LABOUR ANALGESIA- A COMPARISON OF EPIDURAL BOLUS ADMINISTRATION OF 0.0625% BUPIVACAINE WITH 0.0002% FENTANYL VERSUS 0.125% PLAIN BUPIVACAINE

Ramgopal Radha Krishnan¹, Mariappan Gomathi²

¹Associate Professor, Department of Anaesthesiology, Government Vellore Medical College Hospital, Adukkamparai, Vellore, Tamilnadu.

²Associate Professor, Department of Anaesthesiology, Government Vellore Medical College Hospital, Adukkamparai, Vellore, Tamilnadu.

ABSTRACT

BACKGROUND

Labour is an extremely painful process. Labour pain is of major concern since most parturients experience significant pain of extremely severe intensity. Labour pain can have deleterious effects on the mother, on the foetus and on the labour outcome. Among the current methods of obstetric analgesia, regional analgesia (the most widespread technique being epidural analgesia) offers the best effectiveness/ safety ratio. Epidural anaesthesia is an effective means of providing analgesia during labour. The increased availability of epidural analgesia and the favourable experiences of women who have had painless labour with epidural block have reshaped the expectations of pregnant women entering labour.

Aims and Objectives- To compare the efficacy of epidural analgesia using 0.0625% Bupivacaine and 0.0002% fentanyl versus an epidural using 0.125% bupivacaine alone for labour analgesia.

The following parameters are compared:

- Quality of analgesia (VAS).
- Duration of labour.
- Motor block (Bromage score).
- Time from epidural to delivery.
- Rate of operational delivery.

MATERIALS AND METHODS

The non-randomised controlled trial of fifty parturients who were admitted to the antenatal ward and who requested pain relief during labour and who fulfilled the recruitment criteria were selected for the study. The sample size was selected for convenience. The procedure was explained to them in detail and written consent was obtained from them. 50 women fulfilling the inclusion criteria who required epidural analgesia in labour were studied. IV access was secured, but no IV fluid load was given. The patients were shifted to the operation theatre for insertion of the epidural catheter in aseptic manner. An epidural catheter was sited at the L3 - L4 lumbar interspace using a standard midline technique with a 17-gauge Tuohy needle. Patients entered into the study in a randomised order to receive one of the study treatments.

RESULTS

A number of methods exist to provide pain relief to the labouring parturient. Of the regional techniques, epidural analgesia is considered the gold standard among all other techniques and it is the only technique which can provide a complete and convincing pain relief making labour a pleasurable experience. In our study, we have demonstrated that with an epidural top-up technique using 0.0625% bupivacaine with fentanyl 2 microgram/mL (Group A) analgesia was similar to that using 0.125% plain bupivacaine (Group B), but motor power was retained allowing women to mobilise. There also appeared to be beneficial effects on the progress of labour with a clinically important reduction in the length of the second stage. In our study, the patients in Group A had minimal motor blockade when compared to patients in Group B. Reduction in motor block allowing independent movement and awareness of contractions without pain has been shown to be popular with mothers. Retention of pelvic floor sensation and motor function may allow appropriate coordinated pushing during the second stage, improving rotation and descent of the foetal head through the pelvis. Epidural local anaesthetic may attenuate endogenous oxytocin production reducing uterine contractility during the second stage. Both the long second stage and instrumental delivery have associated morbidity for the mother. It poses a controversial potential risk to the baby and negatively influence maternal satisfaction with the experience of labour. Although, epidural analgesia produces excellent analgesia, this does not automatically produce maternal satisfaction with labour and less effective methods of analgesia have produced higher satisfaction with scores. We demonstrated high maternal satisfaction with both epidural solutions, which was significantly greater in bupivacaine-fentanyl group. Analgesia was established by 30 mins. in all women. Establishing analgesia with an epidural bolus is effective, but takes longer than a combined spinal-epidural technique, which has been described widely. However, it avoids the complications of deliberate dural puncture. The time difference between establishing spinal rather than epidural analgesia should be viewed in the context of the duration of labour and the potential complications of the spinal component of a combined technique. The blood pressures (both systolic and diastolic) and pulse rate recorded during the analgesia in both the groups were not statistically significant. The APGAR score observed at 1 minute and 5 minutes showed no significant neonatal depression. Complications were only few, were minor and easily manageable.

CONCLUSION

In our study, we have shown that establishing epidural analgesia in labour with 15 mL of 0.0625% bupivacaine combined with fentanyl 30 micrograms followed by top-ups of 10 mL of 0.0625% bupivacaine with 0.0002% fentanyl produced similar analgesia to that obtained from the same volume of 0.125% bupivacaine alone, but motor block was minimised. This may influence the

progress of labour, decreasing the duration of the second stage and produce high maternal satisfaction with the experience of labour. In our study, the APGAR score observed at 1 minute and 5 minutes showed no significant neonatal depression.

KEYWORDS

Labour Analgesia, Epidural Bolus, Bupivacaine, Fentanyl Versus.

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Corresponding Author:

Mariappan Gomathi,

Department of Anaesthesiology,

Government Vellore Medical College Hospital,

Adukkamparai, Vellore-632011.

E-mail: sureshgomes@yahoo.com

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BACKGROUND

Labour is an extremely painful process. Labour pain is of major concern, since most parturients experience significant pain of extremely severe intensity. Labour pain can have deleterious effects on the mother, on the foetus and on the labour outcome. Among the current methods of obstetric analgesia, regional analgesia (the most widespread technique being epidural analgesia) offers the best effectiveness/ safety ratio.^[1]

Epidural anaesthesia is an effective means of providing analgesia during labour. The increased availability of epidural analgesia and the favourable experiences of women who have had painless labour with epidural block have reshaped the expectations of pregnant women entering labour.^[2]

Compared with other forms of pain relief, epidural analgesia is associated with the highest level of maternal satisfaction.^[3] Despite providing excellent pain relief during labour, epidural analgesia using local anaesthetic agents alone produce motor block in up to 85% of patients, reduces maternal satisfaction with analgesia and is associated with a prolonged second stage and increased incidence of instrumental delivery. Epidural opioids offer the possibility of analgesia without motor block, but when used alone do not provide satisfactory analgesia throughout the labour. Adding an opioid to local anaesthetic solutions can provide effective analgesia with bupivacaine sparing and a reduction in motor block.^[4,5]

The use of either an intermittent bolus or a continuous infusion of local anaesthetic (with or without an opioid) is considered to provide similar analgesic efficacy and no measurable outcome differences.^[6,7] The addition of an opioid to the local anaesthetic epidural bolus or infusion has become a highly popular technique, and the combination is believed to influence the duration and quality of labour analgesia. The efficacy and duration of epidural opioid alone is considered inferior to epidural local anaesthetic, but the benefits of an opioid should outweigh the side effects such as nausea, pruritus and sedation.^[8,9] An epidural opioid local anaesthetic combination may enhance the duration and quality of pain relief at less intense motor blockade and contribute to the good progress of labour and vaginal delivery.^[3]

We conducted this study to compare the efficacy of a mobile epidural using 0.0625% bupivacaine and 0.0002% fentanyl versus a conventional epidural using 0.125% bupivacaine for labour analgesia.

The epidural (extradural, peridural) space^[10] is that part of the vertebral canal external to the dura mater and its contents. It lies between the dura mater and the periosteum lining the canal, and corresponds to the very restricted space within the skull between the two layers of the cranial dura mater enclosing the venous sinuses.^[10,11,12]

MATERIALS AND METHODS

The randomised controlled trial study was done at Govt. Vellore Medical College and Hospital between January 2017 and August 2017. After obtaining approval from the Institutional Ethics Committee and written informed consent, 50 women fulfilling the inclusion criteria who required epidural analgesia in labour were studied. The sample size was selected for convenience.

IV access was secured, but no IV fluid load was given. The patients were shifted to the operation theatre for insertion of

the epidural catheter in aseptic manner. An epidural catheter was sited at the L3 - L4 lumbar interspace using a standard midline technique with a 17-gauge Tuohy needle. Patients entered into the study in a randomised order to receive one of the study treatments.

The procedure was clearly explained to the patient. The visual analogue scale was shown to them and interpretation of the scale explained in detail. Anaesthesia machine was checked and all emergency airway equipments like laryngoscopes, blades of different sizes, endotracheal tubes, LMAs and oropharyngeal airways were kept ready. An emergency drug tray containing all the emergency drugs was also kept ready.

Patient's vital parameters like heart rate, blood pressure, respiratory rate and foetal heart rate were continuously monitored during the procedure. The baseline values were recorded. The drugs to be administered epidurally were prepared and stored in a sterile container.

Inclusion Criteria

- ASA Status I and II.
- Females in the age group from 18 to 30 years.
- Primigravida.
- Adequate gynaecoid pelvis.
- Cervical dilatation less than 4 cm.

Equipment

The needles used for both groups were of Vygon make (17-G Tuohy epidural needle and 19-G epidural catheter).

Procedure

With the patient in sitting position, under aseptic precaution L3-L4 interspace was identified and skin infiltration was done with 1.5 mL of 2% lignocaine. Using a 17-G Tuohy needle and 'loss of resistance to air' technique, the epidural space was identified.

After confirmation by negative aspiration test, 19-G epidural catheter was inserted and 5 cms kept inside the epidural space. The catheter was tapped firmly to the back. The patient was turned to supine position. After negative aspiration of blood and CSF, the initial dose of LA solution was given in divided doses.

A standard epidural test dose itself will result in augmentation of motor blockade. Further, addition of epinephrine to confirm intravascular placement is not reliable in active labour. Hence, test doses were done away with. Rather the bolus dose itself was given in divided doses with 5 mins. interval checking for motor block after the first dose.

Epidural top-ups were not given till patient complained of pain or discomfort. With the catheter in place, patients were shifted to the labour ward where they were closely monitored till delivery.

Procedure for Group A - 0.0625% Bupivacaine with Fentanyl

- IV access.
- Monitors.

Technique

An epidural catheter was sited at the L3-L4 lumbar interspace using standard midline approach with loss of

resistance technique 15 mL of 0.0625% bupivacaine with fentanyl 30 micrograms and maintained on maternal request with bolus doses of 10 mL of 0.0625% bupivacaine with fentanyl 2 micrograms/mL.

Procedure for Group B - 0.125% Plain Bupivacaine

- IV access.
- Monitors.

Technique

An epidural catheter was sited at the L3 - L4 lumbar interspace using a standard midline approach with loss of resistance technique.^[13] 15 mL of 0.125% plain bupivacaine and maintained with 10 mL bolus doses of 0.125% plain bupivacaine.

Parameters that were Compared

Analgesia was measured using visual analogue scores (VAS) on a 100 mm line. Measurements were performed every 10 minutes until analgesia was established and at 30 mins. and 1 hr. after the initial dose. Thereafter, 2 hourly VAS were recorded until delivery.

Motor power was assessed using a modified Bromage score of 30 mins. after each top-up and at each request to get out of bed (score 0= no weakness, able to straight leg raise against resistance, 1= not able to straight leg raise, able to flex knee, 2= unable to flex knee, able to flex ankle, 3= unable to move lower limb).

Mode of delivery was recorded, as were time intervals between top-ups, duration of first and second stages of labour and time from insertion of epidural until delivery.

Tolerability was assessed by checking for complications like dural puncture, venous puncture, pruritus, nausea, vomiting, rigor, drowsiness, urinary retention, hypotension and respiratory depression.

Statistical Analysis

Patients were non-randomly allocated into A/B group to receive either of two drugs according to convenience. Data were analysed using SPSS 11.5. Descriptive analysis for non-parametric variables was expressed in proportion and parametric variables in Mean and Standard deviation. The treatment difference was assessed using 't' test for independent samples for parametric variables and by Chi-square test for non-parametric variables. Statistical significance was assessed using 'p' at 0.05 cut-off or 95% confidence interval (95% CI).

RESULTS

A total of 180 patients were screened for the study. 50 patients who fulfilled the inclusion criteria were enrolled for the study and were divided into two groups-

- **Group A:** 25 patients.
- **Group B:** 25 patients.

Patients were non-randomly allocated to Groups A or B to receive either of the two study therapies- either epidural bolus administration of 0.0625% bupivacaine with 0.0002% fentanyl (Group A) or epidural bolus administration of 0.125% plain bupivacaine (Group B). All patients in both the groups completed the study. There were no drop-outs in the

study. The following flow chart explains the progress of participants through the trial.

Physical Characteristics

Physical characteristics like age, height and weight were comparable in both the groups.

Age Distribution

The age distribution in both groups are shown in the table below.

Age Distribution	Group - A	Group - B
< 20	9	10
20-30	16	15
Total	25	25
Mean $\pm$ SD	21.2000 $\pm$ 2.533	20.0800 $\pm$ 1.824
T-test value	1.79	
P value (Using Student's T-test)	0.037	

Table 1. Age Distribution

Weight Distribution

The distribution of weight in both the groups are shown in Table 2. The values are similar in both groups and are statistically comparable. The student's 't' test was done on the values revealed no statistical significance.

Weight Frequency	Group - A	Group - B
50-59	5	5
60-69	17	14
70-79	3	6
Mean $\pm$ SD	64.44 $\pm$ 5.58	64.68 $\pm$ 5.71
T-test value	0.15	
P value (Using Student's T-test)	0.862 (Not Significant)	

Table 2. Weight Distribution

Height Distribution

The distribution of weight in both the groups are shown in Table 3. The values are similar in both groups and are

statistically comparable. The Student's 'T' test done on the values revealed no statistical significance.

Height Frequency	Group - A	Group - B
50-59	1	3
60-69	17	16
70-79	7	6
Total	25	25
Mean $\pm$ SD	158.32 $\pm$ 4.63	156.84 $\pm$ 5.93
T-test value	0.98	
P value (Using Student's T-test)	0.317 (Not Significant)	

Table 3. Height Distribution

Mode of Delivery

One patient in Group A and two patients in Group B were delivered by Caesarean section. The indication for Caesarean section was failure to progress in labour. Two patients in Group B were delivered by outlet forceps delivery. The indication for forceps delivery was maternal exhaustion. All others were delivered by Natural Labour with episiotomy.

Mode of Delivery	Group - A	Group - B
Labour Natural	24	21
Caesarean section	1	2
Outlet forceps	-	2
Chi-square value	2.53333	
P value	0.28177 (Not Significant)	

Table 4. Mode of Delivery

Time from Epidural to Delivery

The time from epidural to delivery in both groups were comparable. The student's 'T' test done on the values revealed no statistical significance.

Group	No. of Cases	Mean Time from Epidural to Delivery in Mins	SD	Student's 'T' Test P value
Group A	24	161.8750	13.578	0.900 (Not Significant)
Group B	23	166.9565	13.878	

Table 5. Time from Epidural to Delivery

Duration of Labour

The total duration of labour in both groups were comparable. The duration of first and third stage of labour was comparable. Student's T-test was done on duration, on total and each stage of labour. The P-values were all > 0.05, implying that differences were not statistically significant. Duration of the second stage of labour was significantly shorter in Group A (p= 0.009).

Stage of Labour	Group - A		Group - B		T-test	P-value
	Mean (mins)	SD	Mean (mins)	SD		
First Stage	162.08	11.83	161.74	10.18	0.11	0.916
Second Stage	49.21	7.65	55.00	6.74	2.75	0.009**
Third Stage	16.67	4.08	16.96	3.91	0.25	0.805
Total	227.54	16.12	233.70	14.16	1.39	0.172

Table 6. Duration of Labour

** - Denotes significance at 1% level and 5% level.

Number of Top-Ups Given

Number of top-ups given in both groups were comparable. The Chi-square test done on the values revealed no statistical significance.

No. of Top-Ups	Group - A		Group - B	
	N	%	N	%
1	0	0	0	0
2	10	40	10	40
3	15	60	15	60
4	0	0	0	0
Chi-Square Value	0.00000			
P value	1.00000 (Not Significant)			

Table 7. Number of Top-Ups

Motor Blockade

This was assessed using the Modified Bromage Scale. The patients in Group A had minimal motor blockade when compared to patients in Group B. The Chi-square test showed statistical significance with regard to motor blockade between the two groups.

Bromage Scale	Group - A		Group - B	
	N	%	N	%
0	12	48	0	0
1	12	48	14	56
2	1	4	11	44
3	0	0	0	0
Chi-Square Value	20.48718			
P value	0.00004 (Significant)			

Table 8. Motor Block- Bromage Score

VAS Scale

The pain perceived by the patients was assessed by showing them a VAS scale, which contained pictures of faces depicting pain on one end and smiling face on the other end. In between the two, there were pictures expressing intermediate emotions. The other side had a scale marked from 0 to 100. The scale had a slider, which the patients moved to point below the image which they felt expressed their perceived pain.

Time in Mins.	Group - A		Group - B		Student 't' Test
	Mean	Std. Deviation	Mean	Std. Deviation	P value
0	94.00	7.07	94.00	7.07	1.000
5	57.60	11.65	56.80	10.69	0.794
15	11.60	8.50	15.40	7.90	1.000
30	0.20	1.00	5.80	5.72	0.000
45	10.20	6.20	13.00	6.45	0.102
60	12.20	8.05	13.60	7.43	0.847
120	11.40	10.16	12.80	8.55	0.787
180	9.00	4.79	11.80	4.54	0.707

Table 9. VAS Score

The VAS score was assessed at 0, 5, 15, 30, 45, 60, 120 and 180 minutes. The initial VAS score ranged between 80 and 100 for all the patients. VAS score for pain was comparable in both groups throughout labour.

Patient's Comfort Level

This was assessed by asking the patient how they felt at the end of delivery. Majority of patients (68%) in Group A had excellent pain relief. 32% of patients in Group A had good pain relief. In Group B, 60% of patients had fair pain relief and 40% of patients had good pain relief.

Comfort Level	Group - A		Group - B	
	N	%	N	%
1- Poor	0	0	0	0
2- Fair	0	0	15	60
3- Good	8	32	10	40
4- Excellent	0	0	0	0
Chi-Square Value	32.2222			
P value	< 0.001 (Significant)			

Table 10. Patient's Comfort Level

Upper Sensory Level

Patients in both groups had a mean sensory level of T9. The maximum was only T11 and minimum level was T8.

Comfort Level	Group - A		Group - B	
	N	%	N	%
T6	0	0	0	0
T7	0	0	0	0
T8	5	20	6	24
T9	8	32	8	32
T10	7	28	8	32
T11	5	20	3	12

Table 11. Upper Sensory Level

Haemodynamic Variables

All haemodynamic variables were recorded at 0 min. (baseline), 5 mins, 15 mins, 30 mins, 45 mins, 60 mins. and thereafter every 15 mins. For the purpose of statistical comparison after the first hour, only the hourly recording or that during every top-up was considered.

Maternal Pulse Rate

Pulse rate recordings were found to be comparable between the two groups. The two-way ANOVA test done on the pulse rate recordings showed no statistical difference between the two groups.

Time in Mins.	Group - A		Group - B	
	Mean	Std. Deviation	Mean	Std. Deviation
0	90.26	11.14	91.44	9.57
2	92.43	9.65	93.28	9.57
5	91.48	12.11	89.36	7.20
15	91.83	9.44	89.12	7.66
30	90.87	6.20	86.40	6.03
45	90.09	6.59	85.84	4.93
60	89.74	8.10	87.60	3.61
2 hours	88.35	6.23	89.52	6.12
3 hours	88.48	9.12	89.76	2.07

Table 12. Maternal Pulse Rate

Summary of ANOVA for 2X 10 Factorial Experiments with repeated measures on the Second Factor (10 Times)

Sources of Variation	Sum of Square	DF	Mean Square	F value	P value
Between drugs	174.68	1	174.68	0.39	0.53

Systolic Blood Pressure

Systolic blood pressure were normal (i.e.) > 100 mmHg in both the groups and was not statistically significant between the groups.

Time in Mins.	Group - A		Group - B	
	Systolic Blood Pressure Mean	Std. Deviation	Systolic Blood Pressure Mean	Std. Deviation
0	116	6.455	115.84	7.116
5	113.6	9.074	114.4	8.210
15	112.4	7.141	111.12	6.685
30	112.72	7.414	111.84	7.701
45	108.88	7.096	112.4	6.481
60	112.16	7.369	111.12	6.483
2 hours	112.56	9.028	107.24	7.674
3 hours	108.36	7.658	112.40	7.000

Table 13. Maternal Systolic Blood Pressure

Summary of ANOVA for 2X 9 Factorial Experiments with repeated measures on the Second Factor (9 Times)

Sources of Variation	Sum of Square	DF	Mean Square	F value	P value
Between drugs	16245	2	8122.5	5.871	0.553
With time	8415.4	7	1202.2	0.8689	0.141

The two-way ANOVA test showed no significant statistical difference between the two groups and also with time.

Figure 9. Maternal Systolic Blood Pressure

Diastolic Blood Pressure

The two groups had no significant difference in the diastolic blood pressure as was seen in the systolic blood pressure. The two-way ANOVA test showed no statistical difference between the two groups.

Time in Mins.	Group - A		Group - B	
	Diastolic Blood Pressure Mean	Std. Deviation	Diastolic Blood Pressure Mean	Std. Deviation
0	75.52	4.665	76.16	4.394
5	75.62	4.605	75.28	4.468
15	75.44	5.116	75.68	5.558
30	74.80	4.619	76.0	4.761
45	75.12	4.438	74.56	5.523
60	75.12	4.868	73.56	4.142
2 hours	76.16	4.394	76.16	4.580
3 hours	75.28	4.686	76.40	4.435

Table 14. Maternal Diastolic Blood Pressure

Summary of ANOVA for 2X 9 Factorial Experiments with repeated measures on the Second Factor (9 Times)

Sources of Variation	Sum of Square	DF	Mean Square	F value	P value
Between drugs	183.6	2	918.28	0.6980	0.5141
With time	9286.9	7	1326.7	1.008	0.4656

Foetal Heart Rate

There was not much variation between the two groups and the ANOVA test did not show any statistical significance between the two groups.

Time in Mins.	Group - A		Group - B	
	Mean Foetal Heart Rate	Std. Deviation	Mean Foetal Heart Rate	Std. Deviation
0	142.17	8.65	142.24	15.66
5	140.87	11.08	145.28	6.29
15	138.87	7.16	151.00	6.01
30	142.26	6.16	146.00	8.10
45	145.65	7.92	142.92	4.64
60	145.22	9.74	146.72	4.58
2 hours	149.22	10.25	145.68	12.56
3 hours	144.70	12.19	152.88	5.23

Table 15. Foetal Heart Rate

Summary of ANOVA for 2X 9 Factorial Experiment with repeated measures on the Second Factor (9 Times)

Sources of Variation	Sum of Square	DF	Mean Square	F value	P value
Between drugs	945.96	1	945.96	7.3	0.08

APGAR Score

APGAR score estimated at one and five minutes are tabulated below.

Comfort Level	Group - A		Group - B	
	N	%	N	%
5	0	0	0	0
6	2	2	5	20
7	11	44	6	24
8	12	48	14	56
9	0	0	0	0
10	0	0	0	0

Table 16. One Minute APGAR

P value by Chi-square test did not show statistical difference.

Comfort Level	Group - A		Group - B	
	N	%	N	%
5	0	0	0	0
6	0	0	0	0
7	0	0	2	8
8	18	72	15	60
9	5	20	8	32
10	2	8	0	0

Table 17. Five Minute APGAR

P value by Chi-square test did not show statistical difference.

Complications

Hypotension (SBP < 90 mmHg or < 30% of baseline) was present in one case each in both the groups. Both cases responded to 6 mg of Ephedrine IV. Pruritus was present in one case each in both the groups. It was only mild and reassurance was all that was needed. One patient in Group B had vomiting.

Complication	Group - A	Group - B
Hypotension	1	1
Pruritus	1	1
Vomiting	0	1
Respiratory depression	0	0
Urinary retention	0	0

Table 18. Complications

DISCUSSION

A number of methods exist to provide pain relief to the labouring parturient. Of the regional techniques, epidural analgesia is considered the gold standard among all other techniques and it is the only technique which can provide a complete and convincing pain relief making labour a pleasurable experience.^[14]

In our study, we have demonstrated that with an epidural top-up technique using 0.0625% bupivacaine with fentanyl 2 microgram/mL (Group A) analgesia was similar to that using 0.125% plain bupivacaine (Group B), but motor power was retained allowing women to mobilise.^[15] There also appear to be beneficial effects on the progress of labour with a clinically important reduction in the length of the second stage.

In our study, the patients in Group A had minimal motor blockade when compared to patients in Group B. Reduction in motor block allowing independent movement and awareness of contractions without pain has been shown to be popular with mothers. Retention of pelvic floor sensation and motor function may allow appropriate coordinated pushing during the second stage, improving rotation and descent of the foetal head through the pelvis. Epidural local anaesthetic may attenuate endogenous oxytocin production reducing uterine contractility during the second stage.

Both the long second stage and instrumental delivery have associated morbidity for the mother, pose a controversial potential risk to the baby and negatively influence maternal satisfaction with the experience of labour. Although, epidural analgesia produces excellent analgesia, this does not automatically produce maternal satisfaction with labour and less effective methods of analgesia have produced higher satisfaction with scores. We demonstrated high maternal satisfaction with both epidural solutions, which was significantly greater in bupivacaine-fentanyl group.

Analgesia was established by 30 mins. in all women. Establishing analgesia with an epidural bolus is effective but takes longer than a combined spinal-epidural technique, which has been described widely. However, it avoids the complications of deliberate dural puncture. The time difference between establishing spinal rather than epidural analgesia should be viewed in the context of the duration of labour and the potential complications of the spinal component of a combined technique.

The blood pressures (both systolic and diastolic) and pulse rate recorded during analgesia in both the groups were not statistically significant. The APGAR score observed at 1 minute and 5 minutes showed no significant neonatal depression. Complications were only few, were minor and easily manageable.

CONCLUSION

In our study, we have shown that establishing epidural analgesia in labour with 15 mL of 0.0625% bupivacaine combined with fentanyl 30 micrograms followed by top-ups of 10 mL of 0.0625% bupivacaine with 0.0002% fentanyl produced similar analgesia to that obtained from the same volume of 0.125% bupivacaine alone, but motor block was minimised. This may influence the progress of labour, decreasing the duration of the second stage and produce high maternal satisfaction with the experience of labour.

In our study, the APGAR score observed at 1 minute and 5 minutes showed no significant neonatal depression.

REFERENCES

- [1] Pottecher J, Benhamou D. Labor pain and obstetric analgesia. *J Gynecol Obstet Biol Reprod (Paris)* 2004;33(3):179-91.
- [2] Vincent RD, Chestnut DH. Epidural analgesia during labor. *Am Fam Physician* 1998;58(8):1785-92.
- [3] Brownridge P, Cohen SE, Ward ME. Neural blockade for obstetrics and gynecologic surgery. In: Cousins MJ, Bridenbaugh PO. (eds). *Neural blockade in clinical anesthesia and management of pain*. 3rd edn. Philadelphia: Lippincott-Raven, 1998:557-604.
- [4] Clement HJ, Caruso L, Lopez F, et al. Epidural analgesia with 0.15% ropivacaine plus sufentanil 0.5 microgram ml-1 versus 0.10% bupivacaine plus sufentanil 0.5 microgram ml-1: a double-blind comparison during labour. *Br J Anaesth* 2002;88(6):809-13.
- [5] James KS, McGrady E, Quasim I, et al. Comparison of epidural bolus administration of 0.25% bupivacaine and 0.1% bupivacaine with 0.0002% fentanyl for analgesia during labour. *Br J Anaesth* 1998;81(4):507-10.
- [6] Riley ET. Neuroaxial analgesia for labor. Part III: Epidural drugs. In: Norris MC, (eds). *Obstetric Anesthesia*. 2nd edn. Philadelphia: Lippincott Williams & Wilkins, 1999:333-42.
- [7] Paull J. Epidural anesthesia for labor. In: Birnback DJ, Gatt SP, Datta S. (eds). *Textbook of obstetric anesthesia*. New York: Churchill Livingstone, 2000:145-56.
- [8] Polley LS, Columb MO, Naughton NN, et al. Effect of intravenous versus epidural fentanyl on the minimum local analgesic concentration of epidural bupivacaine in labor. *Anesthesiology* 2000;93(1):122-8.
- [9] Polley LS, Columb MO, Wagner DS, et al. Dose-dependent reduction of the minimum local analgesic concentration of bupivacaine by sufentanil for epidural analgesia in labor. *Anesthesiology* 1998;89:626-32.
- [10] Brown DL. Spinal, epidural and caudal anaesthesia. In: Miller RD. (eds). *Miller's anaesthesia*. Elsevier, 2005:1654-8.
- [11] Igarashi T, Hirabayashi Y, Shimizu R, et al. The lumbar extradural structure changes with increasing age. *Br J Anaesthesia* 1997;78(2):149-52.
- [12] Merskey H, Bogduk N. Classification of chronic pain: descriptions of chronic pain syndromes and definitions of pain terms. 2nd edn. Seattle: International Association for the Study of Pain, 1994.
- [13] Thomas E. Epidural analgesia for patients in labour. *Singapore Med J* 1990;31:262-6.
- [14] Porter JS, Bonello E, Reynolds F. The effect of epidural opioids on maternal oxygenation during and delivery. *Anaesthesia* 1996;51(10):899-903.
- [15] Lyons GR, Kocarev MG, Wilson RC, et al. A comparison of minimum local anesthetic volumes and doses of epidural bupivacaine (0.125% w/v and 0.25% w/v) for analgesia in labor. *Anesth Analg* 2007;104(2):412-5.