Original Research Article

A study of progress of labour and feto-maternal outcome with epidural labour analgesia

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Abstract

Background: Experiencing labour pain and giving birth to infant is normal physiological process. In the present study the merits and demerits of epidural analgesia and its effect on progress of labour and its outcome is evaluated.

Materials and methods: The present study on epidural analgesic technique for painless labour had been carried out at King George Hospital, Visakhapatnam, in cooperation with Department of Anesthesia, King George hospital. A total number of 100 patients were studied (50 cases and 50 controls). They were divided into total two groups. GROUP – 1 (Study Group) included 50 low risk primigravida, fulfilled the inclusion criteria. In this group cases received epidural analgesia. GROUP – 2 (Control Group) included 50 low risk primigravida in active phase of labour, fulfilled the inclusion criteria but were not willing for epidural analgesia.

Results: 50 healthy parturient receiving epidural analgesia were compared with 50 parturient in the control group. Maximum number of parturient in both groups belong to age group of 18 to 25 years. The parturient in both groups were comparable as regards to their age distribution. Mean duration of first stage of labour in both cases and control group was compared and there was no significant difference in both groups. p value >0.05, which was non-significant. 80% of parturient in cases has pain score between 1 and 2 in control group none of the parturient has pain score of <7.

Conclusions: Labour pain is associated with biochemical and physiological changes that may have adverse effects on both the mothers and the fetus. Epidural analgesia is an excellent method of relieving labour pains.

Key words

Labour, Fetomaternal outcome, Labour analgesia.

Introduction

Experiencing labour pain 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]. The pain gets progressively severe as labour advances and often aggravated by Anxiety, fear and ignorance. The effects of labour pain are mainly Hypercarbia, loss of consciousness and decreased uterine blood flow [2]. Unrelieved maternal pain leads to series of metabolic changes in the mother including surge in catecholamine levels which may adversely affect the fetus [3].

Catecholamines causes uterine artery vasoconstriction, decreases uteroplacental circulation and results in fetal hypoxia. Maternal hyperventilation impairs the release of oxygen from maternal hemoglobin which results in reduced fetal arterial oxygen tension. Increased levels of maternal plasma catecholamines and hyperventilation combine to reduce oxygen transfer to the fetus and render it increasingly acidotic. Effective pain relief can decrease this response and improves uterine blood flow [4].

Adequate analgesia during labour is benefit for the mother, has a positive influence on the course of labour and the state of the newborn child so intrapartum analgesia is regarded as necessary component of optimal obstetric care. The most frequently chosen methods for relief of pain during labour are systemic medication, inhalation analgesia and regional analgesic techniques. Epidural analgesia is commonly employed technique for providing pain relief during labour. During the first stage and second stages of labour, epidural analgesia blunts the increase in maternal cardiac output, heart rate and blood pressure. Epidural analgesia reduces plasma catecholamines concentrations, increases utero placental circulation and reduces fetal hypoxia and acidosis [5].

Bupivacaine, an amide group of local anesthetics, produces excellent sensory blockade with minimal motor blockade and long duration of action and less tachyphylaxis. It is most commonly employed for lumbar epidural blockade [6].

American college of obstetrician and gynecologist and American society of anesthesiologist concur that maternal request is sufficient for pain relief during labour barring a medical contraindication [7].

In the present study the merits and demerits of epidural analgesia and its effect on progress of labour and its outcome is evaluated.

Materials and methods

The present study on epidural analgesic technique for painless labour had been carried out at King George Hospital, Visakhapatnam, in cooperation with Department of Anesthesia, King George hospital.

A total number of 100 patients were studied (50 cases and 50 controls). They were divided into total two groups.

GROUP – 1 (Study Group)
Included 50 low risk primigravida, fulfilled the inclusion criteria. In this group cases received epidural analgesia. .

GROUP – 2 (Control Group)
Included 50 low risk primigravida in active phase of labour, fulfilled the inclusion criteria but were not willing for epidural analgesia.

Inclusion criteria

- Primigravida (18-30 years)
- Full term singleton pregnancy with cephalic presentation (37-42 weeks)

- Those who had entered spontaneous labour in active phase of labour with cervix 3-4 cms dilated.
- Those without any previous uterine surgery.
- Clinically adequate pelvis, cephalopelvic disproportion ruled out.
- Obstetric high-risk factors ruled out by clinical and ultrasound examination.
- Estimated foetal weight of $\geq$ 2.5kg
- ASA 1 and 2 (American society of anesthesia)

Exclusion criteria

- Antenatal women with Non vertex presentation (breech, transverse lie).
- Multi parity.
- Obstetric complications (pre-eclampsia, preterm labour, previous LSCS, ante partum haemorrhage, etc.).
- Medical disorders complicating pregnancy(anaemia, Diabetes mellitus, bronchial asthma, heart disease, etc.).
- Contraindications for epidural analgesia.
- Foetal anomalies (by TIFFA scan).
- Patients unwilling for procedure.
- History of allergy to local anesthetics.
- Seropositive HIV and HbsAg patients.

Selection of cases

Primigravida coming to labour room and antenatal clinic who had fulfilled inclusion criteria were enrolled in the study. They were counselled when they were admitted in labour room, during 1st stage of labour. The aims of the study were explained to them. Detailed history was taken according to the proforma.

A through medical history and obstetric history was taken. The height and weight of the cases were recorded. The pulse rate and blood pressure were recorded and examined thoroughly for general condition.

Obstetric examination was done in dorsal position. Height of the uterus in weeks, presentation, position, engagement, frequency and duration of uterine contractions were noted. Fetal heart rate and rhythm was recorded.

Pervaginal examination was done with all aseptic precautions to note the following details: -

- Cervical dilatation and effacement
- Station of the presenting part
- Membrane status, intact or not
- Pelvic assessment to rule out cephalo-pelvic disproportion.

Routine Investigations like:

- Blood for grouping and typing,
- Hemoglobin %
- Bleeding time and clotting time
- Urine for Albumin, sugar and microscopy were recorded. Biochemical tests like Random Blood Sugar, blood area and creatine were noted. Ultrasound evaluation was done for foetal well-being, liquour content and placental localization.

Methodology

After selection, the cases were given soap water enemas and local preparation was done. Maternal vitals and fetal heart rate were monitored till good uterine action was initiated i.e. once in 3 minutes lasting for 30-45 seconds. A partogram was started.

Then the parturient were shifted to a separate labour room which was sterile and resuscitation equipment was kept ready.

Maternal outcome was evaluated regarding pain relief, patient satisfaction and any side effects noted during labour and in the puerperium.

Neonatal evaluation was done in all cases with APGAR scores at 1 min and 5 mins after birth.

Procedure of technique [29]

All the patients were explained the procedure of the technique, its effects and side effects and written consent was taken. 18 G intravenous

canula was started and all the patients were preloaded with 500 ml of Ringer lactate.

The patients were placed in a left lateral position with the back of the patient parallel to the edge of the table. After scrubbing up as for surgical operation and wearing a sterile gown and gloves the patients back was cleaned over on area extending from lower thoracic region to the lower part of the sacrum including both flanks. The back was draped.

Midline approach was used in all cases 16 – 18 G Touhy epidural needle was used. It has 8cm shaft marked at 1cm interval (Lee markings).

It had a relatively blunt tip angled at 20 (Huber Point). It was placed exactly in the midline perpendicular to the skin with the bevel facing upwards. After piercing skin, subcutaneous tissue, supraspinal ligament and interspinous ligament the needle enters ligamentum flavum. Then the stylet is removed and a 5 ml syringe filled with 2 ml of air was injectedwith simultaneously appreciating pneumatic bounce. Once the epidural space was entered, sudden loss of resistance feel was appreciated at the plunger of the syringe. This was the "loss of resistance to air method to detect the place."
Epidural space was confirmed by gentle aspiration to ensure that no CSF or blood was aspirated. Care should be taken to see that no attempt is made to advance, the needle though the ligament flavum during active uterine contraction.

Once the Tuohy needle was in place, a graduated epidural catheter was threaded down the needle. A slight resistant was felt as the catheter enters the epidural space and a further 2-3 cm length of catheter was introduced.

Once the catheter was in place the epidural needle is removed carefully, to avoid withdrawing the catheter.

Fixing the catheter

A gauze piece was placed around the catheter at the site of the skin puncture and held in position with adhesive tape. The catheter was then taped along the midline of mother's back towards the right side of the neck.

Results

The study was done to assess the effect of epidural analgesia on the progress of labour and its outcome, to evaluate its efficacy as an analgesic technique and to study the maternal and fetal outcome. 50 healthy parturient receiving epidural analgesia were compared with 50 parturient in the control group. Maximum number of parturient in both groups belong to age group of 18 to 25 years (**Table – 1**).

Table - 1: Distribution of study participants based on age group.

Age (Years)	Cases	Control	P value
<20	22 (44%)	20(40%)	0.04
21-25	23 (46%)	30(60%)	
26-30	5(10%)	0(0%)	
Total	50(100%)	50(100%)	

Table - 2: Distribution of study participants based on mean age in both groups.

	Age (Years)		
	Mean	Minimum	Maximum
Cases	21.62 ±2.58	18	30
Control	21.52 ±1.90	19	25

The parturient in both groups were comparable as regards to their age distribution (**Table – 2**).

Table - 3: Comparison of mean duration of first stage of labour in cases and controls.

Stages of labour	Group	N	Mean	SD	P value
Duration of first stage	Cases	50	6.520	.4840	0.18
	Control	50	6.390	.4979	

In our study, mean duration of first stage of labour in both cases and control group was compared and there was no significant difference

in both groups. p value >0.05, which was non-significant (**Table – 3**).

Table - 4: Percentage of oxytocin usage in cases and controls.

Grouping	Oxytocin use		P value
	Yes	No	
Case	41(82%)	9(18%)	0.001
Control	39(78%)	11(22%)	

The need for oxytocin use in both groups was comparable and it has no significance in this study (**Table – 4**).

Table - 5: Mean duration of second stage of labour in cases and conrols.

Duration of 2nd stage min	Group	N	Mean	SD	P value
	Case	50	40.52	6.405	0.42
	Control	50	39.46	6.911	

There was no significant prolongation of the second stage in cases as compared to controls (**Table – 5**).

Table - 6: Mean duration of third stage of labour in cases and controls.

Duration of 3rd stage min	Group	N	Mean	SD	P value
	Case	50	5.80	1.443	0.38
	Control	50	6.04	1.324	

The duration of third stage of labour was similar in both cases and control (**Table – 6**).

Table - 7: Maternal side effects in cases.

	Frequency	%
No side effect	44	88
Nausea	1	2
Pruritus	2	4
Shivering	3	6
Motor weakness	0	0
Respiratory distress	0	0
Total	50	100

There was no significant side effects in cases (**Table –** 7).

80% of parturient in cases has pain score between 1 and 2 In control group none of the parturient has pain score of < 7 (**Table – 8**).

Table - 8: Visual analogue scale scores in cases and controls.

VAS score	Cases	Control
0	1(2%)	0
1	25(50%)	0
2	15(30%)	0
3	8(16%)	0
4	1(2%)	0
7	0	1(2%)
8	0	11(22%)
9	0	32(64%)
10	0	6(12%)
Total	50(100%)	50(100%)

Table - 9: Mean visual analogue scale scores in cases and controls.

VAS score	Group	N	Mean	SD	P value
	Case	50	1.66	.848	.001
	Control	50	8.86	.639	

Mean pain score in cases was significantly decreased in cases (1.66 mean) as compared to controls (8.86). P value <0.05 which showed significant pain relief in cases with epidural analgesia (**Table – 9**).

Table - 10: Depicting the duration of onset, mean number of top ups and mean duration between top ups in cases.

Variable	Group	N	Mean	SD
Onset of analgesia (min)	Cases	50	8.88	1.881
Duration between top ups (min)	Cases	50	62.10	13.556
No of top ups	Cases	50	3.18	.983

The mean duration of onset of analgesia was 8.88 minutes. The mean duration between top ups was 62 minutes and the mean number of Top ups required was 3.18 (**Table – 10**).

Discussion

Labour pain is a subjective experience with sensory and emotional components. The perception of pain and response to it vary from one parturient to other.

There are many techniques which are both regional and non-regional to provide labour analgesia. However, epidural analgesia gives the most superior analgesia for labour.

Epidural analgesia using Bupivacaine 0.125% has gained popularity as a safe and effective technique of pain relief during labour.

The present study was undertaken to evaluate the efficacy of Bupivacane 0.125% as an analgesic and to assess the progress of labour and maternal and foetal outcome.

A total number of 100 parturient were selected. They are randomly divided in to two groups.50 parturient in study group received 0.125% Bupivacaine 10 ml as an initial dose and 0.125% Bupivacaine 5ml as top up doses. Control group is not willing for epidural analgesia.

The parameters observed were onset of analgesia, duration of analgesia with loading dose, number of top up doses required during labour, patient satisfaction, effect on duration of labour, labour out come and neonatal outcome and maternal side effects.

Parameters like pulse rate, blood pressure and foetal heart rate were also noted from each parturient.

The demographic characteristics are age, body mass Index, Gestational age which were comparable in both cases and controls.

Conclusion

Labour pain is associated with biochemical and physiological changes that may have adverse effects on both the mothers and the fetus. Epidural analgesia is an excellent method of relieving labour pains.

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