labour. Epidural analgesia had no statistically significant impact on risk of caesarean delivery, maternal satisfaction with pain relief, or long-term backache, and no immediate effect on neonatal status as determined with Apgar scores.[26]

Duration of stages of labour

The mean duration of first stage of labour was153 minutes, mean duration of second stage was 30 minutes, and mean duration of third stage was 12 minutes.

In a study conducted by Agrawal et al, epidural analgesia by ropivacaine in Indian nulliparous resulted in reduced duration in first stage and prolonged duration of second stage of labour compared with parturient without analgesia; however, instrumental vaginal or caesarean delivery rate does not increase in the epidural group.[28]

In a research article by Aweda et al, stated use of epidural analgesia for pain relief is associated with prolonged first stage of labour and does not prolong second stage of labour.[31]

Pain relief

During first stage of labour, 20 women (52%) had no pain, 12 women (31%) had mild pain and 6 women (15%) had moderate pain. During second stage of labour, 16 women (42%) had mild pain, 15 women (39%) had no pain and 7 women (18%) had moderate pain. During third stage of labour, 30 women (78.9%) had no pain and 8 women (21%) had mild pain.

In a study conducted by Kumbhar et al concluded epidural analgesia appears to have significant pain relief as compared to no analgesia during labour.[33]

Complications

Out of 38 women who had normal vaginal delivery, 1 participant (2.6%) had postpartum hemorrhage. P value (less than 0.05) was statistically significant. In a study conducted by Luo et al, early administration of epidural analgesia increases postpartum blood loss.[41] There was no blood transfusion reported in the study population, no puerperal complications reported as well and no death had occurred in the study participants.

Neonatal outcome

The mean Apgar score of all babies at 1 minute was 7/10 and 5 minute was 9/10. D'Angelo et al concluded in his study that epidural analgesia report less pain during labour and did not affect foetal oxygenation and 5-minute APGAR score. In a study conducted by Sng et al did not show any difference in caesarean section or instrumental birth, duration of second stage of labour, Apgar scores at one minute and five minutes.[42]

Summary

Out of total 40 study population, the mean age group was 24 years. In this study, 20 (50%) women were primigravidae and 20 (50%) were multigravidae. The

mean gestational age was 39 weeks to 40 weeks 6 days in 28 women (70%) out of 40 women.

The mean duration of first stage of labour was 153 minutes, mean duration of second stage was 30 minutes, and mean duration of third stage was 12 minutes. During first stage of labour, 20 women (52%) had no pain, 12 women (31%) had mild pain and 6 women (15%) had moderate pain. During second stage of labour, 16 women (42%) had mild pain, 15 women (39%) had no pain and 7 women (18%) had moderate pain. During third stage of labour, 30 women (78.9%) had no pain and 8 women (21%) had mild pain. Out of 38 women who had normal vaginal delivery, 1 participant (2.6%) had postpartum hemorrhage. 21 women (55%) experienced good satisfaction; 16 women (42%) had excellent satisfaction with epidural analgesia. The mean APGAR score of all babies at 1 minute was 7/10 and 5 minute was 9/10. There was no blood transfusion reported in the study population, no puerperal complications reported as well and no death had occurred in the study participants. Out of 40 study population, 38 women (95%) had normal vaginal delivery and 2 women (5%) underwent caesarean delivery.

Strength of this study was: useful study in the modern era for the women to undergo normal labour without pain and reduction of operative procedures with good neonatal outcome.

Limitations

There were some limitations also. The sample size of study population was less. Preeclampsia, gestational diabetes mellitus, cardiac disorders, coagulation disorder cases were not included in our study. Long term side effects were not evaluated.

CONCLUSION

Epidural analgesia is a safe and effective technique during labour and provides significant pain relief with excellent patient satisfaction. There is no prolongation in the time duration of first, second and third stages of labour. Epidural analgesia does not increase the incidence of caesarean delivery. There is no adverse effect on neonatal outcome.

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