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Comparison of Methods of Pain Relief during Labour: Epidural Analgesia, Intravenous Tramadol and TENS.

Atul Kumar Singh[1], Deepika Tiwari[2], Neha Verma[3]

[1]Assistant Professor, Department of Anaesthesia, Govt. Doon Medical College, Dehradun.
[2]Senior Resident, Department of Anaesthesia, Govt. Doon Medical College, Dehradun.
[3]Junior Resident, Department of Anaesthesia, Govt. Doon Medical College, Dehradun.

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ABSTRACT

Background: Childbirth is a painful practice for nearly all women. The pain experienced during labour has various physiological and psychosocial measurements and its strength can vary greatly from one woman to another. The aim of this study is to compare the efficacy, safety and adverse effects of epidural analgesia, tramadol and TENS in pain relief, mode of delivery and neonatal outcome. **Methods**: A total of 160 cases were studied. They included primi- as well as multigravidae, belonging to ASA grade 1 and 2 between the ages of 18-35 years, 37-41 weeks of pregnancy were selected. They were in established active stage of labor (uterine contraction 3 per 10 minutes, lasting for 30 to 40 seconds, cervical dilation more than 3 cm and up to 5 cm and cervical effacement more than or equal to 60%) with singleton fetus presenting by vertex and agreeable for analgesia. The selected patients were divided into four groups of Group I (control group, n=40), labour was carried out without using any analgesic technique, Group II (pidural Group, n=40) – Inj. bupivacaine 0.25% was given epidurally for analgesia, Group III (Tramadol Group, n=40) – Inj. Tramadol was given intravenously for analgesia, Group IV (TENS group, n=40) – TENS electrodes were applied as the initial choice of pain relief. **Results:** From the observations gathered from this study, this can concluded that epidural analgesia provides much better analgesia than non-conventional methods of analgesia during labour. **Conclusion**: Tramadol and TENS have also a fair to good role in pain relief in labour, but mainly in first stage of labour when the pain is not severe enough.

Keywords: Epidural Analgesia, Intravenous Tramadol, TENS.

INTRODUCTION

Childbirth is a painful practice for nearly all women. The pain experienced during labour has various physiological and psychosocial measurements and its strength can vary greatly from one woman to another.[1] The cause effect relationship in labour pain does not always correspond to a clinical response; what matters is to understand the pain felt by the pregnant woman and to offer pain release.[2]

Name & Address of Corresponding Author
Dr. Atul Kumar Singh
Assistant Professor,
Dept. of Anaesthesia,
Government Doon Medical College, Dehradun.

Pain management during labour is an essential part of good obstetric care. An ideal analgesic in obstetrics should have potent opiate like analgesic efficacy and possess minimal side effects. Psychological methods of pain relief in labor are time consuming, relief unpredictable, inconsistent, and incomplete. Physical methods like transcutaneous electric nerve stimulation, subcutaneous sterile water injection to the lower back, provides limited pain relief.[3] Different anaesthetic techniques had been performed to relief labour pain. An epidural anaesthesia technique allows the patient to be fully awake and participating in all aspects of the birthing process. Epidural anaesthesia along with a skilled anaesthetist, a faithful obstetrician and a trained midwife can convert the painful labor into a less stressful event.[4] Epidural anesthesia is most frequently used method of pain control. It is reliable and preferred method of anaesthesia for 60% hospitalized women in developed countries. Epidural analgesia is associated with prolonged labour, which might in turn leads to assisted vaginal birth. However, there may be situations where either it is not available or it is not feasible.[5] Parenteral opioids, thus, are still popular for pain relief in labour in many countries throughout the world. Tramadol is a synthetic analogue of codeine and is a centrally acting agent. Studies have shown that tramadol is an effective analgesic without the maternal and neonatal respiratory depression common to other opioids.[6] Tramadol can be used as labour with minimum cost and less training as compared to the proven epidural analgesia that requires trained staff and equipment and has higher cost. It also avoids the side effects

associated with epidural analgesia like fetal heart rate changes, urinary retention, delayed pushing, and a prolonged second stage of labor.[9] Transcutaneous electrical nerve stimulation (TENS) is a non-pharmacological method for relieving pain. It has been used to relieve both acute and chronic pain in a variety of settings, and for a range of conditions including dysmenorrhoea (period pain) and back pain.[10] TENS has been used in childbirth since the 1970s . TENS aims to reduce pain in labour. TENS can be used alone or in combination with other non-pharmacological and pharmacological methods of pain relief. Proponents of the therapy argue that it reduces maternal distress and potentially reduces the duration of labour and the need for more invasive co-intervention. On the other hand, if TENS is not effective, it may increase maternal distress by delaying the use of more effective intervention. The aim of this study is to compare the efficacy, safety and adverse effects of epidural analgesia, tramadol and TENS in pain relief, mode of delivery and neonatal outcome.

MATERIALS AND METHODS

The present study was conducted in the Department of Obstetrics and Gynaecology, Doon Medical College, Dehradun. The cases were selected from the patients attending Antenatal Clinic and Labour room, Department of Obstetrics, Doon Medical College, Dehradun.

A total of 160 cases were studied between the time period April , 2016 to October, 2016. They included primi- as well as multigravidae, belonging to ASA grade 1 and 2 between the ages of 18-35 years. One hundred sixty pregnant women with 37-41 weeks of pregnancy were selected. They were in established active stage of labor (uterine contraction 3 per 10 minutes, lasting for 30 to 40 seconds , cervical dilation more than 3 cm and up to 5 cm and cervical effacement more than or equal to 60%) with singleton fetus presenting by vertex and agreeable for analgesia. Women with abnormal presentations, cephalopelvic disproportion, previous caesarean section, antepartum hemorrhage, any medical complications (diabetes, asthma, pulmonary hypertension, hypertensive disorders of pregnancy, laboratory contraindications to epidural catheter insertion or history of allergy to any opioid or hypersensitivity to drug) or any electrical device fitted to patient (like pacemaker) were excluded from the study.

All patients were carefully interrogated and their name, age, parity, address, socioeconomic status, educational status was noted. Antenatal clinic records were checked, if present. All the procedures and possible risks and complications were explained to the patients and their relatives and informed consent was taken.

All patients were informed about the methods of analgesia available. They were free to decide the first choice of analgesia and also the rescue analgesia method. Information about the study and its aim was then given to all potential participants and then patients were enrolled in their specific group of choice.

Invariably, selection of TENS by patients was made following a simple explanation of the mechanics of the method to those who had not decided on any of the other specific method of analgesia available. Patients were assured that they would be instructed in its use until confident: that the use of TENS did not preclude the use of additional analgesia..

The Study Groups

The selected 160 patients were divided into four groups of 40 parturients of each

Group I (control group)- Consisted labour was carried out without using any analgesic technique.

Group II (Epidural Group) – Inj. bupivacaine 0.25% was given epidurally for analgesia.

Group III (Tramadol Group) – Inj. Tramadol was given intravenously for analgesia.

Group IV (TENS group) – TENS electrodes were applied as the initial choice of pain relief.

Methodology

All labours, including analgesia and its administration, were attended by the regular labour ward midwives and medical personnel in the usual manner.

Group II (Epidural): **Technique of Lumbar Epidural Block;** Before the procedure, pulse, blood pressure, respiration, uterine contractions and dilatation of cervix and fetal heart rate were checked and recorded. Preloading with 500 ml of Ringer Lactate solution was done in every patient. Patients were asked to lie in left lateral position. Taking all aseptic pre-cautions, skin at puncture site was anaesthetized with local anaesthetic. Epidural space was identified in the L2-3 or L3-4 intervertebral space with the help of Tuohy's needle using the "loss of resistance" technique. Aspiration was done to check for CSF or blood. Then an epidural catheter was inserted through the epidural needle and advanced. Once the point of catheter was beyond the needle, it was advanced to about 3-5 cm. The catheter was aspirated for blood and CSF. Initial injection of 1 ml of lignocaine (2%) with adrenaline was given as test dose and if in 5 min., there was no evidence of intradural block, e.g., inability to move the feet or any tingling sensations, or sign of possible intravenous injection i.e. tachycardia, it was as-certained that catheter was in epidural space, needle was gently removed and the catheter was fixed in front of the shoulder and the patient was made to lie down on her back. Thereafter, the patient was managed according to the group allocated.

After making the patient comfortable in supine position, therapeutic dose of 10 ml of 0.25% inj. Bupivacaine was injected slowly through the epidural catheter. The patient was observed constantly and her blood pressure, pulse and respiration measured and recorded every 1-2 minutes. The patient was made comfortable and reassured. If the systolic blood pressure dropped below 100 mmHg in normotensive patients, or if it dropped more than 20 percent in hypertensive patients, prompt therapy was instituted. Having the patient turned on her side was usually sufficient to restore blood pressure to normal included: (1) Using the modified Trendelenburg's position to enhance venous return; (2) administration of oxygen; (3) rapid intravenous infusion of Ringer Lactate solution, or colloid; (4) vasopressor (inj Ephedrine – 7.5 mg i.v. increments).

If analgesia was present, but not sufficiently extensive, reinjection was carried out 20 minutes after the first injection. Volume of the repeated dose was increased above the original as the situation demanded, keeping the total amount of drug injected below the maximum limit. After the analgesia developed, regular monitoring and recording of the various parameters was done. Whenever required top-up with bupivacaine was done.

Top-up doses – as soon as patient started to perceive the pain, 10 ml of 0.125% bupivacaine was given through the epidural catheter. Catheter was aspirated for blood and CSF before each top-up dose. Monitoring and recording of the patient's vital parameters , effect on labour and pain fetal condition were noted regularly. If perineal anaesthesia was required, 10-15 ml lidocaine 1.0- 2% was administered. After delivery, catheter was removed and ensured that the tip of the catheter was removed and ensured that the tip of the catheter was removed intact. The puncture site was sealed with tincture benzoin sterile pad.

Group III (Tramadol): after recording the baseline parameters, inj. Tramadol hydrochloride 100 mg diluted in 10 ml of normal saline was given intravenously over 40-60 sec. For maintaining analgesia,, continuous infusion of Inj. Tramadol 200 mg in 500 ml of 5% Dextrose was used and drip rate adjusted according to the patients response (10-12 drops/min or 30 ml/hr). Monitoring and recording of the patient's vital parameters, effect on labour and pain and fetal condition was done regularly. Whenever requested for additional analgesia, therapeutic dose of Bupivacaine was given in the usual method as described for group II patients and was monitored carefully.

Group IV (TENS): for those choosing TENS, two pairs of carbon rubber electrodes were placed on either side of the spine the electrodes were sited (1) dorsally from T10-L1 and (2) from S2 to S4 approximately 5 cm from the midline. These were attached to a dual channel TENS capable of generating current of maximum 60 mA and a maximum frequency of 100 Hz. This was set initially with a pulse repetition rate of 5-6 (80-100 pulses per second). Following instructions, the woman was allowed to adjust the amplitude settings commencing with a 5-10 mA on each channel, increasing gradually as contractions gained momentum to higher amplitudes and density. Patients vital parameters, effect on labour and pain and fetal condition were monitored and recorded regularly. Whenever requested for additional analgesia, therapeutic dose of bupivacaine was given in the usual method as described for group II patients and was monitored carefully.

All the patients were given injection oxytocin 20 units in 500 ml IV drip immediately after delivery of anterior shoulder of the baby, if not contraindicated.

Data Collection

Record of each case was maintained as follows:-

A note was made of the initial choice of analgesia, when first administered in relation to onset of labour and dilatation of the cervix and the initial pain concept.

(A) **During Labour with Initial Choice of analgesia in use :**

The following parameters were monitored at specific time interval –

Time of onset, degree and duration of pain relief

Blood pressure

Pulse rate

Fetal heart rate

Progress of labour was assessed by monitoring-

- Uterine contractions
- Cervical dilatation
- Descent of head
- Duration of labour

Use of any other form of analgesia

(B) **Delivery :-**

Mode of delivery, Use of Oxytocin, APGAR score of newborn at 1 min and 5 min., weight of the baby. Amount of bleeding in third stage.

(C) **Post delivery** :-

1 hr and 24 hr post delivery, the woman was asked for her comments regarding the form of analgesia chosen during the labour. She was questioned particularly about pain relief, site of pain relief and any other positive or negative comments she might have about the method she had chosen. She was also asked if she would request the same form of analgesia again.

Criteria to assess pain intensity during labour: (Gaston et al, 1984)

0 = No pain
1 = Slight pain (not troublesome)
2 = Moderate pain (troublesome but bearable)
3 = Strong pain (very troublesome)
4 = very sever pain (unbearable)

The pain relief was rated as: **(Gaston et al.)**
0 = No relief (Nil)
1 = Slight relief (Poor)
2 = moderate relief (fair)
3 = Almost complete relief (Good)
4 = Complete relief (excellent)

Assessment of newborn babies: was done by **APGAR** scoring at 1 minute and 5 minute after delivery.
Interpretation of APGAR score:
Score 8 – 10: Excellent condition
Score 5-7: Moderate depression
Score < 5: Severe asphyxia

Data Processing
Chi – square test: was used to test the significance of 2 proportions each having more than 1 group.

Student 't' test: was used to test the significance of difference between mean of one sample with an externally determined mean.

Paired t-test: was used for comparing means in paired data.

RESULTS & DISCUSSION

Labour is a painful process in most women and in a substantial number of patients, the pain is far in excess of their expectation and normal experience of pain. In many, it might be the most painful event in their lives. However, pain is a subjective phenomenon, virtually impossible to quantify, and can be affected by many psychological processes such as preconditioning, psychological attitudes ad traditional practices.

The ideal method of pain relief for use during labour ought to be efficacious, simple to administer and have no side effects on the mother or child. Greater suitability of one over the other depends mainly on the requirements of individual case and the facilities available.
In Lumbar Epidural Analgesia, the conduction of pain is blocked by the direct action of local anaesthetic on nerve fibers in the extradural space following penetration of the dura from T10 onwards.
Tramadol is a sympathetic analogue of codeine that binds to mu-opiate receptors and probably work directly on the central nervous system.
TENS acts as analgesic either by blocking pain impulses to the brain by increasing A-fiber transmission or by stimulating local release of endorphins.
Hence, this study was conducted upon a total of 160 primi- as well as multigravida patients belonging to ASA grade I and II between the ages of 18-35 years with the objective of evaluating the three analgesic techniques with respect to their effect on labour pain and also on the mother and the fetus during the labour and its outcome.
The analysis of observations made during labour without any analgesia and with different analgesic techniques revealed following facts.

Demographic Data:
As shown in [Table 1 and 2], the demographic data like age, and educational status were not found to be statistically significant (*p>0.05)* among the groups indicating that they did not affect the patients for deciding the initial choice of method of analgesia.

Patient Characteristics:
There was no statistically significant difference in the mean parity (*p > 0.05)* of patients among different groups and were 1.77, 1.71, 1.82 and 1.67 in groups I,II, III and IV, respectively [Table 3].
More than 50% patients in both primigravidae and multigravidae groups had complaints of both low back and suprapubic pain in early labour at the time of administration of analgesia and it was not significantly different among the groups.

Table 1: Distribution of patients according to Age (in years).

Age of Patient (yrs)	Group I (Control)		Group II (Epidural)		Group III (Tramadol)		Group IV (TENS)		Total	
	Primi	Multi	Primi	Multi	Primi	Multi	Primi	Multi	Primi	Multi
18-21	6	1	8	0	5	1	4	0	23	2
22-25	10	8	12	10	9	11	14	7	45	36
26-29	2	10	1	7	2	11	3	9	8	37
30-35	0	3	0	2	0	1	1	2	1	8
Total	18	22	21	19	16	24	22	18	77	83
	40		40		40		40		160	
Mean Age (yrs)	22.83	26.94	22.38	26.10	22.68	25.45	23.45	26.83	22.85	26.29
S.D.	±2.35	±2.95	±1.96	±2.92	±1.99	±2.50	±2.38	±2.64		

Table 2: Distribution of patients according to educational status.

Educational Status	Group I (Control)	Group II (Epidural)	Group III (Tramadol)	Group IV (TENS)	Total

	Primi	Multi	Primi	Multi	Primi	Multi	Primi	Multi	Primi	Multi
Nil	1	2	0	1	2	1	0	0	3	4
Primary	4	5	5	3	4	5	3	3	16	16
High School	6	9	7	7	4	9	9	7	26	32
Higher	7	6	9	8	6	9	10	8	32	31
Total	18	22	21	19	16	24	22	18	77	83
	40		40		40		40		160	

Table 3: Distribution of Patients According to Parity.

Parity	Group I (Control)	Group II (Epidural)	Group III (Tramadol)	Group IV (TENS)	Total
1	18	21	16	22	77
2	14	12	16	10	52
3	7	5	7	7	26
4	1	2	1	1	5
Total	40	40	40	40	160
Mean parity	1.77	1.71	1.82	1.67	1.74
S.D.	±0.91	±0.93	±0.87	±0.81	±0.90

About 70 % patients had severe to almost unbearable pain in the first stage of labour before the analgesia was instituted and was not significantly different among the groups.

Effects of analgesic technique:

Cardiovascular Effects

In group II (epidural), there was consistent but modest drop in blood pressure starting about 10 minutes after injecting the initial therapeutic dose of the drug, with corresponding increase in heart rate.

The fall in systolic, diastolic and mean blood pressures was maximum after about 30 min. of initial dose. The average maximum decrease in systolic, diastolic and mean blood pressure were 8.48, 5.811 and 6.98 mmhg, respectively in primigravida and were 8.10, 5.52 and 6.67 mmHg, respectively in multigravida patients. Thereafter, the blood pressure returned towards baseline values. These changes were significant ($p<0.05$).

The increase in heart rate in group I was maximum at about 30 min. and average increase in primigravida and multigravida patient were 14.96 beats and 13.5 beats per minute, respectively. These changes in heart rate were significant ($p>0.05$).

Above findings were consistent with the works of Ward et al. who note similar trends in blood pressure and heart rate following epidural anaesthesia and concluded that this was due to more gradual onset of sympathetic blockade following epidural anaesthesia of approximately 20-30 minutes, particularly with Bupivacaine.

In-group III (tramadol), there were slight decrease in blood pressure with compensatory increase in heart rate, observed in both primigravida and multigravida patients. However, these changes were statistically *not* significant ($p > 0.05$).

The hemodynamic effects of tramadol are minimal and are only pronounced at higher doses particularly in patients with uncompromised cardiovascular functions. These effects are secondary to vasodilatation due to direct action decreasing the tone of blood vessels and depression of vasomotor center.

In Group IV (TENS), no significant changes in cardiovascular effects were observed ($p> 0.05$). The findings were consistent with those of Budsen et al.[9] and Harrison et al[10]. Who also noted no significant changes in hemodynamics with TENS analgesia.

The insignificant increase observed in the control and TENS group was probably pain induced.

Effect on Uterine Activity

In the present study, uterine contractions were judged by abdominal palpitation.

Normal labour is characterized by a progressive increase in myometrial contractility with increase in duration and frequency of contractions. Similar findings were observed in group I (control).

In group II (epidural), there was slight decrease in mean duration of uterine contractions which was maximum at 30 minutes (mean decrease of 2.72 seconds in primigravida and 3.12 seconds in multigravida) and also in mean frequency of contractions which was maximum at 30 minutes (mean decrease in frequency of 1.62 contraction/10 minutes in primigraviida and 1.75 contractions/10 minutes in multigravida). However, these changes were significant ($p>0.05$).

These findings were consistent with those of Vasicka et al. [11] who also noted that immediately following injection of a therapeutic dose of local anaesthetic, the intensity of uterine contractions almost consistently decreased 10 to 20 mmHg. They concluded that epidural block has no effect on uterine contractions or on course of labour as long as maternal blood pressure is maintained within normal limits. Ruppert also noted similar effects.

In-group III (tramadol), there was no significant effect ($p>0.05$) on uterine contractions either in terms of duration of contractions or frequency of contractions. Jain et al[12] also had similar observations of insignificant effect of tramadol on uterine contractions. The action of tramadol on

uterus is clinically insignificant; labour may be prolonged.
In group IV(TENS), there was no significant effect (p>0.05) on uterine contractions. Budsen et al.[9] and Harrison et al [10]. Also noticed no significant effect on uterine contractility.

Effect on Fetal Heart Rate
In group II (epidural), there was maximum increase in mean fetal heart rate of about 2.8 beats per minute after 30 minute. Of epidural analgesia in primigravida patients and from 142.6 to 145.3 beats per minute in multigravida patients. This was statistically not significant (p > 0.05).
Epidural block is likely to be associated with neonatal depression if it produces severe persistent maternal hypotension or hypertension, a toxic reaction, or other maternal complications, which interfere with ventilation, circulation, or placental perfusion. Vasicka et al.[11] noted that mild hypotension produced by epidural anaesthesia was associated with an increase in fetal heart rate, but no fluctuations. However, severe hypotension was frequently associated with changes in fetal heart rate, usually tachycardia, followed by bradycardia, which is considered an indication of fetal distress. Hypertension, produced by vasopressors given to the mother for treatment of severe hypotension caused by epidural block, also resulted in marked changes in fetal heart rate, but no evidence of deleterious effects on newborn. In present study, no such event was noticed.
In Group III (Tramadol), maximum increase in mean fetal heart rate observed was of about 2.1 beats per minute from 142.5 to 145.6 /min in primigravida patients and 141.5 to 143.6/min in multigravida patients after 1 hour of starting intravenous tramadol. This was also not significant (p > 0.05). Keskin et al[13] noticed no significant changes in fetal heart rate in patients given intravenous tramadol for pain relief during labour.
In group IV (TENS), there was slight decrease in mean fetal heart rate which was maximum after 1 hour. This decrease in FHR of 145.2 to 144.3/ min in primigravida patients and a 143.8 to 142.5 /minute in multigravida patients. This was not significant (p>0.05). Budsen et al.[9] and Harrison et al [10] also noticed no significant changes in fetal heart rate in patients given analgesia with TENS. However, they only noticed problem in simultaneous electronic monitoring of fetal heart rate.

Analgesic Effect
On low back pain (in first stage)
In group II (epidural), 16 (76.2%) primigravida and 15 (78.9%) multigravida patient experienced excellent relief of low back pain, while 4 (19.0%) primi- and 3 (15.8%) multigravida experienced good relief. Budsen et al.[9] also observed the effect of epidural analgesia on low back pain and noted that 92% parturients experienced good relief, 6% had moderate relief and 2% had no relief of low back pain in first stage of labour with epidural analgesia.
In group III (tramadol) patients, 2 (12.5%) primigravidae and 3 (12.5%) multigravidae experienced excellent relief, 4 (25%) primigravida and 6 (25%) multigravidae experienced good relief. Only 1 (4.7%) primi-gravidae experienced fair and 1 (5.3%) multigravida complaint of poor relief. Budsen et al.[9] also observed the effect of epidural analgesia on low back pain and notes that 92% parturients experienced good relief, 6 % had moderate relief and 2 % had no relief of low back pain in first stage of labour with epidural analgesia.
In group IV (TENS) patients, 4 (18.2%) primigravida and 4 (22.2%) mutigravida experienced excellent relief, 8 (36.4 %) primigravida and 7 (38.9%) multigravida experienced good relief, 6(27.3%) primigravida and 5 (27.8%) multigravida said it to be fair for relief of low back pain in first stage of labour. While 2 (9.1%) prmigravida and 1 (5.5%) multigravida patients had poor relief and 2 (9.1%) prmigravida and 1 (5.5%) multigravida had no relief of low back pain with TENS during first stage of labour.

Overall Pain Relief during Labour as Described by the Patient Following Initial Choice of Analgesia [Table 4]
In group I (control), no patient was offered any pain relief method and all of them completed their labour with variable degree of pain as per their threshold.
In group II (epidural), out of 21 primigravidae patients, 16 (76.2%) felt excellent, 4 (19.0%) felt good and 1 (4.7%) felt fair relief of pain. Similarly, out of 19 multigravida, 15 (78.9%) felt excellent, 3 (15.8%) felt good and 1 (5.3%) felt poor relief of pain during the whole process of labour. These results were significant (p< 0.05).
In group III (tramadol), out of 16 primigravida patients, 2 (12.5 %) had excellent, 4 (25.0 %) felt good and 3 (31.5 %) felt only fair relief of labour pain when they opted for tramadol as initial choice of pain relief. But 3 (18.7%) had poor and 2 (12.5 %) felt no relief of pain with tramadol. similarly, out of 24 multigravidae, 3 (12.5%) had excellent, 6 (25.0%) had good relief and 8(37.5%) felt fair relief of labour pain with tramadol, while 4 (16.7%) felt poor and 3 (12.5 %) had no relief of labour pain.
In group IV (TENS), out of 24 primigrvidae, 4(18.2%) felt excellent relief, 8 (36.4%) felt good relief and 6 (27.3%) had fair relief of labour pain when they opted for TENS as initial method of pain relief
These results clearly show the superiority of lumbar epidural block as an analgesic technique for labour pain. These results reflect the efficacy of the methods applied to block the pain transmission from the site of organ of pain to the brain and hence their effect on the pain relief.

Table 4: Overall Pain Relief during Labour As Described By the Patient Following Initial Choice of Analgesia.

Pain Relief	Group I (Control)		Group II (Epidural)		Group III (Tramadol)		Group IV (TENS)	
	Primi	Multi	Primi	Multi	Primi	Multi	Primi	Multi
Excellent			16	15	0	1	0	0
Good			4	3	1	2	7	4
Fair			1	0	6	8	8	8
Poor			0	1	4	6	5	3
Nil	18	22	0	0	5	7	2	3
Total	18	22	21	19	16	24	22	18
	40		40		40		40	

Need For Additional Analgesia (As Epidural Analgesia) With Nlgesia of Initial Choice (In Group III and IV)

In group III (tramadol**)**, out of 16 primigravidae, 5 (31.5%) requested for additional analgesia at 6-8 cm cervical dilatation stage of labour and 9% (56.5%) at 8-10 cm cervical dilatation stage. In group IV (TENS**)**, out of 22 primigravidae, 5 (22.7%) patients requested at 6-8 cm cervical dilation stage and 14(63.6%) requested at 8-10 cm cervical dilatation stage off labour for additional analgesia to complete the labour process. The results were statistically significant ($p<0.05$).

These results clearly shows that though tramadol and TENS are quite for pain relief during labour particularly the mild to moderate pain associated with the first stage of labour which is mainly felt in cutaneous distribution along the back and suprapubic region and is referred pain. While the pain during the late first stage and second stage is predominantly abdominal pain and is more severe and is not relieved by TENS and tramadol. This suggests that the relief of abdominal pain is of greater importance for the total experience of pain relief during the labour and is better relieved by epidural block.

Effect on labour and delivery

Duration of labour

The onset of labour starts with the appearance of true labour pains, which are intermittent painful contractions. The total duration of labour was considered as the duration form onset of labour apins to the delivery of the baby.

In group I (control**)**, the mean duration of labour was 8.3+_ 3.1 hours for primigravidae and 6.9 +-2.9 hours for mulitgraida.

In group II (epidural**),** the total duration of labour being 9.2 hours in primigravidae having epidural analgesia as initial choice of pain relieving method. The total duration of labour being 7.6 hours in multigravida having epidural analgesia as initial choice of pain relieving method.

In patients receiving either no analgesia or tramadol or TENS alone as initial choice of pain relieving method had shorter durations of labour compared with those having either epidural analgesia as initial choice or using as additional analgesia. Those using it as additional analgesia (in late phase of labour compared to those having it early in labour) had slightly shorter labours. However, the results are not significant ($p<0.05$).

Duration of Delivery

The findings suggest that neither tramadol nor TENS had any significant effect on the uterine function so as to affect the labour outcome. Moreover, the epidural analgesia with bupivacaine in such low doses only blocks sensory pathways and not causes the motor blockade sufficient enough to alter the uterine or other muscle tones to affect the labour outcome.

Neonatal Outcome

There was no significant difference in APGAR scores of babies delivered to either primigravida or multigravida using any form of analgesia and delivered by any technique.

No degree of neonatal sedation was observed in either of the three analgesia technique.

These findings were consistent with many workers (Budsen et al[9] , Harrison et al[10], Jain et al[12], Keskin et al[13].)Thus, from the observations gathered from this study, this can concluded that epidural analgesia provides much better analgesia than non-conventional methods of analgesia during labour. Tramadol and TENS have also a fair to good role in pain relief in labour, but mainly in first stage of labour when the pain is not severe enough.

Therefore, where the necessary skilled staffs are constantly available and the patients consent for invasive procedure, the lumbar epidural technique is the technique of choice for pain relief during labour.

But where the necessary skilled staff and resuscitation facilities are constantly not available, or the patients fears of invasive procedures or the patient is in early labour and had to travel distance for skilled procedural care, TENS is a better alternative for pain relief during labour.

CONCLUSION

The present study was conducted to evaluate and compare the effects of conventional (Lumbar epidural analgesia technique) and non-conventional (intravenous tramadol and TENS) methods for pain relief during labour, on 160 parturients in Doon

Medical College, Dehradun and following conclusions were drawn :

1) There was no appreciable relationship of age, parity or educational status with the choice of method for pain relief of labour, as far as the patient had no previous knowledge about the analgesic method.
2) Though the lumbar epidural analgesia might have significant effects on the mother, careful monitoring and timely intervention could effectively prevent any serious complication, and so this technique required trained medical personnel for successful analgesia.
3) Intravenous tramadol might have respiratory depressant effects, but no such incidence occurred in this study. TENS had been found to have no risk and as such it could easily be operated by the parturient herself without any supervision.
4) In addition to the effects of the drugs (bupivacaine or tramadol) might have on the mother, they might cross the placental barrier and affect the fetus directly. However, significant effect on the mother and fetus by such low doses does not occur.
5) This study also shows slight prolongation of labour with epidural analgesia when used alone or when used to supplement the other methods, but it is insignificant if the technique is properly done.
6) Neither of the three techniques were found to be associated with any significant increase in the operative deliveries or instrumental deliveries .
7) The results do confirm the superiority of epidural analgesia as an analgesic agent.
8) Tramadol and TENS had a fair to good role in pain relief in labour, but only in early stage of labour when the pain was not sever enough.
9) Therefore, where the necessary skilled staff are constantly available and the patient consents for invasive procedure, the lumbar epidural analgesia is the technique of choice for pain relief during labour.
10) Where the necessary skilled staff and resuscitation facilities are constantly not available, or the patients fears of invasive procedures or the patient is early labour and had to travel distance for skilled procedure, TENS is a good alternative for pain relief during labour.
11) Machines more specifically designed to cope with the particular qualities of the labour pain may enhance analgesic efficacy and the lack of side effects plus the facility for the patient to remain ambulant for the greater part of labour suggests TENS to have the potential to play a major role in the future of analgesia in labour.

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