International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Basit S et al. Int J Reprod Contracept Obstet Gynecol. 2024 Apr;13(4):930-934
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20240790

Original Research Article

A comparative study of intrapartum epidural analgesia with intramuscular tramadol on labor outcome

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Received: 20 February 2024
Revised: 10 March 2024
Accepted: 11 March 2024

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ABSTRACT

Background: Epidural analgesia produces analgesia in labour without affecting nervous system, allows the mother to be well oriented, fully conscious and alert throughout labour. The aim of this study is to study the effect of epidural analgesia and intramuscular (IM) tramadol in different stages of labour and compare the effect of epidural analgesia with intramuscular tramadol on progress of labour and its outcome.
Methods: Continuous monitoring of the haemodynamic parameters of the mother was done using multiparameter monitors. Foetal monitoring was done using continuous cardiotocography (CTG) monitor. Primigravida in spontaneous labour were randomly divided into two groups. Group I received epidural analgesia and group II received IM tramadol.
Results: Duration of Ist stage of labour in group I was 167.0±47.2 min and in group II was 214.4±50.2 min. Mean duration of III stage of labour in the present group I was 7.9 min and 7.5 min in the group II. In the present study, total duration of labour is shortened by 47 min in group I compared to group II.
Conclusions: Epidural analgesia during labour is a simple and effective method for painless and safe delivery. Analgesia produced by epidural route is significantly more effective than intramuscular tramadol. Epidural analgesia has favourable effect on the progress of labour. In developing nations where availability of facilities is the main limiting factor, intramuscular tramadol which is a safe and satisfactory drug for relief of labour pain, can be considered as a suitable alternative.

Keywords: Labor, Epidural analgesia, Intramuscular tramadol

INTRODUCTION

Labour is defined as a series of events taking place in the female genital organs in order to expel the viable products of conception out of the womb through the cervix and vagina into the outer world. Labour pain is considered as the severest forms of pain recorded, which have been explained as 'intolerable pain' by a third of women. So, there is need to develop enough desirable pain relief which every parturient have the right to get it.[1]

Labour analgesia reduces the maternal consumption of oxygen by nearly 15%.

Epidural analgesia increases the utero placental circulation by preventing the pain-induced hyperventilation and hypocapnia. Today the women are requesting for the need of analgesia to overcome the pain during labour.

Lumbar epidural analgesia can be considered to be one of the good options for alleviating the labour pain. It produces analgesia in labour without affecting nervous system, allows the mother to be well oriented, fully conscious and alert throughout labour.[2] So epidural analgesia has become very popular procedure in producing a very effective pain relief during labour pains.

Although epidural analgesia is used very frequently for pain relief, in limited conditions like lack of awareness, inadequate knowledge, untrained medical staff and improper monitoring facilities injectable opioids like intramuscular tramadol are reasonably used, even though it may not produce effective pain relief.[3]

Obstetricians have divided labour into 3 stages that delineate milestones in a continuous process.

First stage of labour begins with regular uterine contractions and ends with complete cervical dilatation at 10 cm. It is divided into a latent phase and an active phase. The active phase usually begins at about 3-4 cm of cervical dilation and is characterized by rapid cervical dilation and descent of the presenting foetal part.

Second stage of labour begins with complete cervical dilatation and ends with the delivery of the foetus.

Third stage of labour is th*e* period between the delivery of the fetus and the delivery of the placenta and foetal membranes.

Effective and adequate labour analgesia is of great benefit to the mother and has a positive effect on the course of labour and the fetal outcome. Thus, obstetrical analgesia, should be considered an essential part of modern obstetrics.[4] An ideal analgesic should be non-toxic to mother and fetus, and not produce cardio-respiratory depression in the fetus. The procedure or method must have no tocolytic action and should not delay labour.[5]

Aims and objectives

The aim of this was to study the effect of epidural analgesia and intramuscular tramadol in different stages of labour and to compare the effect of epidural analgesia with intramuscular tramadol on progress of labour and its outcome.

METHODS

This observational comparative prospective study was conducted in the department of obstetrics and gynaecology, Holy Family Hospital, New Delhi from September 2019-March 2021.

Inclusion criteria

Primigravida, single live fetus with term gestation with vertex presentation, women in labour at cervical dilatation 3-5 cm with good uterine contractions.

Exclusion criteria

Multigravida, CPD, multifetal gestation, pregnancy associated with either medical disorder or obstetric complications.

The study was conducted after obtaining institutional ethical clearance and written informed consent from the patients fulfilling the inclusion criteria. Continuous monitoring of the haemodynamic parameters (pulse rate, blood pressure, ECG and O_2 saturation) of the mother was done using multiparameter monitors. Fetal monitoring is done using continuous CTG monitor. Anaesthesia machine with all resuscitative equipment along with emergency drugs were kept ready.

Primigravida in spontaneous labour were randomly divided into two groups.

Group I included women who were given epidural analgesia at 3-5 cm of cervical dilatation and group II-Women who were given intramuscular tramadol 50 mg at 3-5 cm of cervical dilatation.

Group I patients were given lumbar epidural analgesia using 0.125% bupivacaine + 20 µg of fentanyl using loading and intermittent dose of 0.0625% bupivacaine + 2 mcg of fentanyl @ 4-6 ml/hour by the anaesthesiologist. Group II mothers were given injection tramadol 50 mg i.m. and repeated after 4 hours if required. The two groups were compared under following characteristics.

Duration of labour (active phase of I stage, II stage, III stage and total duration of labour) and mode of delivery. The collected data was analysed with IBM statistical package for the social sciences (SPSS) statistics for Windows, Version 23.0. (Armonk, NY: IBM Corp). To describe about the data descriptive statistics frequency analysis, percentage analysis was used for categorical variables and the mean and standard deviation (SD) were used for continuous variables.

RESULTS

There was no statistically significant difference between the groups in the age distribution.

Mean PR in the group I was 89.16 bpm and group II 85.08 bpm. Mean systolic BP in the group I was 116.05 mmHg and group II 118.90 mmHg. But 1 patient in the group I had hypotension. Mean cervical dilatation at the procedure in the group I was 5 cm and group II were 4 cm.

Duration of first stage of labour was calculated taking into account only from active phase of labour. The mean duration of I stage in the group I was 167.0±47.2 min and 214.4±50.2 min in the group II. This confirms that epidural analgesia does not prolong the I stage of labour in fact it may shorten the I stage of labour by reducing maternal anxiety.

Duration of I stage is shortened by 47.4 min when compared to group II, which is highly statistically significant. Forty-five patients (90%) in group I were fully dilated within 3½ hours (210 min) of commencement of epidural analgesia, whereas only 26 patients (52%) in the

group II were fully dilated at the end of 4 hours. The duration of II stage of labour ranged from 10-85 min in the group I with a mean of 39.8 min. The duration of II stage of labour ranged from 15-90 min with a mean of 40.5 min in group II. Duration of III stage of labour range from 5 to 20 min (mean 7.9 min) in the group I and 3 min to 15 min (mean 7.5 min) in the group II. Total duration of labour is significantly shortened in group I when compared to group II by 47.44 min. In group I, 42 patients (84%) had vaginal delivery, 5 patients (10%) had ventouse assisted delivery, 2 patients (4%) had outlet forceps delivery and 1 patient was delivered by lower segment of caesarean section (LSCS). In group II, 39 patients (78%) had vaginal delivery, 4 patients (8%) had ventouse assisted delivery, 4 patients (8%) had outlet forceps assisted delivery and 3 patients (6%) were delivered by LSCS.

The comparison of indication for caesarean delivery between the groups shows there is no statistically significant difference between the groups in the indication for caesarean delivery.

Table 1: Comparison of age distribution between the groups I (epidural analgesia) and group II (intramuscular tramadol).

Age (years)	Count/ %	Groups		Total
		Group I	Group II	
20-25	Count	36	31	67
	%	72.0	62.0	67.0
26-30	Count	10	16	26
	%	20	32.0	26.0
Above 30	Count	4	3	7
	%	8	6.0	7.0
Total	Count	50	50	100
	%	100.0	100.0	100.0

Table 2: Mean duration of active phase of I stage of labour.

I stage	Group I	Group II
Duration of I stage (min)	90-300	105-305
Mean±SD	167.0±47.2	214.4±50.2

Table 3: Range of duration of I stage of labour.

Duration range (min)	Group I		Group II	
	N	%	N	%
90-150	21	42.0	7	14.0
151-210	22	44.0	13	26.0
211-310	7	14.0	30	60.0

Table 4: Duration of II stage in groups I and II.

II stage	Group I	Group II
Duration of II stage (min)	10-85	15-90
Mean±SD	39.8±21.0	40.5±19.2

Table 5: Duration of III stage in groups I and II.

III stage	Group I	Group II
Duration of III stage (min)	3-10	2-20
Mean±SD	7.9	7.5

Table 6: Total duration of labour.

Parameter	Group I	Group II
Total duration of labour (min)	108-370	122-415
Mean±SD	214.42±55.40	261.87±61.38

Table 7: Mode of delivery.

Mode of delivery	Group I		Group II	
	N	%	N	%
FTD	42	84	39	78
Ventouse	5	10	4	8
Outlet forceps	2	4	4	8
LSCS	1	2	3	6
Total	50	100	50	100

Table 8: Indication of caesarean delivery.

Indication	Group I		Group II	
	N	%	N	%
Fetal distress	1	5.26	1	5.26
Deep transverse arrest	0	0	1	5.26
Non progression of labour	0	0	1	5.26

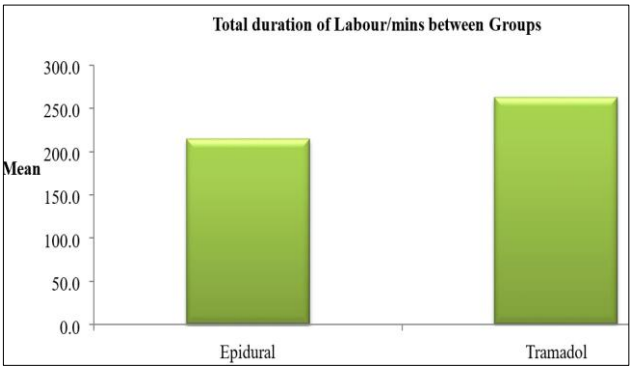

Figure 1: Total duration of labour.

DISCUSSION

Intrapartum epidural analgesia provides effective pain relief in labour and vaginal delivery while the mother remains alert and cooperative during labour thus having a tremendous effect on the labour outcome.

Comparative study of duration of first stage of labour (group I)- duration of Ist stage of labour in group I of our

study is 167.0±47.2 min. However, in a study conducted by Impey et al the duration of I stage was 294±156.[6]

So, duration of Ist stage of labour is significantly shortened in our study which is in accordance with the study by Genc et al and Lurie et al study.[7,8]

Comparative study of duration of Ist stage of labour (group II)- in our study, the duration of stage of labour in Group II is 214.4±50.2 min. In Thakur et al study duration of I stage of labour is 255.6±97.2 min which is prolonged compared to our study.[9]

In Jyothi et al study with programmed labour duration of I stage of labour is significantly shortened.[10]

Finally, compared to intramuscular group II, the mean duration of I stage labour is significantly shortened in group I (p=0.0005).

Mean duration of III stage of labour in the present group I was 7.9 min and 7.5 min in the group II. This confirms that epidural analgesia does not affect III stage of labour. This is in accordance with the study by Genc et al.[7]

In group I, mean total duration of labour is significantly shortened as compared to mean total duration of labour in Impey et al study and it is 333±176 min.[6] In group II, total duration of labour is shortened (261±61.38 min) as compared to study by Thakur et al which have the total duration of labour is 283.45±168.5 min.[9] But it is significantly larger compared to study by Jyothi et al (187.4±61.49 min) because of programmed labour.[10]

In the present study, total duration of labour is shortened by 47 min in group I compared to group II, which is statistically significant (p<0.001). This is in accordance with the study by Rogers et al.[11] From the above observation it is inferred that the duration of I stage is shortened by allaying maternal anxiety and enabling augmented cervical dilatation.

The duration of II stage is also not prolonged by preventing motor blockade. The duration of III stage is not affected by epidural analgesia and therefore the total duration of labour is shortened.

Long et al conducted a study in which study 2nd stage was longer (67±51) min.[12] Outcome of labour was not significantly affected and incidence of caesarean section was not increased by the use of tramadol (intravenously or epidurally). Normal delivery occurred in 93.33% of the women in intravenous group, in 86.67% of the women in epidural group and in 90% of the women in control group which was similar to that of our study in which vaginal delivery occurred in 84% in group I and 78% in group II.

Desai et al reported 9.41% caesarean section rate in women of epidural group while in our study the rate of caesarean section was 2% in group I and 6% in group II.[13]

Nagaria et al concluded that tramadol is an effective and safe labour analgesic, producing moderate to satisfactory analgesia.[14] Besides it also significantly shortens the duration of labour (p<0.05). Our study is not in consonance with their study as patients receiving epidural analgesia had shorter duration of labor in our study.

Our study is similar to the study conducted by Rogers et al who reported that early epidural placement did not affect lengths of labour or caesarean rates and was actually associated with shorter labour compared with late epidural placement.[11] Women managed actively in labour, regardless of timing of epidural placement, had shorter labours than controls.[7]

Sarkar et al conducted a prospective study of IM tramadol hydrochloride patients with dysfunctional labour and normal labour. The results were compared with pethidine. Antinociceptive efficacy of tramadol hydrochloride was found comparable to pethidine. The incidence of FD, duration of labour and incidence of CS was less in group II.[15]

Jyothi et al evaluated the various effects of programmed labour protocol on normal nulliparous and their neonates. Duration of all stages of labour reduced. They concluded that programmed labour protocol provides effective labour analgesia, augments the process of labour and significantly reduces third stage blood loss without adversely affecting the fetus.[16]

Rao et al determined obstetric outcome in terms of duration of labour and mode of delivery with walking epidural containing combination of low dose bupivacaine plus tramadol and concluded that ambulatory epidural analgesia reduces the duration of labour.[17] This study was similar to our study which concluded that epidural analgesia reduces the duration of labor.

CONCLUSION

Epidural analgesia during labour is a simple and effective method for painless and safe delivery. Analgesia produced by epidural route is significantly more effective than intramuscular tramadol. Epidural analgesia has favourable effect on the progress of labour. In developing nations where availability of facilities is the main limiting factor, intramuscular tramadol which is a safe and satisfactory drug for relief of labour pain, can be considered as a suitable alternative.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Rudra A. Pain relief in labour. Update in Anaesthesia. 2004;18(3):6-11.

2. Arulkumaran SS, Rathnam SS, Bhaskar Rao K. Management of labour. 2nd edition. Chapter 3. Orient Longman Publication. 2004;53-6.
3. Jain S, Agra V, Gopala S, Jain V. Analgesic efficacy of i.m. opioids versus epidural analgesia in labour. Indian J Obstet Gynecol. 2003;83(1):19-27.
4. Genc M, Sahin N, Maral J, Celik E, Kar AA, Usar P, et al. Does bupivacaine and fentanyl combination for epidural analgesia shorten the duration of labour? J Obstet Gynaecol. 2015;35(7):672-5.
5. Viegar OAC, Benny Khaw, Ratnam SS. Tramadol in labour pain in primiparous patients – A prospective comparative clinical trial. EJ Obst Gynec Repord Biol. 1993;49:131-5.
6. Impey L, MacQillan K, Rockson M. Epidural analgesia need not increase operative delivery rates. Am J Obstet Gynaecol. 2000;182(2):358-63.
7. Lee TSL, Leang T. Pain relief in labour. In: The management of labour. Arulkumaran SS, Rathnam SS, Bhaskar Rao K, editors. 2nd edition. Orient Longman Publication. 2005;53-6.
8. Lurie S, Matzkel A. Epidural anesthesia shortens of labour in single ton vertex presentasion spontaneous delivery. Asia-Oceania J Obstet Gynaecol. 1991;17:944-50.
9. Rathna T, Rekha P. Comparative study of transcutaneous electrical nerve stimulation (TENS) and tramadol hydrochloride for pain relief in labour. J Obstet Gynecol India. 2004;54(4):346-50.
10. Meena J, Singhal P, Choudary D. Programmed labour. IJOG. 2006;56(1):53-5.
11. Rogers, Rebecca, Gilson, George MD, Kammerer-Doak, Dorthy MD. Epidural analgesia and active management of labour: Effects on length of labour and mode of delivery. Obstetric Gynecol. 1999;93(6):995-8.
12. Long J, Yue Y. Patient controlled intravenous analgesia with tramadol for labor pain relief. Chin Med J (Engl). 2003;116:1752-5.
13. Desai P, Patel P, Gupta A. Epidural analgesia in labor. J Obstet Gynaecol India. 2006;56:417-22.
14. Tripti N, Jyotsna A. Pain relief in labour – Tramadol versus pentazocine. IJOG. 2006;56(5):406-9.
15. Sarkar B, Mukhopadhyay AK. Tramadol hydrochloride in dysfunctional labour, a clinical trial. J Obstet Gynaecol India. 1997;47(1):42-7.
16. Meena J, Singhal P, Choudary D. Programmed labour. IJOG. 2006;56(1):53-5.
17. Rao ZA, Ehsan-Ul-Haq M, Ali L. Evaluation of the analgesic and adverse effects of tramadol in combination with low dose bupivacaine for painless epidural delivery. Pak Armed Forces Med J. 2010;60(3):415-9.

Cite this article as: Basit S, Khan N, Bano A. A comparative study of intrapartum epidural analgesia with intramuscular tramadol on labor outcome. Int J Reprod Contracept Obstet Gynecol 2024;13:930-4.