EPIDURAL ANALGESIA FOR LABOUR IN ARMED FORCES HOSPITALS : A PRELIMINARY STUDY TO ASSESS FEASIBILITY AND ACCEPTANCE

Lt Col AK AGASHE*

ABSTRACT

A pilot project to assess the feasibility of using epidural analgesia for labour was undertaken in an Armed Forces hospital. Effectiveness of the technique, acceptability by patients and nursing staff was assessed. Forty parturients were offered labour analgesia after explaining the procedure. A single-use 16 G Romson epidural catheter was placed in L2-3 or L3-4 space. Injection bupivacaine (0.25%) 10-14 mL was used as an initial dose. An hourly dose of 0.125% bupivacaine (10-12 mL) was given till the onset of second stage. Good to excellent analgesia during first stage was experienced by 34 patients. Marginal second stage prolongation was noticed but without any adverse neonatal effects. Analgesia was unsatisfactory during second stage in 25% patients. Instrumental delivery was required in 17% patients (LSCS - 10% and vacuum extraction - 7%). Procedure was accepted very well by 37 patients and they were satisfied with the pain relief.

MJAFI 1995; 51 : 101-105

KEY WORDS : Anesthesia epidural; Analgesia; Labor; Bupivacaine.

Introduction

Pain during labour has many deleterious effects on the mother and fetus specially when pregnancy is associated with major heart and lung diseases. Pain increases the sympathetic outflow which adds to the burden on an already compromised cardio-respiratory system [1-3]. Pain relief during labour has been tried with various methods either singly or in combination, but epidurally placed local anaesthetics were found to be most effective [4]. Low concentrations of bupivacaine (0.25%, 0.125%, 0.08%) not only provide selective sensory blockade with minimal motor loss but have minimum adverse effects on mother and fetus [3,5-8]. Bupivacaine has low feto-maternal distribution ratio thus minimising neonatal effects even after prolonged use [6,9,10]. Proper timing and positioning of patients will ensure satisfactory analgesia during second stage. After sufficient training, nursing officers can

be entrusted to give top-up doses.

Material and Methods

Out of 40 parturients included in the study, 31 were primipara (Gp A), 4 were multipara (Gp B) and 5 were multipara with systemic disease (Gp C). All the patients on admission were assessed by an obstetrician to rule out possibility of cephalopelvic disproportion (CPD). All patients when in labour and cervical dilation of 4-6 cm were offered labour analgesia. After informed consent patients were preloaded with 500 mL Ringer's lactate. A single-use 16 G Romson epidural catheter was placed in L2-3 or L3-4 space with aseptic precautions in operation theatre. Base line maternal blood pressure, pulse and fetal heart sounds were recorded. Patients were shifted in left-lateral position to the labour room. Here 3 mL of 0.25% bupivacaine was given as a test dose after catheter aspiration. After reconfirmation of extradural placement, remaining quantity of the drug was given in

*Classified Specialist (Anaesthesia), Military Hospital, Jamnagar.

TABLE 1
Demographic data

	Group A Primipara (n=31)	Group B Multipara (n=4)	Group C Multipara with systemic disease (n=5)
Age in years : mean (range)	20.5 (19-24)	24 (22-30)	23.6 (20-29)
Weight in kg : mean (range)	53.5 (48-62)	55 (52-63)	56 (54-67)
Spontaneous delivery	25	3	5
Pitocin induction	6	1	—
Period of gestation (wk)	38.9	39.4	38.8

divided doses within 15 minutes so as to achieve a sensory block upto T-10. Sensory loss was tested with pin prick and motor loss with Bromage scale : 0 = no paralysis; 1 = inability to raise extended legs; 2 = inability to flex knees; 3 = inability to flex ankle and first digit [9]. Fetal heart rate, maternal blood pressure and pulse, and sensory and motor loss were monitored every 5 minutes for next 30 minutes and thereafter every 15 minutes. Progress of labour was monitored by assessment of uterine contractions and by serial per vaginal examinations. Patients were educated to do self assessment of duration and frequency of uterine contractions by placing a hand over the abdomen. A top-up dose of 10 mL 0.125% bupivacaine was used whenever sensory level receded below umbilicus (T 10) during the first stage. A 'catch-up-dose' of 5-8 mL 0.25% bupivacaine was utilised if the patient complained of pain between top-up doses [5]. If episiotomy was indicated, then 5-8 mL of 1.5% lignocaine plain was used in semisitting position [11]. Epidural catheter was removed within one hour of delivery of the placenta. At the time of discharge from hospital, patients were asked about the acceptability and pain relief, by the author.

Observations

There were no significant differences in age and weight between the groups. Period of gestation was more than 38 weeks in all the patients (Table 1).

Good to excellent analgesia upto umbilicus

(T 10) was achieved in 37 patients (Table 2). Mean initial dose to obtain block till T 10 level was 10.75 mL of 0.25% bupivacaine and this resulted in analgesia for a mean duration of 68.5 minutes. On an average 3-4 top-up doses were required till the onset of second stage. Mean total dose of bupivacaine used was 103.5 mg. In two patients analgesia was patchy and in one case block level was upto L1 only. Two patients with Bromage scale 2 motor loss experienced weakness in lower limbs. Vacuum extraction was required in three patients due to occipito-posterior position and unsatisfactory bearing down efforts. Heaviness in the lower limbs was noted by 8 patients but without difficulty in bearing down.

TABLE 2
Sensory and motor loss

Level	Sensory loss		Motor loss	
		No of patients	Bromage scale	No of patients
Above T8	T8	nil	0	29
	T 8	2	1	8
	T 9	6	2	2
	T 10	27	3	nil
	T 11-12	2		
Below L 1		1		
Patchy analgesia		2		

Lower segment caesarean section (LSCS) was required in 4 patients with pitocin induction. Indication of LSCS were poor uterine response in 3 cases and borderline CPD in one

TABLE 3
Obstetrical analysis

	Group A	Group B	Group C				
			VSD	MS+MI	PIH+DM	PIH	PIH
Stage I (hr) : mean (range)	9.5 (6-16)	6.5 (2-8)	12.5	10.5	12	8	9.5
Stage II (min) : mean (range)	58 (45-90)	36 (30-48)	65	45	65	25	75
Time, EA-delivery (hr) mean	6.5	3.2	10.5	9	8.5	7	7.5
Methods of delivery							
1. Spontaneous	25	4	1	1	—	1	1
2. Vacuum extraction	2	—	—	—	1	—	—
3. Forceps	—	—	—	—	—	—	—
4. LSCS	4	—	—	—	—	—	—

(EA - epidural analgesia, VSD - ventricular septal defect, MS+MI - mitral stenosis with incompetence, PIH - Pregnancy-induced hyper tension, DM - diabetes mellitus, LSCS - lower segment caesarean section)

patient. Uterine contractions and cervical dilatation were satisfactory in 35 patients. Vacuum extraction was felt essential in 3 patients. Forceps were not applied in any of the patients.

Apgar score was above 5 at birth in all babies except in one case where active resuscitation was required to establish rhythmic respiration.

Dull low grade pain along left lower limb was noted by two patients. Intravascular placement was seen in one patient during top-up dose and this dose was omitted. Low backache was experienced for 3-8 days by six patients. Complications like meningeal irritation epidural abscess, hematoma, neuraxial damage were not seen in our study. Maternal and fetal cardiovascular instability was not observed during the period of labour analgesia.

Thirtyfive (87%) patients found pain relief to be of definite help and were fully satisfied. A feeling of deprivation of involvement in the labour was expressed by one patient. Pain relief was not felt adequate by two patients. When asked at the time of discharge, about the acceptance of labour analgesia for future deliveries, thirty four patients were ready to accept epidural mode of analgesia, two patients rejected the idea and four did not opine. Nursing staff pointed out that routine ward work and continuous monitoring during la-

bour analgesia cannot be managed by a single person. Separate nursing staff was felt essential for labour analgesia cases.

Discussion

Epidural analgesia for vaginal delivery with bupivacaine is in practice for more than two decades with high degree of success and patient acceptance [12-14]. Many methods of analgesia (singly or in combination) have been tried but epidural analgesia has been proven to be most effective. Epidural labour analgesia has not gained popularity in India because of many reasons : (i) unawareness in the population about the existence of such a facility, (ii) age old concept that pain must accompany delivery, (iii) high cost of catheter and non availability of expertise, (iv) shortage of trained staff and inadequate monitoring facilities and (v) extensive turnover due to high birth rate [15]. In the Armed Forces, there is a high ratio of nursing staff to patients, practical training is easy to implement and there are optimum number of patients. Most of the military hospitals have adequate obstetrical load and obstetrician is readily available.

In spite of the poor background knowledge about the procedure, patients accepted it very well. On the job training to the nursing staff was found to be easy. A proper protocol should be prepared and followed strictly.

Top-up doses can be given by nursing staff after satisfactory training. Complications due to top-up doses were not noticed in our study because of strict adherence to the protocol and meticulous monitoring. Marginal shortening of first stage was seen in our study. Epidural analgesia helps in converting inco-ordinate uterine contractions into co-ordinate ones [3,14]. In high risk compromised patients, shortening of first stage reduces strain on cardiorespiratory systems [1,4]. Hourly bupivacaine (0.125%) is not an ideal method but in the absence of an infusion pump at peripheral hospital, we found it to be satisfactory. It fails to provide satisfactory analgesia during strong contractions, therefore, we used 'catch up' doses of 0.25% bupivacaine. Low instrumental delivery rate seen in the present study could be due to low concentrations of bupivacaine used and proper timing of doses. Continuous infusion of low concentration of bupivacaine is the ideal method but high cost of infusion pumps makes it impracticable in smaller hospitals [16,17]. Phillips et al have noted LSCS rate of 12% and stage II duration of 90 minutes without any adverse neonatal effects [7,18,19]. Patchy block could be due to epidural septa and migration of catheter to paravertebral space. Migration of catheter is not uncommon and high rates have been noted by Phillips et al [20]. Epidural effect may be clinically satisfactory but still patient might experience severe pain because of low threshold, late administration of epidural and inadequate doses of local anaesthetics [4]. We were able to achieve satisfactory pain relief during stage I in 83% patients. Bupivacaine is considered safe even after prolonged use due to its low feto-maternal distribution ratio of 0.3 [6,10,14].

Major complications like epidural hematoma, neuraxis damage and meningitis were not seen in the present study. Apart from low backache, no other complications due to catheter were noted in the study. Regular fetal and maternal monitoring throughout the procedure does increase the work load of nursing staff. Labour room has to be augmented with anaesthesia equipment so that epidural

catheter can be placed in the labour room. Many of the patients in our study showed reluctance for catheter placement in operation theatre.

We achieved satisfactory pain relief in majority of patients (83%) during stage I and procedure was well accepted by patients. We conclude that an effective epidural service for painless vaginal delivery is a distinct possibility in the Armed Forces hospitals.

REFERENCES

1. Carrie LES. In : Recent advances in Obstetrics and Gynaecology. 1977; 29.
2. Hollmen A, Jouppila R, Pihlajaniemi R, Sjöstedt E. Selective lumbar epidural block in labour: A clinical analysis. *Acta Anaesthesiol Scand* 1977; 21 : 174-8.
3. Moir DD, Willocks J. Management of inco-ordinate uterine contraction under continuous epidural analgesia. *BMJ* 1967; 3 : 396.
4. Bundesen P, Perteson LE, Selestam U. Pain relief during delivery. *Acta Obstet Gynecol Scand* 1982; 61 : 289-97.
5. Challen PD, Stainthorp SF, Bradshaw EG, Tobias MA. Assessment of low concentration of bupivacaine in labour: A simple method. *Anaesthesia* 1977; 32 : 102.
6. Littlewood D, Scott DB, Wilson J, Covino BG. Comparative anaesthetic properties of various local anaesthetic agents in extradural block for labour. *Br J Anaesth* 1977; 49 : 75-9.
7. Phillips JC, Hochberg CJ, Petrakis JK, Winkle JDV. Epidural analgesia and its effects on the normal progress of labour. *Am J Obstet Gynecol* 1977; 129 : 316-20.
8. Thornbern J, Moir DD. Extradural analgesia: The influence of volume and concentration in the mode of delivery, analgesic efficiency and motor block. *Br J Anaesth* 1981; 53 : 933-9.
9. Bromage PR. Physiology and pharmacology of epidural analgesia. *Anaesthesiology* 1967; 28 : 592-622.
10. Reynolds FL, Hargrove RL, Wyman JB. Maternal and fetal plasma concentrations of bupivacaine after epidural block. *Br J Anaesth* 1973; 45 : 1049.
11. Bonica JJ. Peripheral mechanisms and pathways of parturient pain. *Br J Anaesth* 1979; 51 (Suppl) : 1-3.
12. Crawford JS. Some maternal complications of epidural analgesia for labour. *Anaesthesia* 1985; 40 : 1219-25.
13. Moore J, Murnaghan GA, Lewis MA. Clinical analysis of the maternal effects of labour epidural analgesia. *Anaesthesia* 1974; 29 : 537-44.
14. Raabe N, Belfrage P. Epidural analgesia in labour: Influence on uterine activity and fetal heart rate. *Acta Obstet Gynecol Scand* 1976; 55 : 305-10.

15. Ukpoma SO, Oronsaye AU. Selective obstetric epidural service in a developing country. *Anaesthesia* 1981; 36 : 816-7.
16. Doughty A. Lumbar epidural anaesthesia : The pursuit of perfection with special reference to midwife participation. *Anaesthesia* 1975; 30 : 741-51.
17. Davies AO, Fettes IW. Simple and safe method for continuous infusion epidural analgesia in obstetrics. *Can Anaesth Soc J* 1981; 28 : 484-7.
18. Studd JW, Crawford JS, Diugnan NM, Rowbotham CJF, Hughes AO. The effects of lumbar epidural analgesia on the rate of cervical dilation and the outcome of the labour of spontaneous onset. *Br J Obstet Gynecol* 1980; 87 : 1015-21.
19. Maresh M, Choong KG, Beard RW. Delayed pushing with lumbar epidural analgesia in labour. *Br J Obstet Gynecol* 1983; 90 : 623-7.
20. Phillips DC, Macdonald R. Epidural catheter migration during labour. *Anaesthesia*; 1987; 42 : 661-3.