“A COMPARATIVE CLINICAL STUDY OF EPIDURAL 0.125% BUPIVACAINE WITH FENTANYL VERSUS 0.1% ROPIVACAINE WITH FENTANYL IN A COMBINED SPINAL EPIDURAL LABOUR ANALGESIA USING INTRATHECAL FENTANYL”

Dissertation submitted in partial fulfillment of

M.D. DEGREE EXAMINATION

M.D. ANAESTHESIOLOGY- BRANCH X

GOVT. KILPAUK MEDICAL COLLEGE, CHENNAI.

THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY

CHENNAI, TAMILNADU.

APRIL 2015

DECLARATION

I, **Dr. PRIYA.R**, solemnly declare that the dissertation titled **"A COMPARATIVE CLINICAL STUDY OF EPIDURAL 0.125% BUPIVACAINE WITH FENTANYL VERSUS 0.1% ROPIVACAINE WITH FENTANYL IN A COMBINED SPINAL EPIDURAL LABOUR ANALGESIA USING INTRATHECAL FENTANYL"** is a bonafide work done by me in the Department of Anaesthesiology, Govt. Kilpauk Medical College & Hospital, Chennai, after getting approval from the Ethical committee under the able guidance of **Prof. Dr. G.R.RAJASREE. M.D.,** Professor, Department of Anaesthesiology, Govt. Kilpauk Medical College, Chennai.

This thesis is submitted to The Tamil Nadu Dr. M.G.R. Medical University in partial fulfillment of the rules and regulations for the M.D. Degree examinations in Anaesthesiology to be held in April 2015.

Place: Chennai.

Date:

(DR.PRIYA.R)

CERTIFICATE

This is to certify that the dissertation presented **"A COMPARATIVE CLINICAL STUDY OF EPIDURAL 0.125% BUPIVACAINE WITH FENTANYL VERSUS 0.1% ROPIVACAINE WITH FENTANYL IN A COMBINED SPINAL EPIDURAL LABOUR ANALGESIA USING INTRATHECAL FENTANYL"** herein by **Dr. PRIYA.R** is an original work done in the Govt. Kilpauk Medical College and Hospital, Department of Anaesthesiology, Chennai in partial fulfillment of regulations of the Tamilnadu Dr. M.G.R. Medical University for the award of Degree of M.D. (Anaesthesiology) Branch X, under my guidance during the academic period 2012-2015.

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CONTENTS

ABSTRACT

BACKGROUND AND OBJECTIVES:

The responsibility of the Anaesthesiologist in obstetrics is arguably greater than in any other fields of anaesthesia. The aim of the study is to compare the quality of epidural analgesia of 0.125% bupivacaine with 0.1% ropivacaine after intrathecal administration of fentanyl 25 mcg in combined spinal epidural labour analgesia.

METHODOLOGY:

Approval was obtained from the Institutional Ethical Committee board. This comparative clinical study of combined spinal epidural labour analgesia for vaginal delivery with intrathecal fentanyl 25 μg initiated in all parturients followed by group B receives epidural 0.125% bupivacaine 10 ml with 2μg of fentanyl/mL and group R receives epidural 0.1% ropivacaine 10 ml with 2μg of fentanyl/mL was conducted in 60 term healthy primi gravida with cephalic singleton pregnancy with 30 in each group, who wished and opted for painless labour after obtaining informed risk consent. Two groups were compared in terms of quality of analgesia using VAS, patient satisfaction, onset and degree of motor & sensory blockade, vitals, fetal heart rate changes, duration of labour, mode of delivery, neonatal outcome and side effects of the drugs.

RESULTS:

Both groups were comparable in age, height, weight, parity and time of initiation of labour analgesia. Combined spinal epidural analgesia decreases the duration of labour. Patient satisfaction, level of sensory blockade, mode of delivery, duration of labour, neonatal outcome and complications are comparable.

Quality of analgesia was excellent in both the groups. Out of 60 parturients, 10 patients (33.3%) in group B and 4(13.3%) patients in Group R had grade 1 Bromage (minimal) motor blockade. P value (0.67) which was statistically insignificant. Maximum motor blockade (grade 1 Bromage) has occurred during the first stage of labour and was seen immediately following the first epidural bolus dose that doesn't affect the progression of labour.

CONCLSION:

The observation of this study shows that both bupivacaine 0.125% and ropivacaine 0.1% administered epidurally as a part of combined spinal epidural technique provides equal and effective quality of analgesia. Motor blockade of grade 1 Bromage was seen relatively more bupivacaine group but that was not statistically significant, it needs further studies in larger scale.

INTRODUCTION

"The delivery of the infant into the arms of a conscious and pain free mother is one of the most exciting and rewarding moments in medicine"

-MOIR DD

Labour is defined as events that occur serially in female genital tract in order to expel the products of conception out of the womb into outer world through the vagina[1].

Pain relief in parturient has always been surrounded by myths and conflicts. Hence, achieving an excellent and safe analgesia during labour remains a most challenging issue.

History of obstetric anaesthesia began with James Young Simpson, who administered Ether to a woman with deformed rachitic pelvis in 1847.She survived the complicated delivery absolutely free of pain .But his concept of "Etherisation of labour" was condemned strongly by critics and was not accepted on the basis of religious background[2] .Religious debate continued till 1853, when John Snow administered chloroform to Queen Victoria during her eighth child birth, Prince Leopold.[3]

In 1950, Neuraxial techniques were introduced for labour pain relief and during the past two decades[3], many more recent advances lead to comprehensive and evidence based management of labour pain.

Labour is a very painful process[4]. It represents the most common acute severe pain in adult life. In McGill pain questionnaire, labour pain ranks in between cancer pain and Amputation of digits[5].

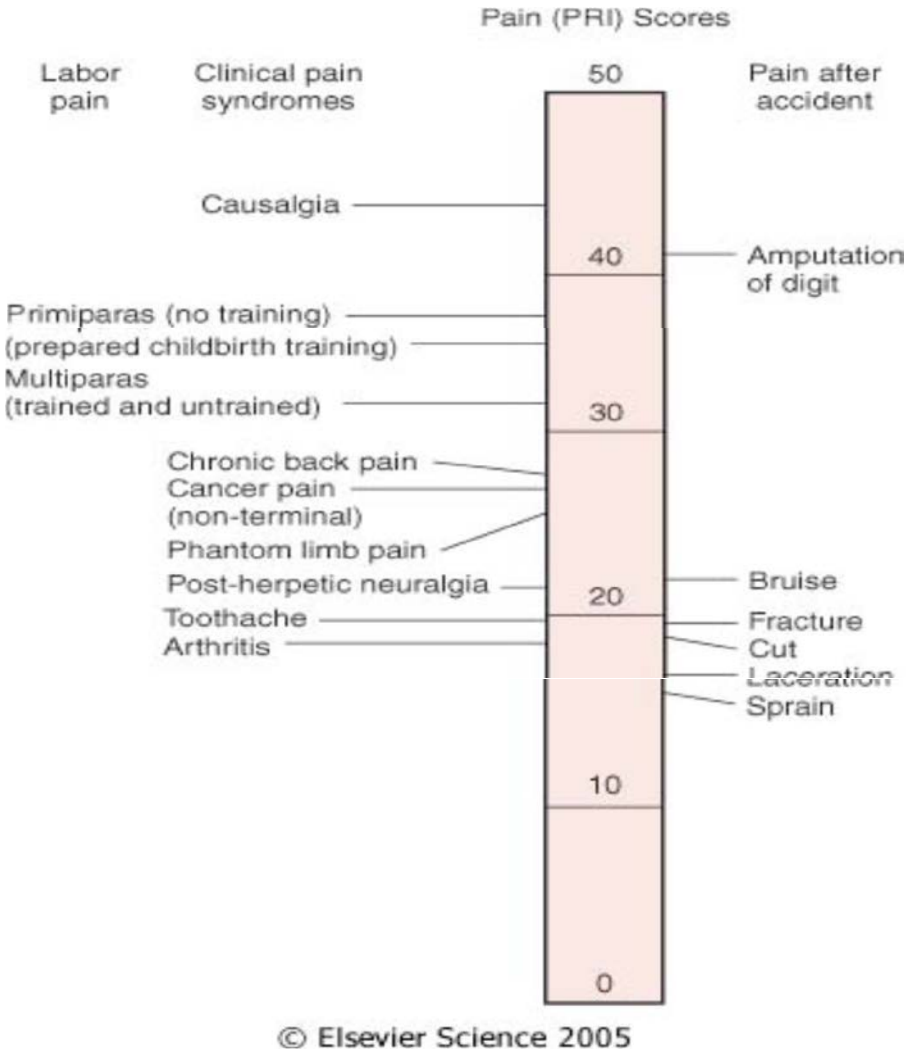


Fig1: McGill Pain Questionnaire

Progression of labour, maternal and foetal well being may be affected by physiological response to labour pain[6.]

- Maternal stress response to pain leads to increase in corticotrophin, cortisol, nor epinephrine and epinephrine levels[6].
- Increased nor epinephrine levels will reduce uterine blood flow by 35-70%.[6]
- Epinephrine has relaxation effect on uterus which may prolong the labour.
- Catecholamine's increases maternal cardiac output, increased systemic vascular resistance and oxygen consumption.[6]
- Hyperventilation during contraction increases the work of breathing , oxygen consumption and resulting in hypoxia which reduces the utero placental blood flow by up to 25%.[7]
- Respiratory alkalosis shift oxyhemoglobin dissociation curve to left and fetal Pa02 may fall up to 23%.[7]
- Compensatory metabolic acidosis appears to be transferred to the fetus.
- There is delayed gastric and urinary emptying.[8]
- Effective pain relief attenuates all these detrimental of stress response to labour pain.
- A goal of maternal labour analgesia is effective pain relief without compromising progression of labour, maternal and fetal safety.

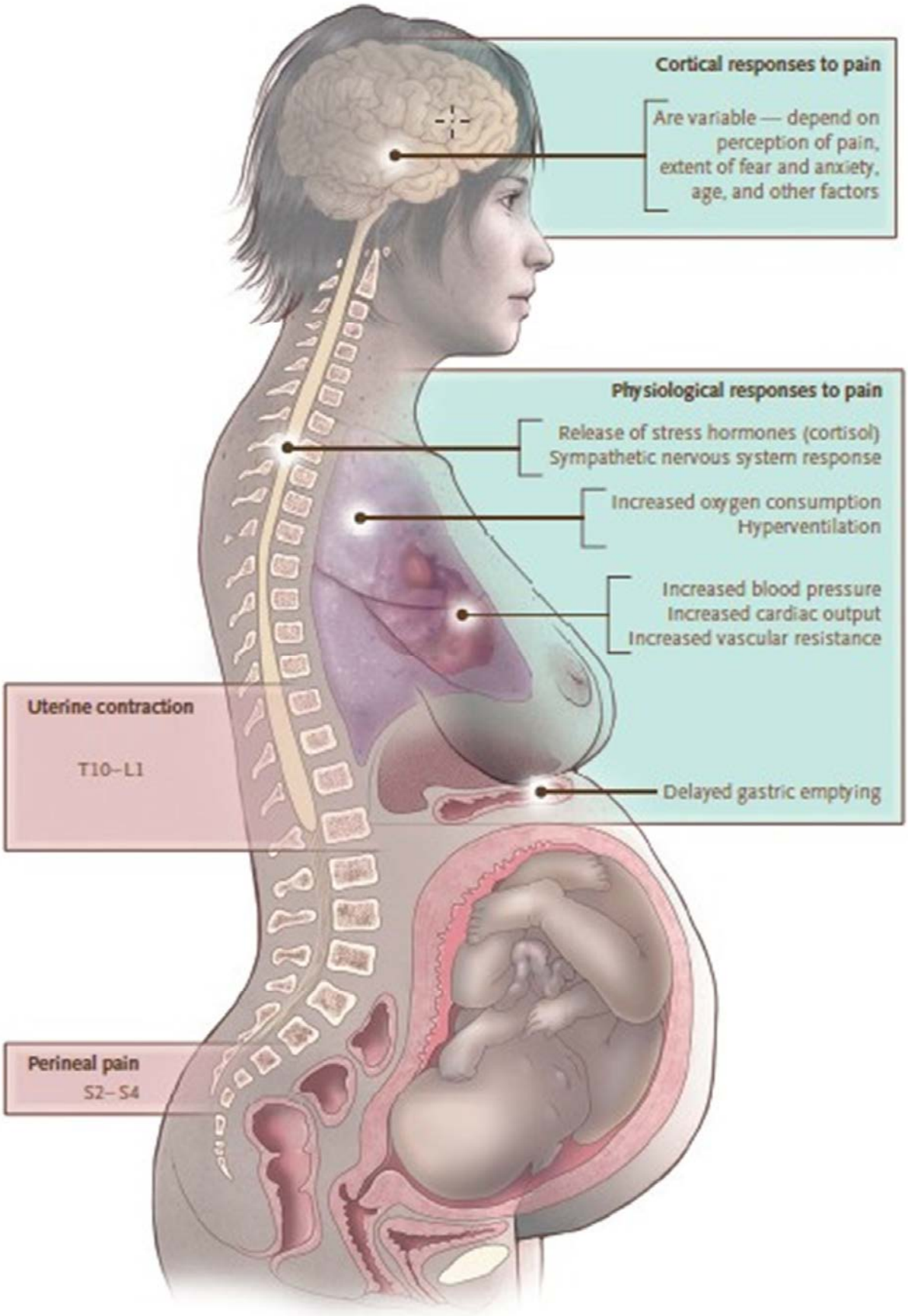
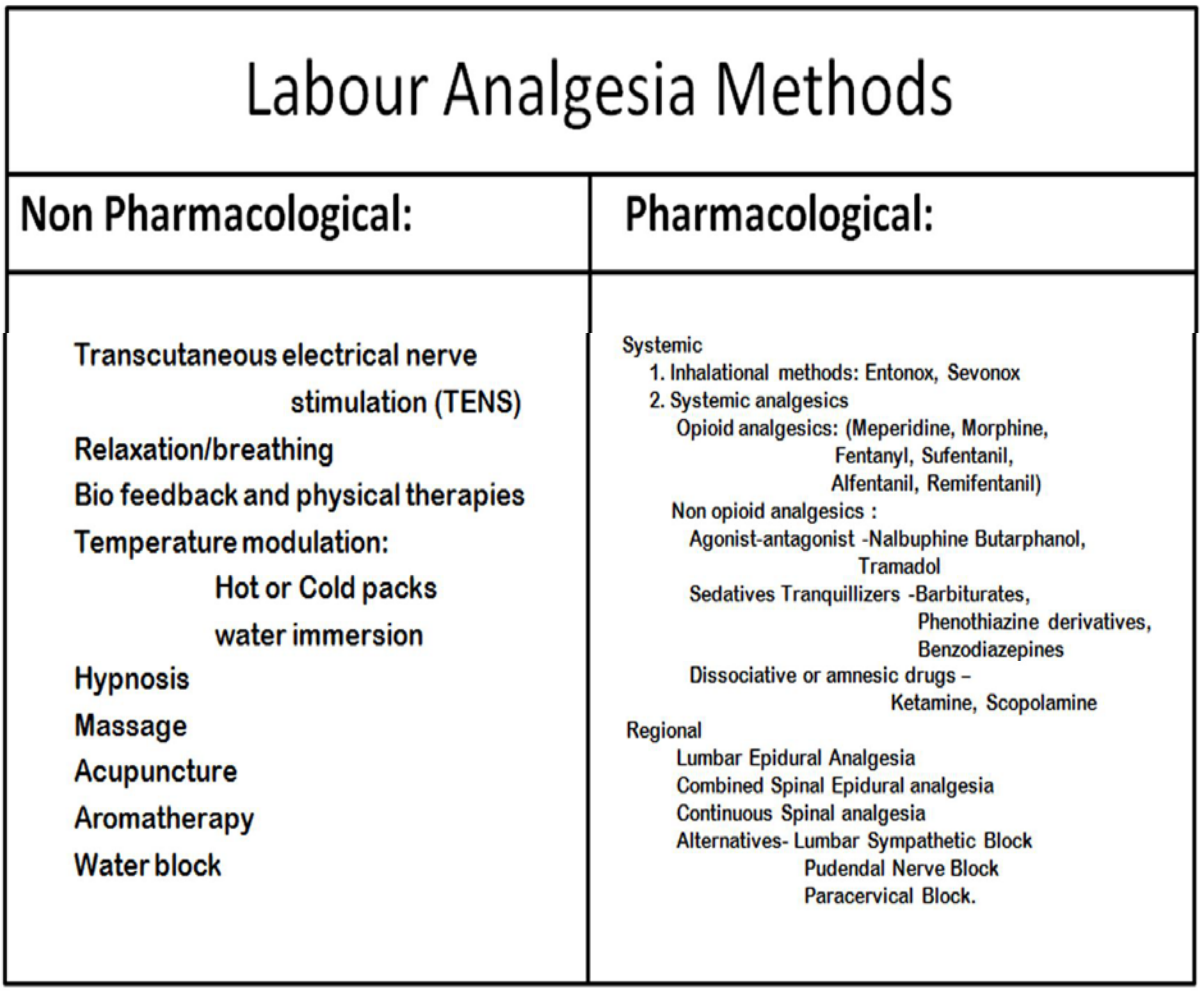


Fig 2: Effects of Labour Pain

Various techniques available for labour analgesia [9]includes



Amongst all, Neuraxial techniques remain the gold standard to provide effective pain relief and least depressant method in current clinical practice.

- Regional technique avoids the risk of gastric aspiration , avoids the usage of general anaesthetic drugs and allows mother to remain awake and participate during delivery.

- It has been said that women confined to bed during labour is associated with prolonged labour due to abnormal presentation, fetal distress that results in increased instrumental deliveries.[10]
- Epidural analgesia remains the most commonly used technique. Time for onset of action takes up to 20 minutes[11, 12, 13]. But the rapid and reliable onset of prolonged analgesia resulting from intrathecal injection with greater flexibility and longer duration of epidural technique makes combined spinal epidural analgesia superior and ideal technique of choice for labour pain.
- Combined spinal epidural technique is frequently used nowadays because of rapid onset of analgesia and better maternal satisfaction. It is associated with shortened labour and increased rate of cervical dilatation.[14]
- Numerous intrathecal intervention are available by using combined Local anaesthetic agent and opioid or opioid alone or null CSE (dura puncture created without injecting any drugs)[15]

  In this study, we used fentanyl 25mcg intrathecally in both groups to provide rapid effective analgesia and then epidurally we used 0.125% bupivacaine with fentanyl µg/mL in Group B and 0.1% ropivacaine with fentanyl 2µg/mL in Group R to compare the quality of analgesia.

AIM OF THE STUDY:

The aim of the study is to compare the quality of epidural analgesia of 0.125% bupivacaine with 0.1% ropivacaine after intrathecal administration of fentanyl 25 mcg in combined spinal epidural labour analgesia.

OBJECTIVES:

Primary Objective:

- To compare the quality of analgesia during the labour in both the groups.

Secondary Objective:

- To compare onset, degree and duration of sensory blockade in both the groups.
- To compare onset, degree and duration of motor blockade in both the groups.
- To compare the rate of cervical dilation duration and progression of different stages of labour and mode of delivery in both the groups.
- Intrapartum fetal heart monitoring and newborn evaluation with APGAR score.
- To study the side effects of the drugs and procedure.

REVIEW OF LITERATURE:

ANATOMY OF EPIDURAL SPACE:

It is a potential space within the bony cavity of spinal canal and lies outside the dural sac .It extends vertically from foramen magnum to coccyx and communicates with paravertebral space laterally through intervertebral foramen.[16]

Boundaries: [17]

Anteriorly	Posterior longitudinal ligament and intervertebral disc
Posteriorly	Ligamentum flavum and the periosteum of the laminae
Superiorly	Foramen magnum where the periosteal and spinal layers of dura fuse together
Inferiorly	Sacrococygeal ligament
Laterally	The pedicles and the intervertebral foramina containing the nerves

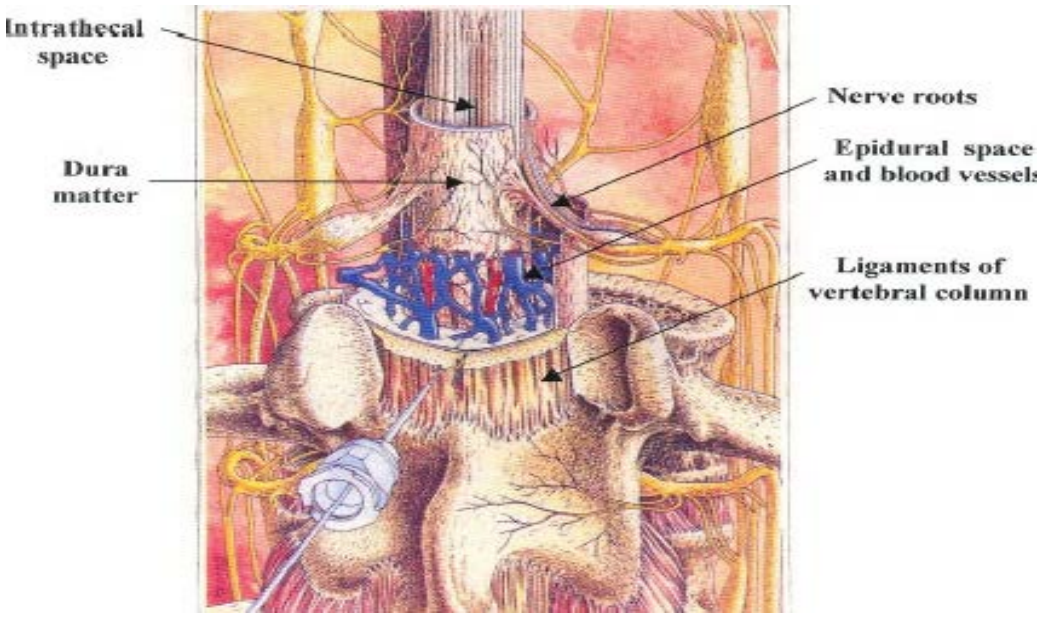


Fig 3: Epidural Space

Contents of the epidural space: [18]

1. Semi liquid fat.
2. Loose areolar connective tissue.
3. Arteries – anterior and posterior spinal artery.
4. Spinal nerve roots.
5. Extensive venous plexus – Bateson's plexus of veins.

Epidural Space in Pregnancy:

- ✓ Epidural space is at a distance of about 4-5 cm from skin in lumbar region[19]
- ✓ Hormonal changes affect vertebral ligamentous structure makes Ligamentum flavum feel softer.[20]
- ✓ Widening of pelvis results in head down tilt of pelvis especially in lateral position which greatly affects the spread of drugs.[21]
- ✓ Epidural veins are engorged and dilated as a result of gravid uterus and thus reducing the volume of epidural space. The local anesthetics will spread more extensively and hence reducing the dose requirement is necessary.
- ✓ Pressure of epidural space in lumbar region is increased from -1cm H2O to 4-10 cm H2O in pregnancy.[16,18]

Site of Action of local anesthetics in the epidural space: [18]

When local anesthetics is injected into epidural space, it exerts it action via

- On nerve roots in epidural space.
- On nerve roots in subarachnoid space after drug diffusion across dura.
- On nerve roots in paravertebral space after they have shed their dural sheath.

MECHANISM AND PATHWAY OF PARTURITION PAIN:

Pain sensation is carried from periphery by small ‘A ‘delta and C fibres, the cell bodies of which lie in dorsal root ganglion. From dorsal horn, projections enter gray mater[22]. Except for few ‘A’ delta fibres that relay in Lamina I (marginal layer), reminder all synapse in Lamina II (Substantia Gelatinosa) and also communication with interneurons whose cell bodies lies in LaminaV. Increased activity in these neurons will result in impulse transmission along anterolateral ascending column. These neurons respond to low sensitivity stimuli like touch and high sensitivity stimuli like pain.

In response to painful stimuli, Substance P in cell bodies of dorsal horn gets released into substantia gelatinosa. Substance P acts as a neuro transmitter which gets inhibited by activity of interneurons in Lamina II. These neurons are activated by collaterals from large sensory fibres and also by inhibitory fibres in dorsolateral funiculus.

Stimulation of opioid receptor in substantia gelatinosa and inhibitory neurons produces analgesia by reducing cyclic AMP levels in opioid sensitive cells, presynaptic inhibition of release of substance P and hyperpolarisation of dorsal horn neurons. Opioids are more effective in blocking activities produced by 'C' fibres than 'A' delta fibres.

Sensory supply:

Sensations from uterine body are carried out by visceral afferents via sympathetic fibres through pelvic inferior hypogastric plexus, uterine plexus and Frankenhauser's plexus. Then these impulse travels to superior ,middle hypogastric plexus and aortic renal plexus to enter lower thoracic and lumbar sympathetic chains to communicate with $T_{10, 11, 12}$& L_1 spinal nerves. They finally pass through posterior roots of nerves to synapse with dorsal horn via LaminaV.

Sensory stimuli from cervix and upper vagina pass through pelvic plexus along pelvic parasympathetic nerves to $S_{2, 3, 4}$ (sacral segments) of spinal cord. Sensations from lower vagina pass through internal pudendal nerve. Branches of ilioinguinal (L_1), posterior cutaneous nerve of thigh ($S_{2,3}$) and genital branch of genitofemoral nerve($L_{2,3}$) carry impulse from perineum and labium majora. Ovarian plexus also carries afferent impulse from uterus along uterine vessels[23].

Motor nerve supply:

Sympathetic fibres from lower thoracic and lumbar segments passes through the aortic renal plexuses, superior and middle hypogastric plexus and continues as paracervical plexus on each side of cervix. Parasympathetic fibres arise from sacral segments and join pelvic plexus.

Uterine activity is predominantly under hormonal and humoral control. Regulation of uterine activity in labour by motor nerve supply is doubtful. Severe hypotension caused by widespread sympathetic block may affect the uterine activity by hindering hormonal supply.[23]

STAGES OF LABOUR: [24]

Progression of labour divided into three stages.

- Stage – I (Onset of uterine contraction to full dilatation of cervix).
- Stage – II (full dilatation of cervix to the delivery of fetus).
- Stage – III (delivery of placenta and membranes).

FIRST STAGE:

Stage begins with onset of regular uterine contractions and ends with the full dilatation of cervix. Average duration in primigravida is 10-13 hours and in multigravida is 6-8 hours.

First stage is further divided into Latent and Active phase.

- Latent phase (initial 3cm dilatation of cervix) is prolonged in nullipara(8 hours) than multipara (4 hours)
- Active phase- Early active phase (cervical dilatation from 3cm to 7 cm) and late active phase (from 7 cm dilatation to full dilatation of cervix), normal rate of dilatation is 1-2 cm/hour in primi and 1.5 cm/hour in multipara. It is considered as prolonged, if rate of cervical dilatation is <1cm/hour.
- Pain in first stage is due to lower uterine distension, mechanical dilatation of cervix and stretching of nociceptive afferents resulting from contraction of uterine musculature. The intensity and duration of contraction correlates with the severity of pain.
- An afferent nerve fibres accompanying sympathetic nerves in the uterine and cervical plexuses, the superior, middle and inferior hypo gastric plexuses supplies the uterus and cervix.

- Small unmyelinated ‘C’ fibres transmit the pain sensation to dorsal nerve roots of $T_{10, 11, 12}$, and L_1 to synapse in the dorsal horn via lower thoracic and sympathetic chains.

Labour pain in first stage is from T_{10}-L_1 dermatomes.

SECOND STAGE:

From full dilatation of cervix to the delivery of foetus.

Average duration is one hour in primi and thirty minutes in multipara. Prolonged second stage is when the duration is more than 2hours in multipara and more than3 hrs in nullipara as per ACOG recommendations.

Stretching of perineum and vagina transmits the pain impulses to spinal cord through internal pudendal nerve (S2, S3, and S4) via fine myelinated, rapidly conducting ‘A ‘delta fibres.

Pain intensity is increased by traction and pressure on bladder, rectum, parietal peritoneum, urethra, uterine ligaments, lumbosacral plexus, fascia and muscles of pelvic floor.

THIRD STAGE:

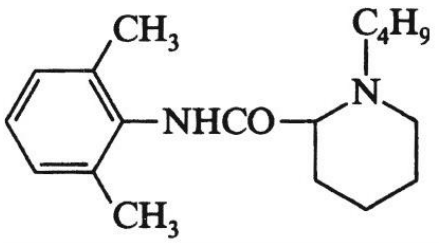
Stage of expulsion of the placenta and membranes. It is usually takes 10-20 min in both primi and multipara.

PHARMACOLOGICAL REVIEW

PHARMACOLOGY OF BUPIVACAINE:

Bupivacaine was first synthesized by Ekenstam in 1957 and it was used clinically in 1963.It is a synthetic long acting amide group local anaesthetic.

Structure:



It is a 2-piperidine carboxamide 1-Butyl N (2, 6, dimethyl, phenyl) mono hydrochloride, hydrate. Molecular weight: 288.pKa-8.1[25]

Pharmacokinetic properties:

Absorption:

- Related to site of injection (Intercostal>Epidural>Brachial plexus>subcutaneous).
- Bupivacaine is a highly lipid soluble drug, so uptake into fat is rapid and it has a direct vasodilator effect.
- A linear relationship between the total dose and the peak blood concentration achieved.

Distribution:

- 95% of drug binds to alpha-1-acid glycol protein in the plasma.
- The Volume of Distribution is 4L/Kg and the foetal maternal transfer ratio is 0.2-0.4.

Metabolism:

- It gets metabolized in the liver by N-dealkylation and is conjugated with glucuronic acid to 2, 6, pipecolyloxylidine.
- N-desbutyl bupivacaine and 4 hydroxy bupivacaine are formed.
- Hepatic disease potentiates its toxicity.

Excretion:

- 5% of dose given is urine as pipecolyloxylidine.
- 16% of drug excreted unchanged.
- The clearance is 0.47L/min.

Presentation:

- Available as 20 mL vial containing clear colourless solution of 0.25%, 0.5% and 0.75% bupivacaine hydrochloride.
- 20 mL vial of 0.25% and 0.5% solution without preservatives are also available.
- 0.5% hyperbaric bupivacaine ampoules (4mL) with dextrose are available.

Mode of action:

Bupivacaine diffuses through neuronal sheath and axonal membrane in its uncharged base to the internal surface of cell membrane sodium ion channel where it combine with hydrogen ion to form cationic form which enters internal opening of sodium channel and acts on receptor . Action is to block sodium channel and thus it decreases sodium ion conductance thereby preventing depolarisation of membrane.

It blocks conduction and generation of nerve impulse by slowing propagation of nerve impulse, by increasing threshold of electrical excitation in the nerve and by reducing rate of rise of action potential. Therapeutic blood concentration doses achieved at 1-2 mcg/mL with no systemic side effects.

Routes of administration and dose:

It can be administered topically, intrathecally, epidurally or by infiltration. Dose is 2mg/kg. It can be used in varying concentration.

- In spinal -hyperbaric 0.5% is used with duration of 75-150 min.
- Epidural- it is used in concentration of 0.5%-0.0625% with onset of 10-20 min and duration 180-300 min.
- Infiltration -0.5-0.25% concentration being used with rapid onset of action and duration is 200 min.

- Peripheral nerve blocks-0.25-0.5% used. Onset of action is 10-20 min and duration is 400 min.
- Obstetric analgesia-0.25 to 0.0625% concentration is being used.
- Predominant sensory blockade seen with concentration of 0.125% - 0.0625% and at concentration above 0.25 % motor blockade predominates.
- It shouldn't be used in Intravenous Regional Anaesthesia.
- Average duration of action in epidural is 120-180 min and 5-6 hours for nerve blocks.

Changes during pregnancy:

Altered protein binding characteristics of bupivacaine in pregnancy lead to increased unbound fraction of drug that results in increased sensitivity to drug and rapid onset of block .Dose is 2mg/kg.[25]

Safe limit is up to 150 mg in 4 hours.

CVS:

- Bupivacaine is markedly cardio toxic as it binds specifically to myocardial proteins.
- It decreases peripheral vascular resistance and myocardial contractility, thus producing hypotension and cardiovascular collapse in toxic concentrations.

CNS:

- Principle effect of this drug is reversible neural blockade which leads to characteristic biphasic effect in CNS.
- Initially excitatory symptoms (light headedness, dizziness, auditory and visual hallucinations, tinnitus and fits) are due to blockade of inhibitory pathways.
- Later CNS depression symptoms (drowsiness, disorientation and coma) are seen with increasing doses because of depression of both facilitatory and inhibitory pathways.
- Limited passage across placenta to fetus since it is highly lipid soluble and protein bound.
- Bupivacaine is undetectable in neonate plasma even 24 hours after caesarean section using bupivacaine induced spinal anaesthesia.[26]

Toxicity / adverse effects:

- Allergic reactions are extremely rare with amide group local anesthetics.
- Toxic plasma levels- 2 to 4 mcg/mL .Dose required producing toxicity in fetus and newborn are much lesser that those adults.
- Pregnant women are more sensitive to cardiovascular toxicity and bupivacaine induced cardiac toxicity are more resistant to CPR. Cardiac toxicity includes ventricular arrhythmia, Atrio ventricular blocks and cardiac arrest. Cardiac/CNS dose ratio is 3.7 ± 0.5.

Obstetric analgesia:

Amide local anaesthetic bupivacaine is being most commonly used for epidural labour analgesia because of its longer duration of action, higher degree of sensory block than motor blockade, less accumulation and less tachyphylaxis.

It is highly protein bound and lipid soluble, a special feature that limits placental transfer. The umbilical vein to maternal vein concentration ratio is approximately 0.3.

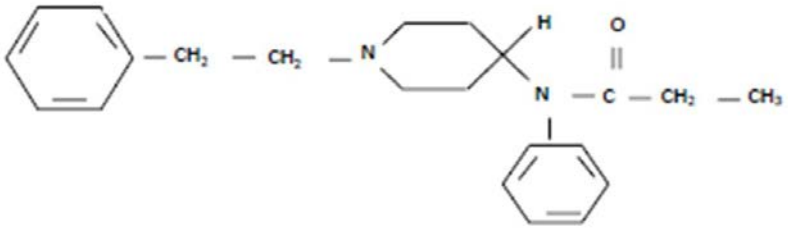
On epidural administration (without opioid), onset of action is within 8 to 10 minutes, but it takes approximately 20 min for its peak action to occur. Duration is approximately 90 min.

Bupivacaine 6.25 to 12.5 mg (5 to 10 mL of 0.125% solution, 10 to 20 mL of 0.0625% solution) combined with fentanyl or sufentanyl is adequate to initiate labour analgesia in most parturients.[2]

PHARMACOLOGY OF FENTANYL

Dr.paul Jannsen, a chemist who first synthesized Fentanyl in1960.It came into clinical practise in 1963.Fentanyl is a synthetic opioid, tertiary amine and phenylpiperidine derivative.[28]

Structure:



Presentation:

I. Available as clear, colourless Fentanyl citrate solution in ampoules containing 50µg/mL
II. Available as transdermal patches which delivers 25/50/75/100mcg/hr over 72 hours.
III. Lollipop –in six dosages (200/400/600/800/1200/1600 µg) that dissolves slowly in mouth.

Potency:

It is 1000 times more potent than meperidine and 50 to 100 times more potent than morphine.

100 µg of fentanyl is equal to 75 mg meperidine and 10 mg morphine.

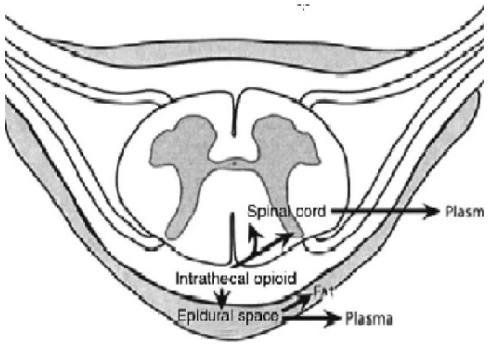
Mode of action: [29, 30]

- ✓ Analgesic property is highly because of selective µ receptor agonist.
- ✓ It acts by inhibition of calcium entry into the cell by inhibition of adenyl cyclase, calcium channels and decreases the release of excitatory neuro transmitter. It also facilitates potassium efflux and hyper polarization of cell membranes
- ✓ Decreased membrane conductance thus decreases both pre and post synaptic responses.
- ✓ Principle site of action through µ receptor at supraspinal sites.

- ✓ It also binds to kappa receptors causing sedation, supraspinal analgesia and anaesthesia.

Intrathecal opioids:

- ➢ Intrathecally opioids binds to G-protein coupled receptor (pre and post synaptic) present in Lamina I and II of dorsal horn of spinal cord.
- ➢ Activation of receptor result in potassium channel opening (mu & delta) and calcium channel closure (kappa), with overall reduction in intracellular calcium.
- ➢ Reduced release of excitatory neurotransmitter (substance P & glutamate) from presynaptic C fibres, but not 'A' fibres resulting in reduced nociceptive transmission.



The fate of intrathecal opioids after injection into lumbar CSF

- ➢ The rapid transfer from the CSF to spinal cord, the epidural fat and the systemic circulation explains the rapid onset and the prompt decline in CSF levels of lipophilic opioid, accounting for the minimal rostral spread,

lack of delayed respiratory depression, and relatively small dermatomal band of analgesia.

- It also enters into brainstem sites via posterior radicular artery.

Epidural fentanyl:

- Epidural fentanyl bolus result in larger amount of drug available in epidural space than occurs at any time during infusion results in activation of dorsal horn opioid receptor in spinal cord.
- Epidural Fentanyl act at spinal levels if administered as a bolus and at supra spinal levels if administered as infusions.
- Epidural bolus cause segmental band of analgesia, the epidural fentanyl infusion produces non segmental analgesia.
- Epidural fentanyl infusion produces analgesia by uptake into systemic circulation with redistribution to peripheral sites and brain. However, epidural bolus acts by specific spinal mechanisms.

Pharmacokinetics and pharmacodynamics:

- IV fentanyl has rapid onset of action and shorter duration than morphine.
- Effect site equilibration time between brain and blood is 6.4 min.
- Greater potency and rapid onset of action reflects greater lipid solubility of drug thereby facilitating transfer across blood brain barrier.

- 75% initial dose of drug administered undergoes first pass pulmonary uptake.
- Rapid redistribution to inactive tissues reflects shorter action of drug.
- Effective analgesic concentrations are seen between 1 and 3ng/mL, while concentration between 1.5 to 3ng/mL, results in 50% reduction in ventilator response to CO2.

Metabolism: [31]

It avidly binds to alpha acid glycoprotein and also bound to albumin. It gets metabolised by N-dealkylation in liver forming norfentanyl which undergoes hydroxylation to hydroxypropionyl derivatives. Cytochrome P_4503A4 plays an important and major role in fentanyl metabolism.

Absorption and distribution:

It can get absorbed orally and its bioavailability is 33%.The Volume of Distribution is 0.88 – 4.4L/Kg. plasma protein binding is 81-94 %.

Excretion:

10% of administered drug gets excreted in urine. Elimination half life is 1.5-6 hours. Clearance is 0.4-1.5L/min. Patients with hepatic diseases have delayed clearance.

Analgesic potency: [31]

- It is 29 times more potent than morphine. Minimal analgesic dose is 0.011mg/kg.
- pKa of drug is 8.4 and therapeutic index is 323.
- The onset and duration depends on the route of administration of drug.
- IM –onset is 7-15 min peaks at 15 min and duration of action is 2 hour.
- IV-onset 2-5 min and duration is 30-60 min.
- Epidural route-onset is 4-6 min, peaks at 5-10 min and duration of action is 2-3 hours.

Clinical effects:

CVS:

- ✓ At dose of 1µg/kg does produce significant effect on papillary muscle mechanics.
- ✓ Doses of 7µg/kg during induction decreases heart rate but no change in mean arterial blood pressure.
- ✓ 10µg/kg produces 50% reduction in myocardial contractility.
- ✓ 20-25 µg/kg produces 15% reduction in heart rate, MAP, systemic and pulmonary vascular resistance and PCWP in patients with coronary artery disease.
- ✓ It can cause histamine release.
- ✓ Fentanyl causes bradycardia of vagal origin.

RS:

- At 1mcg/kg- increase in tidal volume and decrease in respiratory rate
- >3mcg/kg-decrease in tidal volume, respiratory rate and also reduction in ventilator response to hypoxia and hypercarbia.
- It has an antitussive property.
- Chest wall rigidity (“Wooden – chest”.) due to its effect on mu receptors located on GABAnergic interneurons and it can be controlled by the early use of muscle relaxants.
- Respiratory depression is of great concern with spinal and epidural opioid.

CNS:

It has CNS depressant action. Low doses (1-2mcg/kg) are devoid of sedative and hypnotic activity. Stimulation of Edinger Westphal nucleus results in miosis. Epidural fentanyl has less CNS effects than IV administration.

GIT AND GENITOURINARY SYSTEM:

It can produce nausea, vomiting and decreased GI motility. It increases bile duct pressure by causing spasm of sphincter of Oddi. Retention of urine is due to increased tone of bladder detrusor, urethral and vesicle sphincter.

METABOLISM AND OTHERS:

At 50-100mcg/kg produces an increase in plasma cortisol, epinephrine, growth hormone, glucose and free fatty acids during surgery.

Intrathecal opioid induced Pruritus:

Incidences are between 0-100%.pruritus is more common in pregnancy because altered opioid receptor population by hormones. Pruritus is commonly seen in face, neck and upper thorax. There is no relationship between intensity and dose of opioids.

Mechanism of Pruritus and treatment of choice:

- Mechanism has not been fully understood.
- **A** new class of C fibres claims to be the cause and it is linked to central receptor networks. The nature of these networks is not clear, but there is a lot of μ & 5- HT3 receptors in and around trigeminal nucleus.
- Ondansetron (5-HT3 antagonist) decreases pruritus after intrathecal morphine in pregnant females.
- Anti histamines have no role in treatment since it is not caused by histamine release.
- Propofol can be useful by inhibiting posterior horn transmission but sedative property avoids its use for the same.

- Opioid receptor antagonist nalaxone and naltrexone has been used successfully without reversing analgesic property.

Synergism of local anesthetics and opioids: [32]

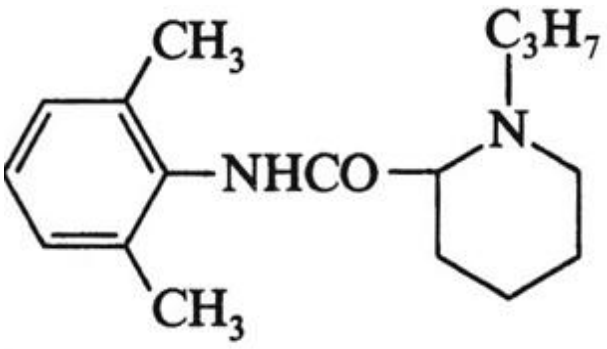
- Advantages of combining these two agents have been thought to be explained their different analgesic properties and their ability to block pain at two different sites.
- Local anesthetics produce analgesia by blocking impulse transmission in nerve roots and dorsal ganglia whereas opioid act on opioid receptors in substantia gelatinosa.
- When lipophilic opioid bolus is administered epidurally, it has biphasic response. Initial portion of drug rapidly absorbed into systemic circulation and act on supraspinal sites. Remaining portion of drug initially distributes in epidural fat and then slowly absorbed in blood stream over several hours.
- It seems far more likely that the local anaesthetic provides a degree of spinal, segmental analgesia while simultaneously; the opioid is systemically absorbed and provides additional analgesia supraspinally.

PHARMOCOLOGY OF ROPIVACAINE:

- ✓ Ropivacaine is long acting amide local anaesthetic which is similar to bupivacaine in structure and pharmacodynamics.
- ✓ Formulated as a single levorotatory enantiomer rather than a racemic mixture.

- ✓ Chemical name : S-(-)-1-propyl-2', 6'-pipecoloxylidide hydrochloride monohydrate

STRUCTURAL FORMULA:



Molecular formula: C17H26N2O•HCl•H2O Molecular weight: 328.89.

Mechanism of action: [33, 34]

Ropivacaine reversibly blocks the entry of sodium into the nerve cell membranes, leading to decreased membrane permeability to sodium and raises the threshold for nerve excitability. Thus, it slows the nerve conduction and reduces the rate of rise of the action potential.

Pharmacodynamics:

Ropivacaine has lesser cardiac and CNS adverse effects because of its stereo selective property. It has similar efficacy of bupivacaine and levobupivacaine in peripheral nerve blocking. It is less potent than bupivacaine when given neuraxially (intrathecal or epidural). It is associated with lower incidence of motor blockade when compared to bupivacaine[35]. It is currently a new agent of choice for regional anaesthesia.

Pharmacokinetics: [34]

- ✓ Plasma concentration varies with dose, injection site vascularity and route of administration.
- ✓ It follows linear kinetics. C max is directly proportional to dose.
- ✓ When given extradurally, its absorption is biphasic ($t_{1/2}$ is 4mins and 4hrs) and complete.
- ✓ Elimination depends upon the route of administration which is a rate limiting step.
- ✓ Epidural ropivacaine has long half life than IV ropivacaine. Terminal half life of IV ropivacaine is 1.8 hours.
- ✓ Highly bound to alpha 1 acid glycoprotein and 6% available in free form.
- ✓ It easily crosses the placenta and degree of protein binding in fetus is less compared to mother.

Metabolism:

- Metabolised mainly by aromatic hydroxylation in liver.
- The main metabolite is 3-hydroxyropivacaine excreted after conjugation. Other metabolites are 4-hydroxyropivacaine and 2', 6'-pipecoloxylidide (PPX).

- When given IV, 86% excreted via urine out of which only 1% is unchanged fragment.
- The 2', 6'-pipecoloxylidide has longer $t_{1/2}$ and lower clearance after infusion through epidural.
- Clearance – unbound ropivacaine – 13.94L/h/Kg & Clearance – Total ropivacaine – 0.555L/h/Kg.
- Volume of distribution – 65.57L/min
- Terminal $t_{1/2}$ of ropivacaine - 3.3hrs & Terminal $t_{1/2}$ of PPX – 17.8 hrs.

Indications:

- Spinal anaesthesia
- Epidural anaesthesia and analgesia
- Peripheral nerve blocks
- Local infiltration

Contraindication:

- Hypersensitivity
- Premature children
- Paracervical block in obstetrics
- Intravenous regional anaesthesia
- Hypovolemia

Dosage and administration:

- ✓ Spinal – 2-3mL of 0.75 %(7.5mg/mL) with doses between 15-22.5mg results in sensory block up to T4 or T5.
- ✓ Epidural block with 6-14 mL of 0.2% ropivacaine provide adequate analgesia
- ✓ Caudal – 1mg/kg, 0.2% or 2mg/mL produces a level below T12.

Adverse effects:

- ✓ Hypersensitivity reactions
- ✓ Main effects - Hypotension ,bradycardia, nausea, vomiting, ,
- ✓ Fever, paresthesia, headache, pruritus, urinary retention, rigors and back pain.

Less common side effects: CNS toxicity, cardiac toxicity

COMBINED SPINAL EPIDURAL TECHNIQUE:

The Obstetric Anaesthetists Association, UK guidelines in 2005[36] suggest the use of CSEA technique in specific situation like

- ➢ Advanced stages of labour where the rapid analgesia is desirable.
- ➢ Very early stages of labour where local anesthetics are avoided.
- ➢ In difficult epidural as CSEA decreases epidural failure rate.

The CSEA technique has been accepted as an ideal technique because it combines rapid profound analgesia of spinal with flexibility and longer duration of epidural techniques. It also reduces or eliminates the disadvantages of both spinal and epidural anaesthesia, while preserving their advantages[37].

Advantages of combined spinal epidural:

Spinal anaesthesia has its own advantages[38] are

- Rapid onset of action.
- Definite end point for placement of needle.
- More reliable and producing excellent analgesia.
- Prevents systemic toxicity by reducing dose requirements.

Disadvantages of spinal [38]are:

- Risk of post dural puncture headache (PDPH).
- Lack of top up methods to prolong or optimize blocks.

Advantages of epidural anaesthesia[38] are:

- Familiar technique
- Widespread use
- Absence of PDPH unless accidental dural tap.
- Slower and predictable onset of hypotension compared to spinal anaesthesia

- Indwelling catheters allows top ups, modification and extension of blocks.

Disadvantages of epidural anaesthesia[38] are:

- Slow to establish the block.
- May be patchy block or asymmetrical.
- Some nerve roots are difficult to block.
- Comparatively large volume of local anaesthetic required.

Thus CSEA technique offers several advantages[38]:

- Better quality of analgesia.
- Rapid onset.
- Low total dose of local anaesthetics.
- Presence of epidural catheter allows us to add local anesthetics and other drugs to optimise and prolong the spinal block.

Characteristics of combined spinal epidural:

It is a multi compartmental block that involves intentional dural puncture followed by epidural drug administration. This introduces the possibility of drug transfer from epidural to subarachnoid space which alters characteristics of block[39].

Pressure in subarachnoid space is greater than epidural space by 5-15cm H20.This pressure gradient prevents drug flux into subarachnoid space.

Epidural administration of drugs transiently abolishes this gradient and allows the drugs to enter into subarachnoid space[39].

Drug transfer depends on needle type, size of hole and property of drugs. Epidurally administered drugs enter the subarachnoid space following dural puncture by spinal needle, accidental dural puncture by epidural needle or by migration and displacement of catheter .Therefore, infusions of low concentration local anesthetics are always safer than high concentration boluses[39].

Techniques of needle insertion and variation:

Numerous CSE techniques[40] are available.

- ✓ Subarachnoid block followed by epidural catheter insertion at same or higher interspace.
- ✓ Epidural catheter insertion followed by spinal needle placement at lower interspace.
- ✓ A spinal needle besides epidural needle in same interspace by specially designed needle.
- ✓ Needle through needle technique in which epidural space identified and dural puncture is made with long fine bore needle inserted through epidural needle. Free flow of CSF indicates correct placement of needle.

Opioid alone or local anesthetics and opioid injected intrathecally. Epidural catheter inserted 3-5 cm after withdrawing spinal needle.

Needle through needle versus separate needle technique:

- Holmstrom et al [39]in 1993 found that 64% of departments in Sweden preferred separate needle technique.
- In a random study of 100 parturients, Lyson et al[40] compared needle through needle technique and separate needle techniques. He found that separate needle has lower spinal failure rate (4% vs. 16%), less hypotension and less time for insertion than needle through technique.
- Casati et al [41]found that higher rate of hypotension (23%) and spinal failure rate (5%) in needle through needle group than separate needle group (13% and 1.6% respectively).
- Cost of special equipments for needle through needle is higher than epidural needle and 27G point spinal needle.

Combined spinal epidural versus traditional epidural:

Cochrane review and CSE[15]:

In CSE, three types of interventions were available.

-opioid alone.

-local anaesthetics plus opioids.

-Null CSE –no intrathecal injections after dural puncture.

By using these definitions, comparison falls into six types.

- 1. LA plus opioid CSE versus traditional epidural
- 2. LA plus opioid CSE versus low-dose epidural
- 3. opioid only CSE versus traditional epidural
- 4. opioid only CSE versus low-dose epidural
- 5. opioid only CSE versus test LA/opioid epidural
- 6. null CSE versus traditional epidural

✓ When CSE compared with traditional epidural, mean time of onset of analgesia is three minutes shorter in CSE groups (MD -2.87, 95% CI -5.07 to -0.67, two studies and 129 women). Lesser urinary retention (RR 0.86, 95% CI 0.79 to 0.95, one study,704 women) and fewer assisted vaginal births(RR 0.80, 95% CI 0.67 to 0.97, six studies, 1015 women) in the CSE group[15].

✓ Comparison of CSE with low dose epidural, mean onset of analgesia is five min shorter in CSE group (average MD -5.42, 95% CI -7.26 to 3.59, five studies, 461women) and effective pain relief at ten min after first injection (RR 1.94, 95% CI 1.49 to 2.54, one study, 101 women)[15].

✓ Pruritus is more common in CSE group (RR 1.94, 95% CI 1.49 to 2.54, one study, 101 women) than low dose epidural[15].

Camman et al[42] conducted a study on 1,532 healthy parturient who received either CSE or conventional epidural during six months period in KK womens and children hospital, Singapore.

- CSE needs lesser analgesic requirements($p<0.01$)
- CSE commonly preferred in 80% of all neuraxial techniques (vs. 20% EA)
- CSE commonly used in multiparous parturients (OR 2.03, $p <0.01$), in a more painful (OR=1.61, p=0.03) and advanced stage of labour (OR=1.12, p=0.03)[42]
- CSE has higher patient satisfaction score (OR=1.77, $p <0.026$)
- Increased risk of Pruritus (29% vs. 14%, $p <0.01$) but lower risk of post block neural deficits (0% vs. 2%, $p <0.01$) seen in CSE than EA[42].
- Thus CSE is a safe and good alternative to EA for labour analgesia.

Miro et al [43]investigated a study conducted in 6497 women who received regional anaesthesia in 2005.

- 4533 received epidural analgesia (69.8%) and 1964 received combined spinal-epidural (30.2%) for labour[43].
- Pruritus, back pain and paresthesia were seen more in CSE group than EA.
- Quality of analgesia was better in CSE.
- No difference regarding accident dural puncture and PDPH were seen.

- Labour outcome and safety was similar in both groups[43].

American Society of Anaesthesiologist guidelines on obstetric anaesthesia 2007[44](comparing CSE with EA, literature supports)

- Equivalent and faster onset of analgesia with CSE
- Increased rate of Pruritus is more with CSE
- Equivocal about nausea, hypotension, mode of delivery, motor block, maternal satisfaction with analgesia, fetal heart rate changes and APGAR scores[43].

Opinions between ASA members and the consultants when comparing CSE with EA are

- Both agree fast onset of analgesia with CSE
- Both disagree that CSE increases neonatal or fetal adverse effects[43]
- Equivocal regarding overall analgesic efficacy, motor block and duration of labour.
- Consultants were disagreeing but ASA members are equivocal about CSE increases maternal side effects[43].

Rapid dilatation and shorter duration of labour with CSE:

- **Michael. P Nageotte et** al studied 775 primiparous women who requested labour analgesia and results were lesser rate of instrumental

deliveries and increased rate of spontaneous deliveries in CSE group than conventional EA group. No difference in incidence of dystocia and rate of operative deliveries among groups[45].

- Lawerence C Tsen et al conducted random study among healthy nulliparous women and concluded that increased rate of cervical dilatation in CSE groups than EA groups[46].
- **Amit.G.Bhagwat et al** investigated 60 nulliparous parturient who participated in study and results were CSE technique associated with rapid cervical dilatation and shorter duration of labour[47].
- **Abouleish et al** study also supported CSE groups had rapid onset of analgesia in advanced stages of labour in term parturients[48].

Fetal heart rate changes:

- ✓ In a study conducted by **Palmer et al**, found out that lower incidence of fetal heart rate changes and no difference in neonatal outcome, while comparing both CSE and conventional EA groups[49].
- ✓ Increased incidence of fetal bradycardia and non reassuring FHR changes immediately after CSE .It has been suggested that sudden onset of analgesia decreases maternal circulating catecholamines which may be the cause for fetal bradycardia. These changes are usually transient and resolves in 5-8 minutes[50].

- ✓ Transient non reassuring FHR changes may be due to uterine hyper stimulation which is due to sudden decrease in maternal catecholamines and hypotension following sympathetic blockade[51].
- ✓ Gorman et al study shown that fetal bradycardia may occur in absence of hypotension or uterine hyper stimulation and it is unrelated uteroplacental insufficiency[52].

Quality of analgesia:

Miro et al, a retrospective study reveals that CSE and EA groups were compared in terms of safety and effect on type of delivery, better quality of analgesia seen with CSE group[45].

Neuraxial analgesia and outcome:

- Many studies revealed that rate of incidence of emergency caesarean section are lower in CSE group than conventional epidural[53, 54].
- In C. R. Cambic and C. A. Wong et al study [55],it has been shown that effective early initiation of neuraxial labour analgesia doesn't increases risk of caesarean delivery. Effective analgesia doesn't affect first stage but it increases duration of second stage. There has been increased rate of instrumental vaginal delivery with neuraxial technique which may be due to many confounding factors (obstetric factor, technique, local anaesthetic drug concentration, maintenance and degree of analgesia) [55].

Accidental Dural puncture and Continuous spinal analgesia:

In a study conducted by S.V Rutter, F Shields, C.R Broadbent, M Popat, R Russell[56] , labour epidural were placed in 15030 patients and 72 accidental dural punctures (ADP) were identified. Group I-34 patients converted into continuous spinal analgesia with intraspinal catheter and Group II- 37 patient's epidural was resited in another space. Both groups were compared in terms of maternal safety, quality of analgesia and mode of delivery.

After epidural resiting, three ADPs noted .High level of blocks were noted & managed with intubation and ventilation. PDPH was seen in 71% vs. 81 %(group I vs II) (p=0.45).Epidural blood patch was done in 50% vs. 73 %(group I vs II) (p=0.008).Hence following ADP, continuous spinal analgesia is a simple and effective method than resiting an epidural[57].

- In Riger et al study, cauda equina syndrome is noted with use of smaller gauge micro catheter (24 G or smaller). It was postulated that smaller diameter of catheter results in laminar flow predisposing nerve roots to higher concentration of local anesthetics[58].
- Ayad et al observed that after ADP, of 20G catheter inserted into intrathecal space and it was left in place for 24 hours after delivery, lower incidence of PDPH (6.2%) rather than removing catheter immediately (51.4 %) [59].

COMPLICATIONS AND ITS MANAGEMENT:

Hypotension[18]:

It is often defined as 20%-30% drop in systolic blood pressure from baseline. Hypotension following intrathecal opioid is due to pain relief rather than sympathectomy. Uncorrected prolonged hypotension leads to decreased uteroplacental blood flow results in fetal hypoxia and acidosis. Management includes left lateral position, 100% oxygen administration, rushing IV fluids, if still hypotensive, ephedrine 6 mg has to be given every two minutes until blood pressure is corrected to restore uterine artery perfusion promptly.

Inadequate Neuraxial Analgesia[18]:

- First the other causes of pain (distended bladder, rupture uterus) have to be ruled out.
- Then the location of the catheter has to be confirmed.
- If in doubt, the catheter has to be replaced.
- If the catheter is placed correctly but the extent of the block is inadequate(i.e. T10-S4 required for late labour)
    - Dilute solution of local anesthetics has to be injected as per group (5-15mL).
    - Alternative maintenance technique (decreasing concentration, increasing volume) have to be chosen.
    - Placing the less blocked side in dependent position

- If all above manoeuvres doesn't help, the catheter can be replaced.

- If catheter is in space ,but the patient has breakthrough pain despite the adequate extent of blockade ,then
  - A more concentrated solution of local anesthetics with or without an opioid can be injected.
  - Alternative maintenance technique (increasing concentration of local anesthetics) can be chosen.

Intra Vascular Placement of Catheter and Local Anaesthetic Systemic Toxicity[20]:

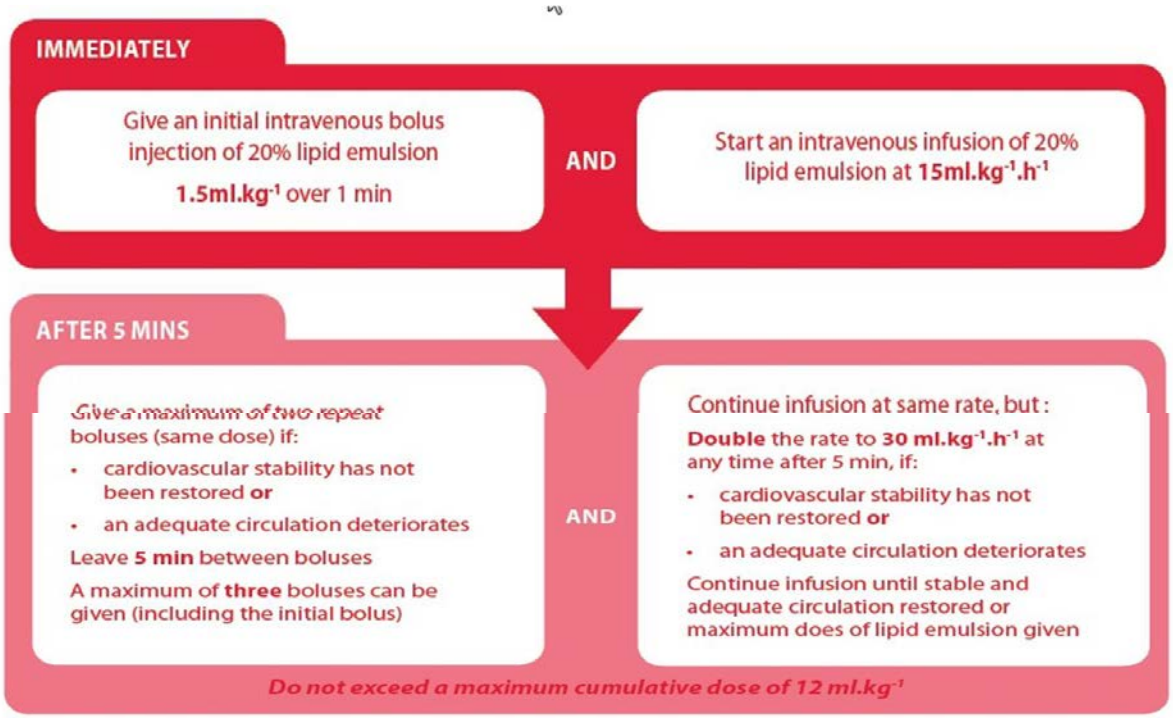
- Confirmation of intravascular placement of catheter can be done with negative aspiration of blood in presence of multiorifice catheter.
- If blood is seen during aspiration, then it can be flushed with saline and the catheter has to be withdrawn 1 cm and the aspiration test can be repeated. One can proceed further if aspiration test is negative.
- If not then the catheter has to be removed and can flush with saline and can be tried in another space.

With the usage of less concentration of local anesthetics, chances for LA toxicity is very less. This plays a major role when operative delivery is planned. If toxicity occurs, then the position of the catheter has to be confirmed with a traditional test dose (3 mL of 1.5% lignocaine with adrenaline 5µg/mL).

Intravascular injection of large doses of local anesthetics causes

- CNS symptoms (perioral numbness, tinnitus, dizziness, restlessness, seizures, loss of consciousness).
- CVS effects ranging from increased blood pressure to bradycardia, ventricular fibrillation and tachycardia.
- Bupivacaine induced cardio toxicity may be fatal in pregnant women.

Management includes treatment of convulsion with benzodiazepines or barbiturates, supporting ventilation and oxygenation, if needed advance cardiac life support may be initiated. Amiodarone may be indicated in life threatening ventricular arrhythmias. Early delivery of infant should be considered after 4 minutes of failed CPR, because it may improves likelihood of resuscitation. If available, an intravenous bolus administration of 20% lipid emulsion can be considered.



Accidental Dural puncture[18, 20]:

During catheter placement if dural puncture is encountered, then one can try in another space. If second attempt also fails, then it can be converted into continuous spinal labour analgesia.

Table 2. Suggested Solutions for Maintenance of Continuous Spinal Catheter Analgesia and Anesthesia

Technique	Solution[a]
Labor analgesia Intermittent bolus[b]	Plain bupivacaine 1.75–2.5 mg + fentanyl 15–20 μg as needed (roughly each 1–2 hours) or Sufentanil 5.0 μg initial bolus, repeated as needed
Continuous infusion[c,d]	0.05%–0.125% bupivacaine + fentanyl 2–5 μg/mL @ 0.5–3.0 mL/h and titrated to a T_8–T_{10} sensory level or Sufentanil 2.5–5.0 μg/h
Surgical anesthesia[b]	Preservative-free 0.5% bupivacaine 5.0 mg (1 mL) + fentanyl 15 μg for the initial dose followed by 0.5-mL boluses of 0.5% bupivacaine (2.5 mg) every 5 minutes until the desired block height is obtained. Repeat the 0.5-mL bupivacaine dose as needed to maintain the desired block height

High (or) total spinal blockade[20]:

Unexpected high level or total spinal blockade can result from

- ✓ Unintentional placement of catheter in subarachnoid or subdural space and injection of epidural dose of local anaesthetic through the catheter.
- ✓ Overdose of the drug in epidural space.
- ✓ Migration of catheter into subarachnoid or subdural space during the course of labour.

	Epidural Block	Subdural Block	Spinal Block
Onset time	Slow	Intermediate	Rapid
Spread	As expected	Higher than expected; may extend intracranially, but sacral sparing is common	Higher than expected; may extend intracranially, and a sacral block is typically present
Nature of block	Segmental	Patchy	Dense
Motor block	Minimal	Minimal	Dense
Hypotension	Less than spinal, and dependent on the extent of the block	Intermediate between spinal and epidural, and dependent on the extent of the block	Likely

Risk is more when operative delivery is planned .Communication with the patient is necessary in assessing the onset of total or high spinal blockade. Symptoms like agitation, difficulty in speaking, dyspnea, and profound hypotension may occur. Patient may lose his consciousness and stop breathing because of hypo perfusion of the brain and brainstem.

During this management includes

- Maintaining patient in left lateral position to avoid aortocaval compression.
- Administration of hundred percentage oxygen
- Positive pressure ventilation through endotracheal tube.
- Monitor maternal vitals, fetal heart sound and ECG.

- Support maternal circulation with intravenous fluids and vasopressors if needed.
- Epinephrine can be administered if needed.
- Administration of small dose of sedative-hypnotic agents.

Intrathecal Opioid Induced Pruritus[18]:

- Incidence of pruritus is 0-100% following intrathecal opioid.
- Anti –histamines have no role, because this is not related with histamine release.
- Use of opioid antagonist relieves pruritus but it reverses analgesia.
- Highest concentration of serotonin (5-HT3) receptors is located on dorsal horn of spinal cord and trigeminal nucleus of medulla. Activation of these receptors plays a role in pruritus. Hence 5-HT3 antagonist (Ondansetron 4 mg) may be used to relieve the pruritus.

ANAESTHESIA FOR EMERGENCY CAESERIAN SECTION:

Emergency LSCS requires sensory blockade level up to T4 which typically requires a volume of 15- 20 mL of local anaesthetics with one or more adjuvants.

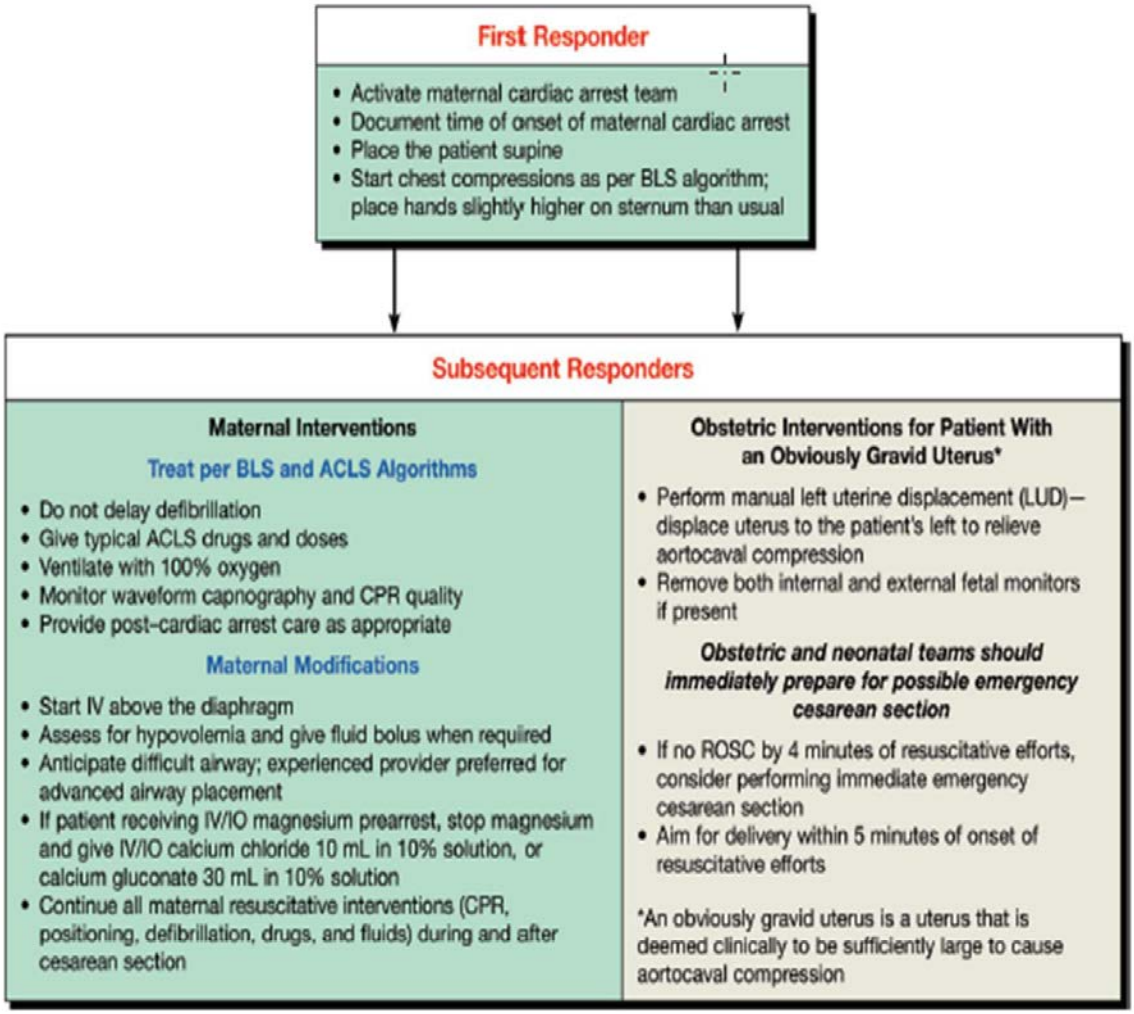
Extension of epidural anaesthesia in labour room can be initiated with 5-10 mL of 2% lignocaine (with adrenaline 2µg/mL) while shifting the patient to OT in left lateral position.

- Sensory blockade level is assessed once patient reaches the OT. If blockade is bilateral and moving cephalad, additional 5- 10 mL can be given in increments to achieve level T4.
- Addition of 50-100µg fentanyl provides good quality of analgesia.
- Fractionated dosing schedule offers advantages like greater hemodynamic stability, minimal compression of dural sac which allows safer conversion to spinal anaesthesia if epidural anaesthesia is not successful and early sensory blockade which allows surgeons to initiate surgery very well early prior to full establishment of level T4.M

Maternal Cardiac Arrest[18]:

Following Cardiac arrest one can resuscitate as per 2010 American Heart Association guidelines.

Maternal Cardiac Arrest



Search for and Treat Possible Contributing Factors (BEAU-CHOPS)

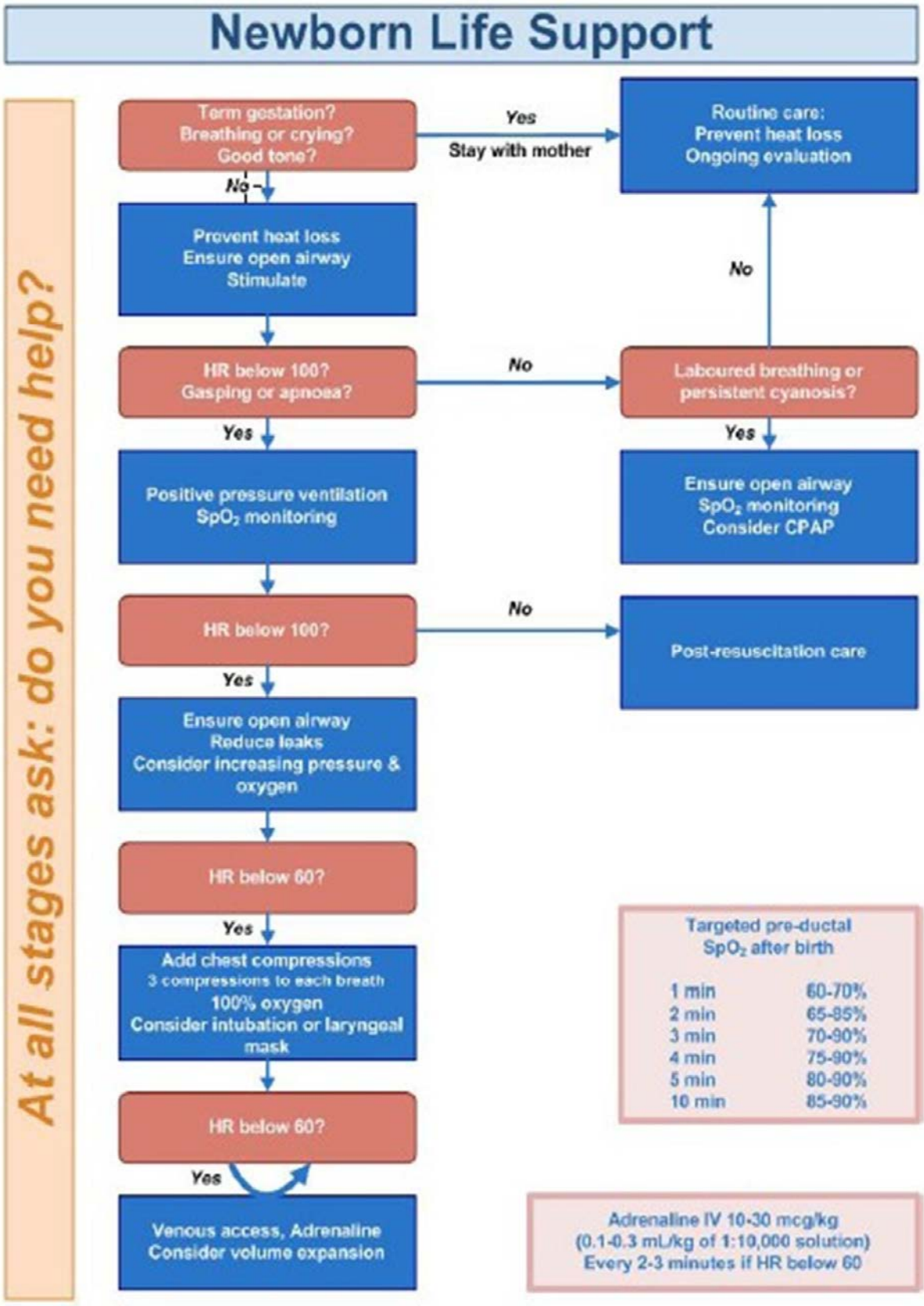
Bleeding/DIC
Embolism: coronary/pulmonary/amniotic fluid embolism
Anesthetic complications
Uterine atony
Cardiac disease (MI/ischemia/aortic dissection/cardiomyopathy)
Hypertension/preeclampsia/eclampsia
Other: differential diagnosis of standard ACLS guidelines
Placenta abruptio/previa
Sepsis

Intrauterine Foetal Resuscitation[18]:

Impairment of oxygen delivery to the fetus results in significant fetal hypoxia and acidosis. During fetal distress, the following resuscitative measures have to be done.

- ✓ Left lateral position
- ✓ High flow oxygen administration
- ✓ Rushing intravenous fluids
- ✓ Tocolysis to reduce uterine contractions.
- ✓ Vasopressors for treating maternal hypotension.
- ✓ Amnioinfusion for improving uterine blood flow.

After delivery the newborn has to be assessed and resuscitated as per 2010 AHA Newborn Resuscitation Guidelines.


Newborn Life Support
At all stages ask: do you need help?
Term gestation?
Breathing or crying?
Good tone?
Yes
Stay with mother
Routine care:
Prevent heat loss
Ongoing evaluation
No
Prevent heat loss
Ensure open airway
Stimulate
No
HR below 100?
Gasping or apnoea?
No
Laboured breathing or persistent cyanosis?
Yes
Yes
Positive pressure ventilation
SpO2 monitoring
Ensure open airway
SpO2 monitoring
Consider CPAP
HR below 100?
No
Post-resuscitation care
Yes
Ensure open airway
Reduce leaks
Consider increasing pressure & oxygen
HR below 60?
Yes
Add chest compressions
3 compressions to each breath
100% oxygen
Consider intubation or laryngeal mask
HR below 60?
Yes
Venous access, Adrenaline
Consider volume expansion
Targeted pre-ductal SpO2 after birth
1 min 60-70%
2 min 65-85%
3 min 70-90%
4 min 75-90%
5 min 80-90%
10 min 85-90%
Adrenaline IV 10-30 mcg/kg
(0.1-0.3 mL/kg of 1:10,000 solution)
Every 2-3 minutes if HR below 60

Intrathecal fentanyl:

- ✓ In a popular study, 84 parturients in active labour divided into seven groups to find effective doses of intrathecal fentanyl. Fentanyl doses of 5,10,15,20,25,35,45 mcg were allocated in each group as a part of CSE technique. They concluded that rapid profound analgesia with intrathecal fentanyl with minimal side effects. If dose of fentanyl increased beyond 25 mcg, there was little benefit[60].
- ✓ In current practice, use of low doses of bupivacaine with fentanyl intrathecally has become very popular. Addition of fentanyl to bupivacaine reduces bupivacaine doses by 50%.Lower concentration of bupivacaine produces very minimal motor block and without fentanyl it doesn't produce effective analgesia. The dilute concentration produces effective analgesia without affecting cardiovascular stability[61].

EPIDURAL ROPIVACAINE AND BUPIVACAINE WITH FENTANYL:

Stienstra et al (1995)[62] conducted a prospective randomized study in 76 term parturients; they compare the effects of initial 10 mL of 0.25% bupivacaine with 0.25% ropivacaine and continuous infusion of same drug at 6-12 mL/hr. Top up of 6-10 mL given as and when required. No statistical difference was found between two groups with regards to onset of analgesia, contraction pain, intensity and duration of motor block.

Eddleson JM et al (1996)[63] compared 0.2% bupivacaine with 0.125% ropivacaine in 104 parturients for labour epidural analgesia. Onset of pain relief, maternal satisfaction, and level of sensory blockade were similar in both the groups. The incidence, duration and degree of motor block were slightly but not significantly less in the ropivacaine group. Higher incidence of spontaneous vaginal delivery was seen in ropivacaine group. No significant difference in neonatal outcome.

Owen et al (1998) [64]compared 0.125% bupivacaine with 0.125% ropivacaine using patient controlled epidural analgesia (PCEA). They found both groups were clinically similar. No difference was noted with regards to sensory levels, verbal pain, duration of labour, mode of delivery and patient satisfaction.

Yaakov Beilin et al(1999)[65] parturients received 0.2% ropivacaine (group I),0.15% ropivacaine(group II),0.1% ropivacaine (group III) with 13 mL bolus and additional 5 mL given after 5 min if analgesia was not adequate, study was concluded after the degree of pain relief noted after 15 min . They found adequate analgesia noted 93 % in group I, 64% in group II and 33% in group III. 0.2 % ropivacaine provides significant analgesia and hence concluded that ropivacaine concentration for initiation of labour analgesia should be minimum 0.2%.

Meister et al (2000)[66] randomised 150 parturients to receive either 0.125% ropivacaine with fentanyl 2µg/mL or 0.125% bupivacaine with fentanyl

2µg/mL by using patient controlled epidural analgesia. No differences in pain score, local anesthetics used and patient satisfaction were noted between the groups. Ropivacaine group had significantly lesser motor block than Bupivacaine group.

Campell et al(2000)[67]conducted a study in 40 nulliparous women in early active labour received either 20 mL of 0.08%bupivacaine with fentanyl 2µg/mL or 20 mL of 0.08% ropivacaine with fentanyl 2µg/mL to initiate labour epidural analgesia. They found that ropivacaine group had effective analgesia without causing clinically significant adverse maternal side effects while preserving maternal ability to void urine and ambulate.

Fettes et al (2000)[68] conducted a double blinded randomised study in 40 labouring nulliparous women to compare continuous infusion or intermittent bolus of Ropivacaine with fentanyl for epidural analgesia. They found no significant differences in patient characteristics, sensory/motor block and maternal/neonatal outcome between two groups. However, the total dose of drug used was lower and time to first rescue bolus was longer in intermittent bolus group. Hence they concluded that intermittent bolus is a more efficacious mode.

Fischer et al (2000)[69] compared the administration of 0.1% ropivacaine and 0.1% bupivacaine with sufentanyl 0.5µg/mL via PCEA .5 mL of above administered as test dose followed by a loading dose 5 min later. PCEA regimen used was 5 mL bolus and 10 min lockout period. Two groups did not differ in

VAS score, volume of drug used, mode of delivery or anaesthetic used. Ropivacaine group needed frequent top ups during second stage and associated with prolonged second stage. Maternal satisfaction was better with bupivacaine. Ropivacaine group had significantly lesser motor blockade during first stage of labour. They concluded ropivacaine produce less motor block but are clinically less potent.

Helene Fine gold et al(2000)[70] did a randomised double blinded study with group I received 10 mL bolus of 0.25 % bupivacaine and infusion of 0.125% bupivacaine with fentanyl 2 µg/mL and group II received 10 mL bolus of 0.2 % ropivacaine and infusion of 0.1% ropivacaine with fentanyl 2µg/mL . No difference in median VAS score was observed between two groups. However, 80% of ropivacaine group had no demonstrable motor block after first hour compared with 55% of patient in bupivacaine group. They concluded that both produced satisfactory analgesia but ropivacaine infusion had lesser motor block.

Dresner M et al (2000)[71] study compared ropivacaine 0.2% ropivacaine with bupivacaine0.1% with fentanyl for labour analgesia. Both groups received 15 mL of loading dose, infusion rate of 8 mL/hr and breakthrough top ups was given with 10 mL 0.25% bupivacaine. Ropivacaine group needs lesser routine topups and fewer escape topups. No significant difference in motor blockade and mode of delivery between two groups.

Fernández-Guisasola J et al (2001)[72] compared equipotent doses of 0.0625% bupivacaine with fentanyl and 0.1% ropivacaine with fentanyl as continuous infusion. Both groups receive initial bolus of 8 mL of 0.7% lignocaine with 50µg fentanyl and continuous infusion of 0.0625% bupivacaine with fentanyl2µg/mL or 0.1%ropivacaine with fentanyl 2µg/mL depending upon group. Top up boluses of 5 mL given for breakthrough pain. No significant difference was noted with regards to pain intensity, VAS score, and mode of delivery, maternal and fetal outcomes. They concluded that both are equally effective but ropivacaine was less potent than bupivacaine.

H.J.Clement et al (2002)[73]study compared 0.1% ropivacaine with sufentanyl0.5µg/mL versus 0.10%bupivacaine with sufentanyl 0.5µg/mL. No significant difference observed. They concluded both are equally effective.

Lacassie HJ et al (2002)[74] conducted a study to determine MLAC (minimum local anaesthetic concentration) motor block for bupivacaine and ropivacaine. They found motor block MLAC for bupivacaine was 0.326% and for ropivacaine0.497%.The ropivacaine/bupivacaine potency ratio was 0.66 and had similar potency for those two drugs.

Owen MD et al (2000)[64] conducted study to find out concentration of ED50 doses of ropivacaine and bupivacaine in labour epidural.59 parturients were randomised to receive 0.075% bupivacaine or ropivacaine with fentanyl using PCEA. Analgesia was initiated with 20 mL of study solution with PCEA settings: 6 mL/h basal rate, 5 mL bolus, 10 min lockout, and 30 mL/h limit.

Breakthrough pain was treated with 10-mL boluses of study solution. They concluded that both are equally effective and no difference with respect to pain score, satisfaction, motor/sensory block, labour outcome and adverse effects.

Lee BB et al(2002)[75]compared ropivacaine 0.1% with 0.2% and to look for effects on addition of fentanyl.58 parturients received 0.2% ropivacaine initially and then they randomised to receive infusion of either of following at 10 mL/hr: Ropivacaine 0.1%(R1),Ropivacaine 0.2%(R2), Ropivacaine 0.1% with fentanyl 2µg/mL(RF).Additional analgesia were given with 5 mL bolus of 0.2% ropivacaine .All groups required equal supplementary top ups and provide equal analgesia.VAS score in R2 and RF was equal and lower than R1.Hypotension was more in RF when compared to R1 and R2. Patient satisfaction, neonatal and maternal outcomes were similar among all groups. They concluded that 0.1% ropivacaine alone provided adequate analgesia during first stage of labour. Addition of fentanyl to ropivacaine 0.2% improved quality of analgesia equal to ropivacaine 0.2% alone.

Fernandez C et al (2003)[76] compared 0.1% ropivacaine(R group) with 0.125% bupivacaine (B group) for motor block and analgesic efficacy in continuous epidural infusion. Analgesia, hemodynamics and fetal characteristics were similar .R group required frequent top ups but was not statistically significant. Motor block was more in group B. Both drugs were equally effective and ropivacaine offered no advantage over bupivacaine.

Boselli et al (2003)[77] compared 0.15% ropivacaine and 0.1% ropivacaine both with 0.5µg/mL sufentanyl using PCEA for labour analgesia. They found that 0.1% group was equally as effective as 0.15% group with 30% dose sparing effect and 40% cost reduction.

Atienzar MC et al (2004)[78] conducted a randomised study to found out efficacy of 0.1% ropivacaine with 2µg/mL fentanyl in labour analgesia in 80 parturients. Both groups received initially 0.2% ropivacaine and then randomised to receive either 0.1% ropivacaine with fentanyl 2µg/mL at 10 mL/hr (group 1) or 0.2% ropivacaine with fentanyl 2µg/mL at 8 mL/hr (group2) as epidural infusions. Additional topups were given with 0.2% ropivacaine. No difference in VAS score, maternal and fetal outcome, patient satisfaction score and mode of delivery between two groups. Amount of drug used in group 1 was lower and were equally effective as group 2.

Neera Sah et al. (2007) [79]conducted a prospective randomised study to compare efficacy of bupivacaine 0.125 %(group1), levobupivacaine0.125 %(group2) and ropivacaine0.1 %(group 3) in 162 labouring ASA I &II parturients. All patients in three groups received a bolus of 8 mL of concerned local anaesthetics with fentanyl 100 µg followed by infusion of 12 mL/hr of local anesthetics with fentanyl2µg/mL. No significant difference in pain (VAS score), motor and sensory block among three groups.

NganKee WD et al (2010)[80] compared the dose response curves of bupivacaine and ropivacaine for labour analgesia. 300 nulliparous patients were

randomLy given epidural ropivacaine (7, 15, 20, 30, 45, or 60 mg) or bupivacaine (5, 10, 15, 20, 30, or 40 mg) in 20 mL of saline.VAS score recorded for 30 min. data were analysed using non linear regression.ED50 was greater for ropivacaine than bupivacaine but ED90 was similar. Potency ratio at ED50 for ropivacaine: bupivacaine was 0.75.Hence they concluded ropivacaine was less potent than bupivacaine with similar dose –response characteristics.

LABOUR ANALGESIA METHODOLOGY

This comparative clinical study of combined spinal epidural labour analgesia for vaginal delivery with intrathecal fentanyl 25 μg +epidural 0.125% bupivacaine 10 mL with 2μg of fentanyl/mL versus intra thecal fentanyl 25μg+ epidural 0.1% ropivacaine 10 mL with 2μg of fentanyl/mL was conducted in 60 parturients, who wished and opted for painless labour in Kilpauk Medical College and Hospital, Chennai after obtaining permission from the Institutional Ethical committee. After taking a written informed consent, only those who fulfilled the selection criteria were included in this study.

Inclusion criteria:

1) Pregnant women with singleton pregnancy, term gestation, cephalic presentation, in active first stage of labour, the mothers who are booked and all antenatal investigations are within normal limits.
2) Cervical dilation >3 cm and <5 cm.
3) Age 18-35 years, Height >150 cm.
4) BMI 18-25
5) Primi gravida.

Exclusion criteria:

1) Mothers with co-existing diseases like diabetes, hypertension, PIH, bronchial asthma, epilepsy, thyroid disorders, IHD, valvular heart disease, previous LSCS
2) Spine abnormalities and local skin infections.
3) Coagulopathies.
4) Cephalo pelvic disproportion.
5) Preterm gestation.
6) Fetal distress.

- Antenatal mothers in antenatal wards and those who attended outpatient department were counselled about labour analgesia. Thorough assessment of mothers including investigation, systemic examination was done. Those mothers who fulfilled inclusion criteria when enters the active stage of labour was enrolled in our study.
- The study population consisted of 60 parturients allocated into two groups, 30 in each group. The parturients satisfying the selection criteria

were randomized by computer generated randomization table into two groups of thirty each –Group B and Group R. The randomization sequence was prepared in double-blinded manner. The study blinding was broken after the statistical analysis.

- (1)Group B (Bupivacaine): received intrathecal fentanyl 25µg+epidural 0.125% Bupivacaine 10 mL with 2µg of fentanyl/mL.

- (2)Group R (Ropivacaine): received intrathecal fentanyl 25 µg +epidural 0.1% Ropivacaine 10 mL with 2µg of fentanyl/mL.

PREPARATION OF THE PARTURIENT:

- She was prepared as per the routine preparation done for delivery, in addition to preparation of back to perform epidural block.
- The onset of active labour, degree of cervical dilatation and the adequacy of pelvis for vaginal delivery were assessed by attending obstetrician, before performing the block.
- Monitors (NIBP, pulse oximeter, ECG and CTG) connected and base line vitals were recorded.
- An IV line was started on the non dominant hand with an 18 G cannula.
- The parturient was preloaded with 500- 1000 mL 0f Ringer lactate solution.
- Anti aspiration prophylaxis (Inj. Ranitidine50mg and Ondansetron 4mg IV) was given.
- All equipments needed for airway management and resuscitation of the mother and baby was kept ready before performing the block.

CHECK LIST FOR MOTHER

- FOR OXYGENATION AND MASK VENTILATION
  1 .Boyles anesthesia machine
  2. oral airways of various sizes
  3. face masks of various size
  4. AMBU bag
- FOR INTUBATION:
  1. working laryngoscope with no 3,4 Macintosh blades
  2. endotracheal tubes-6.0,6.5,7.0,7.5 cuffed
  3. bougie, stylet.magills forceps
  4. LMA -3,4 sizes
- FOR SUCTION
  1. working suction apparatus
  2. suction catheters- adult size
- DRUGS
  1. Atropine 0.6 mg/ml
  2. Adrenaline 1in 1000 1ml ampoule
  3. Ephedrine 30 mg 1ml ampoule
  4. Dopamine 200 mg /5ml ampoule
  5. Frusemide 20 mg/2ml ampoule
  6. Hydrocortisone 100 mg vial, dexamethasone 8 mg vial
  7. deriphylline,aminophylline
  8. sodium bicarbonate,calcium gluconate
  9. intravenous fluids-ringer lactate, normal saline ,Hemaccel, hetastarch
- MONITORS
  1.Pulse oximeter
  2.Sphygmomanometer
  3.ECG monitor

CHECK LIST FOR BABY

GENERAL:

- Firm padded resuscitation surface
- Overhead warmer
- Light for the area
- Clock with timer in seconds
- Warm towel
- Stethoscope neonatal
- Pulse oximeter plus neonatal probe

FOR OXYGENATION AND MASK VENTILATION

- Oropharyngeal airways (sizes 00 and 0)
- Face Masks of various size
- Paediatric AMBU bag
- Laryngeal Mask (size 1, suitable for neonates up to 5 kg)

FOR INTUBATION:

- Working Laryngoscope with Neonatal Blades (sizes 00, 0, 1)
- Endotracheal Tubes- oral,2.5,3.0,3.5 uncuffed
- Supplies for fixing ETT (e.g. sterile scissors, tape)

FOR SUCTION

- working suction apparatus
- suction catheters- 5,6,8 F
- infant feeding tube for gastric decompression (sizes 6F, 8F)
- bulb sucker

DRUGS and FLUIDS

- Adrenaline 1:10 000 concentration (0.1 mg/mL)
- Normal saline (0.9% Sodium Chloride)

The autoclaved epidural tray used for performing the block contained the following

1. Disposable epidural set-18 G Tuohy needle with catheter
2. Disposable 25 G Spinal needle.
3. Disposable syringes 2mL, 5mL and 10mL.
4. Glass syringes 5 mL with a freely moving plunger.
5. Skin towel
6. Sterile dressings
7. Sterile swabs
8. Sponge holding forceps
9. Drugs- Bupivacaine hydrochloride 0.5% vial

    Ropivacaine 0.2% ampoule

    Fentanyl 50µg/mL ampoule

    Lignocaine hydrochloride 2% vial

Normal Saline for dilution.

Preparation of epidural bupivacaine and ropivacaine:

The epidural drug preparation (including top up doses) was done by the duty assistant professor who prepared it according to the group allocation.

- ✓ 2 mL of 100mcg fentanyl (50 µg/mL) diluted with 3 mL of normal saline which gives 20mcg /mL fentanyl.

- ✓ For group B-2.5mL of 0.5 % bupivacaine mixed with 20 mcg of prepared inj. fentanyl (1mL) and 6.5 mL of normal saline which gives 0.125% bupivacaine with fentanyl 2 mcg/mL.
- ✓ For group R- 5mL of 0.2% ropivacaine mixed with 20 mcg of prepared inj. fentanyl (1mL) and 4mL of normal saline which gives 0.1% ropivacaine with fentanyl 2 mcg/mL.

Performing the Block:

Block was performed after shifting patient to operation theatre. We used separate needle CSE technique for this study. We initiated subarachnoid blockade followed by epidural catheter insertion at a higher space.

1. In sitting/right lateral position with monitors attached.
2. under strict aseptic precautions.
3. Ideal space chosen for CSE was L3-L4/L4-L5
4. Local infiltration with 1 cc of 2% Lignocaine was given in the L3-L4/L4-L5 for both the spinal epidural needle placements.
5. Intrathecal fentanyl 25 μg was given with 25 G spinal needle in the L4-L5 space.
6. With bevel directed upwards, a midline approach with Tuohy needle was done and epidural space was identified by loss of resistance technique. Epidural placement was done in absence of uterine contraction at one space above the spinal injection.

7. Catheter was placed 3-5 cm in the epidural space.
8. After negative aspiration for blood and CSF, the epidural catheter was secured. Two mL of prepared solution was given as epidural test dose.
9. Each increment of the therapeutic dose was considered the test dose. These precautions were followed in all bolus injections of local anaesthetic through an epidural catheter.
10. With patient in supine position, left uterine displacement was done by placing a wedge under the right buttock.
11. Remaining 8 mL of 0.125 % bupivacaine with 2 μg/mL fentanyl for group B or 8 mL of 0.1% ropivacaine with 2μg/mL fentanyl for group R was given epidurally and patient was shifted back to labour room.
12. After 60 minutes or when pain recurred or after two segments was regressed whichever was earlier, 5mL (0.125% bupivacaine or 0.1% ropivacaine with fentanyl μg/mL) was given epidurally in presence of duty assistant professor.
13. Left uterine displacement was maintained throughout the labour.
14. Intermittent bladder catheterisation was done.
15. Frequent vaginal examination was not encouraged throughout the labour.
16. Oxytocin infusion was stopped before shifting patient to OT and during catheter insertion. It was then restarted after catheter insertion.
17. Patient was educated that she would feel the uterine contractions as tightness without pain. Except pain, she can feel all other sensation. At

the time of onset of second stage of labour, she may feel pain over perineum, inner thigh, anus or vagina.

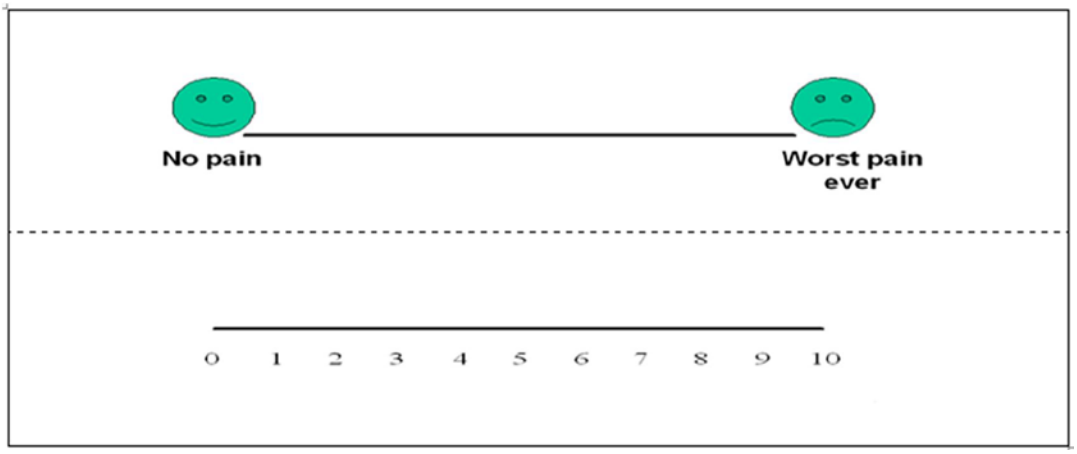
18. Full dose of 10 mL of (bupivacaine 0.125% / ropivacaine 0.1%) was administered regardless of previous dose at second stage, relieves the pain without affecting course of labour and this avoids further analgesia for episiotomy also.
19. Obstetric management was decided by obstetricians.
20. Continuous maternal and fetal monitoring was done and epidural catheter was removed six hours after delivery.

MONITORING:

1) Time of onset of analgesia.
2) Assessment of sensory blockade.
3) Assessment of motor blockade.
4) Assessment of sedation.
5) Duration of analgesia.
6) Assessment of cardiovascular and respiratory system status.
7) Complications or side-effects if any.
8) Obstetric progress by partograph.
9) Fetus monitoring by fetoscope, cardio tocograph.

1. Onset of Analgesia:

Time taken for achieving visual analogue scale to become less than 3. The patient was asked to point to the position on the line between the faces to indicate how much pain they are currently feeling. The far left end indicates 'No pain' and the far right end indicates 'Worst pain ever'



2. Level of Sensory Blockade:

The level of sensory blockade was assessed every 15 minutes using spirit cotton for loss of cold sensation in the midclavicular line bilaterally from the nipple to the pubic symphysis.

3. Assessment of Motor Blockade:

Assessed by modified Bromage Scale

0	No motor blockade
1	Unable to lift leg straight
2	Unable to flex knees
3	Unable to flex ankles

4. Assessment of Sedation:

Sedation was assessed using 5- point scale

Score	Description
0	Wide awake
1	Drowsy
2	Dozing, eyes shut intermittently
3	Asleep
4	Unarousable

5. Duration of Analgesia:

Time interval from the onset of analgesia till the return of painful contraction (VAS more than 3) or till regression of sensory level to below T12

6. Assessment of Cardiovascular Status:

Baseline values of maternal pulse rate and blood pressure was recorded, these parameters were again recorded after the block for every 5 minutes interval up to 20 minutes, then at 30th minute and thereafter every 30 minutes with each top up till delivery. Fetal heart rate was continuously monitored using a cardiotocograph.

7. Side effects of Drugs / Procedure:

- Hypotension- fall in systolic BP to less than 100 mm Hg or 20% to 30% drop in systolic blood pressure (compared with baseline)
- Bradycardia- pulse rate of less than 60 beats/ minute
- Pruritus
- Others (nausea, vomiting etc.)

8. Progress of Labour:

The progress of labour was observed closely after instituting block by partograph.

The frequency and intensity of uterine contractions, dilation and effacement of cervix, descent of presenting part and the foetal heart rate was periodically recorded by the obstetrician.

The requirement for instrumental deliveries or Caesarean section and their indications was also noted.

9. Fetal Monitoring:

The fetal heart rate is monitored by cardiotocograph.

Rate less than 100/ minute was taken as bradycardia and rate of morethan 160/minute was taken as tachycardia.

At birth, the APGAR score of the neonate at 1 and the 5th minute was used to assess the neonatal well being. Any neonate with an APGAR score of less than 7 was resuscitated with suctioning, mask ventilation and intubation if needed and ventilated with 100% oxygen.

10. Patient Satisfaction Score:

1-excellent

2-good

3-poor

STATISTICAL ANALYSIS

The statistical analysis were done using SPSS (Statistical package for social sciences) version 17 for windows. The profile of the cases was compared with the treatment allocation in order to check if there was any significant difference. Descriptive statistics are presented as mean± 1SD. Component bar and line diagrams were drawn as and when required. Two sided independent student's t tests to analyze continuous data and Chi-square test for association was used to compare categorical variables between treatment allocations. $P<0.05$ was considered as statistically significant

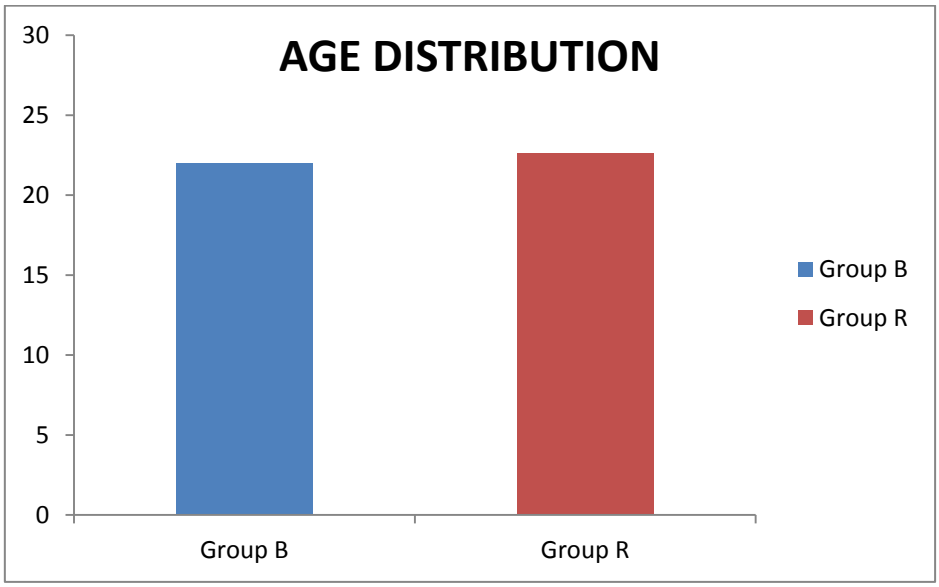
OBSERVATION AND RESULTS

DEMOGRAPHIC DATA:

AGE (in years) (student's t test):

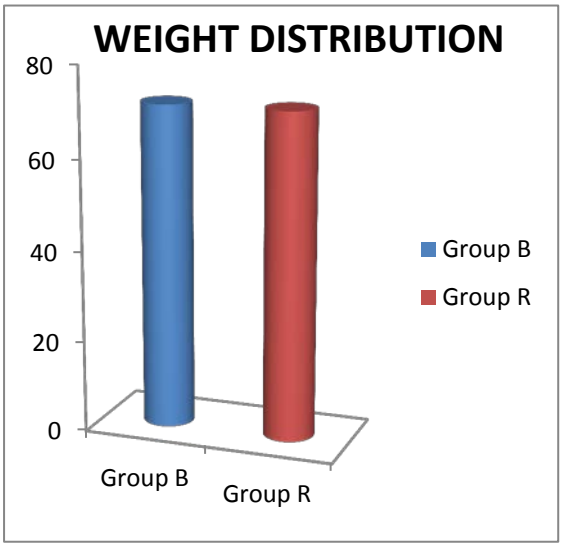
	No. of cases	Mean ± S.D(years)	P Value
Group B	30	21.97 ± 2.356	0.291
Group R	30	22.63 ± 2.484	

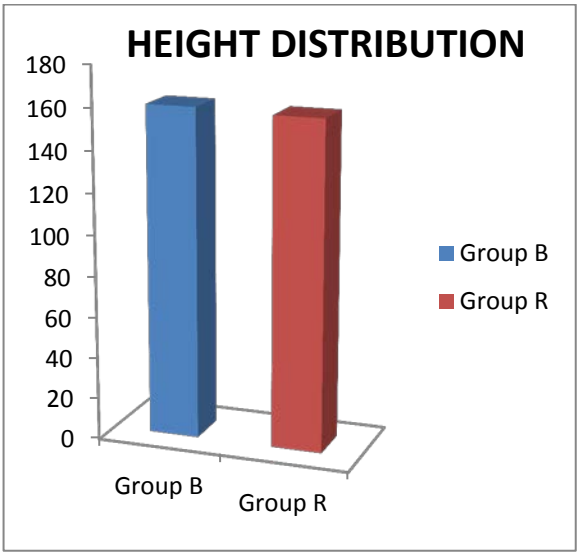
Mean age in group B was 21.97years with SD of 2.356. In group R mean age was 22.63years with SD of 2484. P value of 0.291 and was statistically insignificant.



WEIGHT (kg) and HEIGHT (cm) (student's t test):

	GROUP B	GROUP R	P VALUE
Weight (mean±S.D)(kg)	71.30 ± 5.484	71.53 ± 5.941	0.875
Height (mean±S.D)(cm)	160.23 ± 4.400	158.77 ± 5.117	0.239





Mean weight in group B was71.30 kg with SD of 5.484. In group R mean weight was 71.53kg and SD of 5.941. P value of 0.875 and was statistically insignificant.

Mean height in group B was160.23 cms with SD of4.400. In group R mean height was158.77cms and SD of 5.117. P value of 0.239 and was statistically insignificant.

CERVICAL DILATATION(cm) (student t test):

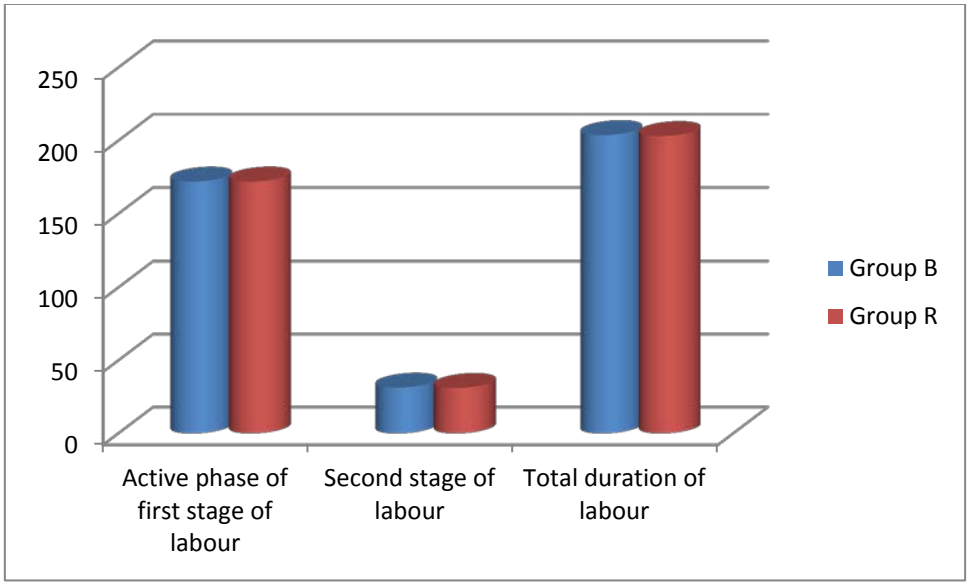
Cervical dilatation(cm)	GROUP B	GROUP R
mean±S.D	4.23±0.430	4.23±0.430
P value	1.0	

Mean cervical dilatation in both groups was 4.23 cm with S.D of 0.430 and P value of 1.0 which was statistically insignificant.

DURATION OF LABOUR (min) (student t test):

Duration	**Active phase of first stage of labour**	**Second stage of Labour**	**Total duration**
Group B	171.97±19.089	31.30±5.240	203.77±19.856
Group R	172.03±25.926	31.10±5.762	203.13±22.793
P Value	0.991	0.889	0.909

Mean duration of active phase of 1st stage of labour in group B was171.97 minutes with SD of19.089. In group R mean duration of active phase of 1st stage was172.03 minutes with SD of 25.926. P value of 0.991.Mean duration of 2nd stage of labour in group B was 31.30 minutes with SD of 5.240. In group R mean duration of 2nd stage was 31.10 minutes with SD of 5.762. P value of 0.889. Mean total duration of labour in group B was203.77 minutes with SD of19.856. In group R mean total duration of labour was 203.13minutes with SD of 22.793. P value of 0.909. All duration were statistically in significant.

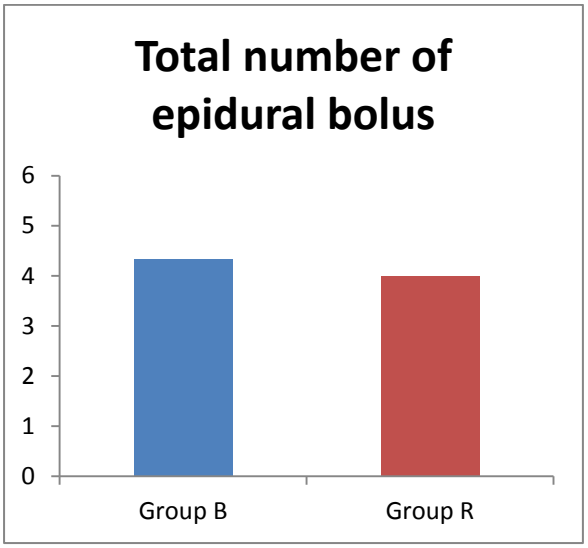


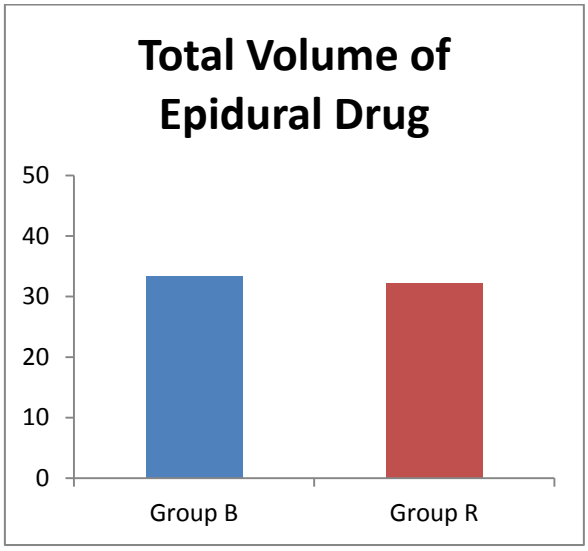
Total number and volume of epidural bolus doses (top-up): (student test):

	Total number of epidural bolus	**Total Volume of Epidural Drug(mL)**
Group B	4.33±0.547	33.33±4.011
Group R	4.00±0.947	32.17±4.676
P Value	0.100	0.102

Mean of total number of epidural bolus doses used in group B was 4.33with SD of 0.547. In group R Mean of total number of epidural bolus doses used was 4.00 with SD of 0.947. P value of0.100 and was statistically insignificant.

Mean of total volume used for epidural analgesia in group B was 33.33mL with SD of 4.011. In group R mean of total volume used for epidural analgesia used was32.17 mL and SD of 4.676. P value of 0.102 and was statistically insignificant.

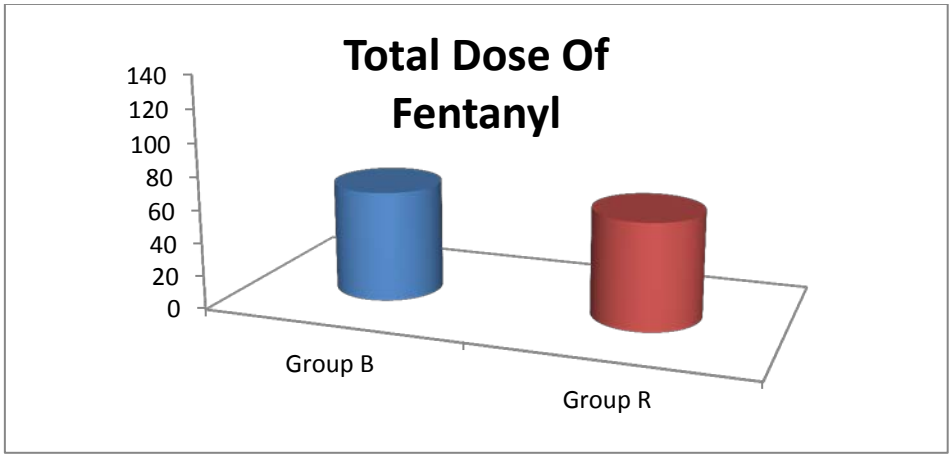




TOTAL DOSE OF EPIDURAL FENTANYL (µg) (student t test):

	Total Dose Of Fentanyl(µg)	P Value
Group B	66.67±8.023	0.304
Group R	64.33±9.353	

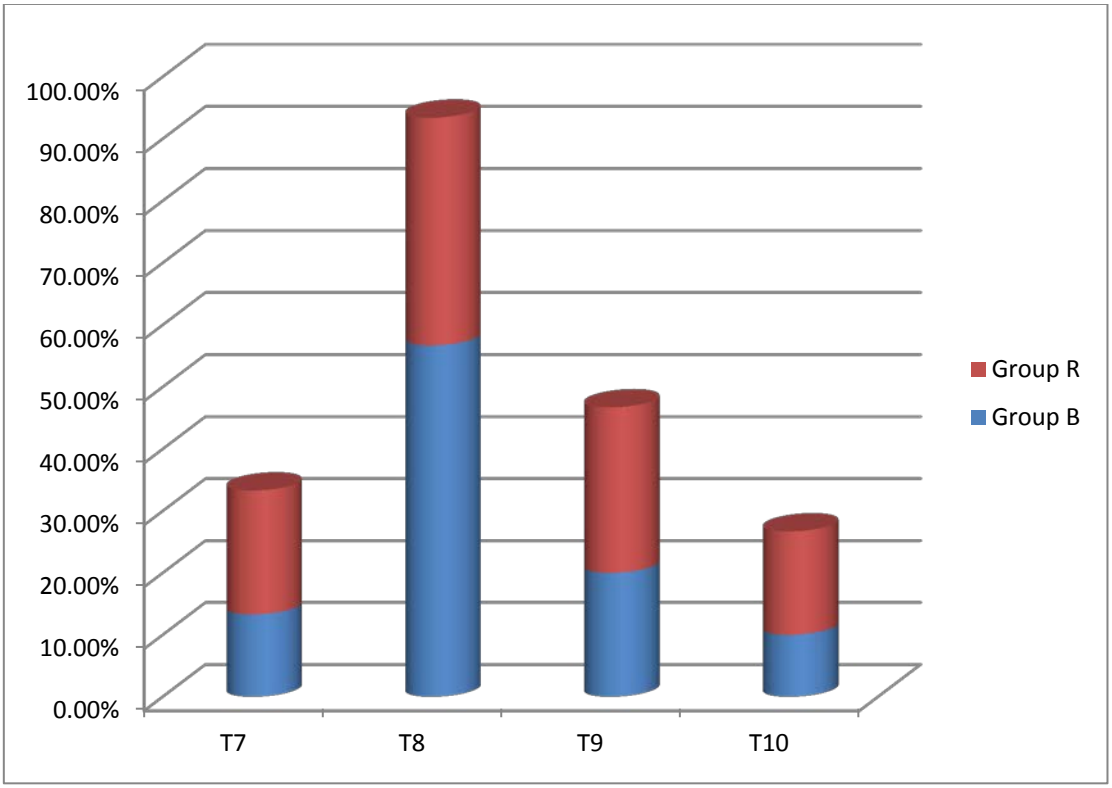
Mean of total dosage of fentanyl used in group B was 66.67 µg with SD of 8.023. In group R mean of total dosage of fentanyl used was 64.33µg with SD of 9.353. P value of 0.304 and was statistically insignificant.



HEIGHT OF DERMATOME (Chi-square test):

	T7	T8	T9	T10	P Value
Group B	4(13.3%)	17(56.7%)	6(20.0%)	3(10.0%)	0.48
Group R	6(20.0%)	11(36.7%)	8(26.7%)	5(16.7%)	

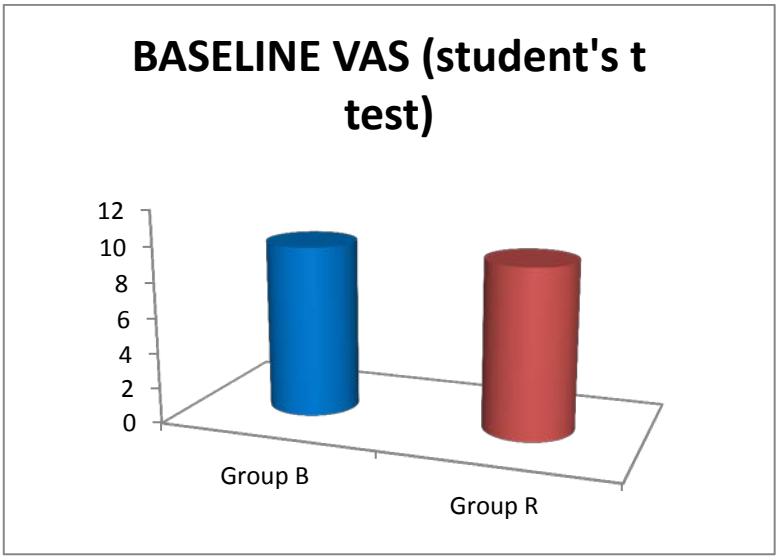
Maximum dermatomal level of sensory blockade achieved in both groups was T7. 13.3% in group B and 20.0% in group R had T7 level.56.7 % in group B and 36.7 % in group R had T8 level.10.0% in group B and 16.7% in group R achieved T10 level .20% in group B and 26.7% in group R achieved T9 level. P value was 0.48 and statistically insignificant.



BASELINE VAS (student's t test):

	MEAN±S.D	P VALUE
GROUP B	9.70±0.466	0.19
GROUP R	9.53±0.507	

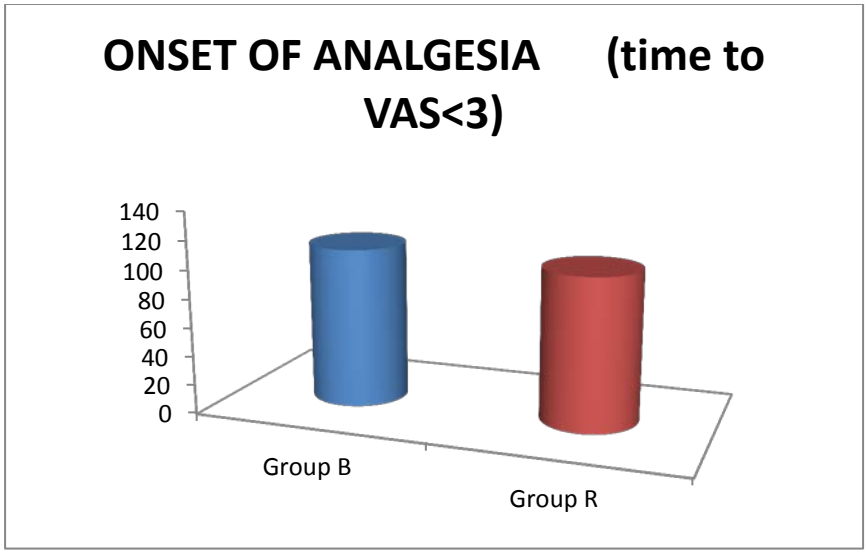
Mean of baseline VAS in group B was 9.70and SD of 0.466. In group R mean of baseline VAS was 9.53 and SD of 0.507. P value of 0.19 and was statistically insignificant.



TIME TO VAS<3(sec)(student t test):

	MEAN±S.D	P VALUE
GROUP B	111.10±17.197	0.104
GROUP R	105.27±8.828	

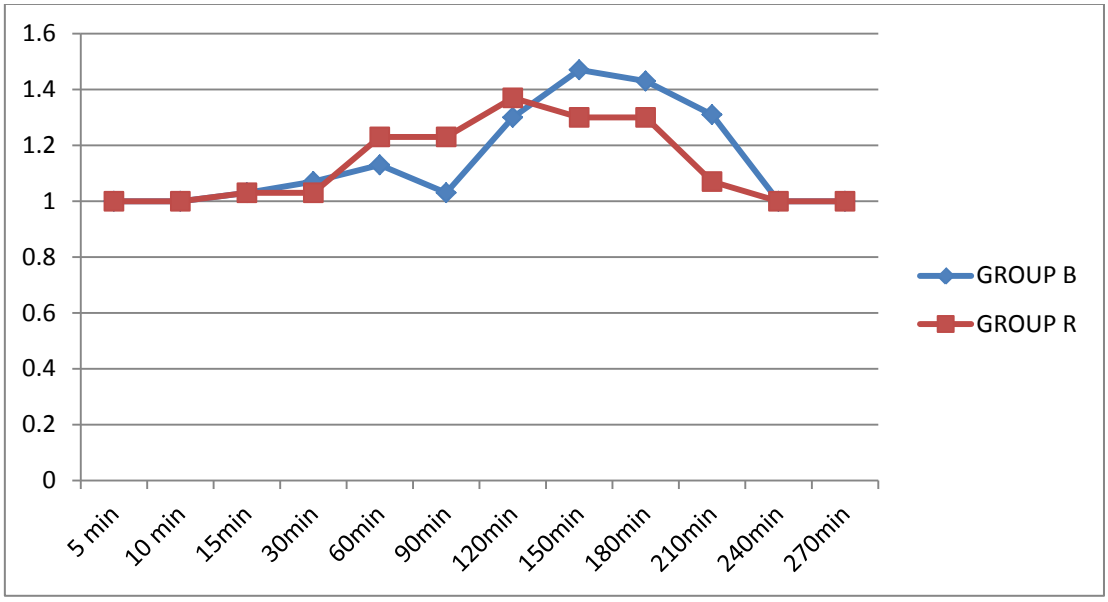
Mean of onset of analgesia (time to VAS <3) in group B was 111.10 seconds and SD of 17.197. In group R mean of onset of analgesia was 105.27 and SD of 8.828. P value of 0.104and was statistically insignificant.



Visual Analogue Score (VAS) (student's t test):

VAS	GROUP B	GROUP R	P VALUE
5 min	1	1	
10 min	1	1	
15min	1.03±0.183	1.03±0.183	1.0
30min	1.07±0.254	1.03±0.183	0.56
60min	1.13±0.346	1.23±0.430	0.32
90min	1.03±0.183	1.23±0.504	0.46.
120min	1.30±0.702	1.37±0.615	0.69
150min	1.47±0.819	1.30±0.466	0.33
180min	1.43±0.728	1.30±0.466	0.22
210min	1.31±0.604	1.07±0.267	0.06
240min	1	1	
270min	1	1	

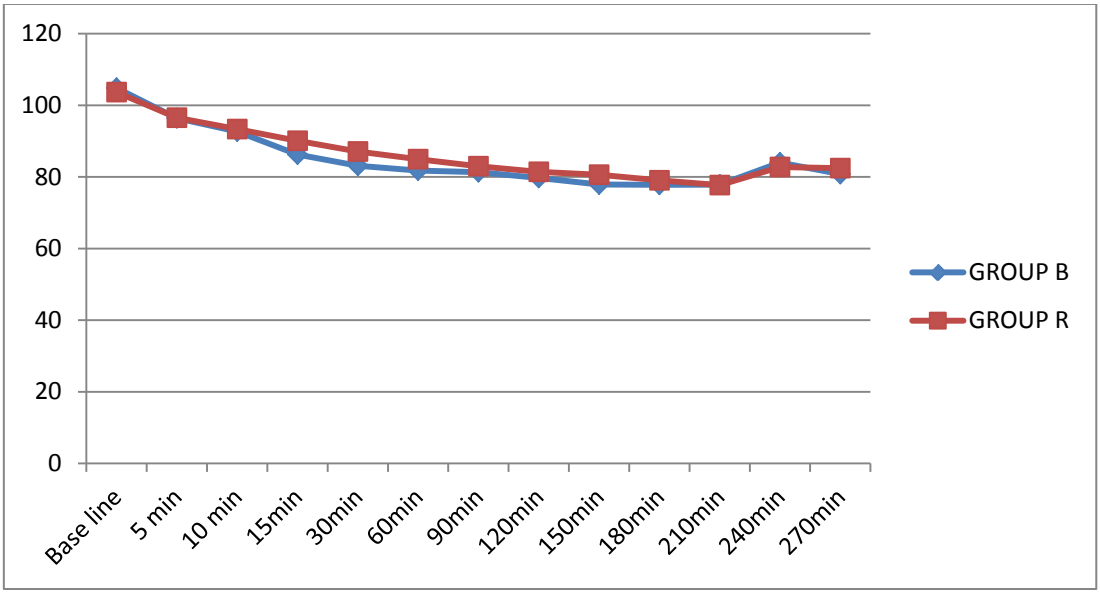
The above table shows VAS score changes. From the above table p-value of both the groups shows no statistically significant differences.



PULSE RATE (beats/min):

PULSE RATE	GROUP B	GROUP R	P VALUE
Base line	104.83±6.675	103.67±5.567	0.465
5 min	96.40±6.317	96.53±5.563	0.931
10 min	92.67±7.622	93.33±5.944	0.707
15min	86.23±5.740	90.10±6.133	0.14
30min	83.13±5.513	87.10±5.573	0.007
60min	81.77±5.882	84.93±6.258	0.14
90min	81.33±5.320	83.00±5.645	0.244
120min	79.70±5.472	81.40±5.733	0.245
150min	77.90±6.071	80.60±5.123	0.06
180min	77.80±6.042	79.03±4.560	0.376
210min	77.84±6.650	77.69±4.380	0.925
240min	84.00±7.937	82.75±2.866	0.625
270min	80.80±5.431	82.45±6.133	0.233

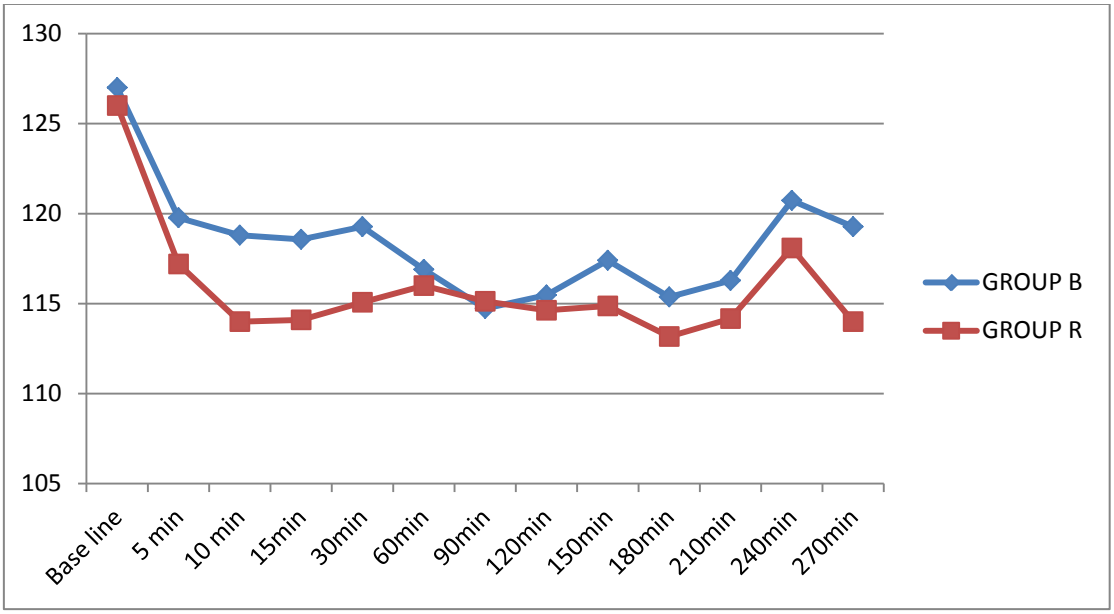
The above table shows Mean Pulse rate changes. . From the above table p-value of both the groups shows no statistically significant differences.



SYSTOLIC BP (mm Hg):

systolic BP	GROUP B	GROUP R	P VALUE
Base line	126.87±10.988	127.20±7.645	0.987
5 min	119.77±9.016	117.20±9.065	0.276
10 min	118.80±9.675	114.00±8.769	0.49
15min	118.57±11.503	114.10±10.192	0.117
30min	119.27±11.307	115.07±11.197	0.15
60min	116.90±11.109	116.00±10.687	0.75
90min	114.73±10.576	115.13±8.893	0.875
120min	115.47±10.543	114.63±8.880	0.742
150min	117.40±9.496	114.87±8.581	0.410
180min	115.37±9.038	113.17±7.670	0.314
210min	116.28±7.630	114.17±8.066	0.557
240min	120.73±7.630	118.09±7.145	0.267.
270min	119.27±11.307	114.00±8.769	0.56

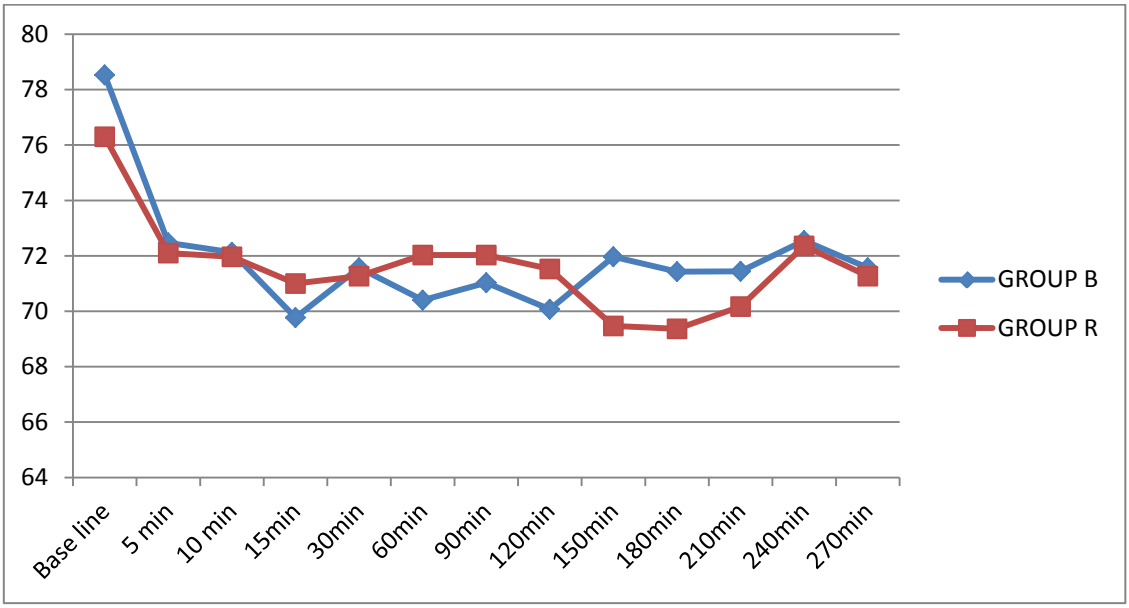
The above table shows Mean Systolic BP changes. From the above table p-value of both the groups shows no statistically significant differences.



DIASTOLIC BP (mm Hg):

Diastolic BP	GROUP B	GROUP R	P VALUE
Base line	78.53±6.678	76.30±5.627	0.288
5 min	72.47±5.882	72.10±5.333	0.801
10 min	72.13±5.519	71.97±5.518	0.907
15min	69.77±5.418	71.00±4.668	0.349
30min	71.57±4.629	71.27±4.209	0.794
60min	70.40±5.001	72.03±6.446	0.277
90min	71.03±6.739	72.03±5.468	0.530
120min	70.07±6.203	71.53±5.544	0.338
150min	71.97±7.595	69.47±4.240	0.121
180min	71.43±6.140	69.37±4.156	0.132
210min	71.44±6.104	70.17±4.509	0.421
240min	72.55±4.741	72.36±4.884	0.930
270min	71.57±4.629	71.27±4.209	0.794

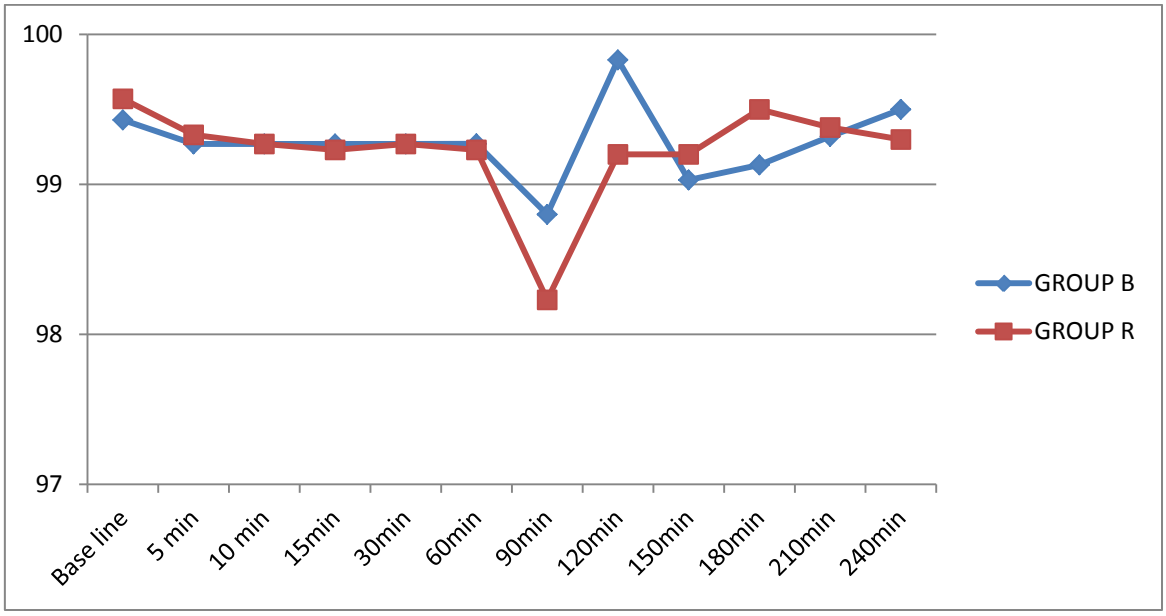
The above table shows Mean Diastolic BP changes. From the above table p-value of both the groups shows no statistically significant differences.



SATURATION (%):

Saturation	GROUP B	GROUP R	P VALUE
Base line	99.43±0.728	99.57±0.504	0.413
5 min	99.27±0.691	99.33±0.606	0.693
10 min	99.27±0.691	99.27±0.691	0.616
15min	99.27±0.691	99.23±0.728	0.693
30min	99.27±0.691	99.27±0.691	0.172
60min	99.27±0.691	99.23±0.728	0.111
90min	98.83±0.085	98.23±0.504	0.672
120min	99.83±0.834	99.20±0.714	0.073
150min	99.03±0.765	99.20±0.714	0.178
180min	99.13±0.819	99.50±0.682	0.650
210min	99.32±0.557	99.38±0.576	0.735
240min	99.50±.527	99.30±.823	0.526

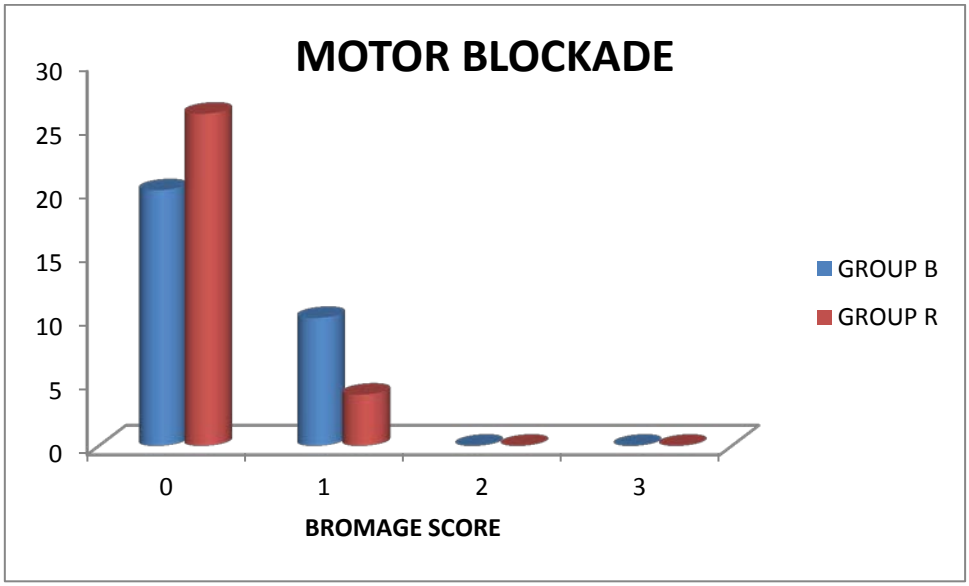
The above table shows mean saturation changes. From the above table p-value of both the groups shows no statistically significant differences.

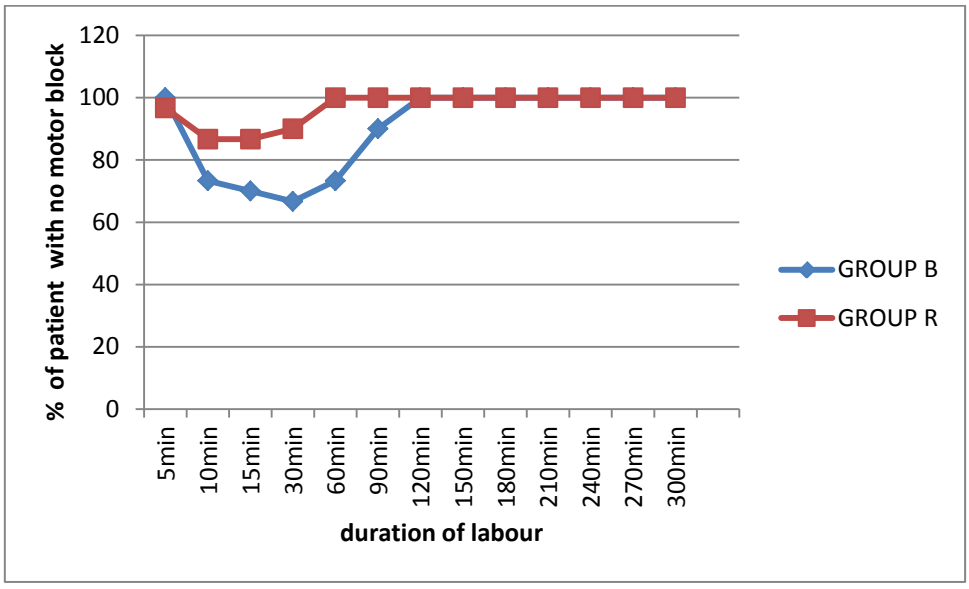


MOTOR BLOCKADE:

MOTOR BLOCKADE	0	1	2	3
GROUP B	20(66.7%)	10(33.3%)	0	0
GROUP R	26(86.7%)	4(13.3%)	0	0
P VALUE	0.67			

20(66.7%) of patients in group B and 26(86.7%) of patients in group R had no motor blockade.10 patients (33.3%) in group B and 4(13.3%) patients in Group R had grade 1 Bromage (minimal) motor blockade. No patient in any groups was developed grade 2 or 3 motor blockade P value of 0.67, which is statistically insignificant.



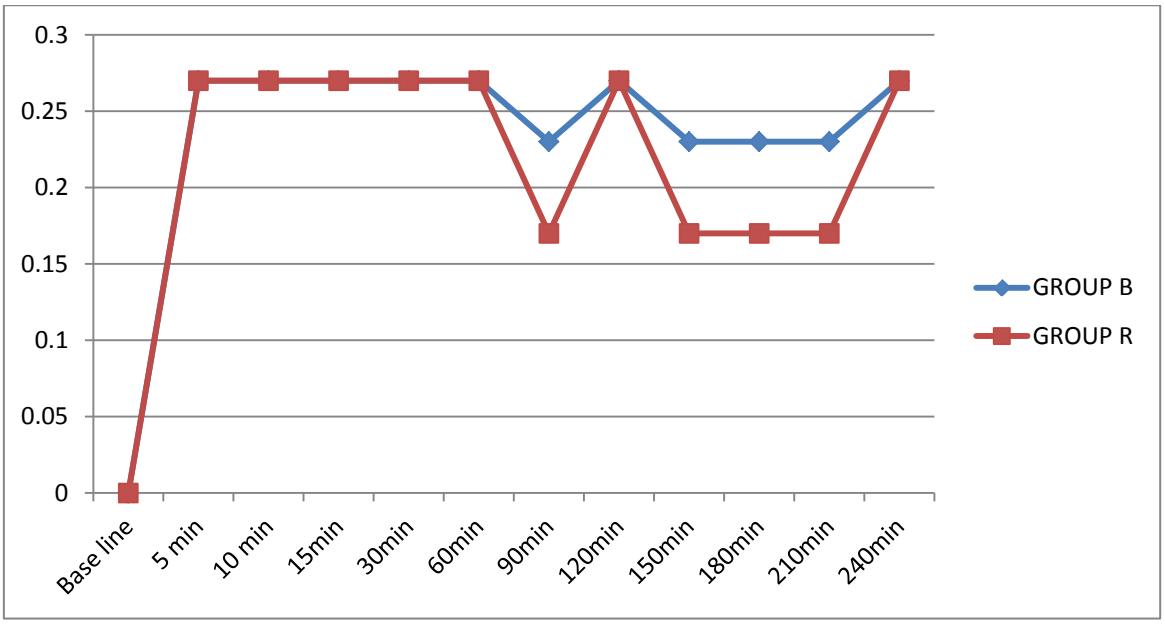


Above line diagram showed that maximum motor blockade (grade 1 Bromage) has occurred during first stage of labour and immediately following bolus dose.

SEDATION:

Sedation score	GROUP B	GROUP R	P VALUE
Base line	0±0	0±0	1.000
5 min	0.27±0.450	0.27±0.450	1.000
10 min	0.27±0.450	0.27±0.450	1.000
15min	0.27±0.450	0.27±0.450	1.000
30min	0.27±0.450	0.27±0.450	1.000
60min	0.27±0.450	0.27±0.450	1.000
90min	0.23±0.430	0.17±0.379	0.527
120min	0.27±0.450	0.27±0.450	1.000
150min	0.23±0.430	0.17±0.379	0.527
180min	0.23±0.430	0.17±0.379	0.527
210min	0.23±0.430	0.17±0.379	0.527
240min	0.27±0.450	0.27±0.450	1.000

The above table shows Sedation score in both groups. From the above table p-value of both the groups shows no statistically significant differences.

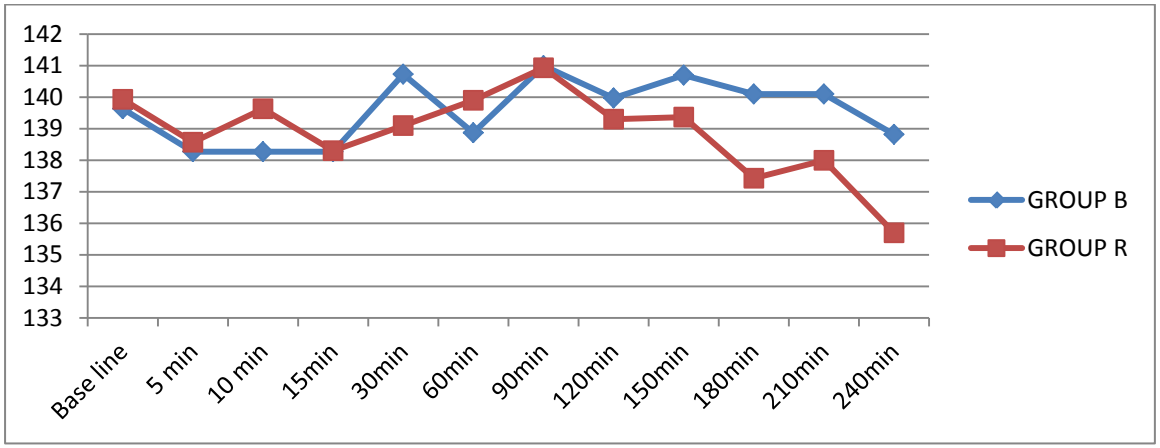


FETAL HEART RATE (beats/min):

Fetal heart rate	GROUP B	GROUP R	P VALUE
Base line	139.63±7.137	139.93±6.596	0.866
5 min	138.27±7.904	138.57±6.157	0.870
10 min	138.27±7.244	139.63±5.933	0.427
15min	138.27±7.400	138.30±4.998	0.984
30min	140.73±8.191	139.10±5.756	0.375
60min	138.87±7.440	139.90±4.859	0.527
90min	141.00±6.863	140.93±5.589	0.967
120min	139.97±8.315	139.30±4.519	0.701
150min	140.70±6.508	139.37±5.986	0.412
180min	140.10±7.703	137.43±5.322	0.124
210min	140.10±7.703	138.00±5.381	0.158
240min	138.82±6.809	135.70±4.057	0.224

Fetal heart rate changes in both groups were within normal limits.

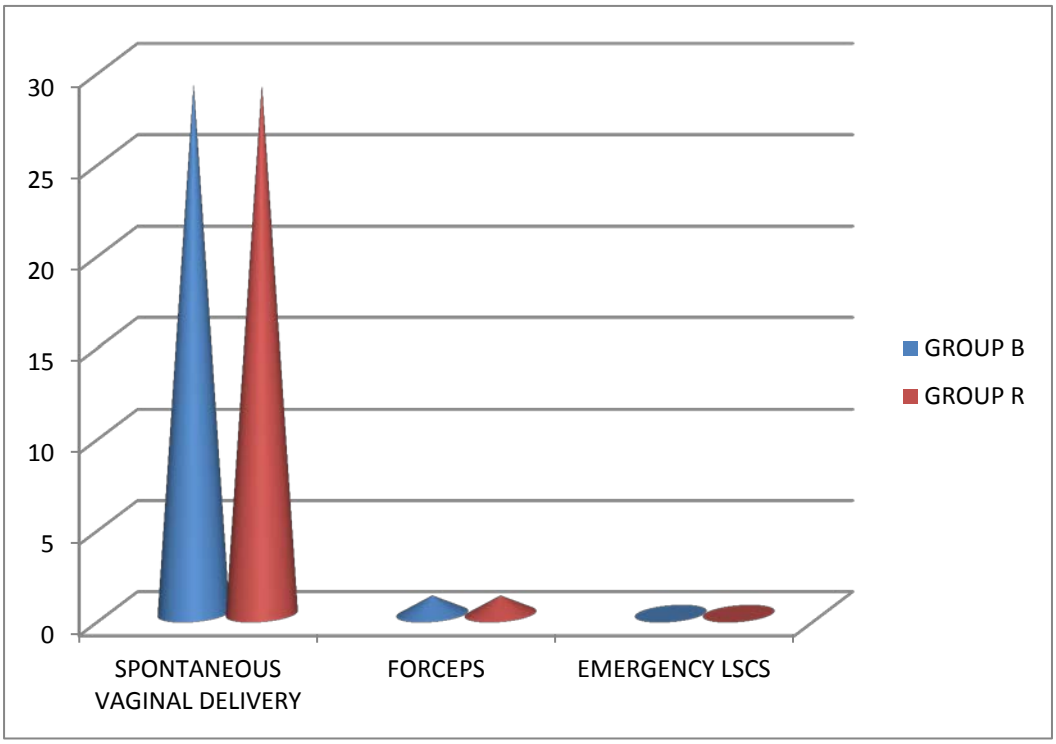
From the above table p-value of both the groups shows no statistically significant changes.



OUTCOME:

OUTCOME	GROUP B	GROUP R	P VALUE
SPONTANEOUS VAGINAL DELIVERY	29(96.7%)	29(96.7%)	1.0
FORCEPS	1(3.3%)	1(3.3%)	
EMERGENCY LSCS	0	0	

In both groups all babies delivered by normal vaginal delivery except two babies were delivered by forceps delivery. Both of them were secondary to poor maternal efforts. No other case underwent caesarean section.

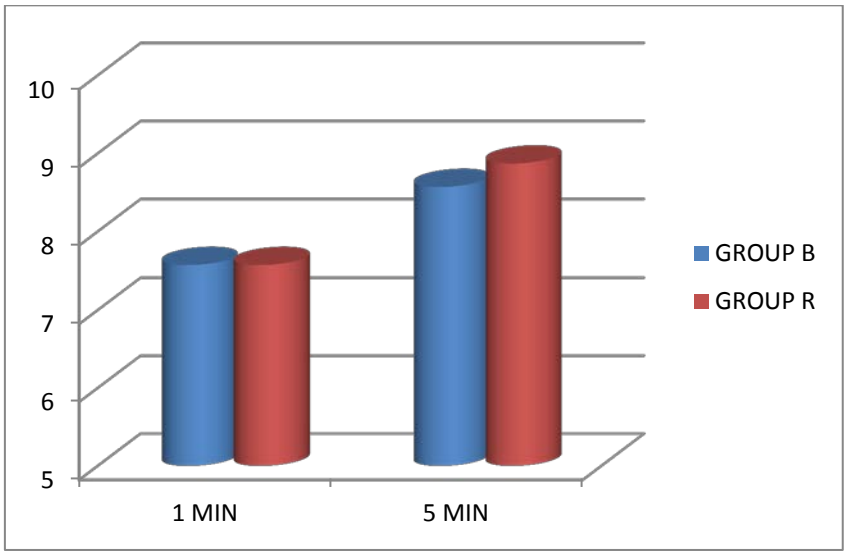


APGAR SCORE:

APGAR SCORE	GROUP B	GROUP R	P VALUE
1 MIN	7.57±0.504	7.57±.0504	1.000
5 MIN	8.57±0.504	8.87±0.346	.009

At 1 minute in group B mean of APGAR score was 7.57 and SD was 0.504. In group R mean was APGAR score 7.57 and SD was 0.504. P value of 1.0 and was statistically insignificant.

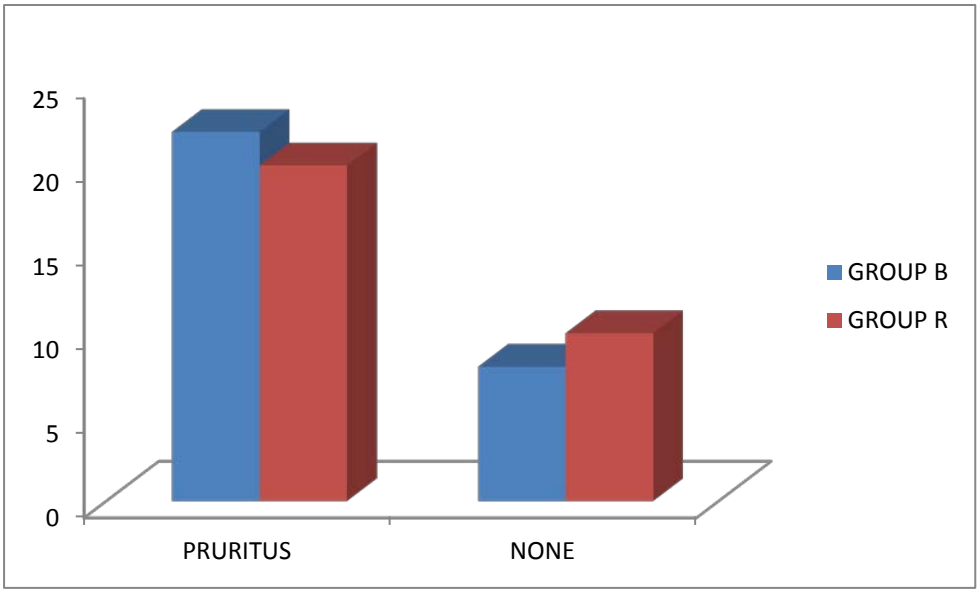
At 5 minutes in group B mean of APGAR score was 8.57 and SD was 0504. In group R mean was APGAR score 8.87 and SD 0.346. P value of 0.009 and was statistically insignificant.



COMPLICATIONS:

COMPLICATION	GROUP B	GROUP R	P VALUE
PRURITUS	22(73.3%)	20(66.7%)	0.5
NONE	8(44.4%)	10(55.6%)	

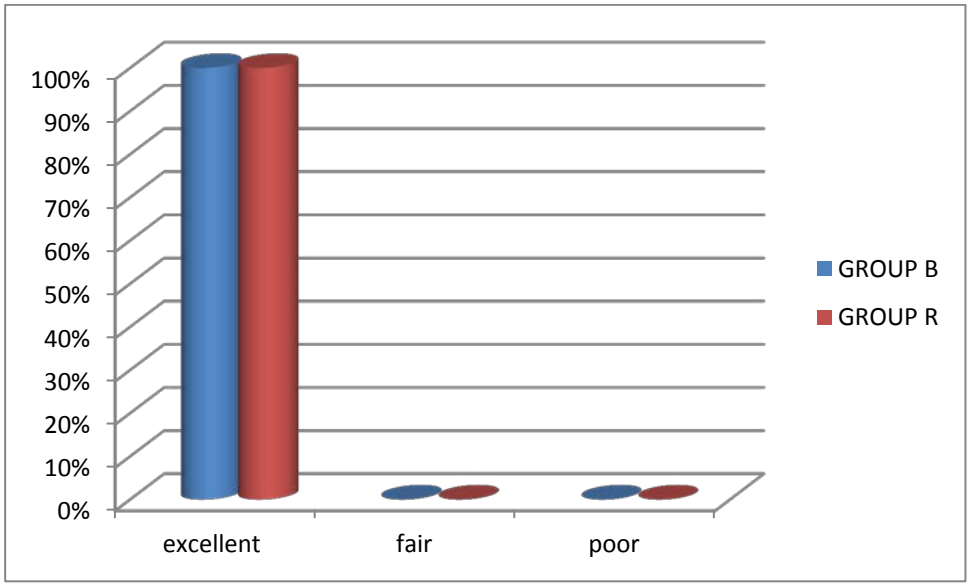
Pruritus was seen in both the groups. In group B (73.3%) and group R (66.7%).



PATIENT SATISFACTION:

PATIENT SATISFACTION SCORE	GROUP B	GROUP R
1	30(100%)	30(100%)
2	0	0
3	0	0

All parturients in both the group experience excellent analgesia during labour till delivery.


100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
excellent
fair
poor
GROUP B
GROUP R

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DISCUSSION

Neuraxial method provides excellent and satisfactory analgesia without compromising maternal and fetal safety hence it is considered till now as a gold standard technique for providing labour analgesia[15].

Use of low concentration local anaesthetic solution preferably blocks 'C' fibres which transmits pain without causing motor blockade that otherwise may affect outcome and course of labour. But using ultra minimal concentration of local anesthetics will result in inadequate analgesia, if it is used alone. Addition of opioid will decrease the MLAC (minimum local anaesthetic concentration) of local anesthetics used and makes it effective for labour analgesia.

Many studies showed that ropivacaine is 60% as potent as that of bupivacaine. There have been many studies compared equal concentration of drugs[64, 66, 69, 81] (0.125% bupivacaine vs0.125% ropivacaine) and equi-potent concentration[72, 73] of both drugs (0.1% bupivacaine vs. 0.15% ropivacaine). Most of the studies proved that that both drugs didn't differ significantly except that ropivacaine had less motor blockade on prolonged infusion.

In our study, we instituted labour analgesia with combined spinal epidural analgesia technique in 60 parturients .Each group had 30 parturients. In both the groups analgesia was initiated with intrathecal injection of fentanyl 25µg. Epidural catheterization was done following spinal analgesia. Epidural analgesia was initiated with 10 mL of 0.125% bupivacaine with fentanyl

2μg/mL in group B and with 10 mL 0.1% ropivacaine with fentanyl 2μg/mL in group R.

We compared the quality of analgesia by using VAS score during labour analgesia and patient's satisfaction at the end of delivery in both the groups.

We also compared the other parameters like onset, degree and duration of analgesia, sensory blockade and motor blockade, the duration of first and 2nd stage of labour, progress and outcome of labour, fetal heart rate changes, outcome of newborn by APGAR score and complications between both the groups.

There were no difference between two groups with respect to age, height and weight.

Mean baseline VAS in group B was 9.7 with S.D of 0.466 and in group R mean baseline VAS was 9.53 with S.D of 0.507. P value of 0.19 and it was statistically insignificant.

Labour analgesia was initiated in both groups between 4-5 cms of cervical dilatation. Mean cervical dilatation in both groups was 4.23cm with S.D of 0.430 .P value of 1.0 which was statistically insignificant.

In a randomised study, Lyons et al [40]compared needle through needle with separate needle CSE in 100 parturients undergoing caesarean section and Casati et al compared the same techniques in 120 non obstetric patients. They observed that less hypotension, lower incidence of spinal failure rate and it took

lesser time to perform in separate needle groups. Hence we used separate needle CSE technique in our study.

Opioid alone is enough for providing pain relief during early latent stage. But soon after spinal injection, low dose bupivacaine 0.03-0.0625% epidural infusion with opioid can started. Alternatively, epidural can be started whenever necessary[67].

CSE analgesia often initiated with intrathecal opioid (fentanyl 25µg or sufentanyl 5µg) in early latent phase with cervical dilatation less 4-5 cm followed by epidural catheter placement in healthy nulliparous women. Addition of local anesthetics to opioid intrathecally is unnecessary for achieving complete spinal analgesia especially in early stage will result in hypotension and profound motor blockade particularly if it is followed by an epidural injection of local anesthetics[60, 61].

In our study, we initiated labour analgesia with intrathecal fentanyl 25 µg followed by epidural catheter placement in L3-L4/L2-L3 space and catheter tip fixed at T12/L1. Ten min after spinal analgesia group B received ten mL of 0.125% bupivacaine with fentanyl 2µg/mL and group R received ten mL of 0.1% ropivacaine with fentanyl 2µg/mL.

Mean onset of analgesia (time to VAS <3) was 111.10 sec with S.D of 17.197 in group B and mean onset of analgesia was105.27 sec with S.D of 8.828.P value of 0.104 was statistically insignificant. There is no significant

difference between two groups with respect to onset of analgesia since both groups were initiated with intrathecal fentanyl 25µg.

These results were consistent with Meister et al[66] compared 0.125% bupivacaine and 0.125% ropivacaine with fentanyl. They found that mean VAS score which were around 9 in bupivacaine and 8 in ropivacaine came down to 0.4 and 0.3 respectively post epidural. Fernandez et al[72] compared 0.0625% bupivacaine with 0.1% ropivacaine with fentanyl. There was no significant difference between two groups with to onset of pain relief.

Maximum dermatomal level of sensory blockade achieved in both groups was T7. 13.3% in group B and 20.0% in group R had T7 level.56.7 % in group B and 36.7 % in group R had T8 level.10.0% in group B and 16.7% in group R achieved T10 level .20% in group B and 26.7% in group R achieved T9 level. P value was 0.48 and statistically insignificant.

This was comparable to the level achieved by Owen et al [64]and Guisasola[72] et al.

In a Halpern et al[82], a Meta analytic study compared ropivacaine and bupivacaine in equal concentration in labour analgesia. He found that 19 out of 23 studies supported ropivacaine had minimal blockade and 5 out of those studies were statistically significant.

Incidence of motor block was less in many studies and it was statistically significant in many studies (Gautier et al, Fischer et al, Meister et al, Campbell et al, Fine gold et al)[64, 66,67,70].

In our study, 20(66.7%) of patients in group B and 26(86.7%) of patients in group R had no motor blockade.10 patients (33.3%) in group B and 4(13.3%) patients in Group R had grade 1 Bromage (minimal) motor blockade. No patient in any groups was developed grade 2 or 3 motor blockade P value of 0.67, which is statistically insignificant. Maximum motor blockade (grade 1 Bromage) has occurred during first stage of labour and was seen immediately following bolus dose.

There were no statistically significant differences in blood pressure, pulse rate, saturation in both the groups.

No statistically significant differences in Sedation score of both groups. Some patients showed mild drowsiness (score 1) mainly due to effective pain relief.

Fetal heart rate changes in both groups were within normal limits. P value of both the groups shows no statistically significant changes.

In both the groups VAS was maintained with less than 3.In most cases VAS 3 usually coincide with the onset of 2nd stage of labour. Repeating the 10 mL of bupivacaine maintained the analgesia.

Mean duration of active phase of 1st stage of labour in group B was171.9±19.089 minutes and172.03 ± 25.926 minutes in group R. Mean duration of 2nd stage of labour in group B was 31.30±5.240 minutes and in group R it was 31.10 ±5.762 minutes. Mean total duration of labour in group B

was203.77 ±19.856 minutes and in group R it was 203.13± 22.793minutes. All durations were statistically insignificant

Our results were correlated well with many studies (Feranandez2001, Owen 20024, Boselli 2003, Halpern 2003)[72, 64,76,77,82]. In contrast Lee et al 2002[75], found that the bupivacaine group had longer first stage of labour than ropivacaine group. However they concluded that the difference may be of limited clinical significance.

In our study CSE is associated with more rapid cervical dilatation and shorter duration of labour. This result was consistent with studies conducted by Amit.G.Bhagwat et al[47] and Lawrence C Tsen et al[46].

Mean of total number of epidural bolus doses used in group B was 4.33with SD of 0.547. In group R Mean of total number of epidural bolus doses used was 4.00 with SD of 0.947. P value of0.100 and was statistically insignificant.

Mean of total volume used for epidural analgesia in group B was 33.33mL with SD of 4.011. In group R mean of total volume used for epidural analgesia used was32.17 mL and SD of 4.676. P value of 0.102 and was statistically insignificant.

There was no difference between two groups in volume requirements.

During second stage, all parturients in our study required ten mL of local anaesthetic bolus for effective pain relief during episiotomy. This was not influenced by position of patient and mainly depends on volume.

Merry A Fet al, Park WY et al, Erdemir HA et al studies showed that inconsistent results with position of patient during drug administration but by increasing the volume of drug[83, 84,85] during second stage of labour.

Mean of total dosage of fentanyl used in group B was 66.67 µg with SD of 8.023. In group R mean of total dosage of fentanyl used was 64.33µg with SD of 9.353. P value of 0.304 and was statistically insignificant.

Most studies showed that incidence of emergency caesarean delivery were less with CSE technique when compared to conventional epidural[48, 53.] Risk of caesarean delivery does not increased by neuraxial techniques and also by time of initiation of labour analgesia in latent phase (cervical dilatation 4 cm)[55] .

In both groups all babies delivered by normal vaginal delivery except two babies were delivered by forceps delivery. Both of them were secondary to poor maternal efforts. No other case underwent caesarean section.

The recent Cochrane review [81]which compared epidural analgesia with inhalational and intravenous analgesia (mainly opioid) and observed that there was less fetal acidosis and less nalaxone administration in babies born to mothers having labour epidural analgesia.

Beilin and Halpern in 2010[65, 82] did a focused review with various studies that compared bupivacaine and ropivacaine and concluded that there was no evidence that neonatal outcome is adversely affected when ropivacaine or bupivacaine is used for labour analgesia.

In our study, at 1 minute in group B mean of APGAR score was 7.57 and SD was 0.504. In group R mean was APGAR score 7.57 and SD was 0.504. P value of 1.0 and was statistically insignificant.

At 5 minutes in group B mean of APGAR score was 8.57 and SD was 0504. In group R mean was APGAR score 8.87 and SD 0.346. P value of 0.009 and was statistically insignificant.

Yeh HM, Chen LK, Lin CJ. et al concluded that prophylactic Ondansetron administration reduces the incidences of pruritus induced by intrathecal morphine[86].

In our study, Pruritus was seen in both the group B (73.3%) and group R (66.7%). In most of womens it was self limiting and got settled within hour of fentanyl administration. Some responded well to Ondansetron 4 mg IV.

No other complications were seen during labour analgesia.

RE Collis, DWL Davies concluded that overall satisfaction was greater in CSE group than conventional epidural because of CSE produces rapid onset of analgesia[14, 43].

In our study, all parturients in both the group experience and gave satisfaction score of (=1) excellent analgesia during labour till delivery.

SUMMARY

Neuraxial analgesia remains the safest and most commonly performed technique amongst all available methods of labour analgesia. Among neuraxial technique, Combined Spinal Epidural analgesia is the most commonly preferred method nowadays because of its rapid action and good quality of analgesia.

Despite its advantages and proven benefits, it hasn't become popular choice in developing countries like India because of myths like increased risk of operative delivery and instrumental delivery, increased risk of motor blockade and hypotension which affects the progression of labour.

By using low dose concentration of local anesthetics with opioid produces better quality of analgesia without adverse effects.

In our study, we compared combined spinal epidural technique using equal concentration of bupivacaine (0.125%) and ropivacaine (0.1%) for quality of analgesia. To initiate analgesia we used intrathecal fentanyl 25 µg in both the groups and we also used fentanyl 2µg/mL in epidural preparation of bupivacaine and ropivacaine to improve quality of analgesia in both the groups.

Both the groups were comparable in age, height, weight, parity and time of initiation of labour analgesia.

Quality of analgesia was excellent in both the groups which were assessed by patient's satisfaction at the end of delivery and effective analgesia throughout the progress of labour till delivery. Onset of analgesia was comparable in both the groups. It also shortens duration of labour which was

augmented by obstetricians as a part of active management of labour. Nearly all parturients in both the groups were required ten mL of bupivacaine or ropivacaine for effective pain relief during second stage of labour. All parturients in both the groups delivered baby by normal vaginal delivery except two babies with each in a group were delivered by forceps which was secondary to poor maternal efforts. No other case underwent operative delivery.

Out of sixty parturients, 10 patients (33.3%) in group B and 4(13.3%) patients in Group R had grade 1 Bromage (minimal) motor blockade. P value (0.67) which was statistically insignificant. No patient in any groups was developed grade 2 or 3 motor blockade at any time during the course of labour. Maximum motor blockade (grade 1 Bromage) has occurred during the first stage of labour and was seen immediately following the first epidural bolus dose that doesn't affect the progression of labour. Except pain and temperature, all other sensations were intact. No significant changes in epidural bolus, volume of drugs used epidurally and dosage of fentanyl used were noted.

No significant changes were noted in maternal vital signs, sedation, fetal heart rate and APGAR score. Pruritus was seen in both the group B (73.3%) and group R (66.7%) which was mild and self limiting.

DRAWBACKS OF OUR STUDY:

We relied upon APGAR score for assessing the neuro behavioural outcome of the baby.

We didn’t measure umbilical cord pH to assess the effects of drugs on acid base status of fetus due to financial constraints.

We didn’t measure the amount of oxytocin used in our study.

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CONCLUSION

The observation of this study shows that both bupivacaine 0.125% and ropivacaine 0.1% administered epidurally as a part of combined spinal epidural technique following intrathecal 25µg provides equal and effective analgesia. Duration of labour was not prolonged rather combined spinal epidural analgesia decreases the duration of labour. Patient satisfaction, level of sensory blockade, mode of delivery, duration of labour, neonatal outcome and complications are comparable between both the groups. Bupivacaine group had relatively more motor blockade which was grade 1 Bromage when compared to ropivacaine group but that was not statistically significant. Maximum motor blockade of grade 1 Bromage was seen during first stage of labour especially immediately after first epidural bolus dose which doesn't affect the progress of labour. But the observation of this study with respect to motor blockade was not statistically significant which needs further future studies in large scale.

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LIST OF ABBREVIATIONS

cm	-	Centimetre
hr	-	Hour
ID	-	Internal Diameter
IV	-	Intravenous
KG	-	Kilogram
mL	-	Millilitre
mmHg	-	Millimeters Of Mercury
NS	-	Not Significant
O2	-	Oxygen
Paco2	-	Arterial Partial Pressure Of Carbon Dioxide
Pao2	-	Arterial Partial Pressure Of Oxygen
CSE	-	Combined Spinal Epidural Analgesia
EA	-	Epidural Analgesia
LA	-	Local Anesthetic Agent
FHR	-	Fetal Heart Rate
ADP	-	Accidental Dural Puncture
PDPH	-	Post Dural Puncture Headache
ASA	-	American Society Of Anesthesiologists
CSF	-	Cerebro Spinal Fluid
PIH	-	Pregnancy Induced Hypertension
VAS	-	Visual Analogue Scale
vs	-	Versus
μg, mcg	-	Microgram

GROUP-B (BUPIVACAINE) MASTER CHART-I

S.No	Name	Age	IP NO	Height in (cm)	Weight (in kg)	parity	Cervical Dilatation	duration of active 1st Stage(min)	2nd stage(min)	Total duration till delivery(mi	no.of epidural bolus doses	Total Volume of EA used(ml)	Total Dosage of Bupivacaine	epidural fentanyl(mc g)	Time to VAS(sec)	Height of dermatomal level	VAS Baseline	VAS 5'	VAS 10'	VAS 15'	VAS 30'	VAS 60'	VAS 90'	VAS 120'	VAS 150'	VAS 180'	VAS 210'	VAS 240'	VAS 270'	VAS 300'	Outcome	APGAR Score 1'	APGAR Score 5'	Complicatio ns	Patient Satisfaction
1	bakkiam	22	13201	160	68	primi	4	210	30	240	6	40	50	80	100	T8	10	1	1	1	1	1	1	1	3	1	1	1			SNVD	7	9	pruritus	1
2	divya	24	11054	164	70	primi	4	190	25	210	5	35	44	70	150	T8	10	1	1	1	1	1	1	1	1	3	1				SVND	8	9	pruritus	1
3	sasikala	20	10674	158	62	primi	4	155	35	190	4	30	38	60	160	T7	10	1	1	1	1	1	1	1	3	1	1				SVND	8	9	none	1
4	rekha	19	11832	155	65	primi	5	160	20	180	4	30	38	60	110	T8	10	1	1	1	2	1	1	2	3	1	1				SVND	7	8	pruritus	1
5	rahasiya	20	12403	157	68	primi	4	185	35	220	5	35	44	70	130	T8	9	1	1	1	1	1	1	1	1	3	2	1			SVND	8	9	pruritus	1
6	kalaiselvi	22	11673	162	70	primi	4	190	40	230	5	40	50	80	140	T8	10	1	1	1	1	1	1	1	1	1	3	1			SVND	7	8	none	1
7	mary	25	12784	159	72	primi	4	145	35	180	4	30	38	60	105	T7	10	1	1	1	1	1	1	1	1	1	1				SVND	8	9	pruritus	1
8	sneha	18	11874	163	69	primi	5	160	25	185	4	30	38	60	112	T8	9	1	1	1	1	1	1	1	1	1	1				SVND	7	8	pruritus	1
9	Bhavani	23	16532	158	68	primi	4	184	36	220	4	35	44	70	90	T9	10	1	1	1	1	1	1	3	1	2	1	1			SVND	8	9	pruritus	1
10	sangeetha	21	18542	155	70	primi	4	155	35	190	4	30	38	60	106	T8	9	1	1	1	1	1	1	1	1	3	1				SVND	7	8	none	1
11	nishanthini	19	12674	160	72	primi	4	145	30	175	4	30	38	60	98	T8	10	1	1	1	1	1	1	1	1	1	1				SVND	8	9	pruritus	1
12	rajeswari	20	18634	164	75	primi	5	190	35	225	4	35	44	70	120	T9	10	1	1	1	1	1	1	1	3	1	2	1			SVND	7	8	pruritus	1
13	sameena banu	18	19523	158	73	primi	4	165	25	210	4	35	44	70	98	T8	10	1	1	1	1	1	1	1	1	1	1	1			SVND	8	9	pruritus	1
14	nandhini	27	15324	170	86	primi	5	141	34	175	4	30	38	60	105	T7	9	1	1	1	1	1	1	1	1	1	2	1			SVND	8	9	none	1
15	vijaya	24	22471	168	79	primi	4	197	28	225	5	35	44	70	107	T8	10	1	1	1	1	1	1	1	1	2	2	1			SVND	8	8	none	1
16	poorani	23	20532	158	70	primi	4	165	30	195	4	30	38	60	90	T9	10	1	1	1	1	2	1	3	1	1	1				SVND	7	8	pruritus	1
17	shabana	22	23415	166	75	primi	4	182	28	210	4	35	44	70	112	T8	10	1	1	1	1	1	1	1	2	2	1	1			SVND	8	9	pruritus	1
18	stella	19	23415	160	69	primi	4	157	38	195	4	30	38	60	124	T10	9	1	1	1	1	2	1	3	1	1	1				SVND	8	8	pruritus	1
19	radha	26	24135	169	77	primi	4	176	36	212	5	35	44	70	98	T8	10	1	1	1	1	2	1	1	3	1	1	1			SVND	7	8	none	1
20	gowri	22	13421	158	68	primi	4	174	24	198	4	30	38	60	100	T7	10	1	1	1	1	1	1	1	1	1	1				FORC	7	9	pruritus	1
21	parameswari	24	22351	152	64	primi	4	185	30	215	5	40	50	80	128	T9	9	1	1	1	1	1	1	1	1	2	1	1			SVND	8	9	pruritus	1
22	aarthy	25	26741	161	73	primi	4	175	25	200	4	35	44	70	99	T8	10	1	1	1	1	1	1	1	1	2	1				SVND	7	8	none	1
23	suguna	24	23410	159	68	primi	5	166	28	194	4	30	38	60	102	T10	9	1	1	2	1	1	1	1	3	1	1				SVND	7	8	pruritus	1
24	kumari	20	52397	158	76	primi	4	198	38	236	5	40	50	80	115	T9	10	1	1	1	1	1	1	1	1	1	2	1			SVND	8	9	none	1
25	menaga	21	26708	159	73	primi	5	152	28	180	4	30	38	60	90	T8	9	1	1	1	1	1	2	1	2	1	1				SVND	8	9	pruritus	1
26	aswanthi	23	21348	162	78	primi	4	183	32	215	4	35	44	70	110	T8	10	1	1	1	2	1	1	1	1	3	1	1			SVND	8	9	pruritus	1
27	suhashini	21	20946	153	60	primi	4	170	35	205	4	35	44	70	98	T9	10	1	1	1	1	1	1	3	1	1	1				SVND	7	8	pruritus	1
28	ammu	24	26565	161	69	primi	5	173	25	198	4	30	38	60	102	T8	10	1	1	1	1	2	1	1	1	1	1				SVND	8	9	pruritus	1
29	manjula	21	27890	164	80	primi	4	197	38	235	5	40	50	80	126	T10	9	1	1	1	1	1	1	1	1	1	3	1	1		SVND	7	8	pruritus	1
30	kalyani	22	27812	156	72	primi	4	134	36	170	4	25	31	50	108	T8	10	1	1	1	1	1	1	1	1	1					SVND	8	9	pruritus	1

GROUP-B (BUPIVACAINE)MASTER CHART-II

S.No	PR Base Line	PR 5'	PR 10'	PR 15'	PR 30'	PR 60'	PR 90'	PR 120'	PR 150'	PR 180'	PR 210'	PR 240'	PR 270'	PR 300'	SBP Baseline	DBP Baseline	SBP 5'	DBP5'	SBP 10'	DBP10'	SBP 15'	DBP15'	SBP 30'	DBP30'	SBP 60'	DBP60'	SBP 90'	DBP90'	SBP 120'	DBP120'	SBP 150'	DBP150'	SBP 180'	DBP180'	SBP 210'	DBP210'	SBP 240'	DBP240'	SBP 270'	DBP270'	SBP 300'	DBP300'
1	103	98	85	88	83	87	86	78	76	80	86	88			118	88	126	78	120	78	126	76	118	72	114	72	116	82	126	84	122	84	126	82	112	74	114	74				
2	110	92	89	88	86	85	82	78	74	73	77				114	72	108	70	102	64	100	62	102	64	112	70	102	64	120	68	110	70	112	68	124	74						
3	106	100	102	88	84	82	78	74	72	70	84				107	68	112	74	118	68	116	74	118	68	108	64	128	86	130	68	126	58	104	56	120	70						
4	98	92	94	86	84	82	80	76	74	79					128	74	132	74	130	70	132	68	120	68	124	74	112	68	102	68	108	64	112	72								
5	104	98	92	78	84	86	88	87	79	74	74	80			132	78	124	68	114	68	105	75	143	74	123	68	120	76	112	67	124	76	120	76	115	75	112	68				
6	92	98	96	86	88	78	72	70	74	76	68	74			102	58	112	76	102	68	120	68	105	65	106	74	104	72	114	77	103	68	122	74	102	68	124	68				
7	112	98	96	86	78	84	78	80	82	74	76				110	64	126	74	126	78	102	68	112	68	126	73	134	74	132	68	112	68	120	74	126	68						
8	100	94	93	78	84	88	85	83	84	86	77				102	64	112	73	116	72	106	72	125	72	128	69	112	68	108	74	124	74	112	68	122	64						
9	98	84	88	76	74	72	82	80	74	78	72	78			126	72	113	78	119	75	112	68	134	78	126	68	134	86	126	78	124	67	124	78	112	65	112	68				
10	106	98	94	84	82	78	80	84	76	78	74				134	67	124	78	122	68	112	64	118	68	113	76	112	67	118	74	118	68	128	74	107	64						
11	99	82	86	87	77	72	73	74	86	90					126	64	121	67	132	64	120	78	112	64	132	78	124	66	132	62	120	74	112	68								
12	112	98	99	86	87	85	84	82	80	78	84	88			132	68	126	78	124	68	124	62	130	70	124	62	112	68	114	68	120	62	114	64	124	62	116	74				
13	120	100	98	86	82	78	80	84	78	74	82				112	78	134	67	123	68	132	70	126	74	104	66	102	63	112	67	132	86	100	72	122	66						
14	108	102	100	84	82	88	92	90	84	82					128	78	132	84	126	78	134	64	126	78	132	68	127	65	112	64	122	73	102	64								
15	110	106	104	86	84	78	82	80	78	72	74	76			132	76	124	76	112	68	124	64	112	72	104	64	98	60	94	62	100	62	112	72	120	78	122	64				
16	100	98	102	92	90	88	86	84	82	74	77				104	76	122	68	124	72	112	80	124	74	132	68	120	70	112	68	134	86	124	68	112	65						
17	99	88	90	92	80	82	84	74	78	77	67				112	74	124	82	112	80	124	68	112	74	102	68	100	72	112	64	102	82	102	64	100	76						
18	106	97	87	86	84	84	82	83	74	76	85				106	80	134	68	124	78	132	80	144	76	132	67	116	74	134	68	112	68	124	64	108	68						
19	102	99	98	96	94	86	84	82	80	78	88	99			102	68	112	67	124	78	126	82	134	70	132	76	125	64	112	60	124	67	123	64	112	74	126	78				
20	100	89	88	86	78	77	76	74	73	86	82				112	60	102	68	112	67	121	68	125	76	122	67	123	78	112	74	124	68	120	67	126	78						
21	102	99	98	97	78	76	82	80	78	86	78	86			114	65	112	68	112	86	124	67	112	68	124	67	123	67	124	67	112	78	102	67	124	78	122	74				
22	112	98	97	96	86	86	89	90	99	78	72				110	70	112	67	134	78	142	67	124	67	112	78	124	68	124	78	134	67	124	76	112	67						
23	106	94	98	88	86	84	78	74	76	72	74				112	76	124	67	142	78	134	68	124	67	112	84	126	78	132	68	123	83	112	76	112	67						
24	112	108	89	92	94	98	89	86	84	82	88	90			107	67	125	56	124	67	124	67	124	68	132	68	112	74	112	68	124	64	112	75	124	68	132	78				
25	105	100	89	88	86	76	73	72	70	89					120	78	104	70	112	74	124	68	112	76	102	68	100	64	104	78	110	70	108	74								
26	108	89	92	78	78	86	76	74	72	70	78	75			102	76	104	78	100	67	104	66	102	76	108	70	110	74	112	78	104	68	110	74	112	86	124	76				
27	112	109	98	91	90	73	89	88	78	76	74				110	74	124	76	112	74	102	68	104	78	108	68	110	78	106	76	120	84	112	78	124	78						
28	102	98	67	76	72	82	80	78	67	68	66				104	68	124	78	124	68	112	76	124	78	103	67	100	67	100	60	112	74	124	76	123	75						
29	112	98	93	85	86	78	74	78	82	88	89	90			134	78	124	76	112	74	107	68	108	78	104	72	112	74	114	68	118	74	136	84	112	78	124	76				
30	89	88	78	77	73	74	76	74	73	70					124	67	120	70	110	68	104	67	104	66	106	78	104	64	102	78	104	72	108	74								

GROUP-B (BUPIVACAINE)MASTER CHART-III

S.No	MB 5'	MB 10'	MB 15'	MB 30'	MB 60'	MB 90'	MB 120'	MB 150'	MB 180'	MB 210'	MB 240'	MB 270	MB 300'	MAXIMUM MOTOR BLOCKADE	SEDATION Baseline	SEDA 15'	SEDA 30'	SEDA 60'	SEDA 90'	SEDA 120'	SEDA 150	SEDA 180'	SEDA 210'	SEDA 240'	SEDA 270'	SEDA 300'	spO2baseline	SpO2 15'	SpO2 30'	SpO2 60'	SpO2 90'	SpO2 120'	SpO2 150'	SpO2 180'	SpO2 210'	SpO2 240'	SpO2 270'	SpO2 300'	FHR Baseline	FHR 5'	FHR 10'	FHR 15'	FHR 30'	FHR 60'	FHR 90'	FHR 120'	FHR 150'	FHR 180'	FHR 210'	FHR 240'	FHR 270'	FHR 300'
1	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0	0	0	0	0			99	100	100	99	99	99	99	100	99	100			146	152	156	149	154	160	148	160	156	153	143	138		
2	0	0	0	0	0	0	0	0	0	0					0	0	0	0	0	0	0	0	0				100	99	99	99	100	98	99	99	100				136	138	142	144	146	139	140	141	143	145	148			
3	0	0	0	0	0	0	0	0	0	0					0	0	1	1	1	1	1	0	0				100	99	98	97	97	98	99	100	99				150	148	146	143	152	139	146	130	138	145	142			
4	0	0	0	0	0	0	0	0	0	0					0	0	0	1	0	1	0	0					99	100	98	97	99	99	100	98					138	132	134	138	142	148	150	146	138	148				
5	0	1	1	1	1	1	0	0	0	0	0			1	0	0	0	0	0	0	0	0	0	0			100	99	98	98	99	99	98	100	99	99			142	146	134	137	132	128	132	130	132	130	132	128		
6	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0	0	0	0	0			100	100	100	99	100	100	100	100	100	100			147	145	144	137	133	145	137	156	144	134	132	134		
7	0	1	1	1	1	1	0	0	0	0				1	0	1	1	1	1	1	0	0	0				100	99	99	99	99	100	100	100	99				146	146	128	132	143	145	146	147	156	157	143			
8	0	0	0	0	0	0	0	0	0	0					0	0	0	0	0	0	0	0	0				99	100	100	99	100	99	100	100	99				145	146	147	148	144	143	134	138	136	137	138			
9	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0	0	0	0	0			100	99	98	99	97	99	100	99	98	99			138	138	142	140	134	135	132	130	146	142	136	132		
10	0	1	1	1	0	0	0	0	0	0				1	0	0	0	0	0	0	0	0	0				100	99	98	98	97	98	99	100	99				150	142	136	134	142	138	134	136	138	140	142			
11	0	0	0	0	0	0	0	0	0						0	0	0	0	0	0	0	0					100	99	98	97	98	99	99	99					128	126	134	124	126	127	142	137	134	132				
12	0	1	1	1	1	0	0	0	0	0	0			1	0	0	0	0	0	0	0	0	0	0			99	100	100	99	98	97	98	98	100	99			132	130	132	140	142	138	135	140	136	137	142	143		
13	0	0	0	0	0	0	0	0	0	0					0	1	1	1	0	0	0	0	0				100	99	99	99	99	99	99	100	99				134	132	136	132	140	136	132	139	140	132	150			
14	0	1	1	1	0	0	0	0	0					1	0	0	0	0	0	0	0	0					99	100	98	99	98	99	100	99					142	136	139	135	143	142	142	140	140	138				
15	0	0	0	0	0	0	0	0	0	0	0				0	1	1	1	0	0	0	0	0	0			99	100	99	99	99	100	99	100	99	100			156	134	132	128	142	137	140	134	132	143	142	140		
16	0	1	1	1	1	0	0	0	0	0				1	0	0	0	0	0	0	0	0	0				98	99	99	99	100	100	99	98	99				132	140	146	143	136	132	142	138	146	156	156			
17	0	0	0	0	0	0	0	0	0	0					0	0	0	0	0	0	0	0	0				97	98	99	100	99	98	98	99	99				145	143	142	132	130	128	129	132	134	136	138			
18	0	0	0	0	0	0	0	0	0	0	0				0	1	1	1	1	0	0	0	0	0			99	100	99	98	98	99	97	99	100				145	128	134	136	137	142	147	134	143	156	150			
19	0	1	1	1	1	0	0	0	0	0	0			1	0	0	0	0	0	0	0	0	0				99	98	99	97	100	98	99	98	99				134	135	136	146	142	142	140	136	132	128	130	146		
20	0	0	0	0	0	0	0	0	0	0					0	0	0	0	0	0	0	0	0				99	98	97	99	100	99	98	99	99				132	142	140	141	156	134	145	134	132	136	145			
21	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0	0	0	0	0			99	100	99	98	100	99	98	97	99	100			142	132	130	128	144	136	156	147	142	138	140	146		
22	0	1	1	0	0	0	0	0	0	0				1	0	0	1	1	1	0	0	0	0				100	99	98	99	98	99	100	99	100				134	123	124	144	135	137	138	132	142	140	134			
23	0	0	0	0	0	0	0	0	0	0					0	0	0	0	1	0	0	0	0				99	100	98	99	97	99	99	99	99				132	146	142	150	142	132	140	138	145	138	136			
24	0	0	1	1	1	1	0	0	0	0				1	0	1	0	1	0	0	0	0	0	0			100	99	99	98	99	97	99	98	99	99			145	132	154	128	130	134	145	136	147	137	149	130		
25	0	0	0	0	0	0	0	0	0						0	0	0	0	0	0	0	0					100	99	100	100	100	100	99	100					132	133	134	124	136	142	140	144	145	136	138			
26	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0	0	0	0	0			100	99	99	98	97	99	99	99	100	99			134	156	137	145	132	137	146	138	139	140	134	145		
27	0	0	0	0	0	0	0	0	0	0					0	0	0	0	0	0	0	0	0				99	98	99	100	99	98	99	99	100				132	134	136	145	162	156	145	148	137	138	139			
28	0	0	0	0	0	0	0	0	0	0					0	0	0	0	0	0	0	0	0				100	99	99	98	100	99	99	100	100				144	145	134	146	145	132	133	134	146	134	134			
29	0	1	1	1	1	1	0	0	0	0	0			1	0	0	0	1	0	1	0	0	0	0			100	100	99	100	100	100	100	99	100	100			132	134	145	136	146	137	138	142	148	132	138	145		
30	0	0	0	0	0	0	0	0	0						0	0	0	0	0	0	0	0					100	100	99	100	99	98	99	99					144	134	132	143	134	145	156	162	134	145				

GROUP-R (ROPIVACAINE)MASTER CHART-I

S.No	Name	Age	IP NO	Height in (cm)	Weight (in kg)	parity	Cervical Dilatation	Duration of Active Stage1st (min)	2nd stage(min)	Total duration till delivery(min)	no.of epidural bolus doses	Total Volume of EA used(ml)	Total Dosage of Ropivacaine(mg)	epidural fentanyl(mcg)	Time to VAS(sec)	Height of dermatomal level	VAS Baseline	VAS 5'	VAS 10'	VAS 15'	VAS 30'	VAS 60'	VAS 90'	VAS 120'	VAS 150'	VAS 180'	VAS 210'	VAS 240'	VAS 270'	VAS 300'	Outcome	APGAR Score 1'	APGAR Score 5'	Complications	Patient Satisfaction
1	nathiya	22	23416	162	70	primi	4	161	34	195	4	30	30	60	105	T8	10	1	1	1	1	1	1	1	1	1	1				SNVD	7	8	Pruritus	1
2	hamse nandini	19	12896	157	68	primi	4	200	25	225	5	35	35	70	110	T7	10	1	1	1	1	1	2	1	1	1	1	1			SNVD	8	8	Pruritus	1
3	srividya	18	15673	163	70	primi	5	226	20	246	6	40	40	80	120	T9	10	1	1	1	1	2	1	3	2	2	1	1	1		SNVD	8	9	none	1
4	raagini	23	18893	158	75	primi	4	192	28	220	5	35	35	70	122	T8	9	1	1	1	1	1	1	1	1	2	1	1			SNVD	8	9	Pruritus	1
5	thasleema	24	23330	156	78	primi	5	192	38	230	5	30	30	60	105	T10	10	1	1	1	1	1	1	1	1	1	1	1			SNVD	8	9	Pruritus	1
6	srija	26	34567	164	85	primi	4	156	29	185	3	25	25	50	100	T8	10	1	1	1	1	2	1	1	1	1	1				SNVD	7	9	Pruritus	1
7	yogeswari	19	12450	154	80	primi	4	201	24	225	4	30	30	60	98	T9	9	1	1	1	1	1	1	1	1	1	1	1			SNVD	8	9	none	1
8	karthiga	24	23561	153	78	primi	4	159	39	198	4	30	30	60	103	T7	10	1	1	1	1	1	1	1	2	2	1				SNVD	7	9	Pruritus	1
9	nikitha	25	15620	162	65	primi	5	170	40	210	5	35	35	70	97	T8	9	1	1	1	1	1	1	1	1	1	1				SNVD	7	9	none	1
10	visnu priya	27	24021	160	59	primi	4	210	25	235	5	40	40	80	96	T7	10	1	1	1	1	1	1	1	1	1	1	1			SNVD	8	9	Pruritus	1
11	paulia	21	16783	156	77	primi	4	217	23	240	6	45	45	90	95	T8	10	1	1	1	1	1	1	2	2	3	1	1			SNVD	8	9	none	1
12	sasweeni	22	19843	152	68	primi	4	183	27	210	4	30	30	60	106	T9	10	1	1	1	1	1	1	1	1	1	1				SNVD	8	9	none	1
13	aswathi	20	21024	155	65	primi	5	165	25	190	3	30	30	60	104	T8	10	1	1	1	1	1	1	2	2	1	1				SNVD	8	9	Pruritus	1
14	megala	19	14327	157	69	primi	4	144	36	180	3	30	30	60	96	T7	9	1	1	1	1	1	1	1	1	1	1				SNVD	7	9	Pruritus	1
15	pattamal	22	17653	164	70	primi	4	145	37	182	3	30	30	60	95	T9	10	1	1	1	1	1	1	1	1	2	2				SNVD	7	8	Pruritus	1
16	fathima	20	12605	170	69	primi	4	198	28	226	4	35	35	70	102	T10	9	1	1	1	2	2	1	1	1	1	1	1			SNVD	7	8	none	1
17	nishitha	23	11290	168	72	primi	4	177	33	210	4	35	35	70	112	T10	10	1	1	1	1	1	2	1	1	1	1				FORC	8	9	none	1
18	daisy	24	14590	149	70	primi	5	177	35	212	4	30	30	60	122	T8	9	1	1	1	1	1	2	1	2	1	1	1			SNVD	8	9	Pruritus	1
19	narmadha	25	20245	155	69	primi	4	152	37	189	3	30	30	60	107	T7	9	1	1	1	1	2	3	2	1	1	1				SNVD	8	9	Pruritus	1
20	gothai	23	18734	152	68	primi	4	166	24	190	3	30	30	60	108	T8	9	1	1	1	1	1	2	1	2	1	1				SNVD	7	9	Pruritus	1
21	lakshmi	22	17432	157	71	primi	4	137	38	175	3	25	25	50	110	T10	9	1	1	1	1	1	1	2	2	1	1				SNVD	8	9	Pruritus	1
22	anandhi	20	21265	154	69	primi	4	154	26	180	3	30	30	60	98	T9	10	1	1	1	1	1	1	1	1	1	1				SNVD	7	9	Pruritus	1
23	poonguzhali	21	23046	158	63	primi	5	207	33	240	5	40	40	80	97	T8	9	1	1	1	1	1	1	2	2	2	2	1			SNVD	8	9	none	1
24	deepa	24	10873	162	65	primi	4	139	31	170	3	30	30	60	106	T9	9	1	1	1	1	2	2	1	1	1					SNVD	8	9	Pruritus	1
25	haarika	25	12067	164	69	primi	4	176	29	205	4	35	35	70	118	T8	10	1	1	1	1	2	1	2	1	1	1				SNVD	7	9	Pruritus	1
26	shanthi	23	13056	158	74	primi	4	168	28	196	4	30	30	60	112	T7	9	1	1	1	1	1	1	3	1	1	1				SNVD	7	9	Pruritus	1
27	malarvizhi	21	12670	163	82	primi	4	172	30	202	5	35	35	70	98	T8	10	1	1	1	1	1	1	1	2	1	1				SNVD	8	9	none	1
28	devikala	26	13450	166	80	primi	5	148	38	186	4	30	30	60	90	T9	9	1	1	1	1	1	1	1	1	1	1				SNVD	8	9	Pruritus	1
29	thenmozhi	27	11789	154	76	primi	4	133	39	172	3	30	30	60	106	T10	10	1	1	2	1	2	1	2	1	1					SNVD	7	9	Pruritus	1
30	vasanthi	24	12674	160	72	primi	4	136	34	170	3	25	25	50	120	T9	9	1	1	1	1	1	1	1	1	1					SNVD	7	9	none	1

GROUP-R (ROPIVACAINE)MASTER CHART-II

S.No	PR Base Line	PR 5'	PR 10'	PR 15'	PR 30'	PR 60'	PR 90'	PR 120'	PR 150'	PR 180'	PR 210'	PR 240'	PR 270'	PR 300'	SBP Baseline	DBP Baseline	SBP 5'	DBP5'	SBP 10'	DBP10'	SBP 15'	DBP15'	SBP 30'	DBP30'	SBP 60'	DBP60'	SBP 90'	DBP90'	SBP 120'	DBP120'	SBP 150'	DBP150'	SBP 180'	DBP180'	SBP 210'	DBP210'	SBP 240'	DBP240'	SBP 270'	DBP270'	SBP 300'	DBP300'
1	112	102	100	98	92	94	93	94	87	86	83				118	86	110	72	96	78	100	76	112	76	114	82	118	73	108	72	104	72	108	74	112	76						
2	108	106	96	94	92	90	84	78	82	83	79	74			116	78	112	74	109	76	124	76	145	78	108	83	118	72	107	86	112	68	112	76	124	82	110	70				
3	114	98	97	95	94	92	90	89	88	87	82	78	89		124	78	112	74	110	86	108	74	106	74	102	74	100	86	106	78	112	64	102	67	104	67	112	74	102	64		
4	109	96	97	89	85	84	83	82	80	77	74	75			116	68	110	72	108	70	102	67	98	62	110	64	108	68	104	72	110	70	114	68	124	74	114	64				
5	108	97	95	94	93	92	88	86	82	80	78	72			126	78	124	73	120	68	132	78	126	78	112	78	110	74	108	64	102	72	108	68	100	72	112	76				
6	98	92	90	88	85	84	84	84	82	80	77				107	70	102	68	100	64	104	70	109	68	112	63	104	62	108	70	110	72	105	62	108	64						
7	100	98	92	94	89	88	78	77	76	74	72	79			124	78	120	68	126	72	132	78	128	68	130	70	126	72	118	70	102	64	100	70	112	68	118	64				
8	112	100	98	97	96	95	92	88	87	76	78				110	70	112	64	108	73	100	70	106	76	112	84	106	72	107	82	104	80	113	72	110	70						
9	98	96	92	88	86	84	82	80	78	83	84				112	68	124	70	126	73	128	74	128	70	136	70	126	88	124	64	120	70	106	68	100	64	112	72				
10	102	98	96	94	78	77	74	75	82	78	76				104	62	123	68	112	72	123	68	124	64	134	72	128	68	130	72	128	68	112	70	130	70	110	70				
11	99	98	92	88	86	84	82	80	78	77	72				112	78	106	72	108	76	100	68	102	68	104	74	120	74	122	76	102	68	112	72	108	68	112	76				
12	102	100	98	96	95	93	90	89	88	78	73				124	78	132	68	120	72	112	74	110	68	120	72	112	68	102	68	112	64	117	68	110	72						
13	98	99	78	72	73	75	87	86	92	90	84				112	76	102	68	112	68	114	70	112	68	100	78	110	70	124	66	100	66	104	68	112	70						
14	106	100	89	86	92	90	89	88	86	82	78				102	76	124	68	104	66	102	78	102	67	100	68	102	70	104	70	112	68	122	68								
15	109	98	97	86	88	78	77	76	83	80	89				120	80	112	76	104	68	100	68	104	72	112	68	114	80	112	70	114	76	118	64	114	76						
16	112	98	89	88	86	84	83	78	72	74	77	78			125	70	132	76	124	76	112	74	120	70	132	80	124	68	127	74	132	68	124	70	124	68	112	76				
17	98	90	92	94	86	82	86	82	80	78	76				112	76	114	78	114	70	124	68	124	67	120	87	126	78	112	70	114	68	112	70	112	70						
18	106	98	93	90	86	84	83	82	80	78	74	72			124	68	124	72	132	68	120	73	126	74	128	76	124	74	132	78	120	67	112	77	124	76	112	78				
19	102	100	98	96	94	90	86	82	78	76	74				124	72	128	74	112	70	116	68	114	72	118	74	114	69	112	60	106	74	108	68	112	65						
20	98	95	94	86	78	73	72	70	82	80	78				112	68	114	76	114	76	124	67	132	74	124	70	124	72	120	68	112	73	110	74	112	67						
21	114	97	96	94	90	89	76	78	74	82	84				110	70	112	67	110	78	114	67	110	78	108	67	104	72	120	67	132	70	132	76								
22	108	94	93	90	88	86	83	82	80	76					114	76	113	67	120	68	124	64	126	78	120	68	112	64	124	74	112	74	124	76								
23	99	97	96	94	86	84	83	82	78	77	76	78			122	76	106	78	120	72	108	68	112	72	108	68	100	70	104	68	100	72	104	64	124	74	120	76				
24	102	98	96	88	87	86	84	78	76	74					106	68	112	70	117	82	120	82	110	70	112	67	114	72	110	70	112	68	114	62								
25	99	78	72	74	78	70	76	84	82	80	78				124	76	112	68	104	64	102	68	100	70	104	64	110	72	104	76	108	72	112	74	112	68						
26	98	80	87	86	82	80	76	74	73	70	72				120	78	124	67	112	76	110	66	100	68	104	65	106	70	112	67	108	64	118	67	118	67						
27	100	98	97	96	92	90	89	88	86	87	78				114	67	112	67	112	60	114	68	114	70	124	67	124	68	124	70	124	76	124	67	120	66						
28	98	97	96	86	83	80	74	70	72	78	74				124	78	132	86	124	76	112	65	120	74	132	67	126	74	120	78	110	70	112	67								
29	102	100	98	96	89	88	86	84	80	78					132	86	124	76	112	68	114	67	112	70	114	68	124	67	124	70	112	64	110	64								
30	99	98	96	86	84	82	80	76	74	72					126	76	132	86	130	73	128	76	120	74	126	73	120	74	110	76	110	62	126	70								

GROUP-R (ROPIVACAINE)MASTER CHART-III

S.No	MB 5'	MB 10'	MB 15'	MB 30'	MB 60'	MB 90'	MB 120'	MB 150'	MB 180'	MB 210'	MB 240'	MB 270	MB 300'	MAXIMUM MOTOR BLOCKADE	SEDATION Baseline	SEDA 15'	SEDA 30'	SEDA 60'	SEDA 90'	SEDA 120'	SEDA 150	SEDA 180'	SEDA 210'	SEDA 240'	SEDA 270'	SEDA 300'	spO2baseline	SpO2 15'	SpO2 30'	SpO2 60'	SpO2 90'	SpO2 120'	SpO2 150'	SpO2 180'	SpO2 210'	SpO2 240'	SpO2 270'	SpO2 300'	FHR Baseline	FHR 5'	FHR 10'	FHR 15'	FHR 30'	FHR 60'	FHR 90'	FHR 120'	FHR 150'	FHR 180'	FHR 210'	FHR 240'	FHR 270'	FHR 300'
1	0	0	0	0	0	0	0	0	0	0					0	0	0	0	0	0	0	0	0				100	99	100	99	99	99	100	100	100				146	142	136	132	130	132	130	132	134	142	140			
2	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0	0	0	0	0			99	100	99	100	99	100	99	100	99	100			136	132	136	138	136	138	132	142	140	132	132	130		
3	0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0	1	0	0	0	0	0	0		100	99	99	99	99	99	100	100	100	100	100		132	129	130	132	134	142	140	136	142	130	132	132	142	
4	0	0	0	0	0	0	0	0	0	0	0				0	0	0	1	0	0	0	0	0	0			99	100	100	99	99	99	99	100	99	100			136	130	136	142	140	136	140	136	132	138	140	136		
5	0	1	1	1	0	0	0	0	0	0	0			1	0	0	0	0	0	0	0	0	0	0			100	99	98	99	99	100	100	99	99	98			132	142	138	136	137	132	130	134	132	134	142	140		
6	0	0	0	0	0	0	0	0	0	0					0	1	0	0	0	0	0	0	0				100	99	98	98	98	98	99	100	100				144	140	136	132	130	134	132	130	134	129	130			
7	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0	0	0	0	0			100	98	99	100	99	99	100	100	99	100			154	146	144	134	132	134	138	136	134	130	132	136		
8	1	1	1	0	0	0	0	0	0	0				1	0	0	1	1	0	0	0	0	0				99	99	100	100	99	99	100	100	99				144	134	132	130	134	135	145	142	140	137	142			
9	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0	0	0	0	0			99	100	99	98	100	99	100	99	100	100			136	132	130	143	142	145	146	147	134	136	132	130		
10	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0	0	0	0	0			100	99	98	100	99	100	99	100	100	99			132	136	137	146	142	140	137	134	132	130	138	140		
11	0	0	0	0	0	0	0	0	0	0	0				0	1	1	0	0	0	0	0	0				100	99	100	99	100	99	100	99	100				136	142	146	137	136	138	142	140	152	146	148			
12	0	1	1	1	0	0	0	0	0	0				1	0	0	0	0	0	0	0	0	0				99	100	98	99	100	99	100	99	100				140	136	132	134	144	145	146	147	132	133	134			
13	0	0	0	0	0	0	0	0	0	0					0	0	0	0	0	0	0	0	0				99	100	99	98	99	100	98	99	99				142	136	130	140	136	137	140	142	144	145	138			
14	0	0	0	0	0	0	0	0	0						0	0	1	0	1	0	1	0					100	98	99	100	99	98	97	100					136	137	138	139	140	142	140	145	146	137				
15	0	0	0	0	0	0	0	0	0	0					0	0	0	0	0	0	0	0	0				100	100	99	100	99	98	99	100	100				150	145	146	135	134	145	146	147	148	138	142			
16	0	1	1	1	0	0	0	0	0	0	0			1	0	0	0	0	0	0	0	0	0	0			99	99	100	99	100	99	99	98	98	98			146	147	148	139	140	138	142	140	145	139	142	140		
17	0	0	0	0	0	0	0	0	0	0	0				0	1	1	0	0	0	0	0	0				100	99	100	99	100	98	99	100	99				134	136	142	140	152	147	142	138	136	137	132			
18	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0	0	0	0	0			99	100	99	98	99	99	100	100	100	99			144	145	144	139	138	142	140	139	145	146	147	139		
19	0	0	0	0	0	0	0	0	0	0					0	0	0	0	0	0	0	0	0				100	99	99	99	100	100	99	98	99				132	130	140	152	148	142	144	136	137	136	134			
20	0	0	0	0	0	0	0	0	0	0					0	0	0	0	0	0	0	0	0				99	99	100	100	99	99	100	99	99				144	145	146	136	152	136	147	138	155	152	145			
21	0	0	0	0	0	0	0	0	0						0	0	1	0	1	0	0	0					100	99	100	99	99	99	99	100					136	138	142	144	147	148	152	139	138	134				
22	0	0	0	0	0	0	0	0	0						0	0	0	0	0	0	0	0					100	99	100	100	99	98	99	100					132	130	140	142	145	146	147	138	139	136				
23	0	0	0	0	0	0	0	0	0	0	0				0	0	0	0	0	0	0	0	0	0			100	100	99	100	99	100	100	100	100	99			134	143	145	146	138	148	152	146	143	134	132	134		
24	0	0	0	0	0	0	0	0	0						0	0	0	0	0	0	0	0					100	99	100	100	99	100	98	98					143	142	140	138	136	137	142	140	134	138				
25	0	0	0	0	0	0	0	0	0	0					0	0	0	0	0	0	0	0	0				99	100	99	98	99	100	99	100	99				134	135	146	140	142	147	136	139	138	142	140			
26	0	0	0	0	0	0	0	0	0	0					0	0	1	0	0	0	0	0	0				99	99	100	100	99	100	99	100	99				138	136	137	132	143	142	140	142	136	138	134			
27	0	0	0	0	0	0	0	0	0	0					0	0	0	0	0	0	0	0	0				100	99	100	99	100	99	100	99	99				145	156	146	139	138	136	142	140	138	136	142			
28	0	0	0	0	0	0	0	0	0	0					0	0	0	0	0	0	0	0	0				99	100	99	100	99	100	99	100	99				156	139	153	142	134	136	140	132	138	136	142			
29	0	0	0	0	0	0	0	0	0						0	0	0	0	0	0	0	0					100	100	99	99	100	99	100	99					142	140	135	136	138	137	136	142	140	142				
30	0	0	0	0	0	0	0	0	0						0	0	0	0	0	0	0	0					99	100	99	99	99	100	99	99					142	136	138	134	135	140	142	140	143	140				

COMBINED SPINAL EPIDURAL LABOUR ANALGESIA

COMPARISON OF EPIDURAL 0.125% BUPIVACAINE WITH FENTANYL VERSUS 0.1% ROPIVACAINE WITH FENTANYL

PROFORMA

NAME OF PATIENT: **CASE NO:**

AGE: **STUDYGROUP:**

UNIT: **HEIGHT:**

EDUCATIONAL STATUS: **WEIGHT:**

ADDRESS: **GRAVIDA:**

ASA-PS:

OCCUPATION:

DATE &TIME OF ADMISSION:

DATE AND TIME OF STUDY:

EXAMINATION OF PATIENT:

PR: BP: RR: CVS: RS:
FHR:

PV FINDINGS: Dilatation- Station- Membrane-

Effacement- position-

INVESTIGATIONS:

Hb- RBS- BLOOD GP- BT,CT- U/E-

PRELOADING:

SPINAL: TIME-

TECHNIQUE-

DOSE & DRUG-

ONSET OF ANALGESIA-

DURATION OF ANALGESIA-

EPIDURAL:TIME-

TECHNIQUE-

TEST DOSE-

TOTAL NO. OF EPIDURAL TOPUPS:-

AMOUNT OF DRUG DELIVERED PER HOUR

	LOADING	1hr	2hr	3hr	4hr	5hr	6hr	7hr	8hr	TOTAL
ROPIVACAINE/ BUPIVACAINE										
FENTANYL										

MODE OF DELIVERY:

LABOUR NATURAL:

EPISIOTOMY:

EPISIOTOMY PAIN: YES/NO

INSTRUMENTAL PAIN:

OUTLET FORCEPS/ LMC FORCEPS/ VACUUM DELIVERY

EPISIOTOMY PAIN:YES/NO

CAESERIAN SECTION

DURATION OF LABOUR: I STAGE –

II STAGE –

III STAGE –

APGAR SCORE : 1 MIN- 5 MIN-

COMPLICATIONS

URINARY RETENTION

MATERNAL HYPOTENSION

BACKACHE

INADEQUATE ANALGESIA

DROWSINESS/SEDATION

MATERNAL BRADYCARDIA

PRURITUS

RESPIRATORY DEPRESSION

NAUSEA/VOMITING

RIGORS/OTHERS

INSTITUTIONAL ETHICAL COMMITTEE
GOVT. KILPAUK MEDICAL COLLEGE,
CHENNAI-10

Ref.No.134/ME-1/Ethics/2014 Dt:06.02.2014

CERTIFICATE OF APPROVAL

The Institutional Ethical Committee of Govt. Kilpauk Medical College, Chennai reviewed and discussed the application for approval "A Study on combined spinal epidural labour analgesia comparison of epidural 0.125% bupivacaine with fentanyl versus 0.1% ropivacaine with fentanyl" – For Project Work submitted by Dr.R.Priya, MD (Anaesthesiology), PG Student, KMC, Chennai-10

The Proposal is APPROVED.

The Institutional Ethical Committee expects to be informed about the progress of the study any Adverse Drug Reaction Occurring in the Course of the study any change in the protocol and patient information /informed consent and asks to be provided a copy of the final report.

26/3/14

CHAIRMAN,
Ethical Committee
Govt.Kilpauk Medical College,Chennai

GOVT. KILPAUK MEDICAL COLLEGE
26 MAR 2014
Kilpauk, Chennai-10.

PATIENT CONSENT FORM

COMBINED SPINAL EPIDURAL LABOUR ANALGESIA

COMPARISON OF EPIDURAL 0.125% BUPIVACAINE WITH FENTANYL VERSUS 0.1% ROPIVACAINE WITH FENTANYL

Study centre : GOVT. KILPAUK MEDICAL COLLEGE HOSPITAL, CHENNAI.

Patients Name :

Patients Age :

Identification Number :

Patient may check (✓) these boxes .

a. I confirm that I have understood the purpose of procedure for the above study. I have the opportunity to ask question and all my questions and doubts have been answered to my complete satisfaction. ☐

b. I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving reason, without my legal rights being affected. ☐

c. I understand that sponsor of the clinical study, others working on the sponsor's behalf, the ethical committee and the regulatory authorities will not need my permission to look at my health records, both in respect of current study and any further research that may be conducted in relation to it, even if I withdraw from the study I agree to this access. However, I understand that my identity will not be revealed in any information released to third parties or published, unless as required under the law. I agree not to restrict the use of any data or results that arise from this study. ☐

d. I agree to take part in the above study and to comply with the instructions given during the study and faithfully cooperate with the study team and to immediately inform the study staff if I suffer from any deterioration in my health or well-being or any unexpected or unusual symptoms. ☐

e. I hereby consent to participate in this study. ☐

f. I hereby give permission to undergo complete clinical examination and diagnostic tests including hematological, biochemical, radiological tests. ☐

Signature/thumb impression:

Patients Name and Address: **Place:** **Date:**

Signature of investigator :

Study investigator's Name : **Place:** **Date:**

நோயாளி தகவல் தாள்

வலியில்லா பிரசவ முறைக்காக கம்பைண்டு ஸ்பைனல் எபிடூரல் முறையில் இரு குழுக்களுக்கும் தண்டுவடபகுதியில் பென்டனைல் என்ற மருந்து 25 மைக்ரோகிராம் அளிக்கப்படும்.ஒரு குழுவுக்கு தண்டுவடபகுதியின் வெளிப்புறம் எபிடூரல் பகுதியில் 0.125% பியூப்பிவாக்கெய்ன் 10 மில்லி லிட்டர் மற்றும் பென்டனைல் 20 மைக்ரோகிராம் மருந்து அல்லது 0.1% ரோப்பிவாக்கெய்ன் 10 மில்லி லிட்டர் மற்றும் பென்டனைல் 20 மைக்ரோகிராம் மருந்து அளிக்கப்படும் ஆய்வில்பக்கவிளைவுகள் மிகக் குறைவாகவும்,உடனடியாக வலி நிவாரணம் கிடைக்கவும் உதவும் மருந்தின் குறைந்த அளவை கண்டறியவும், நோயாளியின் திருப்தியை அறியவும் பயன்படுத்தப் படுகிற ஒப்பீட்டு ஆய்வு.

ஆராய்ச்சியின் நோக்கமும்,ஆதாரங்களும்:

ஒரு தாய்மையின் சிறந்த தருணம் என்பது ஆரோக்கியமான குழந்தையை பெற்றுக் கொள்ளும் தருணம்தான்.அதே குழந்தையை வலியின்றி,வேதனையின்றி ,இன்முகத்துடன் இந்த உலகத்திற்கு வரவேற்பது என்பது கண்டிப்பாக அதை விட சிறந்த தருணமாகத்தான் இருக்க முடியும். ஆய்வுகளின் படி பிரசவவலி என்பது புற்றுநோய் கட்டியினால் வரக்கூடிய வலிக்கு சமமானதாகும். உங்கள் விரல்களை மயக்க மருந்தின்றி கதற ,கதற வெட்டி எடுப்பதை யோசித்துப் பாருங்கள். பிரசவ வலியானது அதனை விட அதிக வேதனை தரக்கூடியது. பிரசவ வலியின் காரணமாக தாயின் இருதய துடிப்பு, சுவாசம் போன்றவற்றில் ஏற்படும் மாற்றங்கள், சில சமயம் தாயின் உடல் நலத்துக்கு மட்டுமன்றி, சேய்க்கு கிடைக்க வேண்டிய பிராணவாயு, நஞ்சுக்கொடியின் வழியாக செல்லும் ரத்த ஓட்டத்தையும் குறைத்து ஆபத்தான நிலைக்கு கொண்டு செல்லும்.ஆனால் சமூக,மத,குடுமப,கலாச்சார கட்டுப்பாடுகளின் படி பிரசவ வலியென்பது தவிர்க்க முடியாதது,ஒவ்வொரு பெண்ணும் தன் வாழ்வில் கண்டிப்பாக அனுபவிக்க வேண்டும் என்ற எழுதப் படாத விதியுள்ளது.

மேலைநாடுகளிலும், நமது ஊரில் சில தனியார் மருத்துவமனைகளிலும் வலியில்லாமல் சுகபிரசவம் பார்க்க விரும்பும் தாய்மார்களுக்கு அந்த வாய்ப்பு வழங்கப் படுகிறது.வலியில்லா பிரசவ முறையில் பிரசவ வலியின் காரணமாக தாயின் இருதய துடிப்பு, சுவாசம் போன்றவற்றில் ஏற்படும் மாற்றங்கள் கட்டுப்படுத்தப் படுகின்றது. இது தாய்,சேய் இருவருகும் நிறைவான நலத்தை அளிக்கின்றது. இப்படி வலியில்லாமல் சுகபிரசவம் பார்க்க நிறைய வழிமுறைகள் உள்ளன.அப்படி பயன்படுத்தப்படும் வழிமுறைகளில் பக்கவிளைவுகள் மிகக் குறைவாகவும்,உடனடியாக வலி நிவாரணம் கிடைக்கவும் பயன்படுத்தப்படும் முறைதான் கம்பைண்டு ஸ்பைனல் எபிடூரல் முறை.இந்த முறையில் உங்களுக்கு முதுகுப்பகுதியில் தண்டுவடபகுதியிலும், அதன் வெளிப்புறம் எபிடூரல் பகுதியில் மருந்துகள் அளிக்கப்படும்.

ஆய்வு முறை:

இதில் நீங்கள் இரு குழுக்களாக பிரிக்கப் படுவீர்கள்.இதில் இரு குழுக்களுக்கும் தண்டுவடபகுதியில் பென்டனைல் என்ற மருந்து 25 மைக்ரோகிராம் அளிக்கப்படும்.உங்களில் ஒரு குழுவுக்கு தண்டுவடபகுதியின் வெளிப்புறம் எபிடூரல் பகுதியில் **0.125 %** பியூப்பிவாக்கெய்ன் 10 மில்லி லிட்டர் மற்றும் பென்டனைல் **20** மைக்ரோகிராம் மருந்து அல்லது **0.1%** ரோப்பிவாக்கெய்ன் 10 மில்லி லிட்டர் மற்றும் பென்டனைல் **20** மைக்ரோகிராம் மருந்து அளிக்கப்படும். மேற்கூறபட்ட மருந்துகளும், அதன் அளவுகளும் பாதுகாப்பானவையென பல்வேறு ஆய்வுகள் மூலம் உறுதி செய்யப்பட்டுள்ளன.இந்த ஆய்வானது பக்கவிளைவுகள் மிகக் குறைவாகவும்,உடனடியாக வலி நிவாரணம் கிடைக்கவும் உதவும் மருந்தின் குறைந்த அளவை கண்டறியவும், நோயாளியின் திருப்தியை அறியவும் பயன்படுத்தப் படுகிறது, இந்த ஆய்வுக்கு முன்னரும், ஆய்வின் போதும், அதற்கு பின்னரும் தாய்,சேய் இருவரது உடல்நிலையும் தொடர்ச்சியாக மிகச் சிறந்த முறையில் கண்காணிக்கப் படும்.

உண்டாகக்கூடிய இடர்கள்:

அனைத்து மயக்க மருந்து மற்றும் மயக்க மருந்துவ முறைகளுடன் இருப்பது போலவே இந்த முறையிலும் சில எதிர்பாரா இடர்பாடுகள் ஏற்படலாம்.மயக்கமருந்து கொடுக்கப்பட்டவுடன் குழந்தையின் நாடித்துடிப்பில் தற்காலிகமாக சில மாற்றங்கள் ஏற்படலாம்.சில சமயங்களில் அறுவைச் சிகிச்சை செய்ய வேண்டிய அவசியமோ,ஆயுதம் மூலம் குழந்தையை எடுக்க வேண்டிய அவசியமோ ஏற்படலாம். இதனால் உங்களுக்கு உடல் முழுவதும் சிறிது நேரத்திற்கு அரிப்பு , வாந்தி,குறைந்த இரத்த அழுத்தம் ஏற்படலாம்.

ஆய்வில் உங்கள் உரிமைகள்:

உங்கள் மருத்துவ பதிவேடுகள் அந்தரமாக வைத்துக்கொள்ளப்படும்.இந்த ஆய்வின் முடிவுகள் அறிவியல் பத்திரிக்கைகளில் வெளியிடப் படலாம்.ஆனால் பெயரை வெளியிடுவதன் மூலம் நீங்கள் அடையாளம் காட்டப்பட மாட்டீர்கள்.இந்த ஆய்வில் பங்கேற்பது தன்னிச்சையானது மற்றும் காரணங்கள் எதுவும் கூறாமலேயே நீங்கள் எப்போது வேண்டுமென்றாலும் விலகிக் கொள்ளலாம்.ஏதேனும் பக்க விளைவுகள் ஏற்பட்டால் முழு சிகிச்சையும் மருத்துவக்குழுவினரால் உடனடியாக வழங்கப்படும்.

நோயாளியின் கையொப்பம்

நாள்

இடது பெருவிரல் ரேகை

(மருத்துவரால் படித்துக் காட்டப்பட்டது)

PLAGIARISM REPORT