

Epidural Analgesia in Labour in Relation to the Rate of Instrumental Deliveries

L JAVED A SALICK N J FARUQI

Department of Obstetrics & Gynecology Unit I Jinnah Hospital, Lahore, Pakistan
Correspondence to Dr. Lubna Javed, Senior Registrar

Aims & Objectives: To study the effect of epidural analgesia (EA) in labour on the rate of instrumental deliveries

Study Design: Clinical Trial / Case Control study. **Study Settings:** Labour ward of Jinnah Hospital, Lahore during one-year period from July 2002 to June 2003. **Patients and Methods:** One hundred women in labour at term were divided into two equal groups. Group-I comprised of those women who were provided with epidural analgesia while group-II consisted of those women who had labour without the block. The anesthetist provided epidural analgesia using 0.125% bupivacaine and the obstetrician or midwife gave intermittent top-ups. **Main Outcome Measures:** The main outcome measures were the effect of epidural analgesia on the duration of second stage of labor and the rate of instrumental deliveries. The data was collected on a pre-designed proforma and was analyzed on computer software (SPSS). Ratio and proportions were calculated and Chi-square test was used to check significant association between the groups. $P < 0.05$ was considered statistically significant. **Results:** Gestational age, gravidity, duration of first stage of labour, and fetal outcome were comparable between the two groups. There was prolongation of second stage of labour ($P < 0.05$). 30% of the parturient in the group with epidural analgesia had second stage of < 1 hour while there were 84 % of women in the control group who had second stage of < 1 hour. 66% of the women in group I (EA) had duration of second stage of 1–2 hours while in group-II 16% of women delivered in the same period. 4% of the women in the study group had second stage of > 2 hours while there was none (0.0%) who took > 2 hours in the control group. There was an increased rate of instrumental deliveries in patients with epidural analgesia ($P < 0.05$). 40% of women had instrumental deliveries in the study group as compared to 10 % in the control group. Patient satisfaction was excellent among parturient given EA, 94 % of the parturient being very satisfied.

Conclusion: Epidural analgesia along with an experienced anesthetist, a dedicated obstetrician and a trained midwife can convert the painful labour into a less stressful event. Although it prolongs the second stage of labour and increases the rate of instrumental deliveries yet its advantages of pain free labour, better psychological outcome and no significant complications outweigh these drawbacks.

Key Words: Epidural analgesia, Labour, Instrumental deliveries

Labour pains have always been a matter of concern for mankind and there have always been attempts to reduce the misery of the parturient. For most women labour is associated with very severe pain often exceeding all expectations. As the labour pains serve no useful purpose, it is unethical not to relieve the sufferings of the women. The knowledge that it is possible to alleviate labour pains dates far back in the history. Dr. James Young Simpson administered the first recognized obstetric analgesia using ether in 1847¹. The other methods range from the use of injectable opioids, self-administration of nitrous oxide, hypnosis, and acupuncture to the development of highly effective epidural analgesia. In modern obstetrics it has emerged as a special entity. Among the different modalities available epidural analgesia has proved to be probably the most effective and safe although invasive method of achieving labour analgesia².

Proper administration of epidural analgesia offers many advantages for both the mother and fetus. It provides an excellent pain relief with few potential complications. During labour epidural analgesia reduces stress by abolishing pain so eliminating the progressive rise in corticosteroids normally seen throughout labour³. Deliveries with epidural promote excellent psycho-emotional state of the parturients⁴. With the availability of

various local anesthetics, opioids and newer infusion techniques, analgesia can be tailored to the specific needs of the mother, fetus and labour⁵. In the last decade delivery by continuous infusion epidural analgesia (CIEA) has become a gold standard in most modern perinatal centers. It produces lesser degree of motor block and is more safe and reliable than traditional top-up regimes⁶. But as the facilities for CIEA are not available in our department so we depend on the traditional top-up regime.

Epidural space is approached through lumbar or sacral route; the anesthetic agent blocks the posterior nerve routes, blocking the sensory input and perception of pain. Optimal use of epidural analgesia depends not only on the availability of 24 hours anesthesia services but also on the adequate knowledge, cooperation and enthusiasm of all those involved namely midwives, obstetricians and anesthesiologists⁷.

The study was undertaken to analyze the effect of epidural analgesia on the duration of second stage of labor and the rate of instrumental delivery. Pregnant women in the antenatal clinic were given information about the availability, cost, advantages and complications of epidural analgesia and those who demanded on reporting to labour room in active phase of labour were provided with the service.

Patients and Methods:

One hundred women reporting to labour ward in labour fulfilling the inclusion and exclusion criteria were selected for the study. It was a case control study in which a clinical intervention i.e. epidural analgesia was provided to 50 women in labor in an open-ended trial, while other fifty women in group-II (controls) had labour without any analgesia. The effect of analgesia on duration of second stage of labor and frequency of instrumentation was compared between the two groups.

Inclusion Criteria: An uncomplicated course of pregnancy and normal fetal heart rate before randomization were necessary inclusion criteria. The study recruited all the pregnant women in whom normal spontaneous vaginal delivery (SVD) was anticipated

Exclusion Criteria: The patients on anticoagulants, those with coagulopathy, with local sepsis, hypo tension, with fetal macrosomia or intrauterine growth restriction (IUGR), previous caesarean section and unwilling were excluded from the study. Fetal malpresentation and abnormalities of pelvis were also excluded.

Main Outcome Measures: Main outcome measures were effects of analgesia on the duration of second stage of labour and the rate of instrumental deliveries. The data was collected and analyzed statistically on computer software (SPSS). Ratio and proportions were calculated and Chi-square test was applied to check any significant association between groups. P value of < 0.05 was considered statistically significant.

Results:

Gestational age and gravidity were comparable between the two groups (figure-I, figure II). There was non-significant change in the duration of first stage of labour (figure-III) while there was significant prolongation of second stage of labour in the study group (Table-I)(P value <0.05). 30% of the parturient in the study group had second stage of < 1 hour while there were 84% of women in the control group who had second stage of < 1hour. 66% of the women in group-I had duration of second stage of 1–2 hours while the number was 16% in the second group. 4% of the women in the study group had second stage of >2hours while there was none who took >2hours in the control group. So there was significant prolongation of second stage of labour in the study group (P < 0.05).

The rate of spontaneous vaginal delivery was low in the study group as compared to control group i.e. 48% as compared to 80% and significant increase in the number of instrumental deliveries in the study group (table-II) (P value < 0.05). There were 20 instrumental deliveries in the study group as compared to 5 in the control group (P value < 0.05). In most of the patients in group-I, the indication of instrumental delivery was prolonged second stage due to poor maternal effort (table-III). There were few minor anesthetic complications, which were self-limiting and managed easily.

Patient satisfaction assessed by series of questions regarding pain, experience of labor with analgesia and without it, was excellent among parturient given EA, 94 % of the parturient being very satisfied and 4 % satisfied (table-IV). Complete satisfaction with analgesia and mobility was reported 12-24 h postpartum by 95% of mothers. The use of this analgesic technique caused no alteration in obstetric management or postpartum care of the women. On the other hand 92 % of the parturient complained of severe pain and 8 % of moderate pain that were not given analgesia and described their labor experience as highly unpleasant.

Discussion:

Epidural analgesia is the most efficient method of pain relief during labor. The number of parturient given intrapartum epidural analgesia is reported to be over 50 percent at many institutions in the United States⁸. There is still a debate as to whether it interferes with the normal process of delivery. Some authors argue that the incidence of instrumental deliveries, malrotation and protracted labor is increased in parturient receiving EA. There are few potential complications of the procedure like hypotension, inadvertent dural puncture and headache, which are easily treated, and self – limiting. Permanent morbidity and mortality are rare¹⁰. The majority of women who received epidural analgesia in labour considered that the benefits of EA outweighed each of the potential complications¹¹. In my study, bupivacaine was used as the sole agent for analgesia. Two to five top-ups of bupivacaine were usually required depending upon cervical dilatation at the time of placement of epidural catheter and gravidity of the patient. Continuous maternal and fetal monitoring was ensured and partogram was maintained. Labour was augmented with oxytocin wherever required and it was observed that oxytocin requirement was more in the epidural group as compared with control. Different studies have shown the increased risk of oxytocin augmentation to be two fold¹².

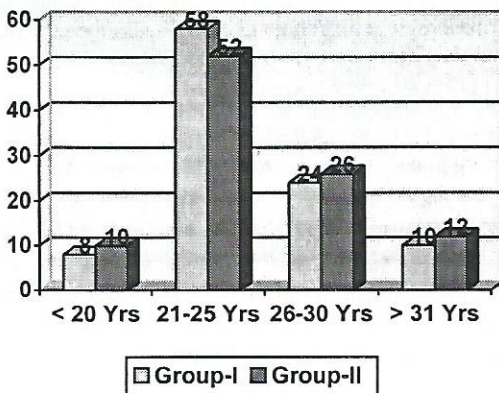
There are conflicting issues regarding influence of epidural analgesia on obstetric mechanisms. As far as duration of labor is concerned, several randomized and non-randomized studies have shown different results. According to Zhang et al, EA prolongs the second stage of labor but not the first stage¹³. 50 percent of women lose their urge to expel in case of EA, which prolongs second stage of labor. The second stage of labor is prolonged by 25 min (P < 0.001) in a study by Zhang J¹⁴. Different studies have shown 10 to 56 percent increased incidence of instrumental delivery¹⁵. This wide variation is due to different concentrations of local anesthetics used, combined regimes with opioids, augmentation with oxytocin and consideration of recommendations of American College of Obstetricians and Gynecologists to wait for 3 hours after full dilatation of cervix in case of satisfactory fetal and maternal condition but as the facility for fetal scalp blood sampling is not available in our unit

so patients were reviewed after 1 hour and intervention was decided after one to two hours. 84 percent of the patients in the control group had second stage of less than one hour while only 30 percent of the women delivered in the same period in the epidural group. The rest had longer second stage in the study group. The incidence of instrumental deliveries was 40 percent as compared to 10 percent in the control group, which is a quite significant difference. This high frequency found in my study is still comparable to 10 to 50 percent incidence in the literature. The duration of second stage of labor and the incidence of instrumental deliveries would have been much less if combined regimes with opioids and CSEA techniques were available. Active management of labour or judicious use of oxytocin might overcome the delay in the second stage of labour¹⁶. As far as patient satisfaction is concerned most of the women were highly satisfied and they considered epidural analgesia a blessing for a labouring woman.

Conclusion:

Epidural analgesia along with an experienced anesthetist, a dedicated obstetrician and a trained midwife can convert the painful labour into a less stressful event. Although it prolongs the second stage of labour and increases the rate of instrumental deliveries yet its advantages of pain free delivery and no end result complications outweigh these drawbacks. In developed countries, 50 – 80% of parturient receive epidural analgesia in labor but here in Pakistan, it is a luxury available to upper class females in private hospitals and in some tertiary care centers. The pregnant women should be given information regarding EA in the antenatal clinics and offered epidural analgesia when they report in labour.

Fig. 1 Gestational Age of Groups (in percentages):

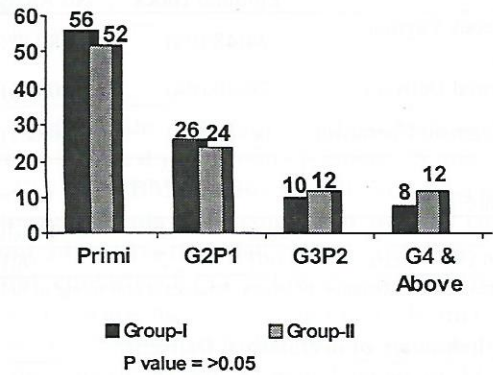


Chi-Square Tests

	Value	df	P value
Pearson Chi-Square	.406	3	.939

P > 0.05 no significant association between Analgesia and gestational age.

Fig. 2 Gravidity of Groups (in percentages):



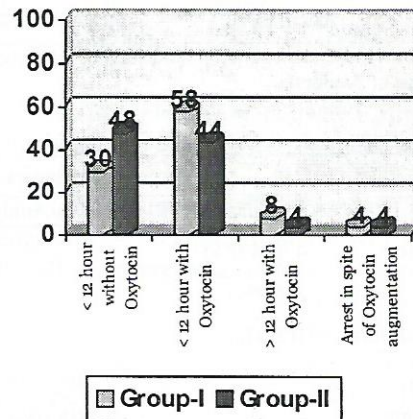
P value = >0.05

Chi-Square Tests:

	Value	df	P value
Pearson Chi-Square	.605	3	.895

P > .05 no significant association between Analgesia and gravidity.

Fig. 3 Duration of 1st Stage of Labor (in percentages):



Chi-Square Tests

	Value	df	P value
Pearson Chi-Square	3.704	3	.295

P > .05 no significant association between duration of first stage of labour and analgesia

Table: 1 Duration of 2nd stage of labour:

	Type of Analgesia	
	Epidural Block	No Analgesia
< 1 hour	15(30.0%)	42 (84.0%)
1 – 2 hour	33 (66.0%)	8(16.0%)
> 2 hour	2 (4.0%)	0.0 (0.0%)

Chi-Square Tests

	Value	df	P value
Pearson Chi-Square	30.033	2	.000

P < 0.05 Significant association between analgesia and 2nd stage of labour

Epidural Analgesia in Labour in Relation to the Rate of Instrumental Deliveries

Table 2: Mode of Delivery:

	Type of Analgesia	
	Epidural Block	No Analgesia
Spontaneous Vaginal Delivery	24(48.0%)	40(80.0%)
Instrumental Delivery	20(40.0%)	5(10.0%)
Lower Segment Caesarean	6(12.0%)	5(10.0%)

Chi-Square Tests

	Value	df	P value
Pearson Chi-Square	13.091	2	.001

P < .05 Significant association between Analgesia and mode of delivery.

Table 3: Indications of Instrumental Deliveries:

	Type of Analgesia	
	Epidural Block	No Analgesia
Fetal Distress in Second stage of Labour	2(4.0%)	2(4.0%)
Prolonged Second stage of labour	18(36.0%)	3(6.0%)

Chi-Square Tests

	Value	df	P value
Pearson Chi-Square	13.714	2	.001

P < .05 Significant association between Indication of Instrumental Delivery * Type of Analgesia .

Table 4: Pain Experience & Satisfaction during labour:

	Type of Analgesia	
	Epidural Block	No Analgesia
Very Satisfied	47(94.0%)	-
Satisfied	2(4.0%)	-
Some Discomfort	1(2.0%)	-
Severe Pain	-	46(92.0%)
Moderate Pain	-	4(8.0%)

Chi-Square Tests:

	Value	df	P value
Pearson Chi-Square	100.000	4	.000
Likelihood Ratio	138.629	4	.000

P < .05 Significant association between Analgesia and pain experience and satisfaction during labor between the groups

References:

1. Michael Hainer. Analgesia and anaesthesia. In: Geoffrey Chamberlain (ed. Turnbull's obstetrics. 2nd ed.) London: Churchill Livingstone. 1995: 591 – 606.
2. Tan TK. Epidural analgesia in Obstetrics. Ann Acad Med Singapore 1998; 27: 325-42.
3. Buchan PC. Emotional stress in Childbirth and its modification by variations in obstetric management. Epidural analgesia and stress in labour. Acta Obstet Gynaecol Scand. 1980; 59(4): 319-21.
4. Porozhanova V, Bozhinova S. Delivery with epidural analgesia. Akush Ginecol (sofia). 1998; 37(4): 8 – 10.
5. Schabel JE, Pappers PJ. Lumbar epidural analgesia for labour and vaginal delivery. Gynaecol Obstet Invert 1997; 44: 73-81.
6. Sia ATR, Chong JL. Epidural 0.2% ropivacaine for labour analgesia. Anaesth Intensive Care. 1999; 27: 154-8.
7. Soreide E, Smedrig JP, Smedrig E. Epidural Obstetrical analgesia: a friend or an enemy? Tidsskr Nor Laegeforen 1998; 118: 1703-5.
8. Epidural analgesia during labor. Vincent RD Jr, Chestnut DH. Am Fam Physician. 1998 Nov 15; 58 (8): 1743-4, 1746
9. Obstetric outcome following epidural analgesia. Loosen C, Ekblom A, Ekman - Ordeberg G, Irestedt L. Acta Anaesthesiol Scand. 1998 Mar; 42 (3): 281 – 3
10. Epidural analgesia in labor: an evaluation of risks and benefits. Thorp JA, Breadlove G. Br Med J 1996; 23: 63-83
11. Complications of obstetric regional analgesia: how much information is enough? Bethune L, Harper N, Lucas DN, Robinson NP, Cox M, Lilley A, Yentis SM. Int J Obstet Anesth. 2004 Jan; 13(1): 30 – 4
12. Zhang J, Klebanoff MA. Epidural analgesia in association with duration of labor and mode of delivery: a quantitative review. Am J obstet Gynecol. 1999 Apr; 180(4): 970 – 7
13. Zhang J, Yancey MK, Klebanoff M, Schwarz J, Schweitzer D. Effects of epidural analgesia in the course of labor and delivery: a natural experiment. Obstet Gynecol 2000 1: 95
14. Zhang J, Yancey MK, Klebanoff M. Does epidural analgesia prolong labor and increase risk of caesarean delivery? Am J Obstet Gynecol. 2001 Jul; 185 (1): 128 – 34
15. The nature and management of labor pain: part II. Pharmacologic pain relief. Leeman L, Fontaine P, King V, Klein MC, Ratchliffe S. Am Fam Physician. 2003 Sep 15; 68 (6): 1115 – 20
16. Impey L, MacQuillan K, Robson M. Epidural analgesia need not increase operative delivery rates. Am J Obstet Gynecol 2000; 182: 358 – 63