

## TO STUDY THE EFFECT OF EPIDURAL ANALGESIA ON DURATION OF LABOUR

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### INTRODUCTION

Labor is an intense and a very painful experience, with almost 30% of mothers finding it much more painful than thought.<sup>[1]</sup> The pain of labour has been known since history of time. Labour is the most painful experience many women encounter. There is variation in experience for each woman and the different methods are chosen to relieve pain depending on the patient preference and need according to situation. Various non-pharmacological methods of pain relief have been described including transcutaneous electrical nerve stimulation (TENS), hypnosis, acupuncture and training in a variety of relaxation techniques, many request pharmacological method of pain relief. In the

early 1960s, the lumbar epidural replaced caudal analgesia as the preferred technique. In 1967 Beazley et al.<sup>[2]</sup> published a classic study of the efficacy of different forms of analgesia in labour. Since then epidural analgesia has been widely introduced for pain relief in labour even for routine practice.<sup>[3]</sup> The use of lumbar epidural catheters in the 1970s permitted administration of pain relief early in labour, rather than only at the time of delivery. Several improvements in epidural analgesia occurred in the 1970s and 1980s.<sup>[1]</sup> The use of epidural analgesia in the United States has tripled between 1981 and 2001, with 60% of parturient using this technique currently in large hospitals.<sup>[4]</sup> About a fifth parturient women in England and Wales received epidural analgesia.<sup>[5]</sup>

Severe pain is not life-threatening in healthy parturient women, it can have neuropsychological consequences. Postnatal depression may be more common when analgesia is not used<sup>[6]</sup> and pain during labor has been correlated with the development of post-traumatic stress disorder.<sup>[7]</sup>

**Sadia-** The term epidural is used as to both analgesia(diminishment or total relief of pain) and anaesthesia (total absence of sensations) produced by injecting local anaesthetics and/or opioids (natural or synthetic narcotics) into epidural space surrounding the spinal column.<sup>[8]</sup>

The pain of labour is derived from visceral and somatic components. The visceral component which involves primarily the cervix and lower uterine segment, becomes active during the first stage of labour due to contractions causing cervical dilatation and effacement, transmitting pain impulses when stretched and distended. Pain of first stage of labour is referred to T10-L1 dermatomes. Somatic pain is derived from vagina, vulva and perineum, beginning late in first stage of labour, prior to complete cervical dilatation and is transmitted by pudendal nerve which communicates with sacral nerves S2, S3 and S4. These pathways can be blocked by epidural blockade.<sup>[9]</sup>

The second stage of labor is briefer than the first, the pain is usually more intense. Perineal pain due to stretching of the vagina, vulva and perineum is superimposed on the pain of uterine contractions. Second-stage pain is principally somatic in nature and is transmitted through pudendal nerve and sacral nerve S2 through S4.

Pain contributes to exhaustion, and may cause emotional disturbances which may negatively influence the mother's relationship with her baby during first few crucial days.<sup>[10]</sup> Moreover it has detrimental cardiovascular, metabolic and endocrine effects predisposing to foetal hypoxia.<sup>[11]</sup>

Lumbar epidural analgesia offers a safe and effective method of pain relief during labour. The benefits of epidural analgesia include effective pain relief without motor block, reduction in maternal catecholamines and a mean to achieve rapid surgical anesthesia.<sup>[12]</sup>

Trials of slow pushing have occurred about the association between epidural analgesia, instrumental deliveries and prolongation of second stage of labour, which is because of weak desire to push due to diminution of bearing down reflex and reduced uterine activity.

Now epidural analgesia is used widely in our country for labour. A number of factors may be involved in lower acceptance of this useful modality by our population, including social customs, lack of public awareness and lack of organized maternity services.

An alarming rise in caesarean section surgeries in India, mainly in private hospitals, has come under the scanner leading to over 1.3 lakh people signing an online petition in February 2017, seeking government intervention to bring in accountability and transparency in institutional deliveries. Following the petition, women and child development minister Maneka Gandhi wrote to health minister J P Nadda, suggesting to make it mandatory for hospitals to publicly display the number of c-section surgeries and normal deliveries carried out.

Hence the need of an hour is to find a way and save caserean delivery for the rarest of the cases and provide females with a better painless mode of delivery.

Aim of this study is to compare the effect of epidural analgesia on duration of 2<sup>nd</sup> stage of labour with that of no epidural analgesia in a singleton primigravida vertex presentation patients.

#### **MATERIALS AND METHOD**

This study protocol was developed in association with obstetricians and approved by the local ethics committee. This is a Prospective comparative study done between August 2015 to July 2017 in the department of Obstetrics and Gynaecology of A.V.B.R.H hospital, Sawangi, Wardha.

Two groups was made Group A with 30 patients went through labour in epidural analgesia and in Group B 30 patients without epidural analgesia.

Parturients who desired epidural analgesia were allocated in group A (epidural group), whereas those who were not enthusiastic to labor analgesia were allocated in group B (control).

Inclusion criteria were that Patient should be Primigravida, Age in between 20 – 35 years, having Body weight <80 kg, Period of gestation - 36- 42 weeks, Singleton pregnancy, Vertex presentation, Cervix > 4 cm dilated Exclusion criterias were Patient with Multiparity, Age <20 and > 35, Gestational age < 36 weeks or > 42 weeks, cephalopelvic disproportion, Malpresentations of fetal head, Cervix dilation < 4 cm, Contraindications of epidural analgesia i.e spinal deformities, local site infections, bleeding abnormalities and etc, Medical complications like pre -clampsia, eclampsia etc, Abnormal fetal heart rate tracing, Patient not opting for epidural analgesia.

Diagnosis of active stage of labour was made by observing good uterine contractions and cervical assessment. Maternal status in terms of stable vital signs (blood pressure, pulse, temperature) and foetal status in terms of satisfactory CTG were assessed.

## METHODOLOGY

Parturients were explained the merits and demerits of epidural analgesia and informed consent was taken. Cases consisting 30 parturient willing for epidural analgesia and Control group consisting 30 parturient not willing for epidural analgesia was included in the study.

In group A.

1. Thorough pre-anaesthetic check up was carried out in the epidural group.
2. Once cervical dilatation reached 4 cm, 500 ml of Ringer lactated solution was administered intravenously, and the patient was seated in the upright position for epidural placement.
3. The low back was prepared and draped in a sterile fashion.
4. The epidural space, at the L2-L3 or L3-L4 intervertebral space was identified with the use of the loss of resistance technique with 17-gauge Tuohy needle.
5. An epidural catheter was inserted 4-5 cm into the epidural space, and a test dose of 3ml lidocaine 2% was given followed 5 minutes later by a bolus injection of 10 ml of ropivacaine 0.2% and 50µg fentanyl.

Maternal blood pressure (BP) was monitored 5 minutes later. Parturients were kept in left lateral position with pillows at their back as to prevent aortocaval compression and were continuously attended.

After initiation of block and following each top up maternal pulse and BP was monitored at 5 minutes interval for 30 minutes and then half hourly thereafter.

6. Analgesia was maintained using a continuous infusion of ropivacaine 0.1% with fentanyl 2µl/ml at a 10ml/hr rate. Further boluses of 5-10ml ropivacaine 0.2% was given upon patients' request.

Following epidural analgesia, maternal blood pressure, heart rate and sensory blockage levels was monitored throughout labour.

An anaesthetist managed all parturient women in epidural group.

Complications were defined as hypotension (systolic BP less than 100mm Hg and diastolic BP less than 60mm Hg), unilateral block, unblocked segments, post-dural puncture headache, cardiac arrest etc. If analgesia was considered inadequate, anaesthetist was called to assess the block. Anaesthetist intervention was defined supplementary as dose of bupivacaine, resetting the catheter or withdrawal of catheter by anaesthetist.

Group B: In this group, patients was not given any anaesthesia.

In both groups, fetal heart rate was continuously monitored. Progress of labour was plotted on partogram. Duration, intensity and interval of uterine contractions were monitored with manual palpation as well as tocodyno-meter in CTG machine and if found to be ineffective with failure of cervical dilatation at the rate of at least **1cm/hr on 2 hourly vaginal examination**, then according to the practice of our unit to manage labour actively, oxytocin infusion was started.

With continuous electronic foetal monitoring second stage was allowed **up till one to two hours**. In the case of persistent bradycardia or decelerations, intervention was done accordingly. We depended upon meconium stained liquor with abnormal foetal heart rate patterns to make the diagnosis of foetal distress.

At the time of delivery neonatologist was called, and baby was evaluated in terms of Apgar scores and the need for bag and mask resuscitation.

The outcome in both groups like duration of second stage of labour, mode of delivery, intra-partum complications, neonatal Apgar scores at 1 minutes and 5 minutes and any need for bag and mask resuscitation were recorded.

## RESULTS

Total of 60 pregnant women fulfilling the inclusion criteria were included in this study. Most of the women were in age group 21–32 years (84%). The mean age of the patients was 27.20 years. All patients included were at term, i.e., 37–41 weeks of gestation with the mean gestational age 38 weeks. There were 52% primigravida and 48% multigravida in study groups. Out of sixty, 50 patients had normal second stage which was less than 1 hour while 10 patients had prolonged second stage.

On comparison, 6 patients (20%) with prolonged second stage received non epidural analgesia while 4 patients (15%) with prolonged second stage were from epidural group (prolonged here is taken as 1 or more than 1 hour)

#### Demographic profile of Patients

Characteristics	Epidural	Control	P value
Mean Age	28	26	
Mean Weight	65	64	
Mean Height	157	159	
Mean Gestation Age	37	38	

**Table-1: Duration of second stage of labour between non-epidural and epidural groups**

Duration of 2 <sup>nd</sup> Stage of Labour	Groups		Total
	A (Epidural)	B (non epidural)	
< 1 hour	85 % (26)	80% (24)	50
1 to > 1 hour	10% (3)	15% (5)	8
2 to > 2 hour	5% (1)	5% (1)	2
<b>Total</b>	<b>30</b>	<b>30</b>	<b>60</b>

**Table-2: Mode of delivery between non-epidural and epidural groups**

Mode of delivery	Groups		Total
	A (Epidural)	B (Non epidural)	
SVD with episiotomy	22 (73%)	20 (67%)	42
Forceps	8 (26%)	7(23%)	15
Ventouse	0 (0)	3 (6%)	3
<b>Total</b>	<b>30</b>	<b>30</b>	

There was no major intrapartum complication in both groups.

On comparison, 22 patients in epidural group had spontaneous vaginal delivery with episiotomy (73%) while 20 patients in non-epidural (67%) group delivered by spontaneous vaginal route.

In epidural group 8 patients had forceps applied (either mid-cavity or outlet forceps) and 0 patients had ventouse applied due to malrotation while in nonepidural group 7 patients had forceps and 3 had ventouse delivery.

#### DISCUSSION

Epidural analgesia has gained wide spread popularity in the last few decades. Not only there is accumulating evidence of greater efficacy and safety but the role of acceptance has expanded with developments and improvements in the pharmacological armamentarium,

equipment, monitoring and clinical management. In obstetrics, great concern prevail regarding the influence of epidural analgesia on obstetric mechanism, progress and outcome of labor.<sup>[13]</sup>

Epidural analgesia provides significantly more analgesia, as measured by visual analog scale in both the first and second stage of labour than parenteral opioid.<sup>[14]</sup> Although regional anaesthesia has been associated with a reduction in anaesthesia related maternal mortality, there is continuing controversy over whether epidural analgesia impedes the progress of labour by causing dystocia and increasing operative delivery rates.<sup>[15,16,17]</sup>

Taking this into account 84% patients had normal duration of second stage of labour, i.e., <1 hour while 16% of patients had prolonged second stage. There is similar study done before which was conducted in Shaikh Zayed Hospital in 1998 by Naz and Saeed<sup>[18]</sup> that reported the impact of epidural analgesia in eighty primigravidas. In their study, 83% patients had normal duration of labour while prolonged labour was encountered mainly in induction group in spite of oxytocin augmentation. In our study when comparison was made, it was found that 24 patients (80%) with normal second stage (<1 hour) were in non-epidural group while 26 patients (85%) with normal second stage were in epidural group and 20% of patients with prolonged second stage were in epidural group while 20% patients with prolonged second stage were in non-epidural group (almost similar).

Another study conducted by Javed et al<sup>[19]</sup> reported normal duration of second stage (<1 hour) in 84% of control group and 30% of epidural group while prolonged second stage was observed in 16% of control group and 70% of epidural group (70% vs 16%  $p < 0.05$ ).

It is recommended to wait for 3 hours after full cervical dilatation for descent and spontaneous rotation of fetal head with satisfactory CTG, according to American College of Obstetrics and Gynaecology. But this needs more top ups which can enhance motor blockade with bupivacain, so intervention was decided after 1 hour for multigravidas and 2 hours for primigravidas and results had good neonatal outcome with this consideration. Similarly Thorp et al<sup>[20]</sup> in their retrospective observational study showed that women with epidural analgesia had a second stage of labor twice as long as that of women without epidural analgesia, but they used continuous 0.125% bupivacain infusion. Jan Zhang<sup>[21]</sup> described a quantitative review of four studies in which the duration of second stage of labour was increased to 63% with respect to women who did not receive epidural analgesia. Lyon et al<sup>[22]</sup>

presented data from US Air Force Medical Corps describing fraction of labours with second stage lasting for >2 hours, which increased from 15% to 23% ( $p < 0.05$ ) due to epidural analgesia.

Epidural analgesia increases the incidence of instrumental delivery. Reported incidence of instrumental delivery varies between 10–56% in literature. This wide variation is due to the use of different local anaesthetic concentrations, combined regimens with opioids, ineffective maternal efforts and motor blockade of pelvic muscles. In our study, 70% patients delivered spontaneously while 30% had instrumental delivery (forceps or ventouse). This was consistent with the same analysis of Naz and Saeed<sup>23</sup> who reported spontaneous vaginal delivery rate of 57.50% and instrumental delivery rate of 32.50%. On comparison in our group, 22 patients (73%) in epidural group and 20 patients (67%) in non-epidural group had spontaneous vaginal deliveries (73% vs 67%) while 8 patients (26%) in epidural group and 10 patients (29%) in non-epidural group had instrumental deliveries.

Epidural analgesia is useful in making the labour painless, it is known to be safer and better for both mothers and neonates. obstetric outcome is dependent on many factors like adequacy of pelvis, size of baby and obstetric management apart from provision of analgesia. These variables should be critically evaluated while considering the effects of epidural analgesia on obstetric outcome and trained personnel should be available to provide maximum benefit with minimum complications.

The studies done by Wong *et al.*<sup>[24]</sup> in 2005 and Fyneface-Ogan *et al.*<sup>[25]</sup> stated that epidural analgesia was associated with shorter first stage of labour. 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.

On contrary to many result of studies quoted above we came across fewer complication associated with epidural group and labour was also not prolonged by much in the epidural group. On comparison we found better outcome and duration of labour was within normal range in maximum of our primigravida patients in epidural group (85%) only 15% patient went into prolong labour.

Also keeping In consideration few patients have fear and anxiety of pain related to labour and they demand of C section or painless labour epidural analgesia is a boon to patients. It



provides pain less and less anxious and mentally stable environment for the mother and her relatives. Patients are less likely to go into post partum stress and depression and bond better with the newly born.

Menka Gandhi in her recent activities has promoted Normal Labour and has made a public awareness regarding reducing the number of caesarean sections in india. The World Health Organisation (WHO) has suggested that C-section rate should be between 10 percent and 15 percent of the total deliveries in a country. However, a latest National Family Health Survey indicated that the overall C-section rate in some states in India was as high as 58 percent. Hence by epidural analgesia we reduce the c section rates which are not related to malposition malrotation or CPD and givemother a painless and stress free labour.

#### Advantages of Epidural Analgesia

- Relaxation of pelvic floor and cervix results in minimal injury to the soft tissues
- Episiotomy and its repair can be carried out without delay
- The third stage is shortened, manual removal of the placenta can be accomplished without general anesthesia a blood loss is reduced.

We promote Epidural Analgesia as it is safer and did not prolong the duration of labour in our study.

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