Original Research Article

Indian Journal of Anesthesia and Analgesia
2018; 5 (2): 230-234
DOI: http://dx.doi.org/10.21088/ijaa.2349.8471.5218.13

Effect of Epidural Labour Analgesia on Maternal Body Temperature

Mohan Kumar Ramaiah Mahadeva[1], Nataraj Madagondapalli Srinivasan[2]

[1]Assistant Professor, [2]Professor, Dept. of Anaesthesiology, ESIC Medical College, Bangalore, Karnataka 560060, India.

Abstract

Context: Epidural analgesia is an effective mode of labour analgesia. Few studies have shown that epidural analgesia is associated with an increase in maternal body temperature. The greatest impact of this increase in maternal body temperature lies in the need to eliminate the possibility of infection and subsequent use of antibiotics. This study was done to determine the relationship between epidural labour analgesia and maternal body temperature in Indian population. *Aims:* To determine the relationship between epidural labour analgesia and increased maternal intrapartum temperature. *Settings and Design:* A prospective randomised study in our institution. *Methods and Material*: Sixty ASA 1 or 2 consenting parturients scheduled for normal delivery were randomly allocated to 2 groups of 30 each to receive inj Fentanyl 50 mg intravenous or epidural boluses of 0.125% ropivacaine with 2 mg/cc of fentanyl after ethical committee approval. Baseline maternal and fetal vital parameters including maternal body temperature were recorded. *Statistical analysis used*: Data was analysed using student's unpaired t-test, Mann Whitney's U test and one-way ANOVA wherever indicated *Results:* Significant difference ($p< 0.05$) in the maternal body temperature between the groups at all intervals were noted. There was a significant rise in the temperature from baseline within the group as well ($p< 0.05$). *Conclusion*: The present study shows that maternal body temperature increases during labour and epidural labour analgesia only exaggerates it, albeit, without any apparent repercussions on the mother or infant.

Keywords: Epidural; Analgesia; Labour; Maternal Temperature.

Introduction

Epidural analgesia is an effective mode of labour analgesia. Few studies have shown that epidural analgesia been associated with an increase in maternal body temperature [1-3]. Though an increase in maternal intrapartum temperature may be an indication of chorioamnionitis, in many cases, it was not associated with any other signs of infection [4-7]. Though the exact mechanism is still largely unknown, the possibility of a change in maternal thermoregulation has been thought of [6]. The greatest impact of this increase in maternal temperature lies in the consequent maternaland neonatal evaluation performed to eliminate any possibility of infection and the increased use of antibiotic therapy [8]. The objective of the present study was to determine the relationship between epidural labour analgesia and increased maternal intrapartum temperature.

Materials and Methods

This study was conducted between october 2016 and june 2017 after approval from institutional research and ethics committee. Sixty American Society of Anaesthesiologists (ASA) physical status 1 or 2 parturients scheduled for labour analgesia were recruited for the study after obtaining a written

Corresponding Author: Mohan Kumar Ramaiah Mahadeva, Assistant Professor, Dept. of Anaesthesiology, ESIC Medical College, Bangalore, Karnataka 560060, India.
E-mail: drmohankumarrm@gmail.com

Received on 25.10.2017, **Accepted on** 16.11.2017

informed consent. Parturients who had any contraindication for epidural technique and history of allergic reactions to any of the study drugs were excluded from the study.

The current study was designed to test the hypothesis that epidural labour analgesia increases maternal body temperature.

All the parturients were randomly assigned by picking lots into 2 groups of 30 subjects in each group: Control group (C) and ropivacaine groups (R). Parturients in control group received inj Fentanyl 50 μg intravenous boluses on request or when VAS score was above 3. Parturients in Ropivacaine group received epidural boluses of 0.125% ropivacaine with 2 μg/cc of fentanyl as and when required.

The parturients in labour, were encouraged not to have any solid food. Fruit juices (without pulp) and clear fluids were allowed. Ranitidine 150 mg and Metoclopramide 10 mg, was given orally (in patients in early labour, with 3-4 cm cervical dilatation).

In the labour room, after checking anesthesia machine and keeping all emergency drugs and airway equipment ready, monitors were connected and maternal baseline cardiorespiratory parameters - pulse rate, non-invasive blood pressure, oxygen saturation andelectro-cardiogram were recorded. Base line maternal body temperature (oral) and fetal heart rate were also recorded. An 18g i.v.cannula was secured and Ringer's lactate was started.

Epidural catheter was secured in all the parturients assigned to the study group. After taking adequate aseptic precautions, the catheter was placed at L2-3, L3-4 or L4-5 level and was secured at about 5 cms from the depth at which the epidural space was identified by loss of resistance technique to air using 18g Tuohy needle. First 10 ml bolus of the premixed solution acted as 'test cum therapeutic dose'. A total of 15 to 20 ml of the test drug was injected epidurally to achieve the desired level of block (T_{10}) over 30-45 min If analgesia was inadequate after 45 min, re-siting the epidural catheter would be considered.

After placement of epidural catheter, maternal blood pressure was monitored at 5 min intervals and continuous FHR monitoring for the first 45 minutes. Maternal BP and FHR would be monitored every 10 minutes thereafter. The attending nurse would check the sensory level once each hour. Also, maternal body temperature measured orally was recorded every hour for 6 hours.

Maternal hypotension was treated by avoiding aortocaval compression and placing the mother in full left lateral position. If there was no response, 3-6 mg bolus of ephedrine IV was given.

Statistics

Data was analyzed using the SPSS statistical software. Parametric and non parametric values were analyzed using student's unpaired t-test and Mann Whitney's U test respectively. Differences within the group for parametric variables at different time points were analyzed by one-way ANOVA with significance using Tukey's method. $P<0.05$ was considered significant.

Results

A total of sixty parturients were involved in the study. There were no drop outs and every body completed the study. There were no complications related to the study.

The demographic characteristics in both the groups were comparable (Table 1).

Both the groups were comparable with respect to parity (p=0.45), and duration of second stage of labour. The duration of first stage of labour was prolonged in the control group (p=0.01) which was clinically not significant (Table 2).

The maternal Heart rate, blood pressure and fetal heart rate were comparable between both the groups (Table 3).

The mean VAS in group C was 1.23 ±0.63 and in group R was 1.24±0.63 p-value of 0.95 which was statistically not significant.

The baseline temperature was comparable between the groups. There was significant difference

Table 1: Demographic characteristics

Characteristic	Control group (n=30) Mean (SD)	Ropivacaine group (n=30) Mean (SD)	P-value
Age(in years)	22.52(2.56)	22.89(2.87)	0.61*
Height(in cms)	153.43(3.234)	152.27(3.095)	0.159*
Weight(in kgs)	64.83(6.838)	60.13(6.976)	0.11*

*Not Significant

Table 2: Labour Characteristics

Characteristic	Control Group	Ropivacaine Group	P=value
Parity – primiparous (%)	65	70	0.450
Multipara (%)	35	30	
Duration of 1st Stage (median/25th-75th percentile)	240(180-300)	200(100-240)	0.04**
Duration of 2nd Stage (median/25th-75th percentile)	35(25-50)	32(20-45)	0.80

**Significant

Table 3: Maternal and fetal Hemodynamic Characteristics

Characteristic	Group C (n=30)	Group R(n=30)	p-value
Maternal Heart Rate (Mean +/- SD)	81.57 +/- 10.17	84.50+/- 9.38	0.250
Maternal Mean BP (Mean +/- SD)	86.86 +/- 5.00	91.65 +/- 6.94	0.06
Fetal Heart Rate	139.99 +/- 7.85	139.45 +/- 6.27	0.770

Table 4: Comparison of Mean Temperature between groups at various intervals

	Control group(n=30)	Ropivacaine (n=30)	p-value
Time 0	36.39	36.36	.063
Time 1	36.47	36.61	.000*
Time 2	36.57	36.78	.000*
Time 3	36.62	36.99	.000*
Time 4	36.65	37.11	.000*
Time 5	36.74	37.29	.000*
Time 6	37.10	37.33	.000*

* Significant

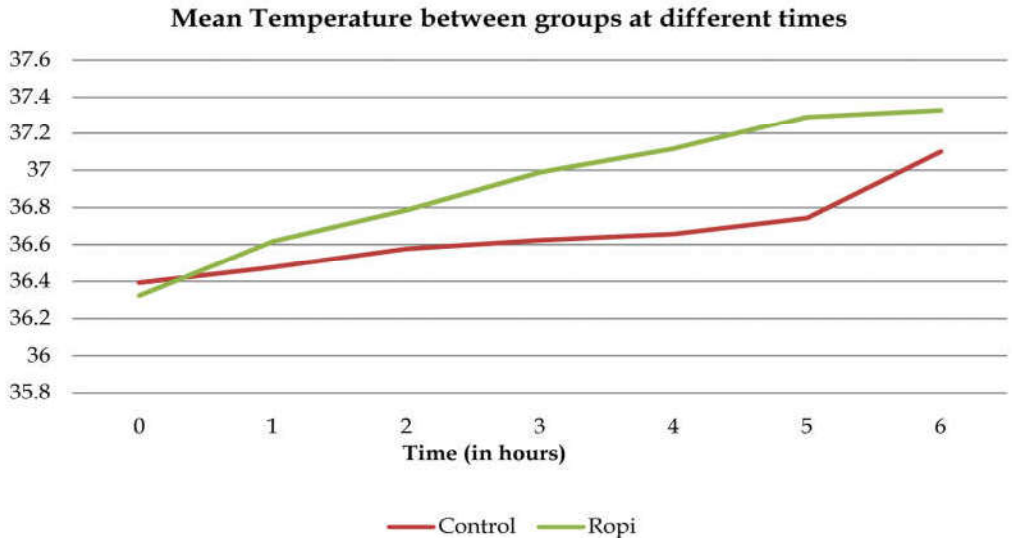

Fig. 1: Mean temperature between groups at different times

in the temperature between the groups at all other intervals (Table 4 and Figure 1).

Discussion

We observed that the mean maternal body temperature was significantly higher in the epidural group at all time interval of assessment. Nonetheless, no cases of maternal or neonatal infection were found and pharmacological analgesia was not associated with any adverse maternal or perinatal effects, as was found in the study done by F.A. De Orane et al [1]. However, we also noticed that there was statistically significant difference in the maternal body temperature from the baseline within the control group as well which was not so in the study done by F.A. De Orane et al [1]. This suggests that changes in the maternal body temperature occur during labour which may be due

to disturbance in the central thermoregulation and also due to an imbalance between heat production and elimination [4-7] and labour epidural analgesia only exaggerates this rise in temperature.

In their study F.A. de Orange et al observed that the hyperthermia seen in pregnant women receiving CSE anaesthesia was different from that found in women submitted to epidural anaesthesia, since the increase in temperature in their study appeared between the first and second hours after analgesia, continued throughout the first hours of labour and disappearedafter the sixth hour. Other investigators have published conflicting findings, reporting that 'epidural fever' is more common in prolonged labour, only 7% of women being affected in the first 6 hrs compared with over 36% when labour persists for more than 18 hrs [9].

Though the association of intrapartum fever with epidural anaesthesia has been demonstrated in several studies [1-3,10-12], their study [1] showed that CSE for pain relief during labour was associated with intrapartum maternal fever, although this fever was not indicative of any increased risk of maternal or neonatal infection.

But still, we have noticed that mere presence of intrapartum maternal fever results in major investigations, since both the mothers and the newborn infants are submitted more often to exams to screen for infection and to antibiotic therapy [10]. Hence, several authors propose a review of the obstetrical and neonatal criteria governing supplementary testing and antibiotic therapy in cases of intrapartum fever associated with anaesthesia [10,13]. Likewise, studies have shown that, despite the association between epidural anaesthesia and an increased risk of developing maternal fever, there are no repercussions on fetal well-being [14].

Several studies have reported an increase in the duration of the second stage of labour but no significant effects on the first stage [15,16,17]. A reduction in the duration of the first stage of labour was found in the present study, with no significant effect on the duration of the expulsion period.

Conclusion

The present study shows that maternal temperature increases during labour and epidural labour analgesia only exaggerates this increase in maternal temperature, albeit without any apparent repercussions on the mother or infant.

Acknowledgement

Nil

Conflict of Interest

Nil

References

1. F. A. de Orange, R. PassiniJr, M. M. R. Amorim, T. Almeida A. Barros. Combined spinal and epidural anaesthesia and maternal intrapartum temperature during vaginal delivery: a randomized clinical trial. Br J Anaesth 2011;107(5):762–8.
2. Camann WR, Hortvet LA, Hughes N, Bader AM, Datta S. Maternal temperature regulation during extradural analgesia for labour. Br J Anaesth 1991;67:565-87.
3. Yancey MK, Zhang J, Schwarz J, Dietrich CS III, Klebanoff M. Labor epidural analgesia and intrapartum maternal hyperthermia. ObstetGynecol 2001;98:763-70.
4. Goodlin RC, Chapin JW. Determinants of maternal temperature during labor. Am J ObstetGynecol 1982;143:97-103.
5. Thierrin L, Mercier FJ. Epidural analgesia and fever during labor. J Gynecol Obstet Biol Reprod 2005; 34:423–6.
6. Glosten B, Savage M, Rooke GA, Brengelmann G. Epidural anesthesia and the thermoregulatory responses to hyperthermia—preliminary observations in volunteer subjects. ActaAnaesthesiol Scand 1998;42:442–6.
7. Philip J, Alexander JM, Sharma SK, Leveno KJ, McIntire DD,Wiley J. Epidural analgesia during labor and maternal fever. Anesthesiology 1999;90:1271–5.
8. Viscomi CM, Manullang T. Maternal fever, neonatal sepsis evaluation and epidural labor analgesia. RegAnesth Pain Med 2000;25:549–53.
9. Lieberman E, Lang JM, Frigoletto F Jr, Richardson DK, Ringer SA, Cohen A. Epidural analgesia, intrapartum fever, and neonatal sepsis evaluation. Pediatrics 1997;99:415–9.
10. Goetzl L, Cohen A, Frigoletto F Jr, Lang JM, Lieberman E. Maternal epidural analgesia and rates of maternal antibiotic treatment in a low-risk nulliparous population. J Perinatol 2003;23:457–61.
11. Lieberman E, Eichenwald E, Mathur G, Richardson D, Heffner L, Cohen A. Intrapartum fever and unexplained seizures in term infants. Pediatrics 2000;106:983–8.
12. Sharma SK. Epidural analgesia during labor and maternal fever. CurrOpinAnaesthesiol 2000;13: 257–60.

13. Ferna´ndez-Guisasola J, Delgado Arna´ iz C, Rodrý´guezCaravaca G, Serrano Rodrý´guez ML, Garcý´a Del Valle S, Go´mez-Arnau JI. Epidural obstetric analgesia, maternal fever and neonatal wellness parameters. Rev EspAnestesiolReanim 2005;52:217–21.
14. Guyatt GH, Oxman AD, Kunz R, Vist GE, Falck-Ytter Y, Schu¨nemann HJ. GRADE Working Group. What is 'quality of evidence' and why is it important to clinicians? Br Med J 2008;336:995–8.
15. Simmons SW, Cyna AM, Dennis AT, Hughes D. Combined spinal– epidural versus epidural analgesia in labour. Cochrane Database Syst Rev 2007;3: CD003401.
16. Anim-Somuah M, Smyth R, Howell C. Epidural versus non-epidural or no analgesia in labour. Cochrane Database Syst Rev 2005;4:CD000331.
17. Brow CS, Garcia JI, Pellegrini JE. Comparison of the length of stage II labor and incidence of forceps and cesarean delivery after epidural infusion of 0.125% bupivacaine with 2 mu/mL fentanyl as compared with 0.0625% bupivacaine with 2mu/mL fentanyl. CRNA 2000;11:51–6.