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Research Article

Maternal and fetal outcome in epidural analgesia study

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ABSTRACT

Background: Labour is a highly complex event. Labour may be the most painful experience many women ever encounter. The objective of this study was to study the maternal and fetal outcome in epidural analgesia.
Methods: A prospective study was conducted on 60 pregnant women. The study group (n = 60) consist of group A (epidural analgesia, n = 60) and group B (control, n = 30).
Results: The maternal and fetal outcome in group A and group B were not statistically significant. Mean duration of first stage of labour (minute) was significantly lower in group A as compared to group B (p value <0.001). The duration of second stage of labour was prolonged in group A as compared to group B (p value 0.0137). The modes of delivery (normal, instrumental delivery, LSCS) were not statistically significant in both the groups. The neonatal outcome (Apgar score at 1 minute and 5 minutes) were statistically similar in both groups (P value = 0.569).
Conclusions: Epidural analgesia is safe and effective to relieve the labour pain. It has no adverse maternal and fetal outcome. Patients are very comfortable and happy after epidural analgesia.

Keywords: Labour, Analgesia, Patients

INTRODUCTION

Labour is a highly complex event. Labour may be the most painful experience many women ever encounter. The experience is different for each woman and the different methods chosen to relieve pain depend upon the techniques available locally and the personal choice of the individual. Pain relief in labour has always been surrounded with myths and controversies. Hence, providing effective and safe analgesia during labour has remained an on-going challenge.[1]

Labour pain management includes both pharmacologic and non-pharmacological methods. Non-pharmacological methods include psycho-prophylaxis, hypnosis, transcutaneous electrical nerve stimulation (TENS), biofeedback, and acupuncture. Pharmacological methods include inhalational agents (entonox, sevoflurane), systemic opioids (morphine, fentanyl, remifentanyl). Both these agents produce analgesia but not in a continuous and effective manner. They also have systemic side effects on both the mother and fetus. They may also interfere with the progress of labour.

Central neuraxial analgesia is the most versatile method of labour analgesia and the gold standard technique for pain control in obstetrics that is currently available. The satisfaction of birth experience is greater with neuraxial techniques. Central neuraxial analgesia includes epidural block. Epidural blockade comes close to being the ideal analgesic technique in labour.[2] It has the advantage of being able to provide continuous analgesia for an unpredictable period of time and to convert analgesia to anaesthesia if an operative intervention becomes necessary.

Bupivacaine, levobupivacaine and ropivacaine are widely used to provide efficient epidural analgesia in labour.[3] The value of bupivacaine is limited by the risks of motor blockade (associated with maternal dissatisfaction and

increased instrumental deliveries) and cardiac toxicity. Ropivacaine has the advantage of more sensory motor differential blockade as well as decreased risk of systemic toxicity. Also in comparison with bupivacaine, levobupivacaine have low incidences of motor block as well as it is lesser cardiotoxic.

The aim of the study was to evaluate the effect of ropivacaine epidural analgesia on duration of labour, maternal and fetal outcome.

METHODS

The study was conducted in collaboration with the department of anesthesia in the department of obstetrics and gynecology, Mahatma Gandhi Hospital, Jaipur after gaining approval from the Institutional Ethics Committee. Sixty parturient (30 in each group) who presented in spontaneous labour were enrolled in this study after a written informed consent was signed. All patients admitted to the labour room were counseled regarding labour analgesia. The procedure was explained to the patient. Informed consent was obtained. Detailed history of the patient was collected. Routine investigations like blood grouping and typing, hemoglobin and platelet count were done as per our hospital labour protocol. Patients fulfilling the inclusion criteria and who gave consent were then randomly allocated to one of the study groups on the basis of chit and box method.

Inclusion criteria

Normal singleton pregnancies belonging to age group between 18-35 years, body weight <80 kg, American Society of Anesthesiologists status - I and II, at least 36 completed weeks (and less than 42 weeks) of gestation (confirmed by ultrasound), established labour, vertex presentation, cervical dilatation of equal or more than 3 cm.

Exclusion criteria

The exclusion criteria included age <20 or >35 years, gestation age <36 or >42 weeks, probable cephalopelvic disproportion or malpresentation on pelvic examination, Multiple or preterm gestation , cervical dilatation of less than 3 cm, presence of medical complications (preeclampsia, eclampsia, diabetes, etc.), presence of contraindications for epidural analgesia (coagulopathy, marked hypovolemia, neurological disorders, allergies to local anaesthetic, etc.), and patients refusal or inability to cooperate for epidural analgesia.

Parturients (n = 30) who desired epidural analgesia were allocated in the group I (epidural group), whereas those (n = 30) were not desired any labour analgesia were allocated in the group II (control or non-epidural group).

Obstetric management

The obstetric management was similar in both groups. The progress of labour was recorded on WHO Modified Partograph. All pregnant women were managing according to the study protocol by trained medical staffs under the direct supervision of an obstetrician. Routine intrapartum management of all pregnant women included intravenous fluid administration and continuous external electronic fetal heart rate monitoring. Pelvic examination was performed every hour to evaluate the progress of labour. Decisions regarding instrumental vaginal or operative deliveries were made by the obstetrician according to maternal or fetal indications.

Outcomes of interest

The primary outcome was duration of labour (first and second stage of labour). Secondary outcome measures were the incidence of vaginal delivery, caesarean sections and instrumental vaginal delivery. Neonatal outcome in form of APGAR score at 5 min noted.

Statistical analysis

Statistical analysis was performed with the SPSS, version 20 for Windows statistical software package (SPSS inc., Chicago, il, USA). The Categorical data were presented as numbers (percent) and were compared among groups using Chi square test. Groups were compared for demographic data were presented as mean and standard deviation and were compared using by students t-test. Probability P value <0.05 was considered statistically.

RESULTS

The study group comprised 60 pregnant females. Both groups were similar in obstetric and maternal demographic character like age, height, weight and gestation age. Maternal demographic characteristics of both groups Values are expressed as Mean±sd (Table 1).

Table 1: Patient profile.

Characteristics	Epidural group (n = 30)	Control group (n = 30)	P value
Mean age (years)	21.93±2.050	21.23±2.063	0.193
Mean weight (Kg)	72.93±2.959	72.27±6.797	0.624
Mean height (cm)	160.1±3.03	162.4±6.13	1.21
Mean gestational age (weeks)	38.76±5.1	38.40±5.5	0.73

The patient's age ranged from 18-26 years, the average age did not differ between the two groups. The mean age of women in group-A was 21.9 3±2.050 years and that of group-B was 21.23±2.063. The difference was not statistically significant. (P = 0.193) The average weight of the women allocated to group-A was 72.93±2.959 kgs and that of those in group-B was 72.27±6.797. This difference in weight between the two groups was statistically not significant. (P = 0.624) maximum numbers of patients were in gestation age between 38-39 weeks in both the groups (mean gestation age 38.76±5.1 for epidural group and 38.40±5.5 weeks for non-epidural (Table 1). Epidural catheter was inserted in mostly parturient was at vaginal dilatation of 3 cms. In group A 56.67% and group B is 53.33%. These variables did not have any statistically significant difference. (p = 0.964) (Table 2).

Table 2: Distribution of the cases according to cervical dilatation.

Cervical dilatation	Group A		Group B	
(cms)	**No**	**%**	**No**	**%**	**No**
3	17	56.67	16	53.33	33
4	11	36.67	12	40.00	23
5	2	6.67	2	6.67	4
Total	**30**	**100**	**30**	**100**	**60**

Table 3: Distribution of the cases according to duration of labour (minutes).

Group		Stage 1	Stage 2	Stage 3
Group A	N	30	30	30
	Mean	199.7	33.13	6.97
	SD	35.603	12.78	2.092
Group B	N	30	30	30
	Mean	244.77	27.53	6.57
	SD	36.147	11.73	1.851
P Value		<0.001S	0.0137	0.436 NS

Mean duration of first stage of labour (minutes) was significantly lower in group A (199.7±35.603) as compared to group B (244.77±36.147) p value <0.001. The duration of second stage of labour was prolong in group A (33.13±12.78) as compared to group B (27.53±11.73) p-value 0.0137 but no significant difference was observed in stage 3 (Table 3).

Incidence of normal vaginal deliveries were not statistically different in both groups (70 % patients in the epidural group versus 80% in the control; p-value = 0.162). There was no statistically significant difference in the rates of caesarean section between the two groups (13.3% patients in the epidural group versus 10% in the control). Although, the number of instrumental deliveries (forceps or vacuum assisted deliveries) looked to be greater in epidural group (16.66 % patients in the epidural group versus 10 % in the control) but was not statistically significant (Table 4).

Table 4: Distribution of the cases according to mode of delivery.

Mode of delivery	Group A		Group B		Total
	No	**%**	**No**	**%**	**No**
Normal vaginal delivery	21	70	24	80	45
Assisted vaginal delivery	5	16.66	3	10	8
Caesarean section	4	13.33	3	10	7
Total	**30**	**100**	**30**	**100**	**60**

The neonatal outcome was noted with APGAR score at 1 and 5 minutes. The average APGAR score during 1st minute assessment was 7.70±0.466 and 7.73±0.450 in group-A and group-B respectively. At 5 minutes, the APGAR score was 9 in both groups. The difference in mean values were not statistically significant at both 1 minute and 5 minutes (P = 0.779). The APGAR scores at 5 min were also statistically similar in both groups (p-value = 0.569) (Table 5).

Table 5: Distribution of the cases according to APGAR 1 minute and 5 minutes.

Group		APGAR 1	APGAR 5
	N	30	30
Group A	Mean	7.70	9.00
	SD	0.466	0.000
	N	30	30
Group B	Mean	7.73	9.00
	SD	0.450	0.000
P value LS		0.779NS	NA

NICU admission - No NICU admission was done.

DISCUSSION

Epidural analgesia provides significantly more analgesia, as measured by visual analog scale in both the first and second stage of labour than parenteral opioid.[3] Regional anaesthesia has been associated with a reduction in anaesthesia related delivery complications.[4-6]

In our study we chose 0.2% ropivacaine with fentanyl as it is effective for epidural pain relief during labour. Ropivacaine have an advantage over bupivacaine of neurobehavioral performance during the first few hours after delivery, and cause less motor block and less cardio- and neurotoxic analgesic agent.[7,8]

In our study, epidural analgesia was given in active stage of labour (after cervical dilatation of 3 cm).[9]

Various studies have found that epidural analgesia is associated with a prolonged first stage of labour while some studies showed no effect on first stage. In our study, the duration of first stage of labour was shorted in epidural group as compared to control group. The studies

done by Wong et al in 2005 and Fyneface-Ogan et al stated that epidural analgesia was associated with shorter first stage of labour as was noted in current study (Table 3).[10,11] Short duration of first stage may be because of better analgesia with epidural resulting to decrease inhibitory effect of catecholamines on uterine contractility hence faster cervical dilatation.[12]

In current study, the second stage was found to be prolonged in epidural group as compared to control. Several retrospective studies consistently demonstrated an association between epidural analgesia and increased durations of second stages of labour, but few randomized, prospective studies could not find any significant relation regarding the effects of epidural analgesia on the duration of labour as compared to non-epidural analgesia (Table 3). Prolonged labour seems to occur more frequently when a higher dose of local anaesthetic agent is used.

In this study, no statistically significant difference was found between epidural group and control group when comparing the rate of caesarean sections, instrumental vaginal (forceps or vacuum assisted) deliveries and normal vaginal deliveries. Few early studies have reported significantly higher incidences of caesarean or instrument deliveries with epidural analgesia as compared with systemic opiate drugs (Table 4). In the late 1980s and early 1990s, several retrospective trials demonstrated an association between the use of epidural and increased caesarean rate.[14]

The main pitfalls of these retrospective trials were that the patients who requested for epidural usually have an associated increased risk of cephalo-pelvic disproportion or fetal malposition, both of which increased the risk of caesarean delivery. Recent randomized, population based studies do not show such increase as in current study. Instrumental births declined over time (Table 4). This decline in the strength of association between epidural analgesia and instrumental birth may reflect improved epidural techniques and management of epidural labour.[11]

Our results demonstrated no significant difference in neonatal outcome (APGAR score) between epidural and control groups as in almost all other studies.[7,8,15]

CONCLUSION

Epidural analgesia is safe and effective analgesia in obstetrics. In our study we found no maternal and fetal adverse effect by epidural analgesia. Mean duration of first stage of labour (min.) was significantly lower in group A (199.7±35.603) as compared to group B (244.77±36.147) p value <0.001. The duration of second stage of labour was prolong in group A (33.13±12.78) as compared to group B (27.53±11.73) p value 0.0137 but no significant difference was observed in stage 3.

There was no statistically significant difference in the rate of caesarean section deliveries between the two groups (13.33% patients in the epidural group versus 10% in the control). Although, the number of instrumental deliveries (forceps or vacuum assisted deliveries) looked to be greater in epidural group (16.66% patients in the epidural group versus 10% in the control) but was not statistically significant. Incidence of normal vaginal deliveries were also not statistically different in both groups (70% patients in the epidural group versus 80% in the control) (p-value = 0.162). The APGAR scores at 1 minute and 5 minutes were also statistically similar in both groups (p-value = 0.569).

Labour pain is most painful event for birth of baby. Many of the women prefer caesarean section only due to get rid of labour pains. With the use of epidural analgesia we can definitely reduce the rate of caesarean section and prevent the women from undergoing unnecessary caesarean section.

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