

The Influence of Combined Spinal Epidural Analgesia on Duration of Labour and Conversion to LSCS Compared to Conventional Parenteral Analgesia – A Comparative Study

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ABSTRACT

Background: Now mostly it is established that analgesia needs to be offered to the parturients, some issues with regards to conversion to caesarean section or delay in labour can occur due to epidural analgesia. This study was aimed to understand the frequency of these issues and its effect on outcomes. **Methods:** Labouring parturients with uncomplicated pregnancies were recruited at the time of admission to labour room after seeking consent. Patients were divided into two groups randomly one receiving epidural analgesia and the other conventional parenteral analgesia and recordings were made for pain intensity, length of labour, frequency of instrumental deliveries and caesarean sections. **Results:** It was observed that the overall duration was reduced in epidural group vs conventional group (mean 217.3 SD 121.9 vs 398.7 SD 273.2 minutes) with better analgesia when VAS were compared (Average 3 vs 7.5), however the rate of instrumental deliveries (frequency 6 vs 3) and caesarean sections (frequency 7 vs 4) were higher in epidural group. **Conclusion:** From our study we conclude that the combined spinal epidural analgesia when compared with conventional parenteral analgesia provides better analgesia and hastens the overall labouring process to delivery however leading to increased frequency of instrumental delivery and caesarean section.

Keywords: Labour analgesia, Epidural, CSEA

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Introduction

Normal labour can be an easy, trouble free, and deeply satisfying experience for any woman provided that a rational and understanding approach is made towards the pregnant patient by her family members and medical attendants. They need to be informed about the options they have towards relief of their labour pains [1].

An ideal obstetric analgesic should satisfy following prerequisites:

- 1.) Provide efficient pain relief, without affecting the level of consciousness or losing patient cooperation.
- 2.) Should not produce foetal depression
- 3.) Should not unduly depress uterine contractions
- 4.) Minimal maternal and foetal complications
- 5.) Safe and nontoxic
- 6.) Minimum chances of procedural failure

Combined Spinal Epidural (CSE) analgesia has been advocated for pain relief in labour. However, there is a controversy regarding

whether the duration of labour and LSCS rate is increased in subjects receiving Combined Spinal Epidural Analgesia. Evidence is available that combined spinal analgesia in addition to improving the quality of analgesia also shortens the duration of the second stage of labour.

Although its efficacy and precision have been emphasized as long back as 1956, its use is still not as widespread as one would expect [2]. This is partly due to the shortage of anesthetic staff in most hospitals, paucity of patient awareness, and also the fact that it is still not readily accepted by some obstetricians. Main concern of obstetricians is that it prolongs labour and results in higher rates of caesarean sections, with our study we aimed at adding to the data on these factors.

The aim of our study was to compare duration of 2nd stage of labour and rate of conversion to caesarean section in laboring parturients who had received combined spinal epidural analgesia against those who received conventional analgesia. Secondary outcome of quality of analgesia, failure of technique and complications of block were also measured.

Method

All patients included in the study were explained about the labour analgesia modalities and written informed consent was obtained. On admission of laboring parturients to the labour room patients were examined by the obstetric resident on duty. The study population consisted of pregnant women in first and second stages of labour, uncomplicated pregnancies of all parities were included in the study.

Following exclusion criteria were implemented:

- 1.) Patient refusal
- 2.) Coagulopathy
- 3.) Hypertension
- 4.) Obstetric contraindications for vaginal birth
- 5.) Complicated pregnancies

Subjects of all parities underwent stratified randomization to one of the groups:

Group I – Those who received parenteral analgesia

Group II – Those receiving combined spinal epidural analgesia

Sequentially 200 patients who gave consent were recruited for this observational study, they were randomized using sealed envelopes into the two groups, however no blinding was feasible due to stark difference in the procedure for analgesia and the same was not done.

For the Group I analgesia was by means of intramuscular injection of Pethidine upto a maximum of 50 mg 6 hourly. It was ensured that last dose of pethidine is administered more than 2 hours prior to anticipated time of delivery.

For the Group II procedure was conducted in left lateral decubitus position using a combined spinal epidural needle. During the procedure 25 mcg of Fentanyl was injected intrathecally and epidural catheter was inserted such that 3-4 cms of catheter is inside the epidural space. Through this catheter an initial bolus of 10 ml of 0.1% Bupivacaine bolus is given. Once the procedure is over an infusion of 0.1% Bupivacaine with 2mcg/ml Fentanyl was initiated, and titrated to Visual Analog Scale (VAS) of pain.

In all the subjects were assessed for intensity of pain using VAS, continuous foetal monitoring was done using Foetal Heart Rate (FHR) monitoring and tocodynamometry. Decision regarding obstetric management or whether to proceed with operative delivery was made by the obstetrician, APGAR scores were recorded by personnel responsible for neonatal management and assessment.

Other data recorded were Parturient Age, Weight, Oxytocin use, time to complete cervical dilation, time and method of delivery, indication for caesarean delivery for those where so decided during the labour.

Once the data was collected it was analysed using NCSS-PASS software, Mann Whitney test was used to test data where it was not normally distributed.

Results

Table 1 with shows the relative duration of labour when labour using CSE analgesia was compared with conventional analgesia (CA). The difference in data counts (92 for CSE versus 96 for CA) was due to the fact that durations were not counted if the patients labour was converted to LSCS. This occurred in 4 patients in the CA group and 7 in the CSE group. One patient was eliminated from the CSE group due to extreme apprehension and inability to cooperate with the procedure. As seen from the histograms, the data was not distributed normally, so the Mann Whitney test was

used to test for significance in differences. The CSE group was found to be associated with a significantly shorter duration of labour.

Table 2: Reflects the increased relative risk of conversion to LSCS with the CSE group. The causes for termination were as follows in the CSE group.

- | | |
|-----|---|
| 1.) | Deep transverse arrest |
| 2.) | Prolonged labour |
| 3.) | LSCS under epidural for nonprogress of labour |
| 4.) | Uterine dystonia |
| 5.) | Non-progress of labour |
| 6.) | Occipito-posterior/non descent of head |
| 7.) | Uncooperative or unwilling for vaginal delivery |

In contrast there were 4 conversions to LSCS in the CA group, 3 for prolonged labour or failed induction and one for fetal distress. Frequency of instrument delivery is shown in Table 3 and relative risk of instrument delivery in CSE group is 2.1.

Figure 1 shows the difference in analgesia as reflected by the visual analogue scale between the CSE and CA group. As can be seen, the mean pain score in the CSE group was 3.02 as compared with the CA group in which the mean pain score was 7.74. The pain scores in the CSE group were significantly less than the CA group as assessed by the Mann Whitney test.

Discussion

Childbirth has always been a painful process. The unprepared and untreated woman will feel pain during uterine contractions which occur in normal uncomplicated labour. The superiority of a combined spinal epidural block lies in quickly eliminating the pains of uterine contraction, thereby facilitating the process of labour. Epidural analgesia had been considered to be suitable to a vast majority of the parturients, absolute contraindication being patient refusal and obstetric contraindications [3].

A number of studies have proven the superiority of CSE analgesia when compared to other modalities. Another observation being that whenever the labour is difficult it is associated with more intense pain, this means that it is not due to any reduced pain threshold but a marker of difficult or ultimately obstructed labour [4,5]. In our study, 5% of the parturients, receiving CSE had less than satisfactory pain relief — VAS scores of less than 5. Of those having unsatisfactory pain relief, two had to under go LSCS for nonprogress of labour. In both these cases the pelvic assessment was found to be “borderline”.

With regards to duration of labour different studies have come out with different outcomes, a earlier studies conducted revealed that the patients receiving epidural analgesia experienced longer labours [6,7]. Detailed studies into progress of labour of parturients receiving CSE analgesia revealed rapid cervical dilation thus reducing the duration of first stage [8]. In our study the overall duration of labour was reduced and only the second stage was found to be increased in duration for the group of patients receiving CSE analgesia.

Various studies have reported many complications of CSE analgesia in labour such as hypotension, pruritus, nausea, vomiting, lower limb weakness and respiratory depression [9]. However in our study Pruritus and lower limb weakness were the only complications recorded. Pruritus was complained mainly after the initial procedure, which may be attributed to initial administration of subarachnoid administration of fentanyl. This was transient and did not require any active intervention apart from reassurance.

Lower limb motor weakness was observed in 18 subjects. It was looked for by testing the ability of the participant to bear weight on her own, and was observed to be more prevalent in those requiring prolonged epidural analgesia, or repeated intermittent boluses. The degree of motor block was never more than a mild limitation of knee flexion (as per Bromage scale).

In a Meta-analysis which included data from 10 trials enrolling 2369 subjects, that randomized subjects to epidural vs parenteral opioid labor analgesia, it was found that Patient satisfaction and neonatal outcome were better after epidural than parenteral opioid analgesia [10]. Further, evidence is available by means clinical investigations on the Effect of Epidural Fentanyl on Neonatal Respiration, which found that fentanyl added to epidural bupivacaine infusions during labor does not depress neonatal respiration or adversely affect neurobehavioral scores and other indices of neonatal wellbeing [11]. Findings from our study were also on similar lines, neonatal depression at birth was observed in three cases in the CSEA group, in all of which the apgar score was below 7 at 1 min after birth and improved to 9 with the help of tactile stimulation at the end of 5 mins. By contrast, there were six instances of foetal distress in the conventional analgesia group, three of whom had Apgar less than 7 at birth.

There have been studies in past which have established increased risk of prolonged fetal heart rate deceleration following intrathecal fentanyl/bupivacaine, however we did not encounter any persistent and prolonged fetal HR changes, in our study. Whether the occurrence of fetal heart rate variation is as a consequence of maternal hypotension needs to be established [12,13].

Deliveries requiring instrumentation in the form of vacuum or forceps application were found to be higher in case of the CSEA group (six), as compared to only three in case of the conventional analgesia group. These findings are in line with some large retrospective data analysis where it was established that rate of instrumental deliveries is higher with CSEA. There may be association prolonged active phase and second stage of labour in patients receiving CSE analgesia and it is likely that those parturients having minor degree of cephalo-pelvic disproportion or occipito-posterior presentation experience severe pain and request for epidural analgesia much more frequently, these are the same group of patients with higher likelihood of instrumental deliveries [14,15].

Some studies have established other causes independent of the type of analgesia which may be the reason for increased frequency of instrumental deliveries. Various explanations have been given for probable mechanisms leading to these increased instrumental deliveries such as, blockade of the motor units of sacral nerves resulting from local anaesthetic agents administered during the first stage of labour. This effect may be cumulative and persist into the second stage. The resulting weakness of pelvic floor muscles reduces the effectiveness of maternal pushing and the involuntary bearing down reflex. Also there is evidence that in these parturients level of oxytocin may be reduced [16,17].

A significantly higher rate of LSCS was seen with the CSEA group. the risk of LSCS with CSEA turned out to be 1.7 times as compared with intramuscular analgesia with inj pethidine. Most of the times this was due to the prolongation of second stage. This is in line with past studies. Further epidural analgesia is associated with significant increase in malposition and dystocia [18,19].

However, some recent studies have revealed that there is no statistically significant difference in the maternal or foetal outcomes of the labour, with use of combined spinal epidural analgesia when

compared with other traditional analgesia techniques [20,21]. This outcome can be attributed to better understanding and refinement of labour analgesia techniques. The same was brought out in a systematic Chochrane database review which revealed that when studies prior to 2005 were excluded there was no statistically significant difference in instrument assisted deliveries or caesarean sections [22].

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References

- 1.) Cook K, Loomis C. *The Impact of Choice and Control on Women's Childbirth Experiences.* J Perinat Educ. 2012;21(3):158-168.
- 2.) Mastroianni L, Kelly JV, Laviates S, Carbone P. *The Use of Continuous Epidural Combined with Continuous Caudal Anesthesia for Labor and Delivery.* American Journal of Obstetrics and Gynecology. 1956;71(2):300-303.
- 3.) J. S. Crawford. *Lumbar epidural block in labour: a clinical analysis.* Br J Anaesth. 1972;44(1):66-74.
- 4.) Alexander JM, Sharma SK, McIntire DD, Wiley J, Leveno KJ. *Intensity of labor pain and cesarean delivery.* Anesth Analg. 2001;92:1524-28.
- 5.) Panni MK, Segal S. *Local anesthetic requirements are greater in dystocia than in normal labor.* Anesthesiology.2003;98(4):957-963.
- 6.) R Salim, M Lavee, A Moskoviz, Z Nachum, E Shalev. *The effect of patient continuous epidural analgesia versus intermittent bolus epidural analgesia on progress of labor and patient satisfaction.* Am J Obs Gynecol.2003;189(6):S134
- 7.) Halpern SH, Leighton BL, Ohlsson A, Barrett JFR, Rice A. *Effect of epidural vs parenteral opioid analgesia on the progress of labor: a meta-analysis.* JAMA.1998;280:2105-2110.
- 8.) Tsen LC, Thue B, Datta S, Segal S. *Is combined spinal-epidural analgesia associated with more rapid cervical dilation in nulliparous patients when compared with conventional epidural analgesia?* Anesthesiology.1999;4:920-925.
- 9.) Moschini V, Marra G, Dabrowska D. *Complications of epidural and combined spinal-epidural analgesia in labour.* Minerva Anestesiologica.2006;72(1-2):47-58.
- 10.) Halpern SH, Leighton BL, Ohlsson A, Barrett JFR, Rice A. *Effect of Epidural vs Parenteral Opioid Analgesia on the Progress of Labor: A Meta-analysis.* JAMA.1998;280(24):2105-2110.
- 11.) Porter, Jackie MB. *Effect of Epidural Fentanyl on Neonatal Respiration.* Anesthesiol.1998;89(1):79-85.
- 12.) Gaister RR, McHugh M, Cheek TG, Gutsche BB. *Predicting prolonged fetal heart rate deceleration following intrathecal fentanyl/bupivacaine.* Int J Obstet Anesth.2005;14(3):208-211.
- 13.) Camorcica M, Capogna G, Columb MO. *Minimum local analgesic doses of ropivacaine, levobupivacaine, and bupivacaine for intrathecal labor analgesia.* Anesthesiology.2005;102(3):646-650.
- 14.) Liu YJ, Qu Y, Zhang XS, Liu J. *Effect of different analgesia on pain relief during labor.* Zhonghua Fu Chan Ke Za Zhi.2005;40(6):372-5.
- 15.) Howell C J. *Epidural versus non-epidural analgesia for pain relief in labour.* Cochrane Database Syst Rev.2000;(2):CD000331.
- 16.) Bates RG, Helm CW. *Uterine activity in the second stage of labour and the effect of epidural analgesia.* British Journal of Obstetrics and Gynaecology.1985;92:1246-1250.
- 17.) Matadial L, Cibils L. *The effect of epidural analgesia on uterine activity and blood pressure.* Am. J. Obstet. Gynecol.1976;125(6):846-854.
- 18.) Thorp JA, Hu DH, Albin RM, McNitt J, Meyer BA, Cohen GR, et al. *The effect of intrapartum epidural analgesia on nulliparous labor: a randomized, controlled, prospective trial.* American journal of obstetrics and gynecology.1993;169(4):851-858.
- 19.) Klein MC. *Does epidural analgesia increase rate of cesarean section?* Can Fam Physician.2006;52(4):419-421.
- 20.) Singh SK, Yahya N, Misiran K, Masdar A, Nor NM, Yee LC. *Combined spinal-epidural analgesia in labour: its effects on delivery outcome.* 2016;66(3):259-264
- 21.) Shivanagappa M, Kumararadhya GB, Thammaiah SH, Swamy AHM, Suhas N. *Progress of Labor and Obstetric Outcome in Parturients with Combined Spinal-epidural Analgesia for Labor: A Comparative Study.* Annals of African Medicine. 2021 Oct-Dec; 20(4): 270-275.
- 22.) Anim-Somuah M, Smyth RM, Cyna AM, Cuthbert A. *Epidural versus non-epidural or no analgesia for pain management in labour.* Cochrane Database Syst Rev. 2018 May 21;5(5):CD000331.

