"EVALUATION OF THE MATERNAL AND FETAL OUTCOME IN PROGRAMMED LABOUR"

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CERTIFICATE

This is to certify that this dissertation entitled ***"EVALUATION OF THE MATERNAL AND FETAL OUTCOME IN PROGRAMMED LABOUR"*** submitted by **Dr. D. SUNITHA** to the faculty of Obstetrics and Gynaecology, The Tamil Nadu Dr. M.G.R. Medical University, Chennai in partial fulfilment of the requirement for the award of MD degree Branch II (Obstetrics and Gynaecology.) is a bonafide research work carried out by her under our direct supervision and guidance.

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CONTENTS

INTRODUCTION

It's never the fear of bringing a new life into the world that frightens a woman; it is the fear of the pain she has to endure to do it.

The distress and agony which women endure during labour is immense and beyond description. The pain felt during labour increases in intensity along the course of labour. As reported on the Mc Gill pain questionnaire labour pain is one of the most intense pains a woman can expect. A study of women in the first stage of labour reported that 60% of primiparous women described the pain of uterine contractions as being "unbearable, intolerable, extremely severe and excruciating".

Many factors have an effect on the degree of pain experienced by woman during labour including psychological preparation, emotional support during labour, past experiences, patient expectation of birthing procedure and augmentation of labour with oxytocin. Read et al in 1944 suggested that labour pain is in large measure due to emotional stress.

Programmed labour is a protocol developed by researchers over a period of a decade. It incorporates the principles of " Active management of labour ", with systemic administration of drugs for pain relief. The concept of 'Active management of labour" was first advanced by Professor O"Driscoll, Studd, Philpotts and Castle. The key elements in addition to strict diagnostic criteria for labour are early amniotomy, use of oxytocics to optimize pain, judicious use of analgesics and continuous professional support.

Synergistic application of analgesics and antispasmodics during the active phase of labour curtails prolonged labour and provides a more comfortable and relatively pain free labour experience for the mother.

AIMS OF STUDY

The study was done to assess the safety and efficacy of programmed labour protocol. The aims of the study were

1. *To study the degree of analgesia during the period of labour.*

2. *To assess the effect of programmed labour on the duration of labour.*

3. *To assess the effect of programming labour on neonates.*

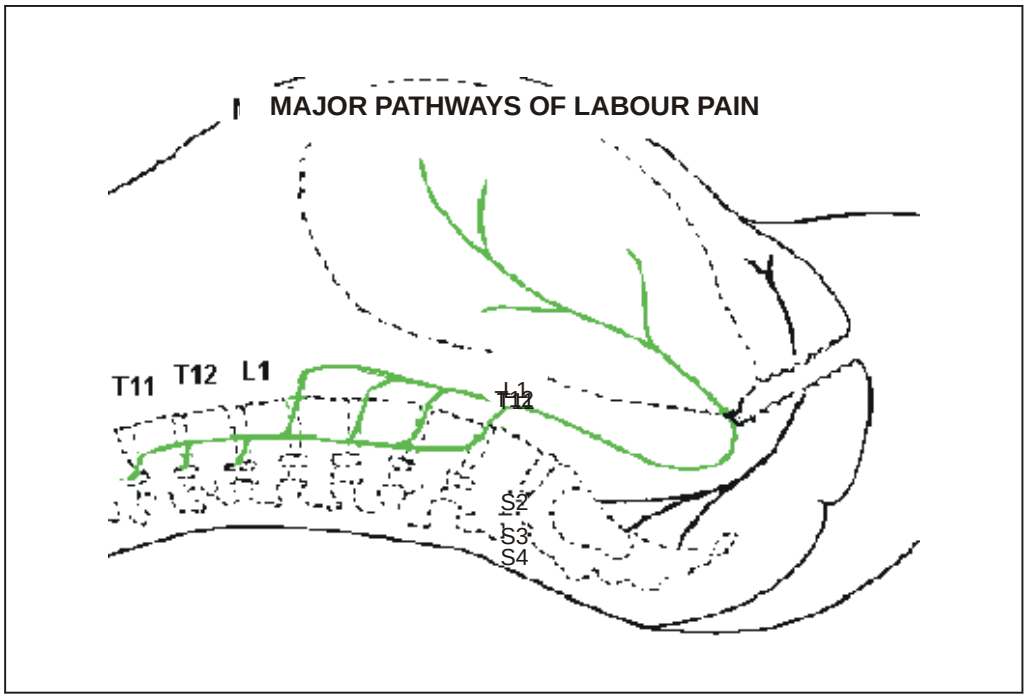
4. *To assess adverse effects of programmed labour, if any, immediate or delayed on maternal and foetal well-being.*

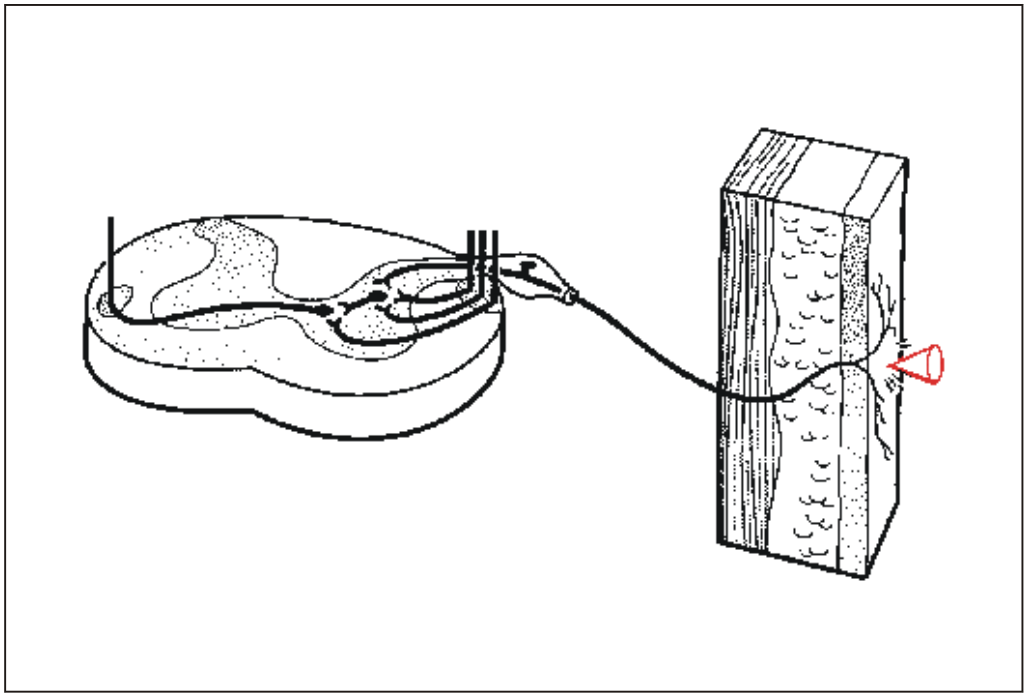
PAIN PATHWAY

Pain in the first stage of labour is generated largely from uterus and is visceral in nature. Sympathetic visceral afferents transmit sensation of pain from the uterus, cervix and upper vagina through the Frakenhauser ganglion, the pelvic plexus, the middle and superior internal iliac plexus into the spinal cord through white rami communicantes associated with T10, T11, T12 and L1. Early in the first stage of labour, pain of uterine contractions is transmitted predominantly through eleventh and twelfth thoracic nerves.

Pain with vaginal delivery is somatic pain arising from stimuli from the lower genital tract. These are transmitted primarily through the pudendal nerve (S 2, 3, 4) which provides sensory innervation to the perineum anus and more medial parts of the vulva and clitoris.

Opinions regarding pain relief during labour invite divergent and widely polarised views. There are protagonists of the “laissez faire” policy of leaving things to nature but the distress felt by labouring women is so intense that there is a definite role for labour analgesia.


MAJOR PATHWAYS OF LABOUR PAIN
T11
T12
L1
L1
T12
S2
S3
S4



ROLE OF PAIN RELIEF

Labour pains may be aggravated by anxiety, fear, maternal expectations and the mother's state of preparation for delivery. As with other forms of visceral pain labour pain stimulates an intense and complex autonomic response. It increases maternal oxygen consumption, cardiac output and circulating catecholamines (Schnider et al 1983). The rise in serum catecholamines may cause fetal tachycardia or bradycardia and dysfunctional uterine contractions. Freedom from pain improves the environment for both mother and foetus and thereby improves obstetric outcome.

For the mother, obstetric analgesia provides relief from pain controls alterations in circulation, ventilation and undue muscular efforts. It ensures better patient cooperation.

For the foetus, labour analgesia means shorter and less traumatic labours, protection against hypoxia and foetal depression at birth, and protection against needless instrumental assisted delivery necessitated by maternal distress.

To the obstetrician, it provides a better control of events emerging the course of labour reduces pressures from the patients and relatives to intervene and ensures optimum condition to prevail at the time of childbirth.

Since time immemorial there have been attempts to reduce the suffering of the labouring woman and from this has evolved several methods of alleviating pain during labour

Non Pharmacological methods for pain relief during labour

These are said to support the natural physiological responses to labour pain, the gate mechanism of pain control and the release of endogenous opioids. (Melzack & Wall 1964)

1. Relaxation / Breathing Techniques / Massage

These forms of pain relief can allay anxiety, encourage relaxation, provide a focus of distraction from pain and tension and encourage a positive attitude.

2. Positioning and Movement

Mobility and the adoption of a position of comfort will be advantageous to the woman. An upright or kneeling position is said to improve the dimensions of the pelvis and encourage forward rotation of the fetus. This may lead to a decrease in the use of regional anaesthesia and analgesics.

3. Temperature Modulation: Hot or Cold packs, Hot or Cold water

Hot packs to the abdomen and back or the perineum in the second stage of labour have the

potential to relieve the burning sensation of pain. For some women the use of extreme cold may be similarly useful.

Hot baths or showers produce a number of beneficial effects including relaxation and increased well-being.

A reduction in pain perception occurs as a result of the stimulation of tactile and thermal receptors by warm water. The response to this is to reduce pain stimulus at the dorsal column “closing the gate” to pain.

4. Transcutaneous Electrical Nerve Stimulation (TENS)

Is thought to work by interrupting pain transmission along the sensory pathway and by stimulating endogenous opioids.

Commonly two electrodes are adhered vertically over the woman’s back parallel to her spine between the areas of T10 down to S4.

The electric current used may be of low frequency and intermittent, or high frequency and continuous.

Low frequency TENS stimulates the release of endogenous opioids while the high frequency current

closes the pain gate. The sensation experienced may be felt as a tingling or as a sharper electric shock sensation. The current can be modified during use

5. Acupuncture

A form of Eastern medicine said to relate to the flow of energy called Qi within the body where needles are inserted along specific pathways or “meridians”.

Its action may be related to stimulating the release of endogenous opioids as well as the transmission of pain stimuli.

Acupressure and Reflexology utilize similar, but distinct techniques.

6. Herbalism and Aromatherapy

These make use of natural plant extracts or essential oils.

These remedies may improve physiological balance, strength and stamina within the mind and body.

Knowledge of specific usage is important, as the use of some of these remedies is contra-indicated in pregnancy and labour, while others may have an adverse effect on the baby if it comes in direct contact with them.

7. Hypnosis

Self-hypnosis and post-hypnotic suggestion can provide an effective form of pain control for suitable subjects.

8. Intradermal Injection

Provide relief of pain and backache by injecting sterile water (0.1-0.5 mls) intradermally, to the lower sacral region

Pharmacological methods for pain relief during labour

1. Systemic Analgesia

Parenteral administration of opiods and sedative hypnotics are a commonly used method of analgesia. Opiod receptors located in cardiac atria are activated by circulating opiods to excite vagal afferents. These in turn activate descending nerve fibres that are inhibitory to pain stimuli thus decreasing the sensation of noxious stimuli. In effect IV opiods produce spinal analgesia without spinal injection.

2. Intravenous PCA.

The use of an intravenous PCA may be of use for women where the placement of an epidural is contraindicated. The total drug requirement to achieve adequate pain relief is usually less using this method than with intramuscular narcotics or a

continuous intravenous infusion. Fentanyl (10mcg/ml) is the drug of choice.

3. Inhalation analgesia.

Nitrous Oxide is used. This is a colourless, odourless gas. Used in higher concentrations it can provide effective pain relief, with the advantage that it's effects are short lived, and there is minimal complications in the neonate. It is obtained by the woman's own respiratory effort via a piped supply.

Analgesia is obtained within 20- 30 seconds of commencement and maximum effect is felt after about 45 seconds.

The use of this form of pain relief is rarely contraindicated.

Self-administration is the recommended method for use as the patient drops the mask/ mouthpiece if she absorbs too much of the gas.

4. Epidural Analgesia.

Epidural analgesia can provide an effective form of pain relief in labour. It may be beneficial for women having a long or painful labour, be required on the grounds of fetal benefit, or administered for maternal or obstetric indications. It may also be provided at maternal request

There are some medical contraindications to its administration.

Complications include hypotension, headache, dural tap and a “patchy” block. Other issues relate to the reduction of motor function and sensation in the woman’s legs and impaired bladder function.

The use of low dose (ropivicaine/ fentanyl) patient controlled epidural analgesia (PCEA) reduces a number of the side effects experienced by the mother, retains the urge to push for the majority of women and reduces the likelihood of an assisted vaginal delivery.

REVIEW OF LITERATURE

A study of literature reveals that there have been various attempts to relieve the labouring woman of her suffering, through various methods, which includes administration of systemic analgesia.

There have been studies on the efficacy of opioid analgesics- tramadol, pentazocine, pethidine, the use of diazepam, and the role of ketamine each used individually or in combination with other drugs.

1. S.N. Daftary et al based on their study on 500 low risk primigravida's concluded that programmed labour protocol shortens duration of labour facilitates cervical dilatation, reduces pain during labour and improves maternal and neonatal outcome and decreases need for obstetric interventions.

2. Chauhan et al conducted a clinical study of programmed labour. Their observation was that programmed labour accelerated the normal course of labour and provided pain relief with no adverse effects on the neonate.

3. Hema Diwakar, Patel concluded after a adopting programmed labour protocol on low risk parturients that duration of labour was

much curtailed, obstetric interventions did not increase and neonatal outcome was satisfactory.

4. Dixit et al in Fogsi Focus 2005 on Indian experiences in programmed labour based on their study concluded that duration of labour is shortened and there is improved maternal and neonatal outcome

5. Cochrane Review by Elbourne D, Wiseman RA, 1998 showed that there was no evidence of a difference between pethidine and tramadol in terms of pain relief, interval to delivery, or instrumental or operative delivery. There appeared to be more adverse effects such as nausea and vomiting and drowsiness with pethidine when compared to Tramadol.
   Maternal satisfaction with pain relief appeared similar for pentazocine and pethidine, with more frequent nausea and vomiting with pethidine

6. Erskine WA et al 1985 in a comparative study between pentazocine and pethidine in self-administered intravenous analgesia during labour concluded that good analgesia was obtained with both drugs, with pentazocine having a decided advantage over pethidine because of its lack of side effects.

7. Wahab SA et al 1988 studied the effect of some recent analgesics- pentazocine, nalbuphine and butarphanol on labor pain and maternal and fetal blood gases and pH. They reported that the studied analgesics caused significant maternal respiratory acidosis and fetal metabolic acidosis. These acidotic changes were most marked with pentazocine, moderate with nalbuphine and minimal with butarphanol.

8. Bitsch M et al 1980 concluded that no adverse side effects were observed with Tramadol concerning the follow-up of labour or the newborn. Tramadol can be recommended for obstetrical analgesia since it does not exert inhibitory effects upon the respiratory center.

9. Viegas OA et al 1993 stated that Tramadol 100 mg is as effective as pethidine 75 mg but has a superior safety profile

10. Lewis KS, et al 1997 concluded that for for labor pain, i.m. Tramadol works as well as meperidine and is less likely to cause neonatal respiratory depression

11. Husslein P et al 1987 conducted a prospective randomized comparative study on Obstetrical analgesia with tramadol-- Based on their study they established that established an analgesic effect of tramadol similar to pethidine but with less side effects.

12. Jain S. et al based on their study on Analgesic efficacy of Intramuscular opioids versus epidural analgesia in labor, concluded that the analgesic efficacy and maternal satisfaction is better with epidural analgesia than with opioids. Analgesia provided by meperidine and tramadol is comparable and approximately 50% of women rated the analgesia as good. Hence in developing nations where availability of facilities is the main limiting factor, Intramuscular opioids can be considered suitable alternatives.

13. Fieni S, et al concluded that Tramadol in accordance to the obtained data from their study - Evaluation of the peripartum effects of 2 analgesics: meperidine and tramadol, gives an analogous analgesic effect, with better tolerability for the absence of collateral effects on the mother, fetus and newborn.

14. Arkatov VA, et al, In their study (The effect of tramadol and acupuncture analgesia on labor pain and the psycho emotional status of the parturient] concluded that while tramadol (at a dose of 1.43 +/- 0.06 mg/kg) was optimal during "programmed" delivery, acupunctural analgesia was optimal during delivery without any correcting therapy.

15. Neumark J, Schmid E. 1978 in their study stated that 80% patients administered had complete amnesia for the time of delivery, but most of them remained cooperative, nevertheless. The main advantage of this technique lies in keeping most of the parturients cooperative and able to help with pushing, while offering them amnesia and analgesia for this period.

16. Youssef AR et al. 1978.concluded that excellent analgesia was achieved with ketamine, however hallucinations were troublesome. There were no untoward effects on fetuses.

17. Avangade O. 1978 concluded that carefully controlled intravenous administration of ketamine produced excellent analgesia and dissociative sleep in all patients in the active phase of labor. The introduction to delivery

interval was significantly shortened. Of the 50 patients studied, 49 were unable to remember if contractions were painful and 80% experienced and narrated dreams. The auditory component was consistently intact in 82% of the cases; 78% described the total experience as pleasant, while the rest found it unpleasant or uncertain. The one-minute Apgar score of 6.8 was not significantly different from that of the general population.

18. Altissimi C. 1979 stated the drug's (ketamine) absolute non-toxicity (as observed in quoted experimental studies) together with the labour response and effects on the foetus and mother (tested in most cases with cardiotocography and haemo gas analysis) suggest that ketamine is useful in obstetric analgesia.

19. Amano K et al 1981 concluded that there was Loss of long term variability was persistently noted until the end of labor from 20-40 min. after the administration of Diazepam and Pentazocine, however there was no significant different of blood gas and acid-base balance.

20. Leuxner E. & Thomas J. Munch. Med. Wachr. 94 564(1952) reported satisfactory results

with Hoyscine Butyl bromide as a means of shortening first stage of labour.

21. Tateiwa T. Italura K., Nowa K. in Clin. Rep. 7, 1249-1254 observed the influence of Buscopan suppository on delivery and found that it hastened parturition when administered in pregnant women in the first stage of labour when the uterocervical mouth is beginning to be widened.

22. G. Corssen (Med. Klin 48 1286 – 1288) studied the use of Buscopan in 112 patients in labour and concluded that Buscopan is of particular value in relieving cervical spasm and thus promoting cervical dilatation. No untoward side effects on the mother and child were observed.

23. Prof. S. Samal Uma Gupta in a study of 150 primigravidas in labour conducted at Mahatma Gandhi Institute of Medical Sciences, Sevagram concluded that Hyoscine Butyl bromide shortened the mean duration of labour on an average by two hours forty two minutes with no side effects on fetus or new born.

24. P. Bhattacharya & S.G. Joshi in a study of “Acceleration of labour – Intramuscular

Buscopan injection" by using 200 primigravidae – 100 as cases and 100 as control – concluded that Buscopan is a parasympatholytic agent and shortens the first stage of labour by accelerating the cervical dilatation. Mean labour time in Buscopan was 5 hours 13 minutes where as in control group it was 8 hours and 50 minutes.

PROGRAMMED LABOUR

In an attempt to relieve pain, in the past analgesics, sedatives, narcotics and smooth muscle relaxing drugs have been effectively used. It was uniformly observed that these drugs relieved pain considerably, and shortened the duration of labours, however, if the foetus was born very easily, it often suffered from side effects of the drugs causing respiratory depression at birth and asphyxia in the new born.

The key element in programmed labour is that drugs are administered in controlled doses in a programmed fashion and at appropriate times to avail the benefits of drug synergism while limiting the usage of drugs within safety limits so as to avoid maternal and foetal jeopardy

Programmed labour is a protocol developed by researchers over a period of a decade. It is based on the incorporation of the three principles of active labour.

- Synergistic application of analgesics and antispasmodics during active phase of labour
- Plotting of patients partogram
- To adopt timely intervention to optimise labour outcome

Pharmacology of drugs used in programmed labour

Factors determining safety of analgesic used for labour analgesia

- Route
- Physical and Chemical properties
- Placental transfer
- Foetal distribution

Route

The drug can be given by either of these routes – oral/ im / iv / sc

Physical and Chemical properties

Analgesics penetrate body cells by passing through cell membranes, which is a lipid bilayer. Drug penetration by determined by lipid solubility of the drug. Aromatic ring containing drugs and unionised form of drugs are highly permeable. Opioids are weak bases coexisting as undissociated freebase and dissociated cations.

Placental transfer

Placental transfer is determined by the following factors:

1. Maternal blood concentration of the drug
2. Concentration of free drug in maternal plasma
3. Maternal metabolism and renal excretion of the drug

4. Lipid solubility
5. Placental metabolism
6. Molecular weight of drug
7. pH of blood on both sides of placenta
8. Differential blood flow on either side of placenta

Uteroplacental flow reduction occurs during spontaneous labour, use of oxytocin, aortocaval compression, PIH, Diabetes. Venous obstruction increases the interval over which drug comes in contact with diffusion membranes and facilitates drug transfer to foetus.

Uptake of drug is reduced if foetal cardiac output is reduced.

PH of blood on foetal side is normally 0.1 – 0.2 units lower. Therefore more of drug remains in ionised state on the foetal side. Because maternal and foetal equilibrium is established only for unionised form of drug →results in greater total ionised and unionised drug load in the foetus.

Foetal distribution;

Placental blood is a mixture of blood in intervillous spaces and fresh blood coming from foetus for removal of CO2 and waste products of metabolism. Drugs transferred from maternal to foetal compartment are diluted before distribution to various foetal organs. In IVC drug is diluted by blood coming from lower

extremities abdominal viscera upper extremities and thorax. Amount of drug ultimately reaching vital organs depends on blood flow to the organ. Since CNS is highly vascular it receives greater amount of drug.

DIAZEPAM

Diazepam is a long lasting highly lipophilic benzodiazepine. In obstetrics IV diazepam has gained popularity because of its calming-analgesic properties and relative safety.

Pharmokinetics

Diazepam undergoes oxidation reduction (Phase I) reaction in the liver. It forms two active metabolites desmethyldiazepam and oxazepam hence resulting in increased elimination half-life.

Clearance of diazepam is 0.2 – 0.5 ml per kg per minute.

Increased age reduces clearance of diazepam. Also in obese individuals volume of distribution is increased as drug goes from plasma into adipose tissue. Elimination of t ½ is prolonged in obese patients because of delayed return of drug to plasma

Mechanism of action

Diazepam exerts general effects by occupying BZD receptors that modulate GABA, the major inhibitory neurotransmitter in the brain. It has rapid onset of action – usually within 30 – 60 seconds. It has relatively shorter duration of action because of rapid redistribution.

Effect on CNS

When given IV, though some degree of awareness is maintained patient has anterograde amnesia (interference of establishment of memory trace), the patient does not recollect events on recovery.

Effect on RS

Diazepam is known to cause respiratory depression especially so when used along with opioids. Peak decrease in minute ventilation occurs at doses of 0.3 mg per kg

Effect on CVS

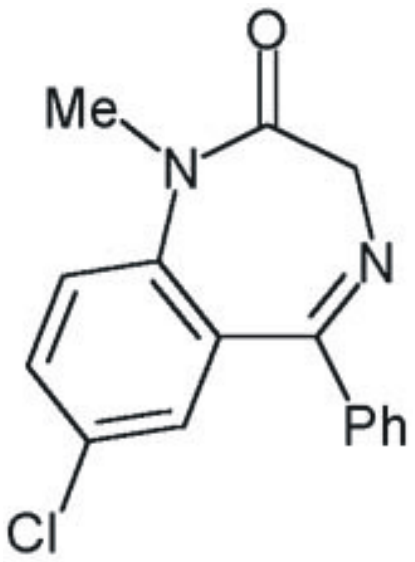
Diazepam has modest hemodynamic effects. There might be a slight decrease in arterial BP.

Side effects

Diazepam is remarkably a safe drug with high margin of safety. It is free of allergenic effects. Major side effect is respiratory depression. Venous irritation and thrombophlebitis occurs which is related to its aqueous insolubility. Amnesia and sedation occur which last for longer than period of unresponsiveness

Foetal side effects include hypotonicity, decreased activity, respiratory depression, impaired temperature regulation and decreased response to metabolic stress (McAllister – 1980).

DIAZEPAM



KETAMINE

Ketamine is a phencyclidine derivative. It is N – methyl D – aspartate NMDA receptor agonist that produces dissociative anaesthesia and has been used in pregnant patients. It exists as to isomers of which S-(+) isomer is more potent. It has significant analgesic effect and does not usually depress the cardio vascular or respiratory system. But it does posses some of the worrisome adverse psychological effects found with other phencyclidines.

Mechanism of action

Its mechanism of action is mediated by an interaction with phencyclidine receptors located in the limbic and corticothalamic areas of the brain.

Pharmacokinetics

Ketamine is highly lipid soluble and of note is its rapid distribution. It has a large volume of distribution and clearance is also high which is why it has short elimination t½ of 2 – 3 hours. Peak onset of action after IV bolus is 30 – 60 sec. Changes in liver blood flow affect clearance.

Effects on CNS

Ketamine produces dose related unconsciousness and analgesia. It causes the blood brain barrier within 30 seconds of administration. Its maximal effect in one

minute. It starts acting with in a minute and recovery starts after 10/15 minutes. But patient remains amnesic for 1-2 hours. Emergence delirium, hallucination and involuntary movements occur in up to 50% of patients. Other undesirable side effects include a 40% rise in uterine tone when ketamine is used in larger doses. (1.5 –2.0 mg/kg) Muscle tone increases.

Duration of ketamine anaesthesia after single administration is for 10-15minutes and patient gains full orientation to person, place and time within 15 – 30 minutes. It induces a so-called "dissociative anaesthesia" – profound analgesia, immobility, amnesia with light sleep and a feeling of dissociation from one's own body and surroundings. The onset and duration of analgesia is rapid, intense and prolonged.

Effects on RS

Ketamine has minimal effect on central respiration. Respiration is not depressed and reflexes are not abolished. It also acts as bronchial smooth muscle relaxant.

Effects on CVS

Ketamine stimulates cardio vascular system. Heart rate, cardiac output , BP are elevated due to sympathetic stimulation. It should therefore not be used in patients with pregnancy induced hypertension

Effect on Foetus

Although, ketamine crosses over into the foetal circulation, it is rapidly metabolised and does not depress the respiratory centre. High doses cause increased uterine tone This has shown to produce neonates with lower Apgar scores, respiratory depression and hypotonia (Akamatsu et al 1974)

Role in labour analgesia

The main advantage of using this drug lies in keeping most of the parturients cooperative and able to help with pushing, while offering them amnesia and analgesia for this period (Neumark Schmid E.)

KETAMINE

OPIOIDS IN OBSTETRIC ANALGESIA

Opioids are the most commonly used class of drugs for systemic analgesia in laboring women. The opioids used in programmed labour are pentazocine and tramadol.

Mechanism of action

Nociception due to uterine and cervical distension could be suppressed by mu and kappa receptors agonists in rats.

Pharmacokinetics

Effect on CNS.

Opoids are strong analgesics. Dull poorly localised visceral pain is relieved better. Associated reaction to intense pain (apprehension, fear, autonomic effects) are also depressed. It has a calming effect.

Effects on CVS

Therapeutic doses cause little in blood pressure of recumbent normotensive patients. Postural hypotension and fainting however can occur due to impairment of vascular reflexes.

Effects on RS

Morphine depresses the respiratory centre in a dose dependent manner.

Effect on uterine contractions

- During the latent phase - it inhibits contractions
- During active phase – increases frequency duration and amplitude of contractions.

Effect on the fetus

FHR shows decrease in short and long term heart rate variability due to depression of fetal CNS or direct effect on fetal myocardium. Diminished FHR variability occurs regularly following meperidine administration and duration of effect is related to route of administration.

Opiods can decrease neonatal minute volume, lower oxygen saturation. Neonate is less able to tolerate narcotic induced depression and hypoxia and respiratory acidosis may ensue rapidly.

Opiods given to the mother during final hour before delivery or more than six hours before delivery are less likely to have a depressive effect upon the neonate.

Pentazocine:

Pentazocine is opioid agonist antagonist. Analgesia produced by pentazocine is related kappa receptor stimulation. It is ¼ - ½ as potent as morphine.

It produces less nausea and postural hypertension than other opiods but is reported to produce increased incidence of dysphoric reactions than other agonists/antagonists.

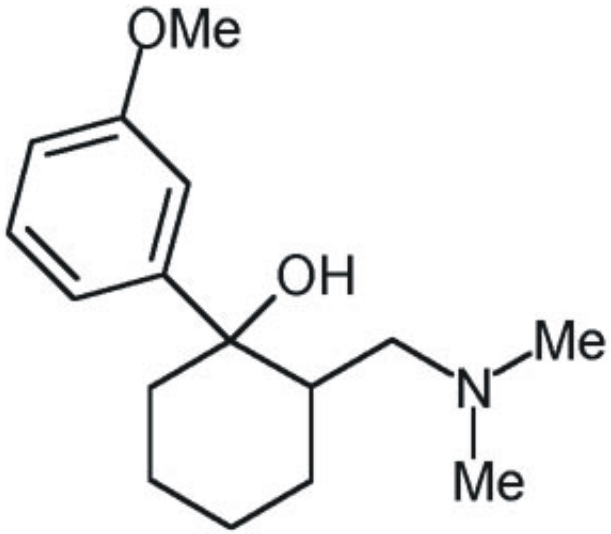
Tramadol

Tramadol is a synthetic derivative. It is a 4-phenyl biperidine analogue of codeine.

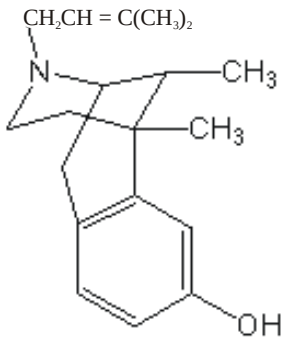
It stimulates mu receptors and to a lesser extent the delta and kappa opioid receptors. It is 1/5 – 1/10 as potent as morphine. Tramadol activates only 30% of opioid receptors as tested by naloxone antagonists.

Like tricyclic antidepressants it also activates spinal inhibition of pain by decreasing the reuptake of norepinephrine and serotonin. This contributes to 70% of nociception provided by Tramadol.

TRAMADOL



PENTAZOCINE



HYOSCINE N – BUTYL BROMIDE (BUSCOPAN)

It is a quaternary ammonium derivative of scopolamine

Mechanism of action

Acts primarily by blocking the transmission of neural impulses in the intramural parasympathetic ganglia of abdominal organs apparently by inhibiting the cholinergic receptors. Peripheral anticholinergic action results from a ganglion blocking action within the visceral wall as well as from the anticholinergic activity

Pharmacokinetics

Onset of action 2-3 minutes following IV administration. Does not cross the blood brain barrier concentrates in tissues of GI tract and kidneys

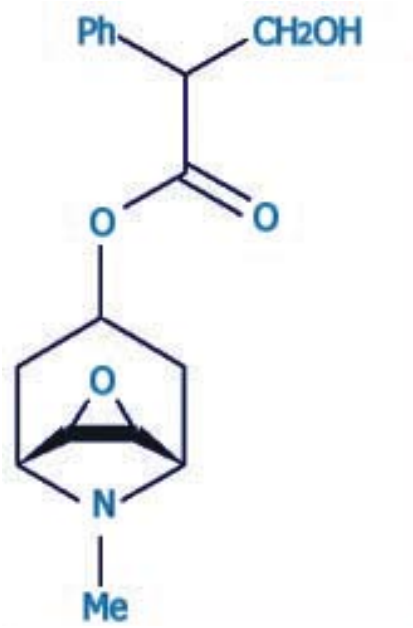
Role in labour

Acts as a smooth muscle relaxant in cervical dilatation. Selectively blocks the cervicouterine plexus and brings about dilatation of the cervix.

Side Effects

Dryness of mouth, visual disturbances, tachycardia, dizziness – mild and self-limiting. Allergenic reactions are rare.

HYOSCINE



MATERIALS AND METHODS

The Study was conducted at Government Rajaji Hospital, Madurai on 50 selected low risk pregnant women who had received adequate antenatal care and in whom the gestation maturity is well documented.

Case selection for painless vaginal delivery was done in consultation with anaesthetist. Informed consent was obtained from each parturient in study group. Control group was not given any intervention and was well matched with study group in age, parity and labour characteristics.

INCLUSION CRITERIA

The following criteria where applied prior to including the case in the study.

1. Primigravida or multigravida between 21 to 35 years of age.
2. No known obstetric or medical complication present.
3. Haemoglobin status more than 10.5 gram percent
4. Gestational maturity between 37 to 41 weeks
5. No clinical evidence of cephalopelvic disproportion
6. No other contra indication to vaginal delivery (eg. Placenta praevia)

EXCLUSION CRITERIA

Antenatal women with the following were excluded from the study

1. PIH
2. Heart Disease complicating pregnancy
3. Diabetes and jaundice
4. History of taking medications like tricyclic antidepressants, MAO inhibitors, sedatives or hypnotics
5. Mal presentation
6. Post caesarean pregnancy
7. Multiple pregnancy
8. Existing foetal distress

Cases were selected after complete history was taken. Vital parameter and weight of the patient was recorded. Basic investigations, which included Urine for albumin, sugar, Blood Hb%, and Blood grouping and typing. Pelvic assessment to rule out CPD was done and patients with borderline and definite CPD were excluded from the study.

The following parameters were monitored:

- Progress of labour with partogram
- Maternal well being
- Foetal well being
- Development of side effects

Progress of Labour

The progress of labour was monitored by partographic recording. The frequency and duration of uterine contraction was noted by abdominal palpation. Cervical dilation and descent of foetal head were assessed by per vaginal examination every one hour.

Maternal well being

The maternal condition was assessed by careful supervision of hourly BP, respiratory rate every 30 minutes, pulse rate every 30 minutes.

Foetal well being

The foetal condition was monitored by noting the FHR every 15 minutes, colour of liquor after ARM done at on set of active phase of labour, presence of caput/moulding and Apgar scores at 1 minute and 5 minutes after birth of baby.

Development of side effects

The following side effects were well looked out for

- Tachycardia
- Rise of Blood Pressure
- Fall of Blood Pressure
- Nausea/vomiting
- Pyrexia
- Hallucinations
- Amnesia
- Post partum haemorrhage
- Vaginal tears/lacerations

- Cervical tears
- Post partum psychosis

Continuous verbal communication to assess pain relief was done for every patient included in the study.

PROGRAMMED LABOUR – PROTOCOL

The protocol of Programmed Labour that I have studied and followed has been developed indigenously by Dr. Daftary and team at the Nowrosji Wadia Maternity Hospital in Mumbai and extensively evaluated in the country.

Programming of Labour was done in the following manner

- I/V line was established with 500ml of ringer lactate solution

- Patients should be getting at least 2 to 3 sustained contractions/10 minutes; if the pains were ineffective oxytocin infusion was started.

- At cervical effacement of 75% and more and dilatation of 3 cms and above administer 6.0 mg pentazocine along with 2.0 mg diazepam given as IV bolus through infusion line (this is prepared by diluting 1 ampoule of diazepam – 10 mg and 1 ampoule of pentazocine – 30 mg

in 10 ml of normal saline and administering 2 ml of this solution slow IV).

- Administer Inj. Tramadol 50.0mg Intramuscularly. Patients weighing more than 60 kgs, the dose of Tramadol is increased to 1 mg per kg body weight.

- Administer Inj. Buscopan intramuscularly along with Tramadol. This may be repeated after four hours if necessary.

- Monitor patient's vital signs and FHR.

- Some patients who have been relatively comfortable so far may complain unbearable pains when the head reaches the pelvic floor and causes stretching of pelvic floor muscles and cervix has dilated to 7 cms or more. In such patients Ketamine was given at a dose of 0.5-mg/kg body weight as IV bolus. Top of doses are given at a dose of 0.25 mg per kg body weight are repeated at an interval of 20 to 30 minutes until delivery if required.

- Local infiltration anaesthesia was given for those patients requiring episiotomy.

- Inj. Methergine 0.4 mg. IV after delivery of anterior shoulder for active management of third stage of labour.

- New born was checked by neonatologist at birth and the Apgar scores at 1 minute and 5 minutes were recorded. The birth weight and any other relevant findings documented.

- Add 10 mg Diazepam to the IV infusion given slowly over two hours. This prevents emerging hallucinogenic reactions in case ketamine has been used.

- The extent of pain relief experienced by the patients and also the degree of amnesia was documented. The pain relief was documented as below.

  Score – 0 – no relief from pain.
  Score – 1 - (Mild) some relief from pain.
  Score – 2 – (Moderate) substantial relief from pain.
  Score – 3 – (Excellent) almost complete relief.

OBSERVATIONS AND RESULTS

This study was conducted on 50 low risk antenatal patients in whom drugs for programming of labour were introduced at the onset of active phase of labour.

Similar low risk counterparts were taken for controls.

Table 1

Distribution of cases according to age group

Age group	Study		Control	
	No.	%	No.	%
15 - 20	8	16	7	14
21 - 25	28	56	27	54
26 - 30	14	28	16	32
Mean	23.7 yrs		24.0 yrs	
Standard deviation	2.8		3.0	

'p' = 0.586

On analysis of study group age wise, the primigravida age group ranged from 18 years to 29 years and the multigravida age group distribution was 20 –30 years. The mean age of the study group was 23.7 years.

In the control group, the primigravida age ranged from 18 –29 mean and multigravidas ranged from 20 to 30 years. The mean age of the control group was 24 years.

There was no significant difference of age in both groups. ($p > 0.05$)

Distribution of cases according to age group

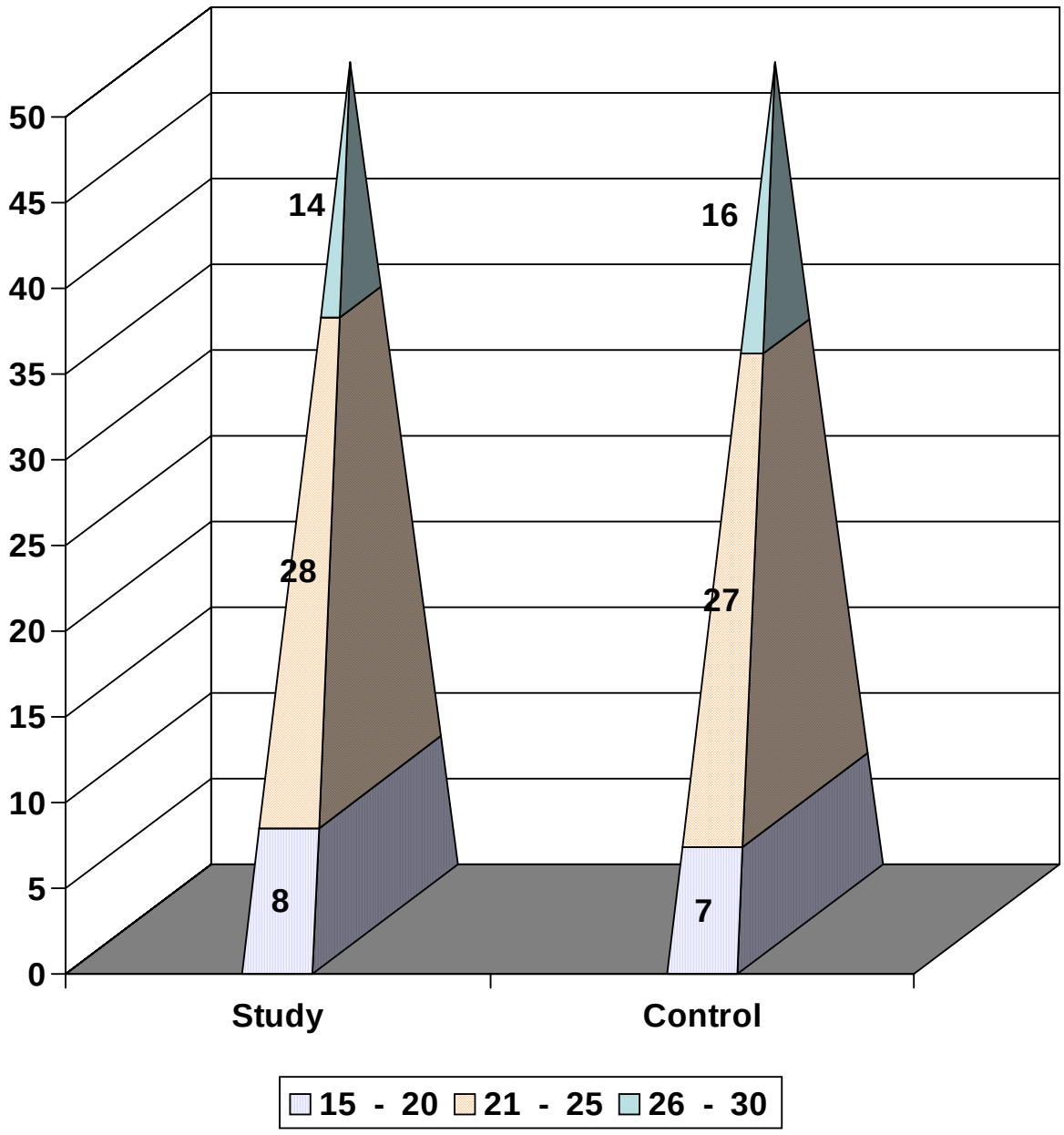


Table 2

Booking status

	Study		Control	
	No.	**%**	**No.**	**%**
Booked	35 pts	(70%)	30 pts	(60%)
Unbooked	15 pts	(30%)	20 pts	(40%)

'p'=0.4017 (not significant)

Booked and unbooked cases were distributed evenly in both groups. However all patients chosen had a minimum of two antenatal check ups in the 3rd trimester.

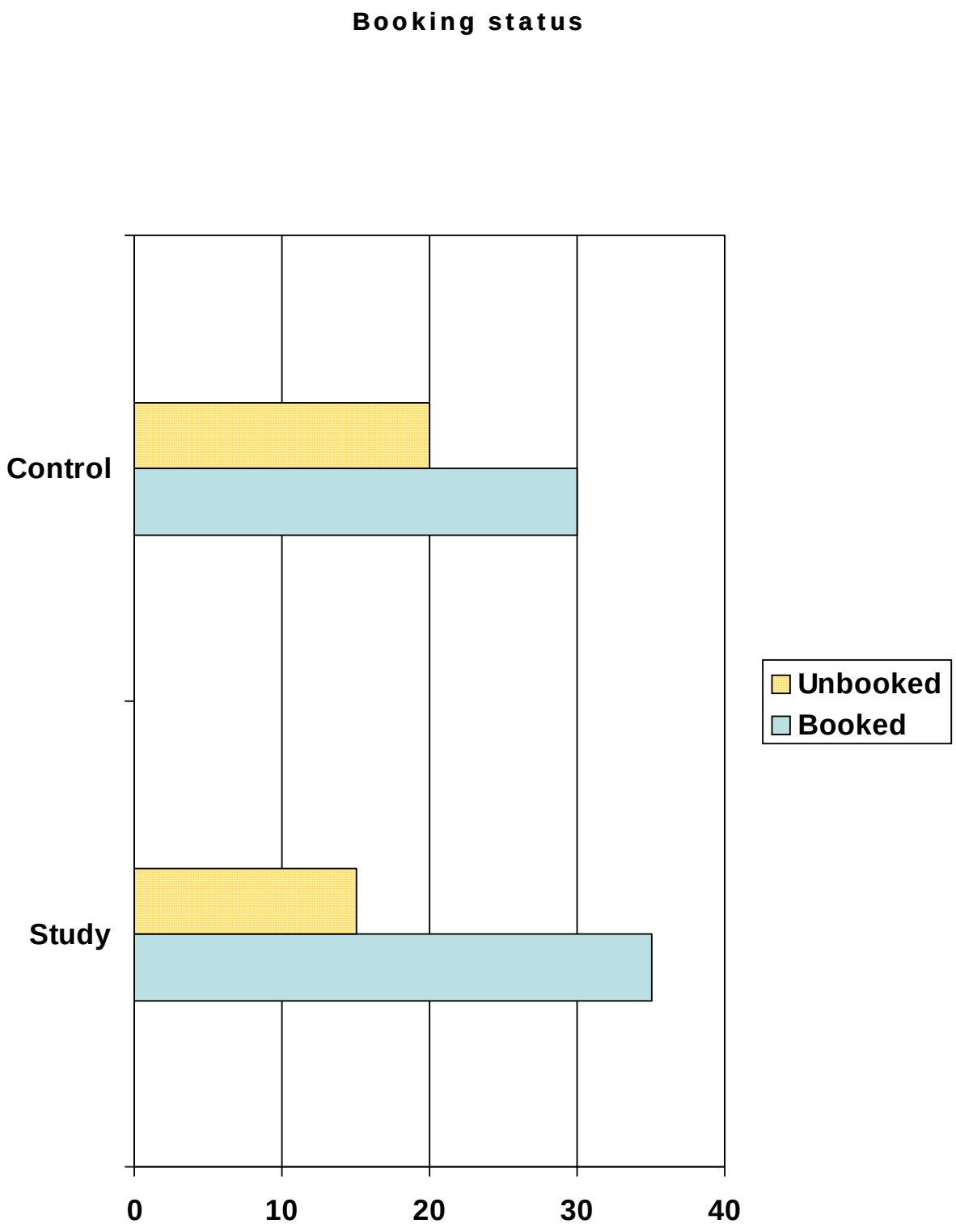

Booking status
Control
Study
0
10
20
30
40
Unbooked
Booked

Table 3

Distribution of cases according to residence

	Study		Control	
	No	**%**	**No**	**%**
Rural	34 pts	68	32 pts	64
Urban	16 pts	32	18 pts	36

In the study 34 patients (68%) are from rural areas and 16(32%) patients from urban areas. In the control group 32 (64%) patients are from rural areas and 18(36) patients are from urban areas. In both the study and the control groups majority are from rural areas.

Table 4

Type of labour

Type of labour	Study		Control	
	No	%	No	%
Spontaneous	38 pts	76 %	41 pts	82
Induced	12 pts	24 %	9 pts	18

In the study group had 38 patients had spontaneous labour and 12 patients had induced labour. In the control group labour was induced in 19 patients and the remaining 41 had spontaneous labour.

Table 5

Membrane Status

Membrane status	Study		Control	
	No	%	No	%
Intact	44	88	40	80
Absent	06	12	10	20

44 patients (88%) had intact membranes at the time of admission. In the control group 40 patients (80%) had intact membranes.

Table 6

Duration of active phase of Ist stage labour

	Study (min)		Control (min)	
	Mean	**SD**	**Mean**	**SD**
Primipara	192.2	24.1	400.4	32.5
Multipara	154.2	24.1	302.5	44.7
Total	174.2	36	357.3	62
"P"Value	0.0001			

In the study group the duration of First stage of labour ranged from 2hrs 5min to 4hrs20 min in primigravidas and from1hrs20min to 3hrs30 min in multiparas. In the control group First stage of labour ranged from 4hrs2min to 7hrs40 min in primiparous patients and from 2hrs20min to 6hrs05 min in multiparas.

The mean of active duration of first stage of labour were lower for the study cases (174.2) then the control cases (357.3 min) and this difference is statistically significant.

Duration of active phase of Ist stage labour

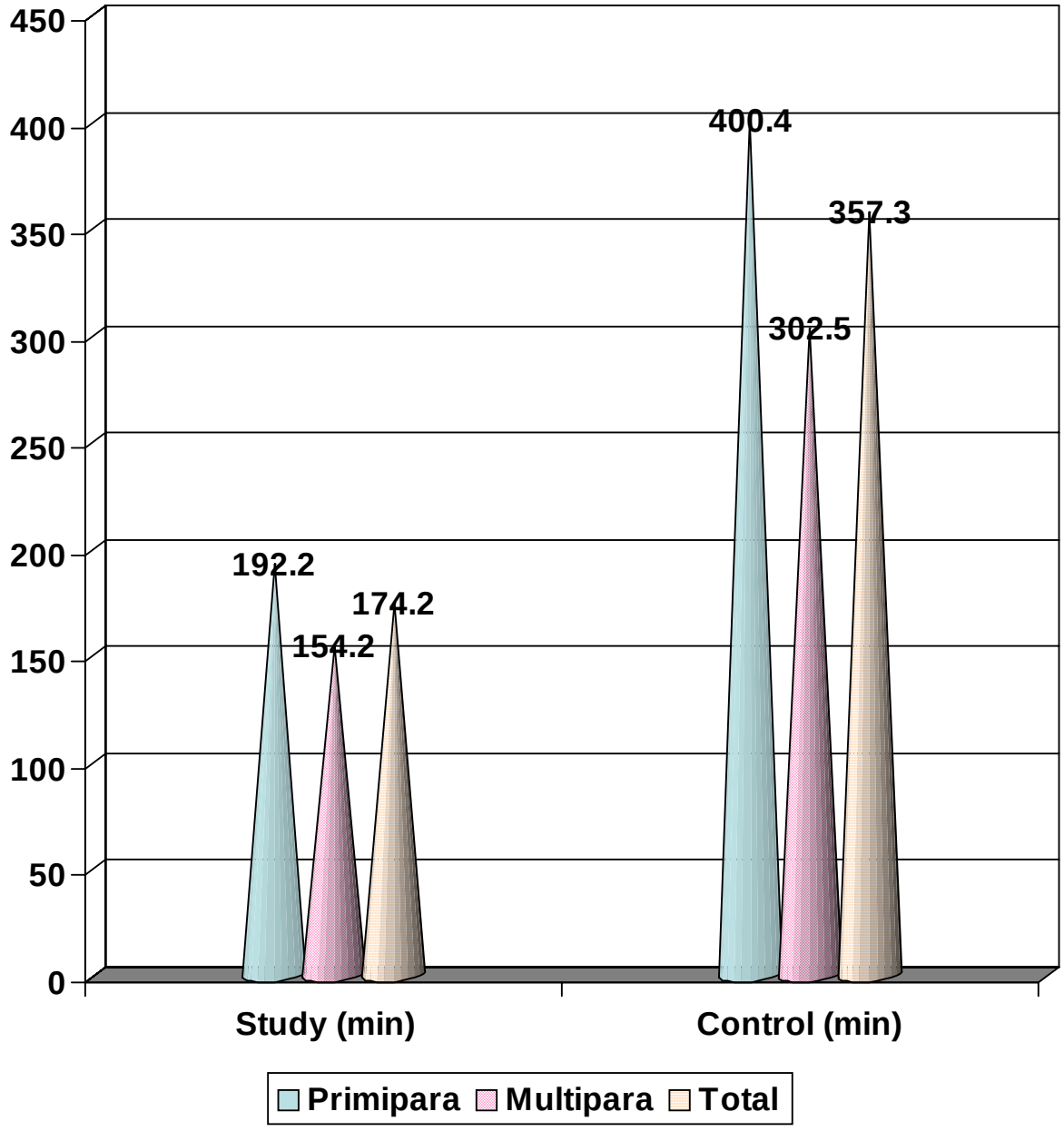


Table 7

Rate of cervical dilatation (cms /hr)

	Study (cms/hr)		Control (cms/hr)	
	Mean	**SD**	**Mean**	**SD**
Primipara	2.2	0.4	1.1	0.3
Multipara	2.8	0.5	1.4	0.1
Total	2.5	0.5	1.2	0.3
"P"Value	0.0001			

The rate of cervical dilatation were lower for primi paras than multiparas in both groups. The differences were also statistically significant.

The mean rate of cervical dilatation for the study groups was 2.5 cms / hr and this is significantly higher than the mean rate of cervical dilatation for the control cases (1.2 cms / hr.)

Rate of cervical dilatation (cms /hr)

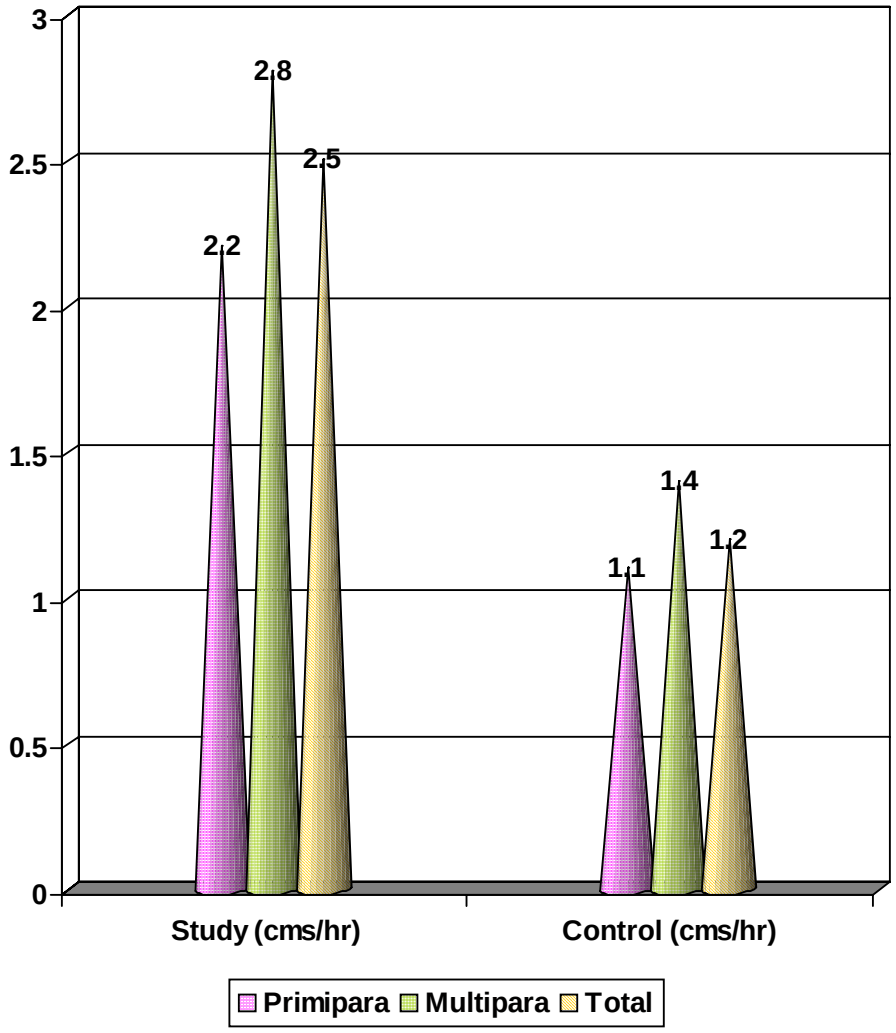


Table 8

2ND STAGE DURATION

	Study (min)		Control (min)	
	Mean	**SD**	**Mean**	**SD**
Primipara	29.5	10	30.1	9.7
Multipara	18.5	7.6	26.2	13.3
Total	24.0	10.6	28.2	11.8
"P"Value	0.0001		0.5356	
"P"Value	0.1845			

Among the study cases, there is statistically significant difference between the mean duration of 2nd stage of labour among primi paras and multiparas. But this difference is not significant among the control cases.

There is no statistical significant difference between the mean duration of second stage of labour between that of the study group and control group.

2ND STAGE DURATION

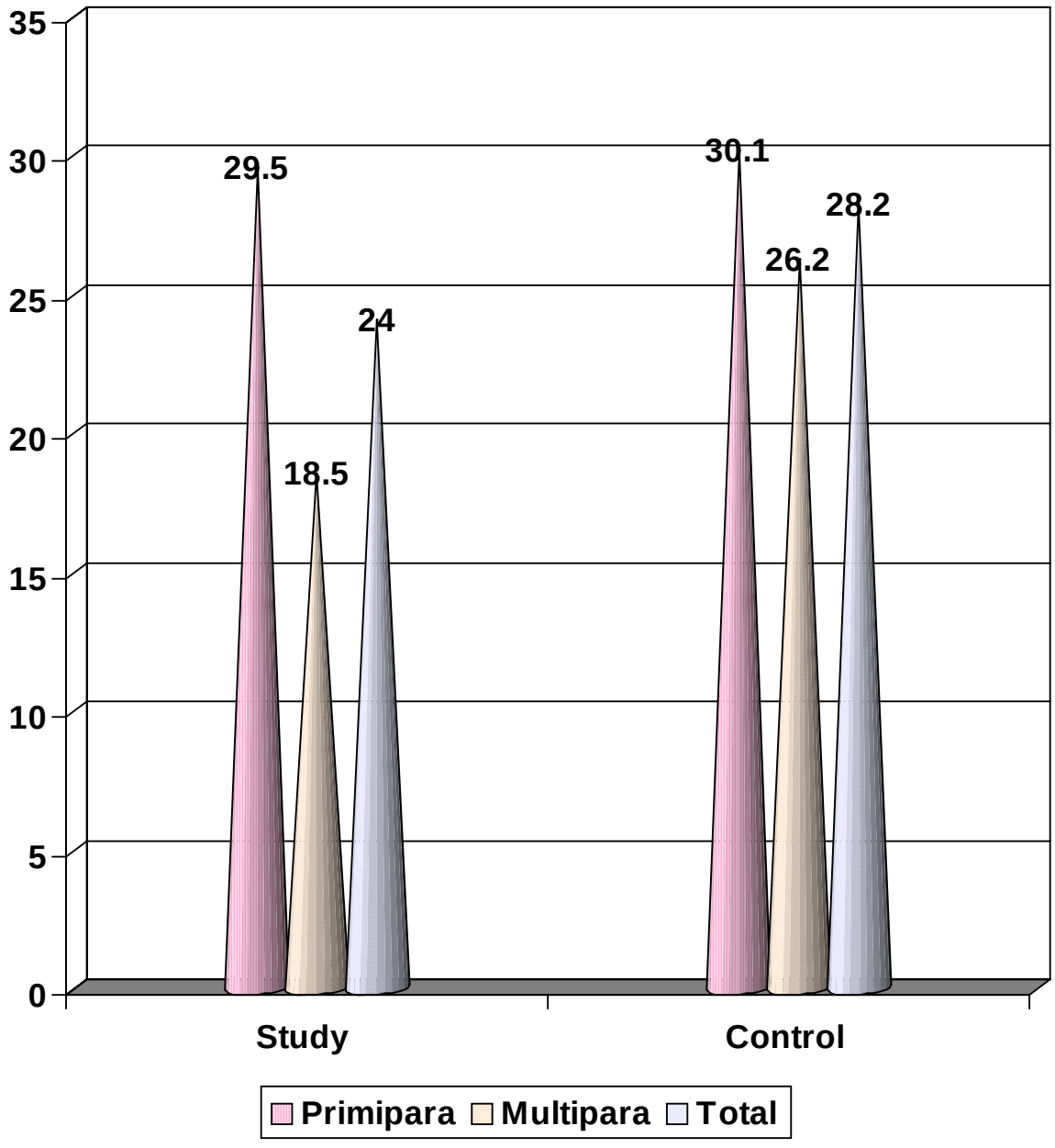


Table 9

Mode of delivery

	Study		Control	
	No	**%**	**Mean**	**SD**
Labour Natural	38	96	36	92
Outlet forceps	2	4	4	8
LSCS	0	0	0	0

In the study group only two patients (4%) required assisted vaginal delivery, whereas in the control group four patients (8%) were delivered by outlet forceps.

The indication for assisted vaginal delivery in the control group was fetal distress in three of the cases and prolonged second stage in one patient. In the study group second stage was cut short by outlet forceps for prolonged second stage in the case of one patient and fetal distress in one patient.

Mode of delivery

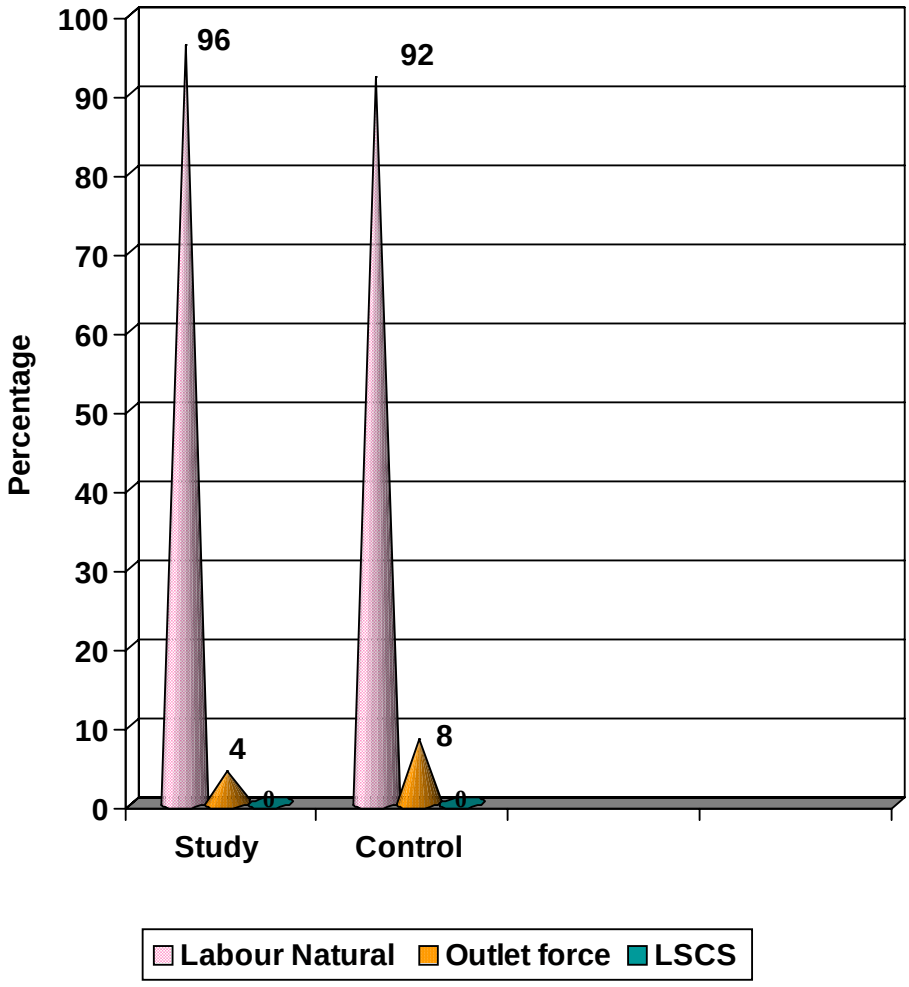


Table 10

3RD STAGE DURATION

	Study (min)		Control (min)	
	Mean	**SD**	**Mean**	**SD**
Primipara	6.4	2.7	10.4	3
Multipara	5.1	2.4	8.2	2.2
Total	5.8	2.6	9.4	2.9
"P"Value	0.0001			

The mean duration of 3rd stage of labour is significantly higher for primi paras than multiparas.

There is statistically significant difference between the mean duration of 3rd stage of labour between the study cases (5.8 minutes) and the control cases (9.4 minutes.)

3RD STAGE DURATION

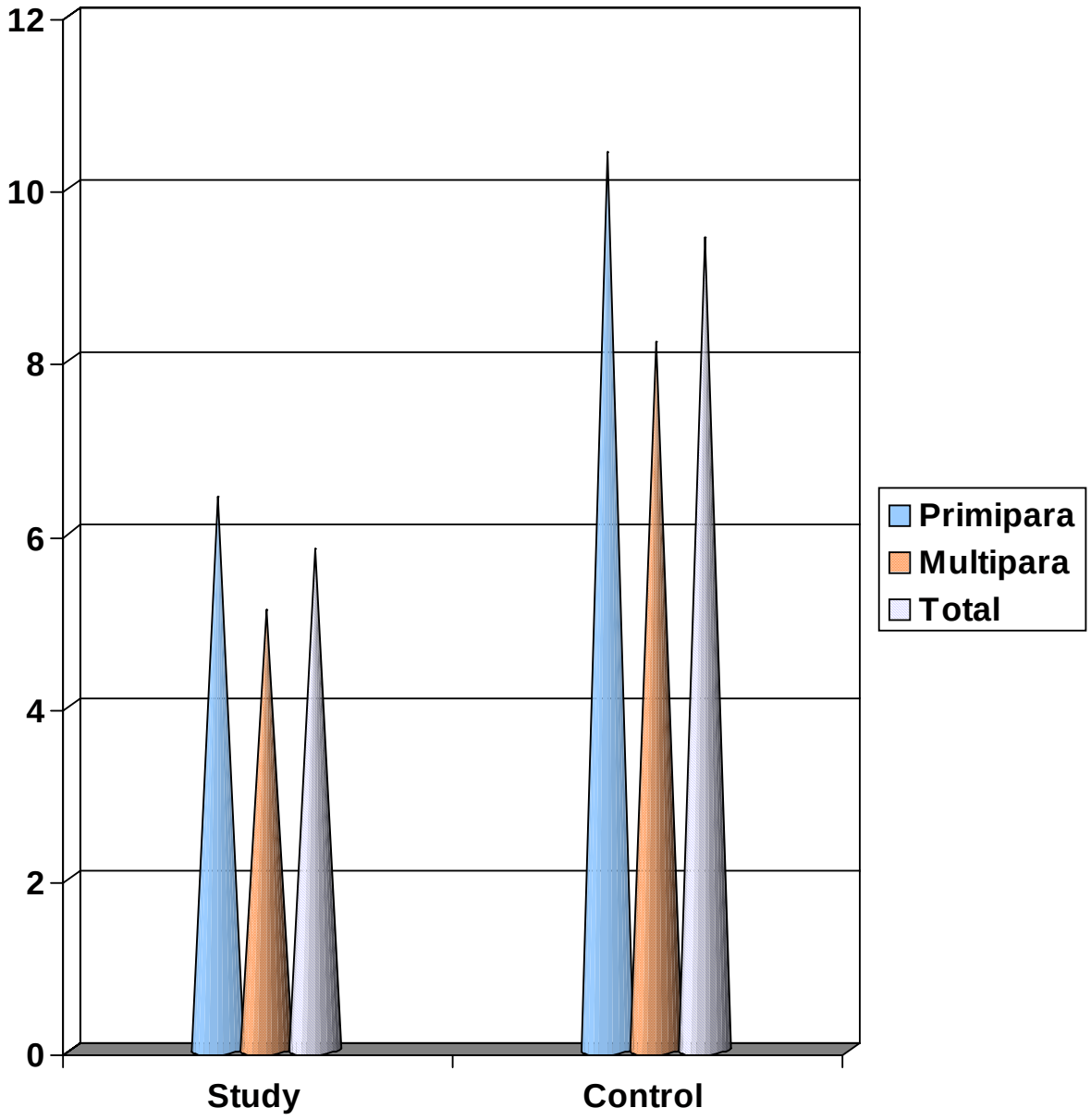


Table 11

APGAR SCORE

	APGAR 1 MIN		APGAR 5 MIN	
	MEAN	**SD**	**MEAN**	**SD**
Study	7.7	0.9	8.9	0.6
Control	7.9	0.8	8.9	0.8
'p'	0.1576		0.7699	

There is no significant difference in the Apgar scores of the two groups both at 1 minute and 5 minutes.

APGAR SCORE

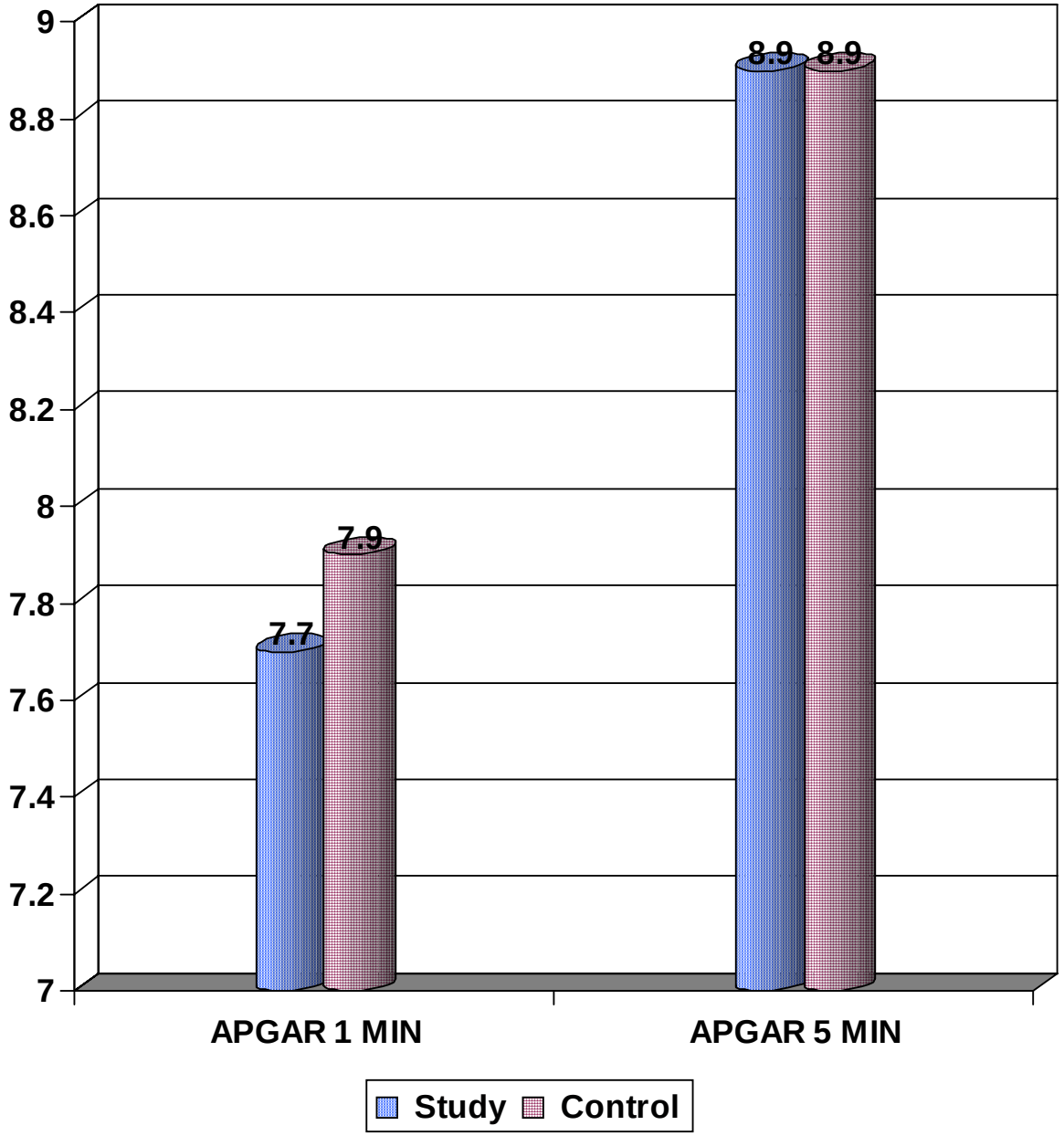

9
8.8
8.6
8.4
8.2
8
7.8
7.6
7.4
7.2
7
7.7
7.9
8.9
8.9
APGAR 1 MIN
APGAR 5 MIN
Study
Control

Table 12

Average Data

	1st Stage Duration (min)	Cervical Dilatation (cms/hr)	2nd Stage Duration (min)	3rd Stage Duration (min)	Total Duration (min)	Apgar	
						1'	5'
Study	174.2	2.5	24.0	5.8	204.0	7.7	8.9
Control	357.3	1.2	28.2	9.4	394.9	7.9	8.9

The total duration of labour in study group is much reduced (mean duration = 204.0 min) when compared to that of the control group (mean duration = 394.9 min). There is significant reduction of duration of 1st stage and 3rd stage of labour in the study group when compared to that of the control group. There is no significant difference of Apgar scores in both groups.

Average Data

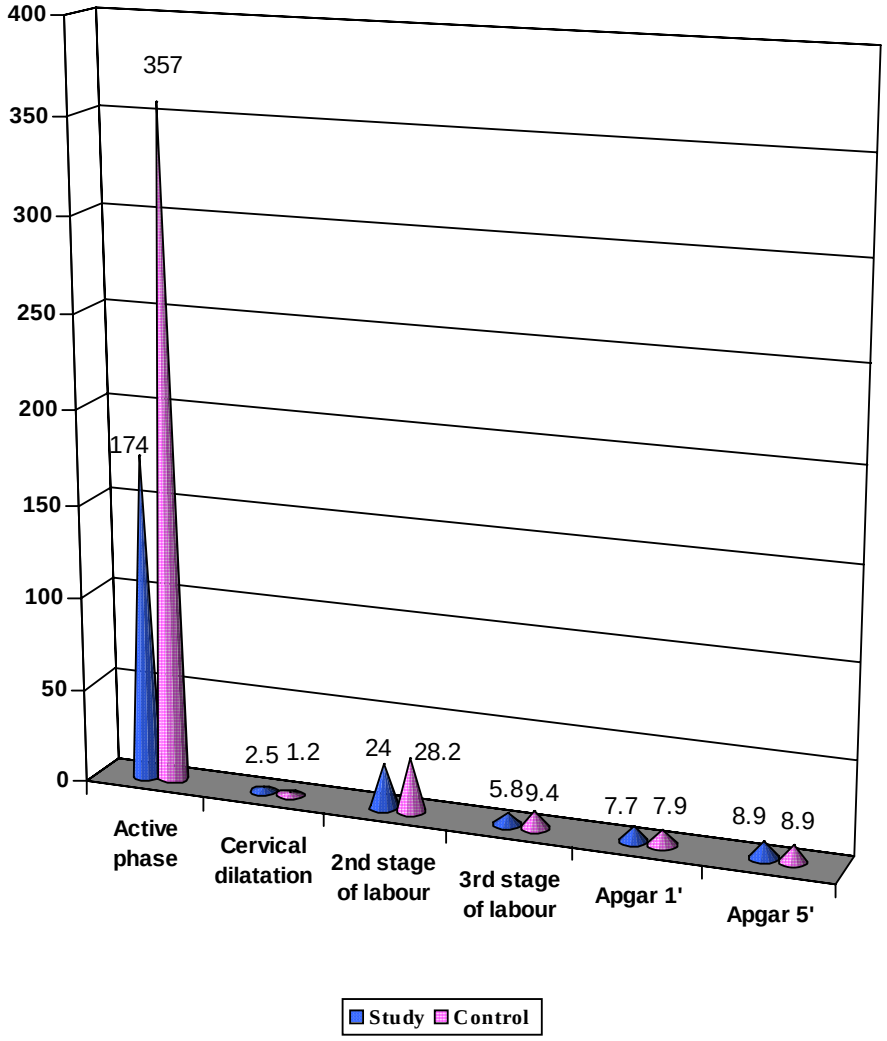


Table 13

QUALITY OF PAIN RELIEF

Quality Of Pain Relief	Study group	
	No	%
Excellent	19	38
Moderate	14	28
Mild	14	28
Nil	3	6

Among the study cases, 94% had pain relief. Out of them, 38% reported excellent pain relief and 28% reported moderate pain relief.

QUALITY OF PAIN RELIEF

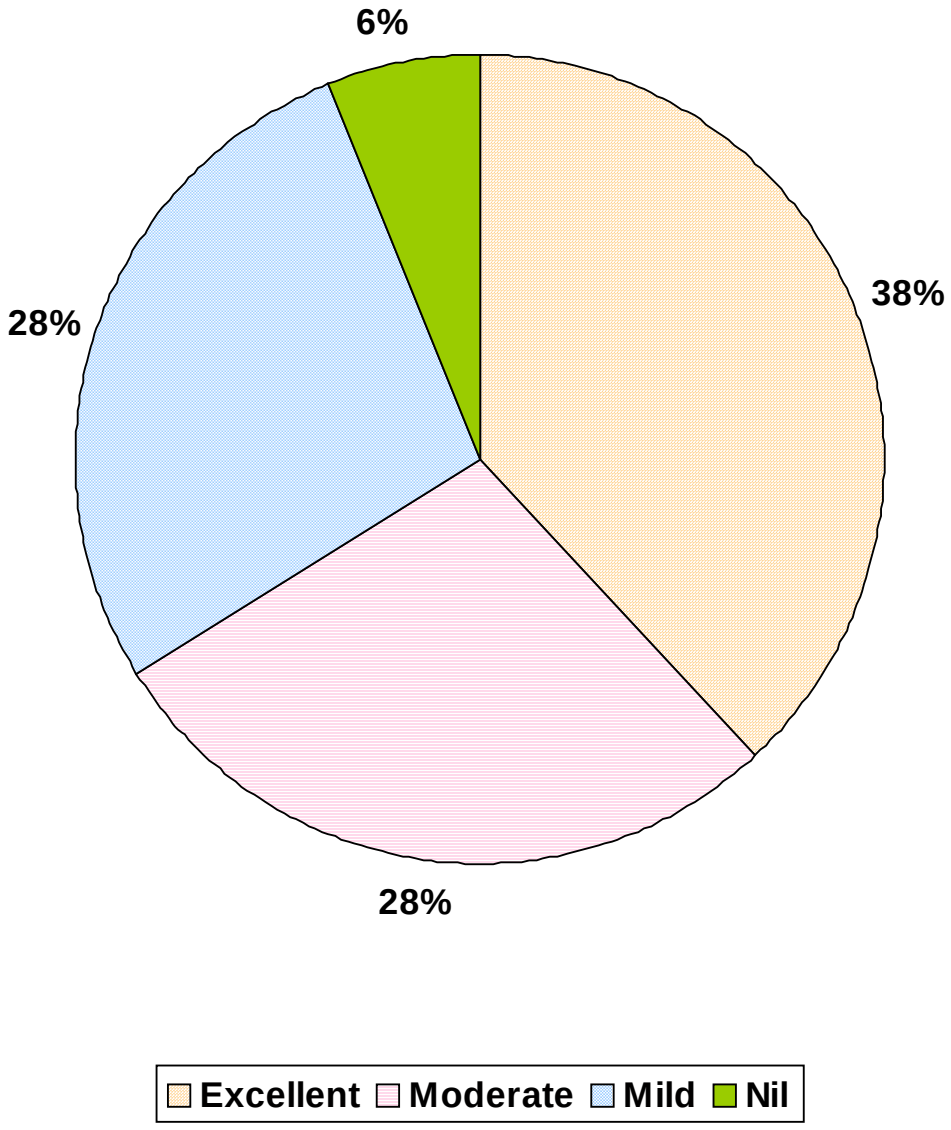
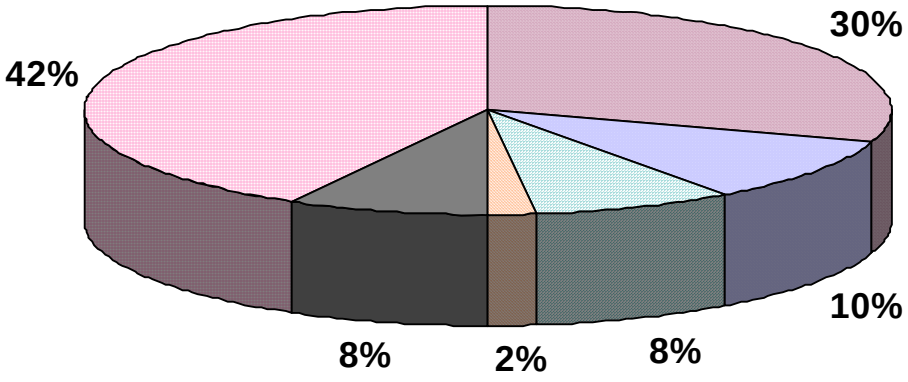


Table 14

Maternal morbidity and side effects

Maternal morbidity and side effects	No	%
Tachycardia	15	30
Drowsy	5	10
Nausea/vomiting	4	8
Hallucination	1	2
Amnesia	4	8
Nil	21	42
Total	50	100

Maternal morbidity and side effects



Tachycardia	Drowsy	Nausea/vomiting
Hallucination	Amnesia	Nil

Table 15

Impact of giving Ketamine

Ketamine was given to those patients who complained of unbearable pain close to delivery.

	Ketamine				'p'
	Given (n=23)		Not Given (n=27)		
	Mean	S.D.	Mean	S.D.	
A. Apgar 1"	7.7	1.0	7.7	0.8	0.9918
B. Apgar 5"	9.0	0.7	8.7	0.5	0.1547
C. Degree of Pain relief					
i) Excellent	14	60.9	5	18.5	
ii) Mild	3	13.0	11	40.7	
iii) Moderate	6	26.1	8	29.7	0.2396
iv) Nil	-	0.0	3	11.1	
D. Side Effects					
i) Yes	14	60.9	14	51.9	0.723
ii) No	9	39.1	13	48.1	
E. NICU Observation					
i) Yes	1	4.3	2	7.4	0.5611
ii) No	22	95.7	25	92.6	

It was noted that there were no adverse effects following ketamine administration on the Apgar Scores. 61% of the mothers given ketamine reported excellent pain relief.

DISCUSSION

A short labour with effect pain relief and minimal side effects to mother and fetus is what every labouring mother and obstetrician would desire for.

Concept of programmed labour has been introduced by Dr. Daftary in 1992. Chauhan et al (2003) and Diwakar et al (2002) endorsed these findings.The observation that analgesia in labour shortens its duration and improves obstetric outcome has been documented in various studies, Ganla et al (2000) and Singh et al (2000).

Programmed labour utilizes a variety of drugs in minimal sub anesthetic doses with the objective of providing pain free short labour while at the same time decreasing significantly morbidity to mother and fetus.

The aim of present study was to determine the influence of the programmed labour protocol on the events of labour and obstetric outcome.

Utilizing the principle of drugs synergism the individual drug dosage is limited so that each drug is well within safety limits so as to avoid maternal and fetal jeopardy. Benzodiazepines (Diazepam) potentiates the effect of opioids (Tramadol, Pentazocine) and decreases

opioids requirement often in a synergistic (supra additive) fashion.

The partogram has been used to monitor of the progress of labour. The partogram is an excellent modality of documenting labour events, Friedman E (1954), Daftary (1979), Studd (1973). The integration of the partogram in the protocol of programmed labour renders its implementation easy and meaningful.

Duration of first stage of labour

The most common cause of prolonged first stage of labour cervical spasm leading to cervical dystocia. A tense woman results in a tense cervix. Pain relief during labour provides a break in the pain anxiety vicious cycle and accelerates cervical dilatation. The use of Hyoscine and effective spasmolytic aids in the same and also improves co-ordination of uterine contractions. This has been widely studied and documented, Desai et al (1984), Geseck E (1952), Khosla et al (2003), Mehrotra A (2001), Mishra et al (2002), Puri et al (1988), Ranka et al (2002), Sarin et al (1982), and Sharma et al (2003). Since then many others have evaluated it with success. The duration of the first stage labour was significantly reduced and rate of cervical dilatation was doubled with the programmed labour protocol.

Duration of Second Stage of Labour

The mean duration of second stage of labour was not significantly diofferent in the study group when compared the control. However, labour analgesia provided a more favorable environment for the mother which entailed better co-operation. The use of Ketamine close to delivery produced profound analgesia and anaesthesia. As Ketamine is used in very small doses 0.5mg/hr and also because of short half life side effects both mother and fetus are minimal. Two of the patients were given top up doses (0.25mg/kg) at half an hour interval with no adverse effects.

Duration of Third Stage of Labour

The third stage of labour was actively managed by administering 0.4mg methergine iv at the time of delivery of the anterior shoulder. The mean duration of third stage as well as the amount of blood loss was significantly reduced in the study group (mean 5.8 min) when compared to the control (mean 9.4 min).

Effect on Fetus

The well being of the new born was unaltered by programmed labour as evidenced by identical APGAR scores in both the study and control group. The mean APGAR score in the study group was 7.7 at 1minute and 8.9 at 5minutes and that the control group was 7.9 at 1 minute and 8.9 at 5 minutes. The difference was not statistically significant.

Effect on mother

The provision of pain free and shorter labour ensures that childbirth is a joyous event. 38% reported excellent pain relief. Multigravidas were better able to feel the difference and document the extent of pain relief, and reported labour as much more satisfying. 8% reported amnesia for the events during labour and stated the labour as comfortable one.

Adverse effects

The commonest side effect noted was tachycardia (30%).There was no alteration in BP in any of the patients administered the drugs in the study group. Nausea was reported by two patients (4%). A significant number, 7 patients (14%) reported amnesia for the events of labour. Hallucinations were reported by only one patient. The use of Diazepam and slow administration of Ketamine was responsible for the low incidents of hallucinations. None of the side effects caused anxiety

SUMMARY

- ✓ The study was performed on 50 low risk antenatal mothers in active labour.

- ✓ The majority of the patients belong to the age group of 21-25. The mean age of the study group was 23.7 years and the control group was 24 years.70% of the study cases were booked and 60% of the control cases were booked.

- ✓ The study group has significantly shorter labour when compared to the control. The mean duration of labour was reduced by 50%.

- ✓ The rate cervical dilatation was doubled when compared to that of a control group.

- ✓ The mean duration of second stage of labour was not significantly different in study group and control group.

- ✓ The duration of 3rd stage of labour was significantly reduced.

- ✓ The neonatal outcome shown by APGAR score was almost the same for both study and control group.

- ✓ Quality of pain relief was good with 94 % stating that they had some pain relief of which 38 % stated that they had excellent pain relief.

- ✓ Need for assisted vaginal delivery was minimal in study group 4% vs 8% in control.

- ✓ Fetal distress was 2% in study group when compared to 6% in the control. There were no significant fetal side effects following administration of drugs for programming of labour.

- ✓ Maternal side effects were minimal and 94% reported satisfying labour experience with some degree of pain relief.

CONCLUSION

Programmed labour protocol provides good pain relief in majority of patients. It is very safe and has absolutely no major complications with minimal minor side effects.

It has a favourable impact on the progress of labour. It augments cervical dilatation and shortens the first stage of labour significantly. Duration of second stage of labour is not affected. It reduces the number of assisted vaginal delivery, improves the performance, reduces the duration of third stage and incidence of postpartum haemorrhage.

There is absolutely no untoward effect on mother and foetus. There is no incidence of fetal distress caused by this optimizing labour protocol.

To conclude, programmed labour is a safe method which shortens the duration of labour facilitates cervical dilatation, reduces incidence cervical dystocia, reduces the pain during labour, improves maternal and neonatal outcome and decreases the need for obstetric intervention.

BIBLIOGRAPHY

1. Altissimi C.Ketamine and analgesia during labor] Minerva Anestesiol. 1979 Dec;45(12):907-14.

2. Arkatov VA. The effect of tramal and acupuncture analgesia on labor pain and the psychoemotional status of the parturient] Anesteziol Reanimatol. 1992 Mar-Apr;(2):31-3.

3. Arulkumaran Management of labour

4. Bitsch M. Obstetrical analgesia with tramadol] Fortschr Med. 1980 Apr 24;98(16):632-4.

5. Bredow V. Use of tramadol versus pethidine versus denaverine suppositories in labor--a contribution to noninvasive therapy of labor pain] Zentralbl Gynakol. 1992;114(11):551-4.

6. Chauhan R, Gupta A. A clinical study of programmed labour and it's outcome J Obstet Gynaecol & Family Welfare 8-9: 2003

7. Daftary SN Ch 24. Modern Management of labour. Principles and Practice of Obstetrics and Gynaecology for Postgraduates – FOGSI publication. (eds) Saraiya UB, Rao KA, Chatterjee A.) publishers JAYPEE India 2003

8. Daftary SN, Desai SV, Nanavati MS et al. J Perinatology and Neonatal Care 3:137, 2001

9. Daftary SN, Mhatre PN Cervicographs in the management of labours in primigravida J Obstet Gynaecol India 27:687, 1997

10. Desai SV, Deshpande V, Krishna U, Acceleration in labour J Obstet Gynaecol India 34:657, 1984

11. Divakar H, Patil A. Programmed Labour – A personal communication

12. Effects of analgesics during labor. Middle East J Anaesthesiol. 1978 Jun;5(1):46-56.

13. Elbourne D, Wiseman RA. (Cochrane Review). Types of intra-muscular opioids for maternal pain relief in labour

14. Erskine WA. Self-administered intravenous analgesia during labour. A comparison between pentazocine and pethidine. S Afr Med J. 1985 May 11;67(19):764-7.

15. Etterich M, Mall M, Haefeli, The effect of spasmolytic agents on parturition. Gynecologia 147:512, 1959

16. Fieni S. Evaluation of the peripartum effects of 2 analgesics: meperidine and tramadol, used in labor] Acta Biomed Ateneo Parmense. 2000;71 Suppl 1:397-400.

17. Fishburne JI. Systemic analgesia during labor. Clin Perinatol. 1982 Feb;9(1):29-53

18. Freidman EA Primigavid labour – a graphostatistical analysis Obstet Gynaecol 6:567, 1955

19. Friedman EA Labor clinical evaluation and management. Appleton Century Crofts. New York 1967

20. Ganla KN, Deshmukh S, Bhide A et al. Intermittent i.v. bolus ketamine in labour analgesia J Obstet Gynaecol India 50:60, 2000

21. Guseck E. Conservative acceleration of parturition by avacan Schweizerische Medizinische Wochenschrift 32:882, 1952

22. Husslein P. Obstetrical analgesia with tramadol--results of a prospective randomized comparative study with pethidine] Z Geburtshilfe Perinatol. 1987 Nov-Dec;191(6):234-7.

23. Jain S. Analgesic efficacy of intramuscular opioids versus epidural analgesia in labor. Int J Gynaecol Obstet. 2003

Oct;83(1):19-27.

24. Kadakia PH, Verma Ragini. Labour Analgesia = Personal communication.

25. Keskin HL. Pethidine versus tramadol for pain relief during labor. Int J Gynaecol Obstet. 2003 Jul;82(1):11-6.

26. Khosla A, Bala I, Dahiya K, Sangwan K. A comparative study of the efficacy of Valethamate bromide and Drotaverine in normal labour J Obstet Gynaecol India 53:568, 2003

27. Larsen JV.Obstetric analgesia and anaesthesia. Clin Obstet Gynaecol. 1982 Dec;9(3):685-710

28. Levy DL. Obstetric analgesia. Pentazocine and meperidine in normal primiparous labor. Obstet Gynecol. 1971 Dec;38(6):907-11..

29. Lewis KS, Han NH. Tramadol: a new centrally acting analgesic. Am J Health Syst Pharm. 1997 Mar 15;54(6):643-52.

30. Long J, Yue Y. Patient controlled intravenous analgesia with tramadol for labor pain relief. Chin Med J (Engl). 2003 Nov;116(11):1752-5

31. Mehrotra A. Role of Drotaverine in cervical dilatation Obstet Gynaec Today 6:2008, 2001

32. Merger R. Control of fetal vitality during obstetrical analgesia. Study of fetal pH, cardiac frequency in the fetus in relation to uterine contraction when a new analgesic, pentazocine, is used in labor] Rev Fr Gynecol Obstet. 1970 Jul-Aug;65(7):437-47.

33. Micro administration of ketamine during labor and delivery of Nigerian women. Int J Gynaecol Obstet. 1978 Jul-1979 Aug;17(1):88-90.

34. Miller GW. Intramuscular analgesia with pentazocine during labor. J Am Osteopath Assoc. 1971.Feb;70(6):555-8.

35. Miller's textbook of anaesthesia

36. Mishra SL, Toshniawal A, Banerjee R. Effect of Drotaverine HCI on cervical dilatation in labour, a comparison with Valethamate bromide J Obstet Gynaecol India 52:76, 2002

37. Moore J, Ball HG.. A sequential study of intravenous analgesic treatment during labour. Br J Anaesth. 1974 May;46(5):365-72.

38. Mukhopadye AK, Ghosh S, Roy B et al. Effect of epidosine forte on cervical dilatation in labour J Obstet Gynaecol India 50:45, 2000

39. O'Driscoll K, Stronge JM, Minogne M. BMJ 11:470, 1973

40. Philpott RH, Castle WM. Cervicographs in the management of labour J Obstet Gynaecol British Commonwealth 79:592, 1972

41. Puri M, Rathee S, Garg G. Effect of Epidosin on cervical dilatation in labour J Obstet Gynaecol India 38:427, 1988

42. Purwar M, Balsara R. Acceleration of labour by iv epidosin in primigravadae Ind J Clin Pract. 6:1, 1996

43. Radakovic D. Drug analgesia during labor Gynakol Rundsch. 1980 Jun;20 Suppl 1:27-34.

44. Ranka PR, Hishikar VA. Effect of Drotaverine HCI on normal labour. A randomized study J Obstet Gynaecol India 52:28, 2002

45. Sarin AR, Singla P, Rani R. Role of Valethamate Bromide (Epidosin) in acceleration of labour. Ind Med Gazette 370, 1982

46. Sharma JB, Pundir P, Kumar A et al. Drotaverine HCL and Valethamate bromide in acceleration of labour Int J Gynaecol Obstet 74:255, 2003

47. Singh S, Mathur V, Srivastava U Pandey DN. Comparative evaluation of efficacy of Tramadol with Pentazocine HCI in labour analgesia, and their effects on foetal outcome J Obstet Gynaecol India 50, 21, 2000

48. Studd JWW. Partograms and nomograms in the management of primigravid labours British Medical Journal 4:451, 1973

49. Tiengo M. Pentazocine in labor analgesia (1st observation)] Acta Anaesthesiol. 1968;19:Suppl 2:227.

50. Viegas OA, Khaw B, Ratnam SS. Tramadol in labour pain in primiparous patients. A prospective comparative clinical trial. Eur J Obstet Gynecol Reprod Biol. 1993 May;49(3):131-5.

51. Wahab SA. Effect of some recent analgesics on labor pain and maternal and fetal blood gases and pH. Int J Gynaecol Obstet. 1988 Feb;26(1):75-80.

52. Wien Klin Wochenschr Subanaesthetic doses of ketamine for obstetric delivery. 1978 Feb 17;90(4):127-30

53. Williams Obstetrics 21st edition

PROFORMA

Name Case No

Age

IP No. Unit

Booking Status Married Since

Gravida : Para : Live :

Abortion :

LMP : Gestational age in weeks :

EDD :

Mens Period Regular / Irregular

Date & Time of Admission :

Examination

Height PR BP RR

Temperature

Weight Anaemia Pedal oedema : Urine - ALB

- SUG

-

Informed consent Hb %

CVS : B1. Grouping :

RS : Rh typing

P/A :

P/V :

Nature of Labour

I) Spontaneous ARM

II) Induced Syntocinon

Bishops Score at time of drug administrations

Position	Length	Dilatation	Consistency	Station

Time of administration of drug :

Drug	**Time**
Diazepam	
Pentazocine	
Tramadol	
Hyoscine	
Ketamine	

Duration of first stage :

Rate of cervical dilatation :

Duration of second stage :

Mode of delivery

Labour Natural	**Instrumental**	**Caesarean Section**

Indication for instrumental delivery

Pain relief

Nil	
Mild	
Moderate	
Excellent	

Side effects of drugs

Tachycardia	
Rise of BP	
Fall of BP	
Nausea/Vomiting	
Pyrexia	
Hallucinations	

Amnesia	
Post partum haemorrhage	
Vaginal tears/lacerations	
Cervical tears	
Post partum psychosis	

Neonatal outcome

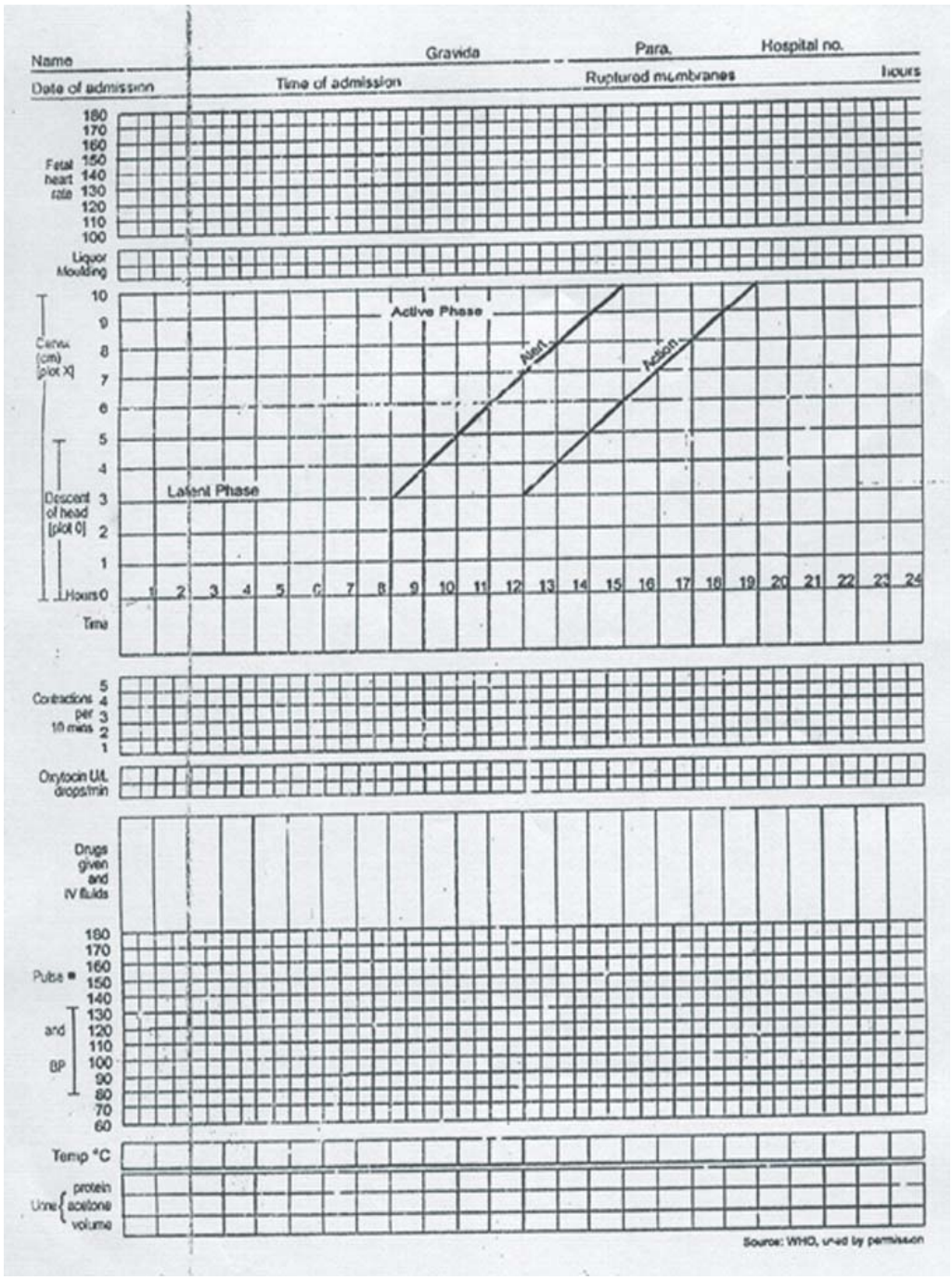
Birth wt	APGAR		Resuscitation	NICU Obs./Adm.
	I min	5 min		

Duration of third stage

Third stage complications if any :

Others :

PARTOGRAM


Name
Gravida
Para.
Hospital no.
Date of admission
Time of admission
Ruptured membranes
hours
Fetal heart rate
Liquor
Moulding
Cervix (cm) [plot X]
Active Phase
Alert
Action
Descent of head [plot O]
Latent Phase
Hours
Time
Contractions per 10 mins
Oxytocin U/L drops/min
Drugs given and IV fluids
Pulse
and
BP
Temp °C
Urine
protein
acetone
volume
Source: WHO, used by permission

MASTER CHART

STUDY GROUP

	SE status	Edu status	Gest .age	medical comp	obst. Risk	spont. /ind	I stg	rate of cervical	II stg. Durmin	III stg. dur.min	synto	ketamine	rpt. ketamine	mode of del.	Indication	degofpain relief	Baby Wt.	Apgar 1"	Apgar 5"	
	IV	5th	38	nil	nil	spont	4hr20m	1.6	32	3	no	no	0	LN epi	-	mod	2.85	8	9	ı
	IV	8th	41	nil	nil	ind	4hr	1.8	30	4	yes	no	0	LN epi	-	mod	2.7	7	9	t
1	V	3rd	39	nil	nil	spont	2hr40m	2.6	20	3	no	no	0	LN epi	-	excellent	3	8	9	ı
	IV	11th	40	nil	nil	spont	4hr	1.7	35	5	no	no	0	LN epi	-	mild	3	7	8	ı
	IV	grad	40	nil	PROM	ind	2hr35m	2.7	30	4	yes	given	0	LN epi	-	excellent	2.9	7	8	(l
1	IV	4th	40	nil	nil	spont	2hr45m	2.5	20	3	no	no	0	LN	-	excellent	2.8	7	9	ı
1A	IV	9th	37	nil	PROM	spont	2hr	3.5	12	5	no	given	0	LN	-	excellent	2.9	8	9	l (
1	V	nil	40	nil	nil	spont	2hr50m	2.5	25	4	yes	given	0	LN epi	-	mod	3.2	8	8	t
	III	12th	41	nil	ROP	ind	3hr20m	2.1	60	5	no	no	0	outlet	Pro.2nd Stage	mild	3.25	6	8	t
	IV	8th	39	nil	nil	spont	2hr5m	3.3	35	4	yes	no	1	LN epi	-	mod	2.7	8	8	ı
1	IV	3rd	40	nil	nil	spont	2hr30m	2.8	15	4	no	no	0	LN	-	excellent	2.6	9	9	ı
	IV	8th	38	nil	nil	spont	3hr	2.3	35	4	no	no	0	LN epi	-	mild	3	7	8	ı
	IV	11th	41	nil	nil	ind	3hr10m	2.2	30	5	yes	no	0	LN epi	-	mild	2.8	7	9	t
	V	nil	40	nil	nil	spont	3hr	2.3	25	3	yes	no	0	LN epi	-	nil	2.6	8	9	ı
	IV	11th	39	nil	md.7yrs	spont	3hr15m	2.1	11	2	yes	no	0	LN epi	-	mod	2.9	8	9	t
	IV	6th	37	nil	nil	spont	3hr	2.3	25	3	yes	no	0	LN epi	-	mild	2.7	8	9	ı
2	V	8th	41	nil	nil	spont	2hr30m	2.8	10	4	no	given	0	LN	-	mod	3.35	9	10	t
	IV	12th	38	nil	nil	spont	2hr40m	2.6	30	4	no	given	1	outlet	Fetal distress	excellent	3.1	7	9	ı
	IV	6th	39	nil	PROM	ind	2hr40m	2.6	25	8	yes	no	0	LN epi	-	nil	2.8	9	9	t s
	IV	12th	40	nil	Rh-ve	ind	3hr	2.3	32	7	yes	no	0	LN epi	-	excellent	3	9	10	(
	IV	9th	41	nil	nil	spont	3hr30m	2	18	6	yes	given	0	LN epi	-	excellent	3.1	7	8	ı
	IV	nil	37	nil	nil	spont	3hr	2.3	22	8	no	given	0	LN epi	-	excellent	2.6	7	8	(
1	IV	9th	39	nil	nil	spont	1hr40m	4.2	12	5	no	given	0	LN	-	excellent	2.7	9	10	ı
1	V	4th	40	nil	nil	spont	2hr40m	2.6	14	5	no	no	0	LN	-	mod	2.65	8	9	t
	IV	8th	40	nil	nil	spont	3hr10m	2.2	25	12	no	given	0	LN epi	-	mild	3.1	7	9	(
	V	3rd	39	nil	nil	spont	2hrs10m	3.2	16	7	yes	given	0	LN	-	excellent	2.7	9	9	t
1	IV	10th	40	nil	nil	ind	2hr30m	2.8	30	9	yes	given	0	LN lp	-	excellent	2.9	7	9	ı
1	IV	11th	38	nil	nil	spont	2hr15m	3	15	3	no	given	0	LN	-	excellent	3	9	9	ı
	IV	5th	41	nil	nil	spont	3hr	2.3	40	10	yes	no	0	LN epi	-	mild	3.1	7	8	ı
1	III	grad	40	nil	nil	spont	3hr	2.3	25	6	yes	no	0	LN epi	-	mod	3	7	8	ı
	IV	12th	41	nil	nil	ind	3hr10m	2.2	30	9	yes	given	0	LN epi	-	mod	2.8	6	9	(ı
	V	nil	39	nil	nil	spont	4hr	1.8	30	15	no	no	0	LN epi	-	mild	2.9	8	9	ı
1	IV	3rd	37	nil	nil	spont	2hr30m	2.8	10	3	yes	given	0	LN	-	excellent	2.75	9	10	t
1	IV	8th	38	nil	nil	spont	2hr20m	3	16	4	no	given	0	LN	-	excellent	3.3	8	9	a a
	IV	8th	40	nil	nil	spont	3hr30m	2	30	7	no	no	0	LN	-	nil	2.8	9	9	ı
	V	nil	40	nil	nil	spont	2hr20m	3	45	6	yes	given	0	LN	-	mild	2.9	9	9	ı
	IV	12th	37	nil	nil	spont	3hr10m	2.2	20	6	no	no	0	LN	-	mild	2.9	8	9	a
	IV	5th	41	nil	nil	spont	3hr30m	2	25	8	yes	given	0	LN epi	-	mild	2.7	9	10	ı
2	V	8th	38	nil	nil	spont	2hr10m	3.5	6	4	yes	given	0	LN epi	-	excellent	2.65	8	10	ı

	SE status	Edu status	Gest .age	medical comp	obst. Risk	spont. /ind	I stg	rate of cervical	II stg. Durmin	III stg. dur.min	synto	ketamine	rpt. ketamine	mode of del.	Indication	degofpain relief	Baby Wt.	Apgar 1"	Apgar 5"	
1A	IV	4th	38	nil	nil	spont	2hr	3.5	16	7	no	no	0	LN	-	mod	2.9	8	9	t
	IV	7th	39	nil	nil	spont	3hr30m	2	35	9	yes	no	0	LN epi	-	mild	3.3	8	9	ı
	IV	10th	40	nil	nil	spont	2hr30m	2.8	35	7	yes	given	0	LN epi	-	excellent	3.2	7	8	ı
	V	10th	41	nil	nil	ind	3hr30m	2	22	7	no	no	0	LN epi	-	mod	3	7	9	ı
1	III	6th	40	nil	Rh-ve	ind	2hr20m	3	30	8	yes	no	0	LN epi	-	excellent	3.2	7	8	t
1	IV	5th	37	nil	nil	spont	2hr40m	2.6	11	4	no	no	0	LN	-	mild	2.8	7	9	ı
2	IV	nil	39	nil	nil	spont	3hr	2.3	8	3	no	given	0	LN	-	excellent	2.85	7	9	t
	V	grad	40	nil	nil	ind	3hr	2.3	40	9	yes	given	0	LN epi	-	mod	3.2	6	9	(
	V	8th	37	nil	nil	spont	3hr30m	2	25	7	no	no	0	LN epi	-	mild	3	7	8	(
	IV	9th	38	nil	nil	spont	4hr	1.8	20	7	no	given	0	LN epi	-	mod	3	7	9	t
1	V	3rd	40	nil	nil	ind	2hr15	3.1	20	5	yes	given	0	LN epi	-	mod	3.1	7	9	t (

CONTROL GROUP

age	gravida	SE status	edu	gest age	medical	obst	Spont/ind	I stg.	cer dil	II stg.	III stg.	synto	md of del	Indication	Baby Wt	1"	
1	primi	IV	5	37	nil	nil		6hrs 20	1.1	40	10	yes	LN epi	-	2.9		
1	primi	V	8	39	nil	nil	s	6hr25	1.1	30	15		LN epi	-	3.0		
9	primi	IV	5	40	nil	nil	s	7hr	1	15	12		LN epi	-	2.75		
2	primi	V	6	41	nil	nil	s	7hr40min	0.9	35	8		LN epi	-	2.8		
9	primi	V	11	40	nil	nil	s	6hr40m	1	70	6		outlet	Pro.2nd stg	2.9		
5	primi	IV	7	39	nil	nil	s	7hr	1	40	9		LN epi	-	3.0		
6	primi	IV	9	38	nil	nil	I	6hr30m	1	25	10	yes	LN epi	-	3.1		
1	primi	IV	12	37	nil	nil	s	6hr20m	0.9	30	12		LN epi	-	2.8		
1	primi	V	11	39	nil	nil	s	7hr20m	1	35	14		LN epi	-	2.6		
0	primi	IV	9	40	nil	nil	s	7hr25	1	40	9		LN epi	-	2.9		
9	primi	IV	7	41	nil	nil	i	7hr	1	15	9		LN epi	-	2.85		
2	primi	IV	8	40	nil	nil	s	6hr30m	1.1	20	10	yes	LN epi	-	2.7		
3	primi	IV	9	37	nil	nil	s	6hr 40m	1.1	30	16		LN epi	-	2.7		
2	primi	IV	10	38	nil	nil	i	6hr 50m	1	50	12		LN epi	-	3.0		
5	primi	III	g	39	nil	nil	s	6hr45m	1	35	15	yes	LN epi	-	2.8		
4	primi	III	g	40	nil	nil	s	6hr40m	1	20	12		LN epi	-	3.1		
5	primi	IV	12	37	nil	nil	s	6hr35m	1.1	40	8		LN epi	-	3.1		
7	primi	IV	9	38	nil	nil	s	6hr10m	1.2	20	6	yes	LN epi	-	2.75		
8	primi	IV	4	41	nil	nil	s	6hr50m	1	15	8	yes	LN epi	-	2.6		
9	primi	V	4	40	nil	nil	i	6hr50m	1	18	9		LN epi	-	2.5		
9	primi	IV	5	40	nil	nil	s	7hr	1	20	11		LN epi	-	3.1		
0	primi	V	11	38	nil	nil	s	6hr	1.2	15	10		LN epi	-	2.8		
0	primi	V	20	39	nil	nil	s	7hr10m	1	50	5	yes	outlet	fet.distress	2.7		
1	primi	IV	8	39	nil	nil	i	6hr30m	1.2	22	11		LN epi	-	2.6		
5	primi	IV	9	38	nil	nil	s	7hr40m	0.9	35	7		outlet	-	2.85		
4	primi	V	7	39	nil	nil	s	5hr30m	1.3	20	14		LN epi	-	2.8		
6	primi	IV	8	41	nil	nil	s	5hr40m	1.2	25	15	yes	LN epi	-	2.6		
2	primi	III	4	39	nil	nil	s	5hr50m	1.1	15	8		LN epi	-	3.0		
7	G2P1L1	IV	11	40	nil	nil	s	5hr30m	1.3	20	6		LN epi	-	3.2		
5	G3P2L1	IV	10	40	nil	nil	s	5hr30m	1.3	25	9		LN epi	-	3.0		
3	G2P1L1	IV	9	41	nil	nil	s	5hr	1.4	18	10		LN	-	3.0		
4	G2P1L1	V	6	40	nil	nil	s	5hr10m	1.4	30	12		LN	-	2.8		
6	G2P1L1	IV	7	39	nil	nil	i	4hr50m	1.4	30	5		LN epi	-	2.9		
8	G2P1L1	IV	4	37	nil	nil	i	6hr	1.1	50	8		outlet	fe.distress	2.65		
9	G2P1L1	IV	11	41	nil	nil	s	6hr	1.1	25	9		LN epi	-	2.75		
4	G3P2L1	V	4	38	nil	nil	s	4hr	1.7	20	7		LN epi	-	2.8		
4	G2P1L1	III	5	39	nil	nil	s	5hr20	1.3	20	9		LN	-	2.7		
5	G3P1L1A1	IV	9	41	nil	nil	s	5hr20	1.3	35	4		LN epi	-	2.6		
3	G2P1L1	V	10	40	nil	nil	s	4hr30	1.5	20	8		LN epi	-	2.9		
5	G3P1L1A1	IV	8	40	nil	nil	s	4hr40m	1.4	35	10		LN epi	-	3.0		
2	G2P1L1	IV	9	39	nil	nil	s	5hr10m	1.4	16	9		LN	-	3.1		

	age	gravida	SE status	edu	gest age	medical	obst	Spont/ind	I stg.	cer dil	II stg.	III stg.	synto	md of del	Indication	Baby Wt	1"	
	0	G3P2L2	IV	8	40	nil	nil	i	5hr	1.4	34	5		LN epi	-	2.9		
	9	G2P1L1	V	4	38	nil	nil	s	5hr30m	1.3	28	8		LN	-	2.8		
	5	G3P2L2	IV	9	39	nil	nil	s	5hr40m	1.2	34	9		LN epi	-	3.0		
	7	G2P1L1	V	4	40	nil	nil	s	5hr10m	1.4	22	11	yes	LN epi	-	2.5		
	6	G3P2L2	IV	7	40	nil	nil	s	4hr40m	1.5	25	5		LN	-	2.6		
	0	G2P1L1	III	6	41	nil	nil	s	6hr	1.2	30	11		LN epi	-	3.0		
	7	G3P2L2	IV	5	37	nil	nil	s	3hr10m	2.2	12	9		LN	-	2.6		
	6	G3P1L1A1	V	5	39	nil	nil	i	3hr30m	2	8	10		LN epi	-	2.6		
	1	G2P1L1	III	9	40	nil	nil	s	5hr15m	1.4	40	6		outlet	fe.distress	3.3		