

## Painless delivery – a short experience

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### Abstract

**Purpose:** To determine efficacy and safety a randomized comparison of continuous infusion versus intermittent injection of epidural bupivacaine for labor analgesia was performed in the Maternity Hospital, Thapathali Kathmandu. **Methods:** Twenty healthy parturient received a loading dose of 10 ml of epidural 0.1% bupivacaine with 25 mg of pethidine. They were then randomized to receive continuous infusion of 0.1% bupivacaine 10 ml/hour with the help of infusion pump or intermittent injection of 0.1% bupivacaine 10 ml hourly. For breakthrough pain 10 ml of 0.1% bupivacaine top ups given in both groups. The two groups were compared for analgesic efficacy, mode of delivery, patient assessment of analgesia, motor block and other complications. Data analyzed in Pentium III version with SPSS and statistical significance test is done with independent samples t-test. **Results:** The 10 patients in each group were comparable in age but not in parity. Analgesic efficacy was excellent in 10 cases and comfortable in another 10 cases [excellent / comfortable 6:4 with infusion and 4:6 with intermittent injection]. There were no statistically significant differences between groups in pain scores or duration of active first or second stage of labor. Fifteen women had spontaneous vaginal deliveries, one caesarian section (infusion group) and four instrumental deliveries (intermittent injection group). Four women in the infusion group had hypotension and motor block, but none in the intermittent injection group. APGAR scores in both groups were 7-8/10 at 1 minute and 9-10/10 at 5 minutes. **Conclusion:** Both continuous infusion and intermittent injection of low dose bupivacaine are very good methods of relieving labor pain in our context. Analgesic efficacy was similar in both groups and there was no prolongation of second stage of labor.

**Key words:** painless delivery, parturient, bupivacaine, epidural analgesia.

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In recent year epidural and even combined spinal Epidural has become increasingly popular and standard technique for pain relief in labor. Other techniques such as parental opioids, inhalation agents and even other regional blocks have neonatal complications and rarely provide complete and satisfactory analgesia (1).

Two most commonly used local anesthetics for epidural analgesia are lignocaine and bupivacaine in concentrations of 1% and 0.1% respectively. The ideal agent should have rapid onset of action, minimal risk of toxicity to mother and fetus, minimal or no motor blockade with effective sensory blockade and minor or no effect on uterine activity and placental perfusion. Lignocaine has faster onset of action but shorter duration of action. Bupivacaine meets most of the above mentioned criteria. It is highly protein bound and therefore placental transfer is limited compared to lignocaine. Addition of opioids speeds up the onset of action and has synergistic analgesic action (2, 3, 4).

In most laboring women, epidural analgesia is effective in reducing pain and thereby decreasing adverse effects. It reduces maternal Catecholamine

levels and improves uteroplacental circulation. Catecholamine increments as a result of painful uterine contractions may prolong labor by adversely affecting uterine contractions. Painful contractions may lead to maternal hyperventilation and respiratory alkalosis, which in turn shifts oxygen hemoglobin dissociation curve to left, increasing maternal oxygen affinity and decreasing delivery of oxygen to fetus (3, 5).

Epidural analgesia is very effective method of reducing pain during labor but it is not commonly used in our context and no definitive data of study done in past is available. Thus we intended to study efficacy and safety of epidural analgesia in Maternity Hospital, Kathmandu, Nepal.

### Material and methods

After getting approval from the hospital ethical committee, informed consent was taken for this study from all parturient. Patients were explained about the procedure, benefits and shortcomings.

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All twenty parturient in active first stage of labor, irrespective of parity were selected for study with epidural analgesia. They were divided into two groups. In both groups, after initial preoperative evaluation and preparation, lumbar epidural space was identified by 16 or 17 gauge Tuohy epidural needle using saline and loss of resistant technique in sitting position. Epidural catheter was introduced and fixed. Test dose of 3 ml of 2% lignocaine with 1:200,000 epinephrine was given through the epidural catheter after confirming no CSF or blood aspirated through the catheter.

The continuous infusion group received 0.1% bupivacaine at the rate of 10 ml per hour and 10 ml of top ups for breakthrough pain till the patient

delivered. Those randomized for intermittent injection group, received 10 ml of 0.1% bupivacaine injection hourly after confirming negative aspiration. This group also received 10 ml of 0.1% bupivacaine for any breakthrough pain. Initially both group received loading dose of 25 mg of pethidine epidurally.

In both groups, age range was 20-34 years and mean with standard deviation almost same. Statistical analysis revealed no significant differences,  $p > 0.05$ . Parity wise, 7 primipara and 3 were multipara in intermittent injection group and in continuous infusion group, 5 primipara and 5 were multipara group. (Table 1)

**Table 1.** Parturient characteristics:

Group	Intermittent injection group	Continuous infusion group	P value
Age	20-34 yr., 24.8±4.91 yr.	20-34yr. 25.4 yr±4.2 yr.	0.77
Primipara	7	5	
Multipara	3	5	

During the study period, following assessment were made:

- ?? pulse, blood pressure and fetal heart sound closely monitored,
- ?? two hourly assessments of progress of labor was done,
- ?? Any complications like hypotension and motor block were recorded,
- ?? Duration of first stage and second stage of labor were calculated and analyzed,
- ?? Mode of delivery and baby APGAR scores recorded and analyzed,
- ?? Patient assessment of pain relief deduced by interviewing on the next day of delivery.

Data analysis done with pentium-3 version of computer and statistical analysis was performed with independent samples t- test on SPSS version 10 for windows.

### Results

Analgesic efficacy was assessed after interviewing the parturient on the next day of delivery. Visual analogue scores were not used as subjective assessment of analgesia is what patients choose and judge and their primary concern. In intermittent injection group, 4 women had excellent pain relief, and 6 were comfortable. In continuous infusion group, 6 women had excellent pain relief and 4 were comfortable.(Table 2)

**Table 2.** Patient assessment of analgesic efficacy:

Group	Group 1 Intermittent injection group	Group 2 Continuous infusion group
Analgesic efficacy		
Excellent	4	6
Comfortable	6	4
total	10	10

The stages of labor were counted from the time the analgesia was started. It didn't represent actual first stage as latent phase had already passed as all women on study were in active first stage of labor. The mean first stages of labor were 4.90 hours in group 1 and 3.55 hours in the group 2 and no

significant difference,  $p > 0.05$ . In intermittent injection group, the average time of second stage of labor was 32.6 minutes, whereas in continuous infusion group, it was 36.5 minutes, but there was no significant statistical difference,  $p > 0.05$ . (Table 3)

**Table 3.** Stages of labor

Group	Group 1 Intermittent injection	Group 2 Continuous infusion	P value
Stages of labor			
First stage in hours (mean $\pm$ SD)	2.5 -10.0 (4.90 $\pm$ 2.65)	2.5 - 6.0 (3.55 $\pm$ 1.21)	0.16
Second stag in minutes (mean $\pm$ SD)	20 – 50 (32.6 $\pm$ 9.20)	10 – 90 (36.5 $\pm$ 7.03)	0.61

Mode of delivery was important aspect of this study. Most physicians believed prolongation of labor and increase instrumental delivery and caesarian section, after epidural analgesia.

In intermittent injection group, out of 10 women, there was 9 normal delivery (spontaneous vaginal) with episiotomy (90%). One woman underwent caesarian section due to cervical dystocia and fetal distress. In continuous infusion group, out of 10, 6

delivered vaginally; there were 4 instrumental deliveries (3 vacuum delivery and one forceps delivery). In total of 20 cases, 75% delivered vaginally, 20.0% by instrumentation and 5.0% had caesarian section. APGAR scores of all babies delivered were calculated and studied. In both groups the scores were 7-8/10 in first minute and 9-10/10 in first five minutes, which shows no effect of epidural analgesia in fetal outcome. (Table 4)

**Table 4.** Mode of delivery

Group	Intermittent injection group		Continuous infusion group		Total	
	No.	%	No.	%	No.	%
Mode of delivery						
Spontaneous vaginal	9	90.0	6	60.0	15	75.0
Instrumental	-	-	4	40.0	4	20.0
Caesarian section	1	10.0	-	-	1	5.0
Total	10	100.0	10	100.0	20	100.0

### Complications

We encountered motor block and hypotension (defined as more than 30% decrease in systolic pressure than initial reading and / or less than 100 mmHg systolic) in four parturient in continuous infusion group (4/20, 20%) and not in intermittent injection group. Among them two parturient had minimal motor block and needed support for walking. Other two had moderate motor block that needed assistance to move in bed. These cases had instrumental deliveries, as there was minimal bearing down efforts. Apart from this, there was no inadvertent dural puncture or difficulty in locating epidural space or catheter placement.

### Discussion

This was a randomized comparative study to study efficacy and safety of epidural analgesia for labor pain having continuous infusion versus intermittent injection with epidural bupivacaine. Descriptive scales, visual analog scores for pain and Bromage scale for motor block, were not used. (1).

Patients can easily judge subjective feeling of analgesia and motor blockade and therefore should be of primary concern (1). Parturient enrolled in this study were all in early active stage of labor (3-5cm of cervical dilation). In all

patients 1<sup>st</sup> stage of labor was not more than 10 hrs after start analgesic drugs and 2<sup>nd</sup> stage not more than 90minutes.

Use of pethidine in initial loading dose probably helped to speed up the action, as all parturient were pain free after 5-7 minutes of injection of bupivacaine with pethidine. In subsequent injections, pethidine was not used for fear of fetal respiratory depression.

In most cases, pain relief was excellent and most of them slept after bolus injection of analgesic drugs. Subsequent pain relief was better in continuous infusion group, but there was increase in hypotension & motor blockade compared to intermittent injection group. There was more breakthrough pain in 2<sup>nd</sup> stage of labor in intermittent injection group.

British Journal of Anesthesia 1999 (5) reported the mode of delivery in parturient that underwent painless delivery using epidural and combined spinal and epidural techniques. The result shows 53.3% spontaneous vaginal delivery, 24.6% instrumental delivery and 22.1% cesarean delivery which is comparable to ours.

Epidural analgesia was not associated with increased numbers of cesarean delivery when compared with a suitable alternative method of analgesia (6). Increased use of epidural analgesia did not change the overall dystocia cesarean delivery rate, although dystocia was more common. Consequently, limiting availability of epidural service will not affect cesarean delivery rates. (7)

Women in the epidural group had lower pain scores during both the first and the second stage of labor, and women in the PCIA group had higher sedation scores. (Women in the PCIA group were "visibly sedated but invariably arousable.") There was no difference between the two groups in neonatal outcome, except that more babies in the PCIA group received naloxone to reverse respiratory depression at birth. (6)

The low-dose combination of pethidine and bupivacaine used in this trial proved a satisfactory

preparation for epidural administration during the early stages of labor.(8)

During the lumbar epidural space finding and catheter placement, there was no inadvertent dural puncture and subsequent complications. In all cases lumbar epidural Catheter placement and space finding in sitting position were performed without difficulty.

### Conclusion

Lumbar epidural analgesia, either continuous infusion or intermittent injection, is very effective and safe. This is a simple method of pain relief in laboring women but needs vigilant and meticulous monitoring of mother and fetus along with progress of labor.

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