COMPARATIVE STUDY OF EPIDURAL ANALGESIA IN LABOUR

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ABSTRACT

BACKGROUND

The pain of child birth is one of the most severe types of pain a woman will endure in her lifetime. Epidural analgesia possesses a long record of safety and has few complications and can be considered as standard management for pain relief during labour.

METHODS

The study comprises of continuous lumbar epidural analgesia with Bupivacaine (0.125%) pain relief during labour. A total of 100 cases (Primigravidae) were studied (After written informed consent), out of which 50 received continuous lumbar epidural analgesia and 50 served as control. Perception of pain relief was standardised by using data from Visual analogue scale. Motor power was assessed. Maternal and foetal outcome were noted.

RESULTS

30 (60%) of women left their experience with epidural analgesia better than expected; 19 (38%) patients found it satisfactory and as expected only 1 (2%) patients had inadequate analgesia. A scale measuring from 0-10 cm was used and pain was assessed before giving epidural analgesia and after giving analgesia. Mean basal VAS before giving epidural analgesia was 8.88 cm. Mean VAS after giving epidural during 1st stage was 1.70 cm and during 2nd stage was 2.13 cm. Maximal motor blockage assessed by Bromage scale was 96% and 4% for grade 0 and 1 respectively.

CONCLUSION

Epidural analgesia results in significantly satisfactory analgesia with minimal motor blockade, so that patient remains ambulatory.

KEYWORDS

Parturient, Pain Relief, Epidural Analgesia, Bupivacaine, Maternal and Fetal Outcome, Visual Analogue Scale.

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INTRODUCTION

Labour and delivery are amongst the most painful of human experiences. Women have been able to cope up with this pain with these extreme conditions, probably in anticipation of the result and that the happy experiences of motherhood would dull the memories of pain. Pain in labour was thought to be essential to the birth process until mid-nineteenth century.

This myth was broken later and it surfaced that child birth should be pleasant and painless experience in human being. Chloroform was used for it first by Simpson.¹ but he quoted that "It will be necessary to ascertain anaesthesia's precise effect upon the actions of the uterus and abdominal muscles and its influence upon the child." Motor weakness of lower body resulting from epidural analgesia may inhibit normal foetal rotation and descent, particularly when the epidural is administered in latent labour. To address these concerns, modern day epidural analgesia administered during labour consists of low dose of local anaesthetic and adjuvant medications allowing adequate pain relief without significant effects on motor function.

Epidural analgesia may be administered by obstetrician when he or she has been properly trained and in appropriately selected circumstances.

METHODS

A total of 100 cases (Primigravidae) were studied, out of 50 received continuous lumbar epidural analgesia and 50 served as control; they did not receive epidural analgesia.

Selection of Patients

Following Criteria were used for Selection of Patients

1. The full term (37-40 wks.) primigravida patient willing for continuous/single shot lumbar epidural analgesia.
2. The presentation vertex and spontaneous vaginal delivery expected.
3. The patient in active labour (Cervical dilatation more than >3 cm.)

The Contraindication for Epidural Blockade Considered were as follows

1. The patient not willing for epidural analgesia.
2. Abnormal presentation.
3. Previous LSCS.
4. Cephalopelvic disproportion.
5. Antepartum haemorrhage/Hypotension.
6. Coagulation disorders.
7. Spinal deformity.
8. Local sepsis at the site of puncture and systemic sepsis.
9. Known case of sensitivity of local anaesthetic agent.
10. Foetal distress.

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Perception of pain relief is subjective and this variable was standardised by using data from Visual analogue scale.

Visual Analogue scale involves the use of 10 cm scale, which was marked from 0-10 VAS before epidural analgesia; VAS at 5 min, 10 min, 20 min, 30 min, 45 min, 60 min and after that half hourly till delivery of baby. Mean VAS is calculated for 1st and 2nd stage of labour. Motor power was assessed using a modified Bromage score at hourly intervals and at each request to get out of bed.

Bromage Score	Method
0	Free movement of legs and feet
1	Just able to flex knees; free movement of feet
2	Unable to flex knees; free movement of feet
3	Unable to move legs or feet

The degree of motor block was assessed according to a modified Bromage scale before administration of epidural analgesia and 5, 10, 20, 30, 45, 60 min after the first dose of drugs and every 30 min thereafter until delivery. Analgesia was established with 10 mL of 0.125% Bupivacaine and maintained with epidural top up doses of the same solution at regular intervals.

If the patients did not receive adequate pain relief within 30 minutes of first dose, 5 mL of the test solution was repeated at minimum intervals of 5 minutes till adequate analgesia was established. Analgesia was measured using visual analogue scores on a 100 mm scale. After the initial dose of the test drug, visual analogue scale was measured at the peak of each contraction and the time of onset of first painless contraction noted. The establishment of epidural blockade was tested with skin prick using a needle and the time taken for loss of sensation to pinprick was also noted.

Measurements were performed every 30 min until delivery. The target for adequate analgesia is said to be attained when visual analogue score is less than 30 mm. The VAPS and the highest dermatomal level of sensory block were assessed using loss of sensation to pinprick was measured before administration of epidural analgesia and 5, 10, 20, 30, 45, 60 min after the first dose of drugs and every 30 min thereafter until delivery.

Patients who required instrumental delivery received 10 mL of the test solution before the procedure in sitting position. Patients who required caesarean section received the test solution till T4 level were achieved.

Motor power was assessed using a modified Bromage score at hourly intervals and at each request to get out of bed. Complications related to epidural like hypotension were noted. The duration of first and second stages of labour were noted. The mode of delivery was noted and if instrumental or caesarean section, the indications for intervention were noted. Neonatal outcome was evaluated by APGAR scores at 1 and 5 mins. Maternal satisfaction with analgesia was assessed by asking the mothers to rate their overall quality of analgesia 24 hrs. after delivery.

	Satisfaction with Analgesia
1.	Excellent
2.	Satisfactory
3.	Inadequate, No pain relief at all

OBSERVATION

Duration (min)	Group A (n=50)	Group B (n=50)
180-300	18	29
300-420	28	20
>420	4	1
MEAN±S.D.	334.66±71.75	323.48±71.22
t test	P>0.05 Insignificant	

Table 1: Distribution Cases According to Duration of First Stage of Labour

n=number of cases

Fig. 1: Distribution Cases According to Duration of First Stage of Labour

Figure on bar shows number of cases.

Mean duration of first stage of labour in Group A was 334.66 min and that for Group B were 323.48 min, and their P (t test) value was insignificant. So both groups were comparable statistically. So there was no significant difference in duration of labour in study group and control group.

Duration (min)	Group A (n=50)	Group B (n=50)
15-29	7	9
30-44	18	22
45-59	16	16
60-75	5	0
MEAN±SD.	41.54±11.93	37.57±9.10
t test	P >0.05 INSIGNIFICANT	

Table 2: Distribution of Cases According to Duration of Second Stage of Labour

n=number of cases

Fig. 2: Distribution of Cases According to Duration of Second Stage of Labour

Figure on bar shows number of cases.

Mean duration of second stage of labour in group A was 41.54 min and that for group B were 37.57 min, and their P (t test) value was insignificant. So both groups were comparable statistically. So there was no significant difference in duration of labour in study group and control group. There was no complication in third stage of labour in both Group A and Group B patients.

Indication	Group A (n=50)	Group B (n=50)
Normal Vaginal Delivery	43 (86%)	45 (90%)
Instrumental Delivery (Ventouse)	3 (6%)	2 (4%)
Fetal Distress	1 (2%)	1 (2%)
Non-Progressive 2 nd Stage	2 (4%)	1 (2%)
Caesarean Section	4 (8%)	3 (6%)
Fetal Distress	2 (4%)	2 (4%)
Non-Progressive 2 nd Stage	2 (4%)	1 (2%)

Table 3: Distribution of Cases According to Mode of Delivery

n=number of cases

Sl. No.	Apgar Time	Score	Group A	Group B
1.	At 1 Min	<7	2	1
		7-10 Score	48	49
2.	At 5 Min	<7	0	0
		7-10	50	50

Table 4: Showing Distribution According to APGAR Score at 1 min and 5 min

n=number of cases

Fig. 4: Distribution of Cases According to APGAR Score at 1 min and 5 min

In Group A 2 (4%) and in Group B 1 (2%) neonates had APGAR <7 at 1 min. They were resuscitated in the form of suction and stimulation and nasal O₂ was given; no neonate needed intubation and any drugs.

Subjective Assessment

Quality of Analgesia	No. of Patients (50)	Percentage %
Excellent (Better than Expected)	30	60
Satisfactory/Good	19	38
Inadequate	1	2
Failure	0	0
Total	50	100

Table 5: Distribution of Cases According to Quality of Analgesia

Subjective Assessment

Fig. 5: Distribution of Cases According to Quality of Analgesia

Figure on bar shows number of cases

30 (60%) of women left their experience with epidural analgesia better than expected; 19 (38%) patients found it satisfactory and as expected only 1 (2%) patients had inadequate analgesia, i.e. they had significant pain relief but experienced some pain during most of time of labour and delivery.

Sl. No.	VAS and Stage of Labour	Mean
1.	Basal VAS (Before Epidural)	8.88 cm
2.	1 st stage	1.70 cm
3.	2 nd stage	2.13 cm

Table 6: Distribution of Cases According to Visual Analogue Scale

Fig. 6: Distribution of Cases According to Visual Analogue Scale

A scale measuring from 0-100 mm (0-10 cm) was used and pain was assessed before giving epidural analgesia and after giving analgesia.

Mean basal VAS before giving epidural analgesia was 8.88 cm. Mean VAS after giving epidural during 1st stage was 1.70 cm and during 2nd stage was 2.13 cm. Maternal side effects were seen in 6 (12%). Hypotension was seen in 1 (2%) patients on O.T. Table.

Distribution of patients according to motor weakness by using Bromage scale

Sl. No.	Maximum Motor Block	No. of Patients (n=50)	(%) n=50
1.	0	48	96
2.	1	2	4
3.	2	0	0%

Table 7: Distribution of Cases According to Motor Blockade

n= number of cases

Fig. 7: Distribution of Patients According to Motor Weakness by Using Bromage Scale

Figure on bar shows number of cases.

All patients remained ambulatory and they could go walking to toilet or sit in a chair at bedside.

DISCUSSION

Various concentration of different drugs like lignocaine, mepivacaine, ropivacaine, carbocaine, bupivacaine, etc. have been tried for injection into epidural space for pain relief in labour.^{1,2,3} The first report which appeared in literature using bupivacaine for epidural analgesia was done by E. K. Blom and Widman in 1964. Since then, many studies have been carried. For the present study, 0.125% bupivacaine was used to study the efficacy of epidural analgesia during labour.^{4,5}

Duration of 1st and 2nd stage was studied

As per table number 4 and 5, both Group A and Group B were comparable statistically and there was no significant difference in the duration of labour, as t test p value >0.05 is insignificant.

Study Group	1 st Stage	2 nd Stage	Total Duration
Stud et al 1980. ⁴	480 min	57.9 min	537.9 min
Cohen et al 1987. ⁵	-	52 min	-
David Chestnut 1994	381 min	112 min	493 min
Russell et al 1995	299 min	104 min	403 min
Botill et al 1997	269 min	46 min	315 min
Present study	334.66 min	41.54 min	376.2 min

The present study is comparable with Russell et al 1995.⁶ for the duration of 1st stage of labour. The present study is comparable with Botill et al 1998.⁷ and Cohen et al 1987.⁸ for the duration of 2nd stage of labour. There was no complication in third stage of labour in both Group A and Group B patients such as retained placenta, PPH, hypotension.

Mode of Delivery

Mode of Delivery	Normal	Instrumental	LSCS
Celleno and Capogna 1988. ⁹	83.3%	10%	6.6%
Russell et al 1995. ⁶	46%	40%	14%
Dahl et al 1999. ¹⁰	82%	9%	9%
Hart et al 2003. ¹¹	51%	29%	20%
Desai Pankaj et al 2006. ¹²	65.12%	25.45%	9.43%
Present study	86%	6%	8%

In the present study, majority of patients in Group A (86%) and Group B (90%) delivered spontaneously without intervention (Table No. 6). The present study is comparable with study Cellano and Capogna 1988.⁹ Dahl et al 1999.¹¹

RCT conducted by Philipsen and Jensen 1989.¹³ Sharma et al 1997.¹⁴ Bofill et al 1998.⁷ Clark and Colleagues 1998.¹⁵ showed no significant difference between caesarean delivery rates associated with epidural analgesia as compared to those without epidural analgesia.

In present study also, there is no significant difference between caesarean delivery rates in Group A (Epidural Group) and Group B (Control Group).

Neonatal status - In the RCT by Lriberman et al 1996,^{16,17} more than 34 studies were identified in which APGAR score of infants was studied between women receiving epidural analgesia and those who did not. Only one study showed a higher proportion, whose mothers received epidural having a 5 min APGAR <7.

	Group A (Epidural Group)		Group B (Control Group)	
	Desai Pankaj et al 2006	Present Study	Desai Pankaj et al 2006	Present Study
Neonates 5 minute APGAR score <6	0.69%	0%	0.77%	0%

In Desai Pankaj et al 2006.¹³ comparative study in epidural group 0.69% neonates had APGAR score <6 at 5 min and in control group 0.77% neonates had APGAR score <6 at 5 min, in present study 0% neonates had APGAR score <6 at 5 min in epidural group and control group.

In the present study majority of women 60% felt their experience as better than expected, i.e. excellent and 38% women felt it to be as expected, i.e. satisfactory. Only 2% patients had incomplete analgesia.

Present study is comparable with study of Danilo Celleno and Capogna 1988.⁹ J. D. Murphy et al 1991.¹⁸ Dahl et al 1998.¹⁹

Maximum Motor Block: (Table No. 13)

In the present study, maximum patients had their Bromage score 0.

Present study is comparable to study by Chestnut et al 1994.⁸ As the patients had no motor block, they remained ambulatory and were satisfied.

CONCLUSION

1. Mean duration of first and second stage of labour in epidural group was 334.66 ± 71.75 minutes and 41.54 ± 11.93 minutes and in control group was 323.48 ± 71.22 minute and 37.57 ± 9.10 minutes and they were statistically comparable. There was no prolongation of labour in epidural group.
2. Maximum patients delivered vaginally in both groups.
3. The incidence of spontaneous vaginal delivery in epidural group was 86% and in non-epidural group was 90%.
4. The incidence of instrumental deliveries in epidural group was 6% and non-epidural group was 4%.
5. Incidence of LSCS in epidural group was 8% and non-epidural group was 6%.
6. Foetal outcome was good in both epidural and non-epidural group babies. In epidural group, 4% neonates has APGAR score <7 at one minute and in control group 2% neonates had <7 at one minute, but APGAR score at 5 minutes was >7 in all neonates in both groups.
7. Pain relief was assessed after 24 hrs. by patient's own evaluation. It shows that 60% of the patients experienced better than expected pain relief, 38% of the patients were satisfied. Only 2% patients had inadequate pain relief, but did not feel worse.
8. Basal VAS before epidural was 8.88 cm. The mean VAS during first stage was 1.70 cm and during second stage was 2.13 cm. All the mothers were happy with quality of pain relief they obtained.
9. Maximal motor blockage assessed by Bromage scale was 96% and 4% for grade 0 and 1 respectively. Patients were happy.

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