ORIGINAL ARTICLE

Walking Epidural with Low Dose Bupivacaine Plus Tramadol on Normal Labour in Primipara

Zahid Akhtar Rao[1], Abeera Choudhri[2], Shahab Naqvi[3] and Ehsan-ul-Haq[4]

ABSTRACT

Objective: To determine the obstetric outcome in terms of duration of labour and mode of delivery between the walking epidural analgesia with 0.1% Bupivacaine + 0.5% tramadol and routine labour practice.

Study Design: Non-randomized controlled trial.

Place and Duration of Study: Department of Anaesthesia, Military Hospital, Rawalpindi, from August 2004 to July 2007.

Methodology: Consecutive 50 primiparous patients, ASA-I, coming to antenatal clinic for routine delivery were included in control group-A, and consecutive 50 primiparous ASA-I, coming to antenatal clinic and requesting for painless delivery were included in group-B.

In group-A, only injection Nalbuphine 10 mg intramuscular was given when pain was unbearable, on patient's request as a routine practice. In group-B epidural analgesia was given with 15 ml of 0.1% Bupivacaine + 0.5 mg/ml Tramadol. First stage, second stage and total duration of labour were noted. Mode of delivery was also recorded in both groups. Patient satisfaction was assessed by interviewing the parturient at evening round after delivery.

Results: In group-A, first stage duration of labour was 6.72±1.16 hours and in group-B, it was 4.03±1.00 hours, ($p < 0.001$). Second stage of labour in group-A was 0.55±0.35 hours and in group-B it was 0.67±0.33 hours; ($p=0.072$). Total duration of labour, in group-A was 7.57±1.13 hours and in group-B it was 4.77±1.21 hours, ($p < 0.001$).

In group-A 46/50 (92%) patients were delivered spontaneously, while 4/50 (8%) required instrumental assistance. In group-B 36/50 (72%) patients were delivered spontaneously and instrumental deliveries were 13/50 (26%) ($p=0.015$). One patient developed fetal distress and went through cesarean section in group B. Patient satisfaction was excellent in 88% of group-B parturients.

Conclusion: Epidural analgesia with combination of low concentration of Bupivacaine, injection Tramadol and ambulation markedly reduce the duration of labour.

Key words: *Painless delivery. Tramadol. Epidural. Ambulation. Bupivacaine. Instrumental delivery. Duration of labour.*

INTRODUCTION

Labour is the most painful experience in a woman's life. If pain is not adequately controlled, it can lead to adverse maternal and fetal outcome or sequele because of maternal sympathetic activation, which in turn predisposes to dysfunctional labour and compromises fetal oxygenation.

Effective pain relief in labour prevents the sympathetic activation and exhaustion of mother and improves obstetric outcome as well as it shortens the duration of labour due to maternal timely co-ordinated voluntarily push. This has led to a continued search for the ideal form of labour analgesia.[1] The ideal labour analgesic must be devoid of the undesirable effects of motor blockade, while simultaneously maintaining the unique advantages of epidural analgesia.[2] This ideal labour analgesic should also facilitate a maternal sense of participation, as well as the option of ambulation especially during a long labour. It should also give a rested parturient; the energy, strength and sensation to perform expulsive efforts at the time of delivery with the ability to assume various birthing positions. To achieve these goals, recent developments have facilitated maternal ambulation while receiving effective regional labour analgesia.

Many studies conducted to evaluate the effects of epidural analgesia during labour on obstetric outcome have concluded that epidural analgesia during labour, leads to a higher rate of cesarean section and instrumental deliveries. It also increases the duration of labour.[3,4] Due to better understanding of drug pharmacology and trials with newer drugs, and more experience with combination of local anaesthetic and opioid, the obstetric outcome has improved.[5,6]

In developed countries, demand for painless delivery is rising. In United States, it was more than 50% in late 90's,[7] and now increased to 70-80%. In Pakistani

[1] *Department of Anaesthesialogy, PNS Shifa Hospital, Karachi.*
[2] *Department of Gynaecology, Combined Military Hospital, Multan.*
[3] *Department of Anaesthesiology, Armed Forces Institute of Cardiology, Rawalpindi.*
[4] *Department of Anaesthesialogy, Combined Military Hospital, Peshawar.*

Correspondence: *Dr. Zahid Akhtar Rao, Consultant Anaesthesiologist, Main Operation Theatre, PNS Shifa Hospital, Karachi.*
E-mail: zahidrao57@hotmail.com

Received March 03, 2009; accepted February 12, 2010.

women the knowledge about pain free labour is very low due to multiple factors,[8] but now more and more women request for painless labour.

The aim of this study was to compare the obstetric outcome, in terms of duration of labour and mode of delivery between the walking epidural analgesia with 0.1% Bupivacaine + 0.5% (5 mg/ml) Tramadol and routine labour practice in a tertiary care hospital (Nalbuphine 10 mg I/M, without epidural analgesia).

METHODOLOGY

The study was carried out at the Department of Anaesthesia, Military Hospital, Rawalpindi, from August 2004 to July 2007. After obtaining approval from the Hospital Ethic Committee, all patients and their husbands were interviewed in antenatal period. They were explained about procedure; the technique, shortcomings and possible problems/complications were discussed and written consent was taken.

Consecutive 50 patients all primiparous, ASA-I, who were not willing for painless delivery were included in group-A as a control, and consecutive 50 patients all primiparous ASA-I, requesting for painless delivery were included in group-B. All patients selected for this study were with uncomplicated pregnancy without any mal-rotation or cephalo-pelvic disproportion, which were kept as exclusion criteria. All patients selected were comparable in age, height and weight (Table I). All deliveries were conducted by the obstetrician on duty.

Table I: Patient characteristics.

Group of patients	Age (in years)	Weight (in kg)	Height (in cm)
A	25.40±2.77	67.00±9.37	157.70±5.23
B	26.54±3.79	64.62±5.75	157.44±3.48
p-value	0.089	0.129	0.770

Pre-analgesia evaluation was done through history, systemic examination, examining spine and routine investigations including coagulation profile in all cases. With the consultation of the obstetrician induction of labour in early morning was planned in all cases. All monitors were attached to the patient and basic parameters were recorded. I/V (intravenous) line was maintained with 18 G cannula and Ringer's lactate infusion was started. In group-A, no epidural analgesia was given. Only injection Nalbuphine 10 mg intra-muscular (I/M) was given when pain was unbearable, on patient's request and patients were monitored for labour progress and fetal distress. Time duration from 3-4 cm cervical dilatation to full cervical dilatation (first stage), from full cervical dilatation to delivery of baby (second stage), from delivery of baby to delivery of placenta (third stage) was noted. The total duration of delivery from 3-4 cm cervical dilatation to delivery of placenta was calculated by adding durations of all three stages of labour.

In group-B, when labour was established and cervix dilatation was 3-4 cm, Epidural catheter was passed through 18G Tuohy's needle with bevel cephaled at L2-3 interspace. Loss of resistance technique with normal saline was used under aseptic conditions, in sitting position with midline approach. Epidural catheter having 5-6 cm in space was fixed with adhesive plaster at back. Analgesia was established with injection 0.1% Bupivacaine (0.5% 1 ml diluted in 5 ml) plus 0.5% (5 mg/ml) Tramadol, 15 ml in supine position. Top-up dose of 10 ml was given on patient's demand intermittently. When cervical dilatation was about 8 cm, 15 ml of analgesic mixture was given in sitting position for second stage of labour.

Patient was monitored for blood pressure with non-invasive blood pressure monitor, heart rate and peripheral oxygen saturation by pulse oximetry, and fetal wellbeing was monitored by cardiotochography (CTG). Analgesia was assessed after 15 minutes of giving drug by monitoring pain-free uterine contraction. Motor power was assessed using modified Bromage scale in both legs (0=no paralysis, full flexion of knees and feet; 1= inability to raise extended legs; 2= inability to flex knees; 3= Inability to flex ankle joints). Patients with full motor strength (modified Bromage scale-0) were allowed to walk around accompanied with attendant. Duration from giving first dose of drug for painless delivery at 3-4 cm cervical dilatation. Mode of delivery was recorded in both groups. Maternal satisfaction about the method of delivery was assessed on five point scale (Table II).

Table II: Overall patient satisfaction of process.

Scale	Description	Group-A	Group-B
1	Terrible	41	0
2	Unsatisfactory	9	0
3	Satisfactory	0	1
4	Good	0	5
5	Excellent	0	44

All data was analyzed by using statistical package for social sciences version-10 (SPSS-10). For duration of delivery to compare means between groups, independent sample T-test and for mode of delivery to compare between groups, chi- squire test was used and p-value less than 0.05 was considered significant.

RESULTS

Age, height and weight were comparable in both groups (Table I). One patient in group-B, developed fetal distress at the end of first stage and landed for cesarean section; was excluded from the study. In group-A, the first stage duration of labour was 6.72±1.16 hours and in group-B it was 4.03±1.00 hours, $p < 0.001$ and 95% confidence interval was 2.258 to 3.116. The second stage of labour in group-A was 0.55±0.35 hours and in group-B it was 0.67±0.33 hours, p=0.072 and 95%

confidence interval was -0.258 to 1.138. Total duration of labour in group-A was 7.57±1.13 hours and in group-B it was 4.77±1.21 hours, p < 0.001 with 95% confidence interval 2.132 to 3.063 (Table III).

In group-A, 46/50 (92%) patients were delivered spontaneously, while 4/50 (8%) required vacuum assistance. In group-B, 36/50 (72%) patients were delivered spontaneously and instrumental deliveries were 13/50 (26%), (p=0.015), (Table III). Overall labour process satisfaction of patients was terrible (82%) in group-A and it was excellent (88%) in group-B (Table II).

Table III: Duration of labour mean ± standard deviation in hours/mode of delivery.

	Group-A	Group-B	P-value	95% Confidence Interval
First stage of labour	6.72±1.16	4.03±1.00	0.0001	2.258 to 3.116
Second stage of labour	0.55±0.35	0.67±0.33	0.072	-0.258 to 1.138
Total duration of labour	7.57±1.13	4.77±1.21	0.0001	2.132 to 3.063
*Mode of **SVD Delivery	46	36	0.015	-
Instrumental	04	13	-	-
Cesarean Section	-	01	-	-

**Mode of delivery in numbers; **SVD=Spontaneous vaginal delivery.*

DISCUSSION

There is a common concept that epidural analgesia for painless delivery increases the duration of labour and Instrumental deliveries as described by many studies mentioned earlier in the introduction. If we do critical analysis of these studies it is clear that these were conducted by using different protocols and by different drugs, even using various concentrations of same drug.

Modern labour epidural analgesic techniques and medications have resulted in more consistent, predictable and effective analgesia. The aim is to improve patient care and safety, while increasing the satisfaction and participation of women in their labour experience.

Another factor which is important in this study as well as in other studies is that, deliveries were conducted by persons of varied experiences, which can affect the duration as well as outcome.

Upright position and walking make the patient comfortable, reduces the pain and hasten the cervical dilatationas seen in this study.[9,10] A study conducted by Frenea and colleagues showed, that prolong ambulatory patients need less analgesic and have a greater ability to void.[11] Roberts and colleague in a systemic review and meta-analysis of randomized controlled trials (RCT) of ambulation or upright positions versus recumbence in the first stage of labour among women with effective first-stage epidural analgesia concluded that, there was no statistically significant difference in the mode of delivery, when women with an epidural ambulated in the first stage of labour compared with those who remained recumbent.[12] Later, in another meta-analysis he concluded that, the upright position reduces instrumental deliveries in women with epidural analgesia.[13] This study reveals that epidural plus ambulation do increase statistically and significantly in instrumental deliveries (Table III).

Most of the studies are conducted using local anaesthetic with combination of opioid injection fentanyl; in Pakistan, fentanyl is not freely available, so we used injection Tramadol which is freely available and is much cheaper also. Tramadol is a synthetic; centrally acting mu-agonist opioid, it inhibits nor epinephrine and serotonin reuptake. In epidural for post-operative analgesia, it is more effective than Bupivacaine and in labour pains, it is equally effective as pethedine, but with less side effects.[14] The study conducted by Tripti and colleague showed that Tramadol reduced the duration of labour with fewer side effects in Tramadol group.[15] Kuti and colleague also compared Tramadol versus Pentazocine and concluded that Tramadol reduces the duration of labour.[16]

Although they used Tramadol intramuscular, but found a reduction in duration of labour which favours the present results.

Jianjing and colleague compared combined spinal epidural (CSE) and intravenous Tramadol with control (without analgesia); their result showed no significant difference in duration of first and third stages of labour. Duration of second stage of labour in combined spinal epidural group was 67±51 minutes, in control group 44±21 minutes and in Tramadol group it was 41±20 minutes. Cesarean rate was significantly high in control group (16.7%) than CSE group (3.3%) and Tramadol group (5.0%).[17]

Zhang and colleagues review previous literature on effects of epidural analgesia in labour on duration and mode of delivery from 1965 through 1997 and observed that, although most studies show longer labour duration among women with epidural analgesia than without, most studies used inappropriate statistical analysis; and they also observed that neither it increases the rate of cesarean nor the rate of instrumental deliveries.[18]

James and colleagues compared 0.1% Bupivacaine with 0.25% for epidural analgesia during labour and found that, women with 0.1% Bupivacaine had overall shorter duration of labour, but statistically insignificant.[19] The second stage duration was significantly shorter with low concentration of Bupivacaine with p-value 0.0003;[18] low concentration group has low instrumental delivery rate with p-value 0.03. This is also comparable with the present results.

Khan and colleagues compared 0.125% Bupivacaine in epidural for painless delievery with control and found that, in primiparous women, epidural group had of pain significant reduction in all stages of labour.[6]

Lee and colleagues carried out a retrospective study of 704 nulliparous to observe the effects of timing of

initiating epidural analgesia on the mode of delivery. They found significant decline in overall cesarean rate in epidural group regardless of time of initiation of epidural. They also observed that early epidural analgesia (< 3.0 cm cervical dilatation) shortened the duration of active phase of first stage of vaginal delivery. No difference was observed between groups in duration of second stage or the instrumental delivery rate.[20] We could not find any study using Tramadol for epidural painless delivery, but there are many studies on Tramadol, used as intramuscular for pain-free deliveries and it reduces the duration of labour and enhances the cervical dilatation.[15,16]

The duration of labour was remarkably reduced in this study; the reason is evident from previous discussion that; upright position, ambulation, Tramadol and low concentration of local anaesthetic decrease the duration of labour.[12,13,16,18-20] All these modalities were utilized and the effect was synergistic. There results are comparable with the later studies.[4,19]

Keeping this as a pilot study, it is planned to carryout multi-centers study with 0.1% Bupivacaine + 0.5% (5 mg/ml) Tramadol in intermittent epidural technique for painless delivery and also including more variables; permission from ethics committee is already in process.

CONCLUSION

Epidural analgesia with combination of low concentration of Bupivacaine, ambulation and epidural injection of Tramadol reduced the duration of labour and produced excellent satisfaction in parturient.

REFERENCES

1. Wong CA. Labour analgesia: is there an ideal technique? *Anesth Analg* 2009; **109**:296-8.
2. Vincent RD, Chestnut DH. Epidural analgesia during labour. *Am Fm Physician* 1998; **58**:1785-94.
3. Liu EHC, Sia ATH. Rates of caesarean section and instrumental vaginal delivery in nulliparous women after low concentration epidural infusions or opioid analgesia: systematic review. *BMJ* 2004; **328**:1410.
4. Liang CC, Wong SY, Chang YL, Tsay PK, Chang SD, Lo LM. Does intrapartum epidural analgesia affect nulliparous labour and postpartum urinary incontinence? *Chang Gung Med J* 2007; **30**:161-7.
5. Campbell DC. Labour analgesia: what's new and PCEA too? *Can J Anesth* 2003; **50**:R8.
6. Khan MA, Yasin B, Mona Z, Shafiur Rehman. Epidural analgesia: effect on the duration of labour. *Professional Med J* 2008; **15**:101-3.
7. Minhas MR, Kamal R, Afshan G, Raheel H. Knowledge, attitude and practice of parturients regarding epidural analgesia for labour in a university hospital in Karachi. *J Pak Med Assoc* 2005; **55**:63-6.
8. Campbell DC. Combined spinal-epidural analgesia for labour. *Techniques Regional Anesth Pain Manag* 1997; **1:**113-7.
9. Méndez-Bauer C, Arroyo J, García Ramos C, Menéndez A, Lavilla M, Izquierdo F, *et al.* Effects of standing position on spontaneous uterine contractility and other aspects of labour. *J Perinat Med* 1975; **3**:89-100.
10. Stewart P, Calder AA. Posture in labour: patients' choice and its effects on performance. *Br J Obstet Gynaecol* 1984; **91**:1091-5.
11. Frenea S, Chirossel C, Rodriguez R, Baguet JP, Racinet C, Payen JF. The effects of prolonged ambulation on labour with epidural analgesia. *Anesth Analg* 2004; **98**:224-9.
12. Robert CL, Algert CS, Olive E. Impact of first stage ambulation on mode of delivery among women with epidural analgesia. *Aust NZ J Obstet Gynaecol* 2004; **44**:489-94.
13. Robert CL, Algert CS, Cameron CA, Torvaldsen S. A meta-analysis of upright positions in the second stage to reduce instrumental deliveries in women with epidural analgesia. *Acta Obstet Gynecol Scand* 200; **84**:794-8.
14. Lewis KS, Han NH. Tramadol: a new centrally acting analgesic. *Am J Health Syst Pharm* 1997; **54**:643-52.
15. Tripti N, Jyotsna A. Pain relief in labour-Tramadol versus Pentazocine. *J Obstet Gynecol India* 2006; **56**:406-9.
16. Kuti O, Faponle AF, Adeyemi AB, Owolabi AT. Pain relief in labour: a randomized controlled trial comparing Pentazocine with Tramadol. *Nepal J Obstet Gyneacol* 2008; **3**:14-8.
17. Long J, Yue Y. Patient controlled intravenous analgesia with Tramadol for labour pain relief. *Chin Med J* 2003; **116**:1752-5.
18. Zhang J, Klebanof MA, DerSimonian R. Epidural analgesia in association with duration of labour and mode of delivery: a quantitative review. *Am J Obstet Gynecol* 1999; **180**:970-7. Comment in: *Am J Obstet Gynecol* 2000; **183**:258.
19. James KS, McGrady E, Quasim I, Patrick A. 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**:507-10.
20. Lee HL, Lo LM, Chou CC, Chiang TY, Chuah EC. Timing of initiating epidural in nulliparous: a retrospective experience using ropivacaine. *Cheng Gung Med J* 2008; **31**:395-401.