BILATERAL TRANSVERSUS ABDOMINIS PLANE BLOCK USING ROPIVACAINE & BUPIVACAINE FOR LOWER SEGMENT CAESAREAN SECTION UNDER SPINAL ANAESTHESIA". (A PROSPECTIVE, RANDOMIZED, SINGLE BLINDED, PLACEBO CONTROLLED STUDY FOR EVALUATING THE ANALGESIC EFFICACY OF 0.5% ROPIVACAINE VS 0.25% BUPIVACAINE)

Dissertation submitted to

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

In partial fulfilment for the award of the degree of

DOCTOR OF MEDICINE

IN

ANAESTHESIOLOGY

BRANCH X

INSTITUTE OF ANAESTHESIOLOGY AND CRITICAL CARE
MADRAS MEDICAL COLLEGE
CHENNAI- 600003
APRIL 2017

CERTIFICATE OF THE GUIDE

This is to certify that the dissertation titled "**BILATERAL TRANSVERSUS ABDOMINIS PLANE BLOCK USING ROPIVACAINE & BUPIVACAINE FOR LOWER SEGMENT CAESAREAN SECTION UNDER SPINAL ANAESTHESIA".(A PROSPECTIVE, RANDOMIZED, SINGLE BLINDED,PLACEBO CONTROLLED STUDY FOR EVALUATING THE ANALGESIC EFFICACY OF 0.5% ROPIVACAINE VS 0.25% BUPIVACAINE)"** is a bonafide research work done by **Dr.G.NITHYA** in partial fulfillment of the requirement for the degree of **DOCTOR OF MEDICINE** in **ANAESTHESIOLOGY**.

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Date:

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DECLARATION

I hereby declare that the dissertation titled, "**BILATERAL TRANSVERSUS ABDOMINIS PLANE BLOCK USING ROPIVACAINE & BUPIVACAINE FOR LOWER SEGMENT CAESAREAN SECTION UNDER SPINAL ANAESTHESIA".(A PROSPECTIVE, RANDOMIZED, SINGLE BLINDED, PLACEBO CONTROLLED STUDY FOR EVALUATING THE ANALGESIC EFFICACY OF 0.5% ROPIVACAINE VS 0.25% BUPIVACAINE)"** Has been prepared by me under the guidance of **PROF .DR.B.CHANDRIKA,M.D.,D.A** Professor of Anaesthesiology, **INSTITUTE OF OBSTETRICS AND GYNAECOLOGY , MADRAS MEDICAL COLLEGE, CHENNAI**, in partial fulfillment of the regulations for the award of the degree of **M.D** (**ANAESTHESIOLOGY**),examination to be held in April 2017.

This study was conducted at Department of Anaesthesiology, **INSTITUTE OF OBSTETRICS AND GYNAECOLOGY,MADRAS MEDICAL COLLEGE, CHENNAI.**

I have not submitted this dissertation previously to any journal or any university for the award of any degree or diploma.

Date:

Place: Chennai **DR.G.NITHYA.**

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Lastly I am greatly indebted and thankful **to all the patients and their family members for willingly submitting themselves for this study.**

INDEX

INTRODUCTION [2,4,9]

In recent years, caesarean section has been one of the commonly performed surgeries in the world.

The pain caused by caesarean section is usually moderate to severe for the first two to three postoperative days. This pain can interfere with the mother-child bonding, breast feeding and care. Also the immobility caused may predispose to deep vein thrombosis.

So the postoperative analgesia should alleviate all these ill effects of pain and should be safe for both mother and baby.

This is accomplished by a multimodal analgesia in which opioids are routinely used. But opioids have many side effects like vomitting, sedation, respiratory depression etc. A parturient should be rendered free of these side effects too. Thus we should use analgesic techniques that reduce opioid requirement.

The pain associated with LSCS may be somatic and visceral.The major component is from the abdominal wall incision(i.e somatic).

A technique of regional anaesthesia called the transversus abdominis plane (TAP) block ,blocks the afferents from the nerves supplying anterior abdominal wall (T6-L1) and can relieve this incisional pain.

The Transversus abdominis plane is situated in between the internal oblique and transversus abdominis muscle. It contains the nerve fibres supplying anterior abdominal wall and can be blocked by local anaesthetics.

Mc donnell et al conducted a study and demonstrated the efficacy of TAP block in reducing morphine consumption after abdominal surgeries.

Another meta analysis proved that, in addition to effective pain relief ,the requirement of opioids and their side effects were reduced by TAP block.

TAP block done under USG guidance have the additional advantage of monitoring the needle course and the spread of local anaesthetic solution which helps in improving safety and efficacy of the block.

AIM AND OBJECTIVES OF THE STUDY

AIM

To compare post operative analgesia using Ropivacaine (0.5%) and Bupivacaine (0.25%) in bilateral transversus abdominis plane block after spinal anaesthesia for lower segment caesarean section .

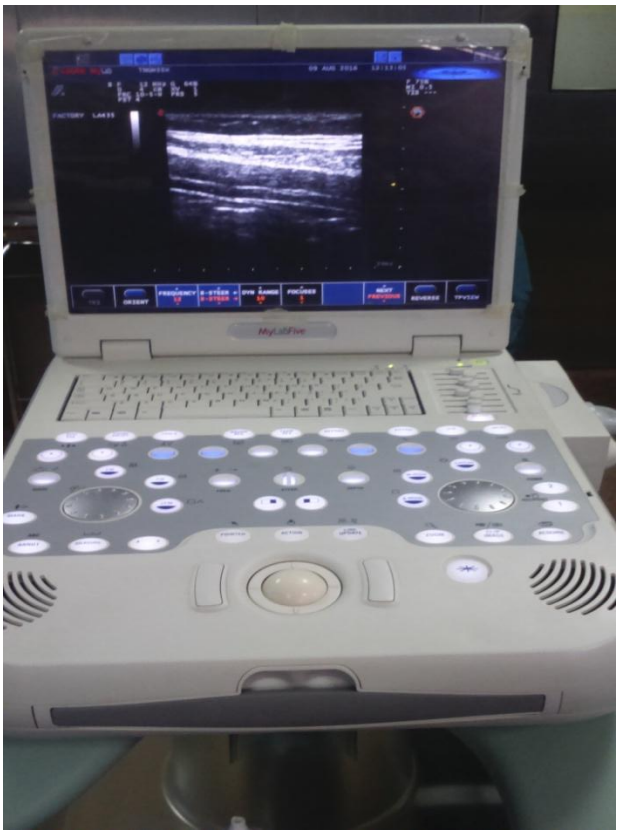
SECONDARY OBJECTIVES

1. To evaluate the duration of post operative analgesic efficacy of these drugs.
2. To assess postoperative haemodynamics.
3. Post operative visual analogue scale pain score.
4. Complication rate.
5. To evaluate postoperative IV/IM analgesic initiation time

ULTRASOUND IN ANAESTHESIA [27,28]

The technology of ultrasound in medicine has evolved leaps and bounds over the years.

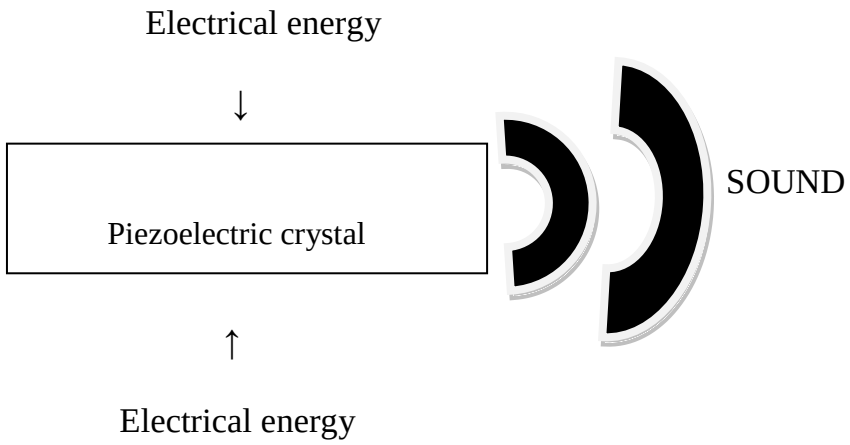
The ultrasound imaging can play a major role in the field of Anaesthesiology, critical care and pain to perform with precision and to reduce complications.



PHYSICS OF ULTRASOUND

Sound is produced when mechanical energy travels through matter as a wave, producing alternate compression and rarefaction. Ultrasound imaging is based on the scattering of sound energy by interfaces formed of materials of different properties. The amplitude of reflected energy is used to generate ultrasound images.

Frequencies used in ultrasound are higher than those in the audible range and typically vary from 2-15 MHz for diagnostic procedures.



PARTS OF ULTRASOUND

1) TRANSDUCER

2) RECEIVER AND PROCESSOR

3) IMAGE DISPLAY

1)TRANSDUCER:

Converts electrical energy to mechanical energy & vice versa.

2)RECEIVER AND PROCESSOR

These detect and amplify the backscattered energy and manipulate the reflected signals for display.

3)IMAGE DISPLAY

Earliest A mode devices displayed the voltage produced across the transducer as a vertical deflection.

Only the position and strength of reflection of a structure could be recorded.

M mode displays echo amplitude and shows the position of moving reflectors.

Real time B mode display uses multiple ultrasound pulses to generate a two dimensional image.

PROPAGATION OF ULTRASOUND:

Ultrasound transducers work on the principle of piezo electricity. Within the transducer are arrays of piezoelectric crystals, which have the property of changing shape when an electrical voltage is applied.

The sound wave propagates through the body tissues and interactions occur between the wave and the tissues.

The waves that are reflected back to the transducer strike the piezoelectric crystal. The crystal converts sound into electrical energy.

Air and bone have different impedence compared to other tissues. Hence ultrasound cannot be used to image deep to bone or air.

RESOLUTION:

Refers to ability of the device to differentiate two closely situated objects or distinct objects

TYPES

Axial Resolution: Measured along the axis of the ultrasound beam in its direction of propagation.

Transverse resolution: Measured at 90^0 to axial resolution

Axial resolution is always superior.

High frequency transducers produce higher resolution images but the sound waves are absorbed more.

Low frequency transducers have greater penetration but poor resolution.

APPLICATON OF ULTRASOUND IN ANAESTHESIA:

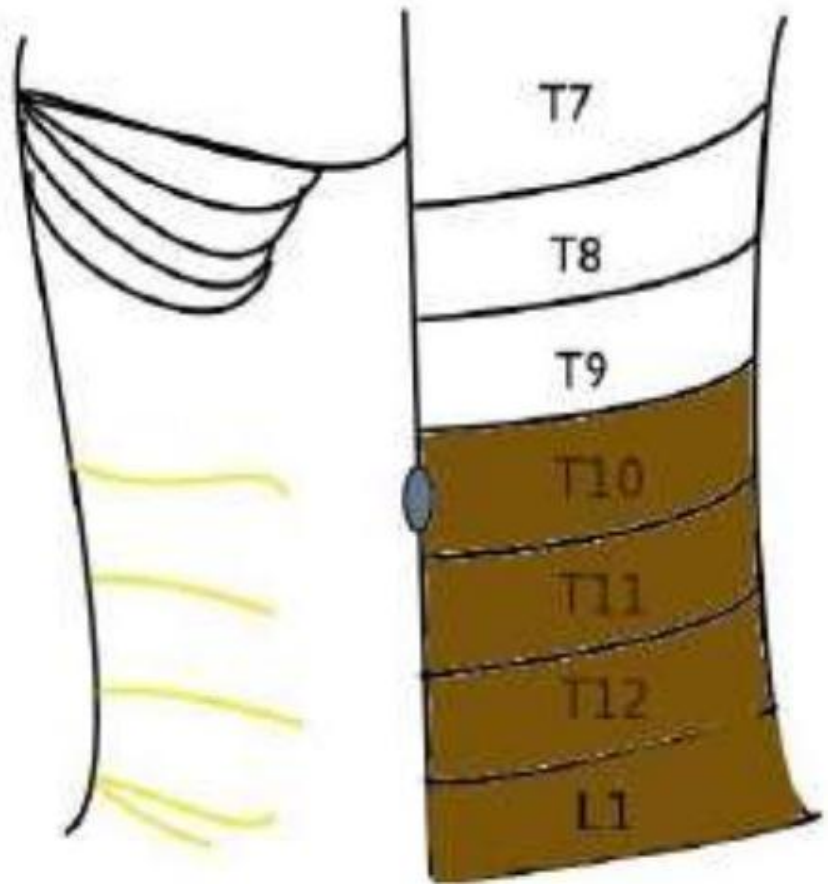
1. Ultrasound for vascular access
2. Ultrasound guided regional anaesthesia
3. Trans-esophageal echocardiography
4. Echocardiogram

ULTRASOUND GUIDED PERIPHERAL NERVE BLOCKS:

ADVANTAGES:

1. Direct visualisation of neural structures.
2. Direct visualisation of related structures like blood vessels and tendons which helps to identify nerves.
3. Guidance of the needle under real time visualisation.
4. Monitor the spread of local anaesthetic.
5. Avoid complications like intravascular and intraneuronal injection.
6. Allows repositioning of the needle after an initial injection to allow better delivery of local anaesthetics.
7. Can be used in patients with poor twitch response to nerve stimulation.
8. In fixing catheter for postop analgesia.
9. Complications are less in USG guided peripheral nerve blocks

ANATOMY [2,4,16]



Innervation of the anterolateral abdominal wall arises from the anterior rami of spinal nerves T7 to L1. These include the intercostal nerves (T7-T11), the subcostal nerve (T12), and the iliohypogastric and ilioinguinal nerves (L1).

The anterior divisions of T7-T11 continue from the intercostal space to enter the abdominal wall between the internal oblique and transversus abdominis muscles until they reach the rectus abdominis, which they perforate and supply, ending as anterior cutaneous branches supplying the skin of the front of the abdomen. Midway in their course they pierce the external oblique

muscle giving off the lateral cutaneous branch which divides into anterior and posterior branches that supply the external oblique muscle and latissimus dorsi respectively.

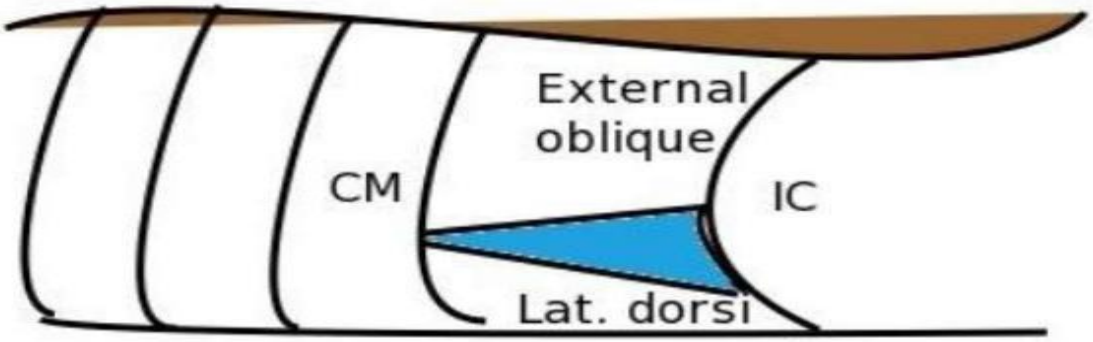
The anterior branch of T12 communicates with the iliohypogastric nerve and gives a branch to the pyramidalis. Its lateral cutaneous branch perforates the internal and external oblique muscles and descends over the iliac crest and supplies sensation to the front part of the gluteal region.

The Iliohypogastric nerve (L1) divides between the internal oblique and transversus abdominis near the iliac crest into lateral and anterior cutaneous branches, the former supplying part of the skin of the gluteal region while the latter supplies the hypogastric region.

The Ilioinguinal nerve (L1) communicates with the iliohypogastric nerve between the internal oblique and transversus abdominis near the anterior part of the iliac crest. It supplies the upper and medial part of the thigh and part of the skin covering the genitalia.

LUMBAR TRIANGLE OF PETIT [16]

Lumbar triangle of Petit between external oblique muscle and latissmis dorsi.
CM: costal margin, **IC**: iliac crest.



The lower lumbar triangle of petit is a deficiency in the anterior abdominal muscle wall,situated in the midaxillary line between iliac crest and lower costal margin.

The triangle is bounded anteriorly by lateral border of external oblique muscle and posteriorly by the lateral border of latissimus dorsi.

External oblique aponeurosis,internal oblique and transversus abdominis forms the base of the triangle. It gives charecteristic `POP OFF` feel during blind method of TAP block.

It is not uncommon for the triangle of petit to be quite small or poorly defined wherein it is suggested to insert the needle 2.5cm behind the highest point of iliac crest.

TRANSVERSUS ABDOMINIS PLANE BLOCK[7,8,26,29]

The Transversus Abdominis Plane (TAP) Block is a local anaesthetic block used to provide analgesia to the anterior and lateral abdominal wall.

INDCATIONS OF TAP BLOCK:

TAP block has been recommended as an analgesia for lower abdomnal surgeries like

- Hernia repair
- Open appendicectomy
- Lower segment Caesarean section.
- Total abdominal hysterectomy
- Radical prostatectomy
- Laproscopic cholecystectomy

CONTRAINDICATIONS FOR TAP BLOCK:

ABSOLUTE:

- Patient refusal
- Allergy to local anaesthetic
- Localised infection over the injection port

RELATIVE:

- Coagulopathy
- Surgery at injection site

COMPLICATIONS:

TAP block is a relatively safe technique with only a few case reports of complications. They are

- Failure
- Local anaesthetic toxicity
- Intraperitoneal injection
- Bowel injury
- Hepatic injury

TECHNIQUE:

The aim of the TAP block is to deposit a large volume of local anaesthetic into the transversus abdominis plane with at least 20 ml of solution being for used each side. The concentration of solution used will depend on the calculated maximum dose of local anaesthetic allowed.

General Preparation:

• Full resuscitation equipment

• Patient monitoring (ECG, pulse oximeter, BP)

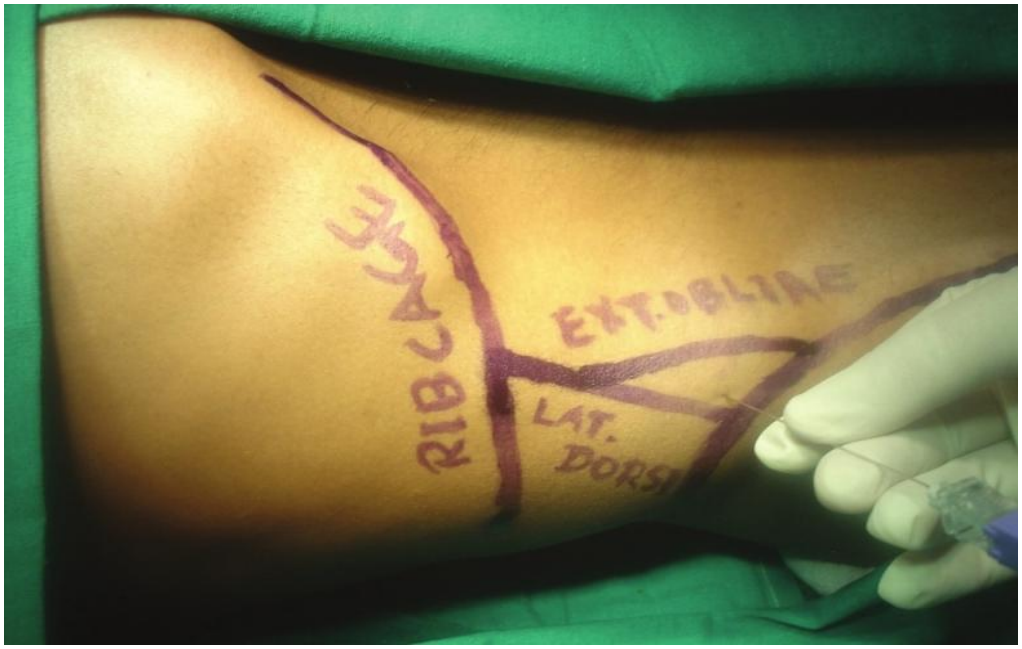
• Antiseptic skin preparation and sterile gloves

• Short bevel (30^0)block needle (50 – 100 mm), or 16-G Tuohy needle

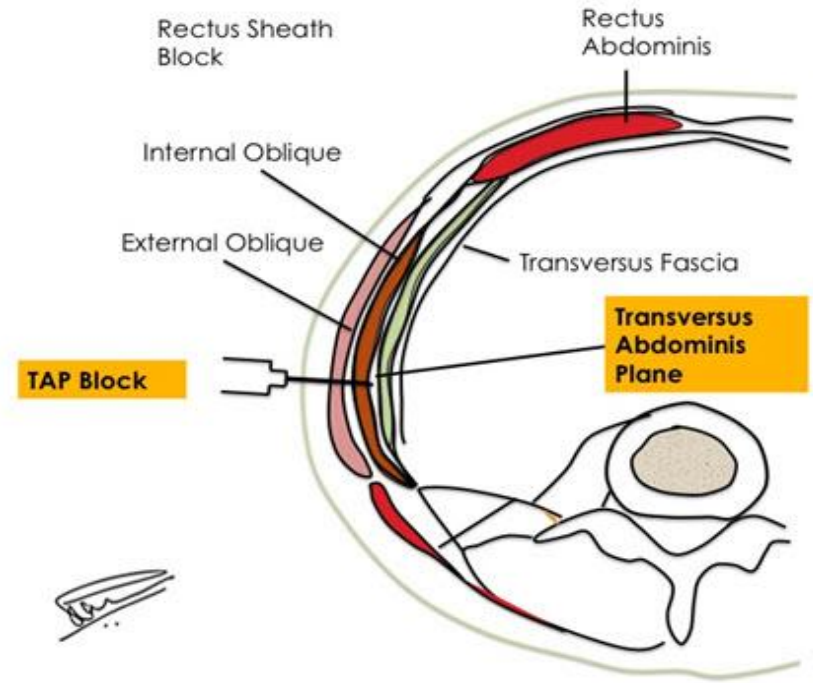
• 20 ml syringe

• Local anaesthetic

LANDMARK TECHNIQUE:



- Identify the triangle of petit using the anatomical landmarks.
- A depression can sometimes be palpated between the posterior border of the external oblique muscle and the anterior border of the latissimus dorsi muscle.
- As a guide this normally found in the region of posterior axillary line, directly above the iliac crest.
- Insert the needle perpendicular to the skin.



- After piercing the skin, the needle is advanced until a ‘pop’ is felt - this is the needle piercing the fascial extension of the external oblique muscle.
- The needle should be advanced until a second ’pop’ is felt, as the needle passes through the fascial extension of the internal oblique muscle.
- The needle should now lie superficial to the transversus abdominis muscle, in the transversus abdominis plane
- After aspiration, to exclude malposition of the needle tip, the local anaesthetic is injected. A minimum of 20 ml of local anaesthetic per side should be used.
- Be careful not to exceed the maximum safe dose of local anaesthetic

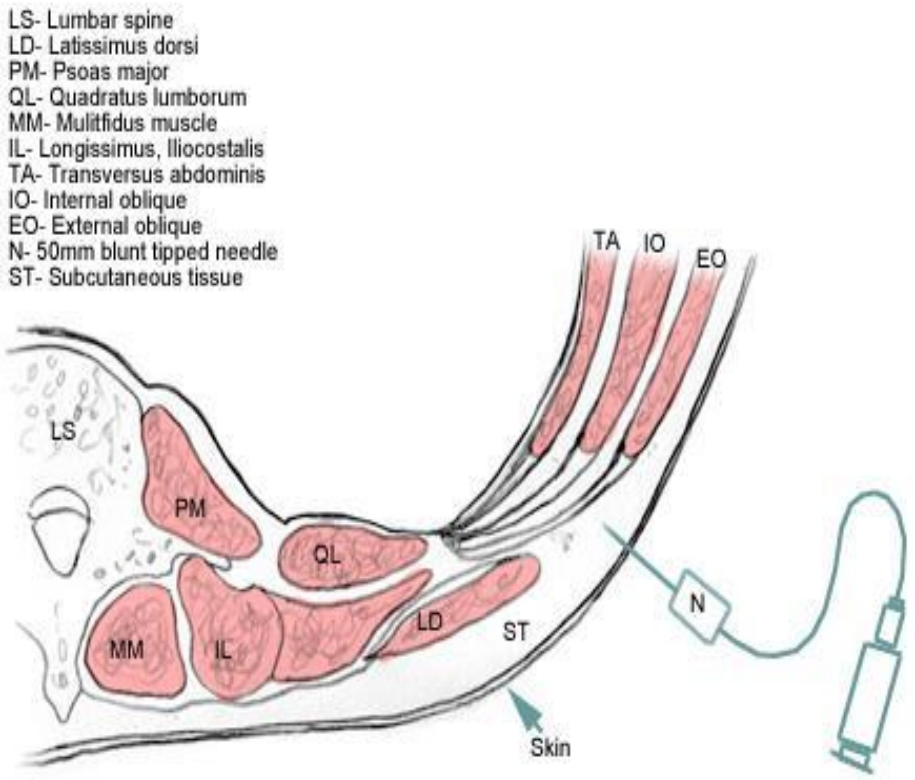
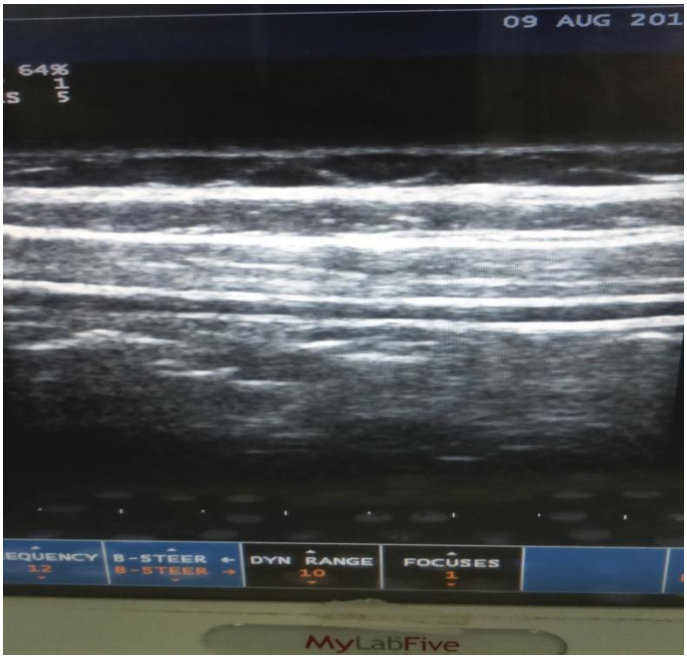


Figure showing the entry point for the TAP block.

ULTRASOUND GUIDED TECHNIQUE:[7,26]



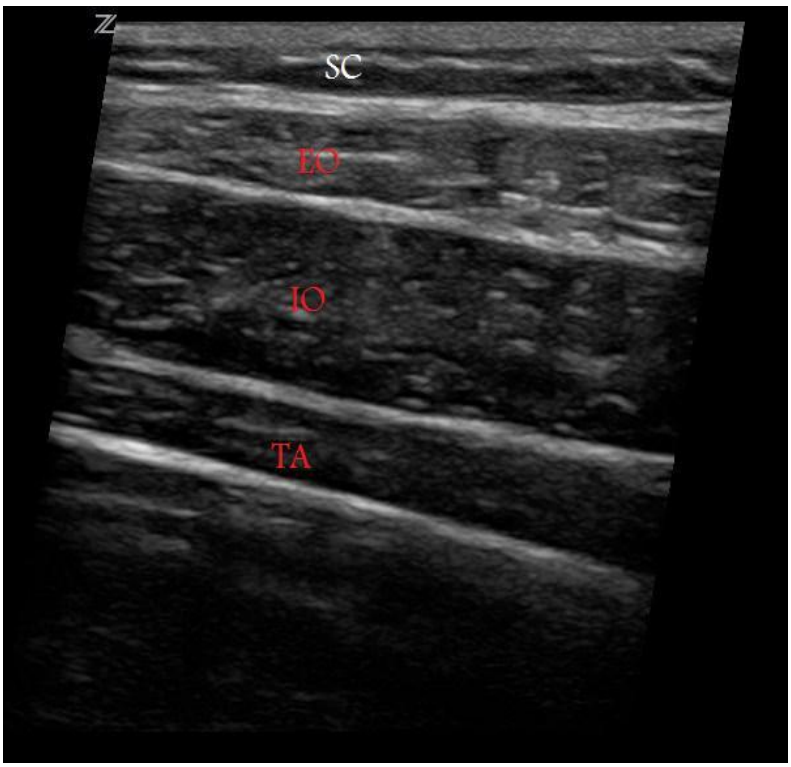
PREPARATION :

- As for the landmark technique
- Ultrasound machine
- High frequency (6-13MHz) linear array probe with probe cover and sterile gel.
- An assistant to perform injection of the local anaesthetic (optional)

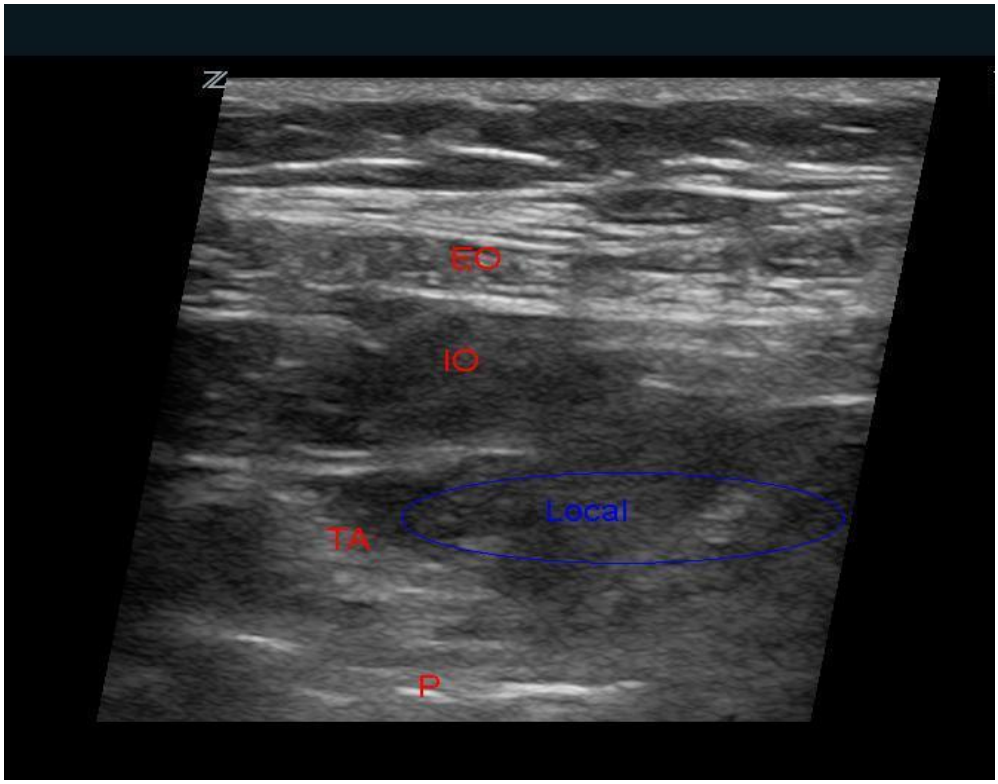
TECHNIQUE:

- The ultrasound transducer is positioned horizontally across the abdomen.
- The muscle layers in the anterolateral part of the abdomen can be traced by scanning from the midline towards the area

between the iliac crest and the costal margin, in the mid-axillary line.



- The ultrasound transducer is moved to scan laterally where the 3 muscle layers can be seen running parallel to one another.
- With an adequate ultrasound image, the regional block needle is inserted anterior to the transducer. This allows an in plane view of the needle as you pierce the transversus abdominis plane.
- The local anaesthetic is then slowly injected. If the needle is correctly positioned, the fascial plane is seen to separate and form a well-defined, hypoechoic, elliptical image between the internal oblique and transversus abdominis muscles.

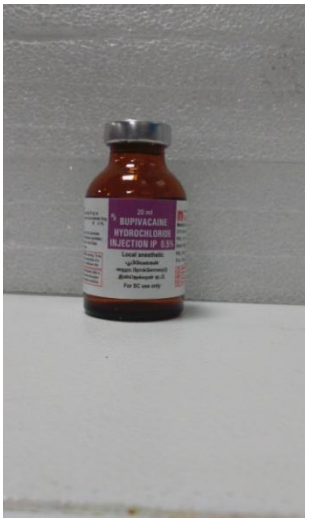


- It is essential to watch for the spread of local anaesthetic solution in the correct plane.

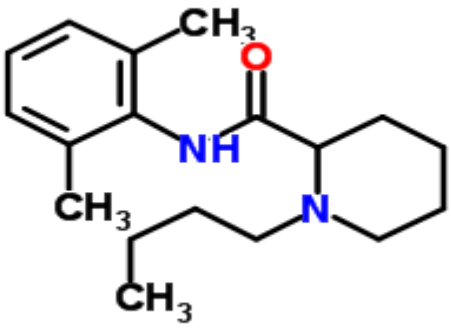
PHARMACOLOGY OF BUPIVACAINE [1,3,4,6,33]

Bupivacaine is a long acting amino amide group of local anaesthetic agent.

Synthesized by **A.F.Ekenstam** in 1957 and brought into clinical use in 1963.



It is produced in a racemic mixture, containing equal proportions of the S and R enantiomers. It is supplied for clinical use as a hydrochloride salt.

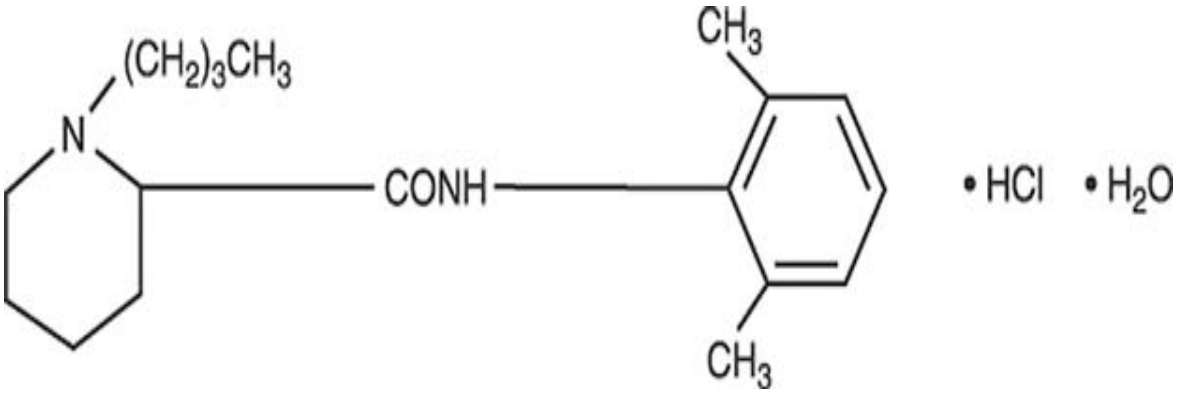


CHEMICAL NAME: 1- Butyl-2`6`pipecoloxylidide monohydrochloride monohydrate

NATURE: White crystalline powder.

SOLUBILITY: Freely soluble in ethanol and water.Minimally soluble in acetone

CHEMICAL STRUCTURE:



PHYSICO-CHEMICAL PROFILE

Molecular weight (base) - 288

pKa - 8.1

pH -4.5-6.0

MECHANISM OF ACTION:

Local anaesthetic crosses the cell membrane

↓

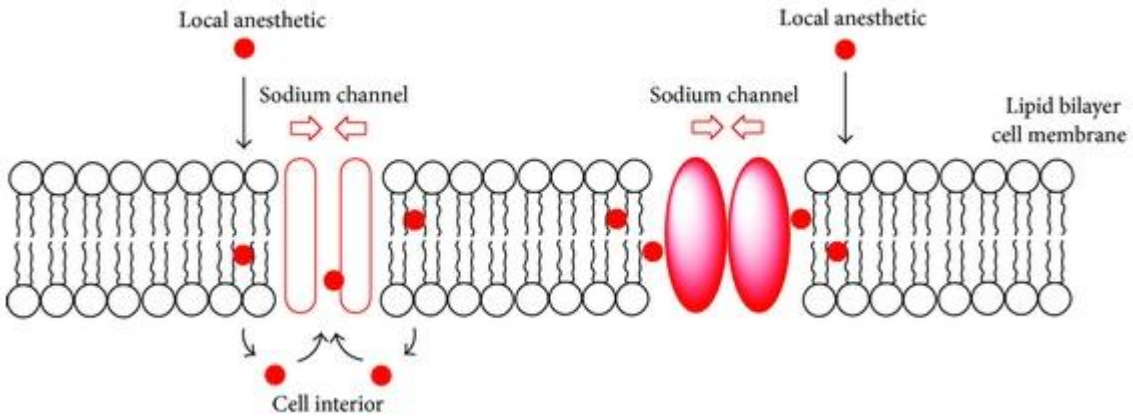
Inhibition of sodium channel from cytoplasmic side

↓

Inhibition of propagation of action potential

This occurs by decrease in or prevention of the large transient increases in permeability of the cell membrane to sodium ions .

Bupivacaine also reduces the permeability of the resting nerve membrane to potassium as well as sodium ions.



PHARMACOKINETICS:

Volume Of Distribution :- 73 Litres

Elimination Half Life :- 210 Mins

Clearance :- 0.58 Litres/Min

Plasma Protein Binding :- 95%

Lipid solubility:-28%

Metabolism:- -Mainly By Liver Microsomal Enzymes

- Aromatic hydroxylation,

- N-dealkylation to N –desbutyl bupivacaine

- Amide hydrolysis

- Conjugation.

Only the N-dealkylated metabolite N-desbutyl bupivacaine has been measured in blood and urine after epidural and spinal administration.

Excretion: Through Kidneys. Less than 10% of the drug is excreted unchanged in urine. Renal disease is unlikely to alter the kinetics after peripheral nerve blockade.

Onset of blockade:-Usually occurs in 20-30 mins

Duration: 8-9 hours

The determinants of the duration are

I. The rate of clearance of the local anesthetics drug :- Rate of clearance depends upon the blood supply of the local tissue. Hydrophobic drugs produce longer blockade due to slower clearance.

II. Drug dosage:- Larger the dose of drug, longer the duration of the blockade. This is understood by the longer time needed to clear the larger amount of drug injected

III. Addition of additives

CLINICAL APPLICATIONS :

 Infiltration anaesthesia

 Peripheral nerve blocks

 Central neruraxial blocks (intrathecal, epidural and caudal)

PREPARATIONS AVAILABLE

-0.5% Bupivacaine(5mg/ml) and 80 mg dextrose in 4 ml ampoules for intrathecal injection .

-0.5% Bupivacaine solution in 20 ml vial with 8mg sodium chloride and 1mg methylparaben as preservative.

ADVERSE REACTIONS

It is mainly due to sudden rise in plasma concentrations secondary to accidental intravascular administration, increased rate of absorption and decreased clearance rate.

CNS COMPLICATIONS:

1.Excitation or depression.

2.Nervousness, dizziness

3.Blurred vision, tremors

4. Drowsiness, convulsions

5. Unconsciousness, respiratory arrest

6.Nausea, vomiting, chills

7.Miosis of the pupils, or tinnitus

CVS COMPLICATIONS:

1.Depression of the myocardium

2.Hypotension

3.Cardiac arrest.

Hypersensitivity, idiosyncrasy, diminished tolerance, urticaria, edema are the other adverse reactions.

SYSTEMIC TOXICITY:

CC/CNS ratio: Ratio of dosage required for irreversible cardiovascular collapse (CC) and Central nervous system(CNS)toxicity.

CONTRAINDICATIONS:-

Known history of Hypersensitivity to amide local anaesthetics or other components of Bupivacaine solutions

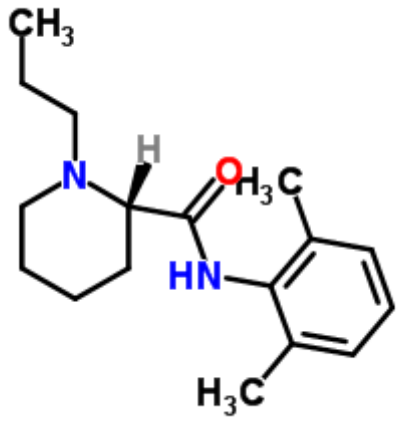
Obstetric Para cervical block with higher concentrations due to risk of fetal bradycardia and cardiac arrest

PHARMACOLOGY OF ROPIVACAINE [4,11,19,20,31,33,35]

Ropivacaine is a new aminoamide local anaesthetic.

One of the pipecoloxylidides,introduced in 1992 .

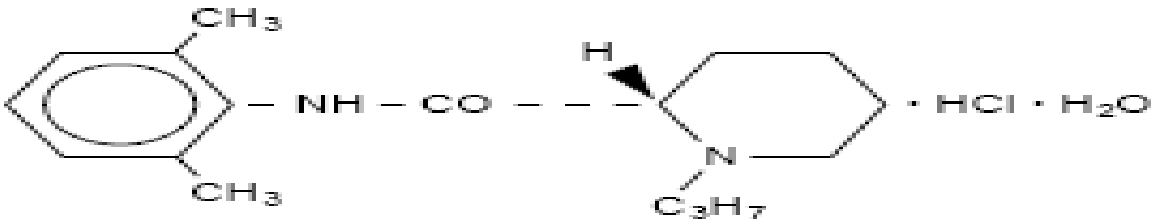
It is a single “S” enantiomer with an enantiometric purity of 99.5%.



CHEMICAL NAME:

(S)-N-(2,6-dimethylphenyl)-1-propylpiperidine-2-carboxamide

CHEMICAL STRUCTURE:



PHYSICOCHEMICAL PROFILE

Molecular weight (base) - 274

pKa (25˚C) -8.1

Lipid solubility - 6.1

Plasma protein binding -94%

Water partition coefficient -2.9

PHARMACOKINETICS:

In terms of lipid solubility , it is 2-3 times less than bupivacaine

When compared to Bupivacaine, Ropivacaine has a smaller volume of distribution, greater clearance, and shorter elimination half-life.

It undergoes hepatic biotransformation by cytochrome P450 and only a minor proportion is excreted unchanged in urine.

PHARMACOKINETIC PROFILE :

Volume of distribution - 59±7 litres

Clearance -0.82±0.16 l /min

Elimination half life -111± 62 min.

Metabolism - It is rapidly cleared from plasma and it is extensively metabolised by cytochrome P450 to 2’6’-pipecoloxylidide[PPX], 3’-OH ropivacaine and 4’-OH ropivacaine.

USES:

-Peripheral nerve blocks

-Central neuraxial blocks

-Infiltration anaesthesia

ADVANTAGES OF ROPIVACAINE :

The stereospecificity of s-ropivacaine decreases cardiotoxicity.

Both Bupivacaine and Ropivacaine molecules have chiral centers. Commercial bupivacaine is a 50:50 racemic mixture of the S- and R-enantiomers.

R-enantiomer has greater affinity at voltage-gated sodium channels and confers greater cardiotoxicity

Also Compared to the S-enantiomer, R-bupivacaine binds three times more firmly to the sodium channel, and unbinds 4.4 times as slowly.It is also more arrhythmogenic, and slows ventricular conduction 4.6 times as much as S-bupivacaine.

But Ropivacaine is manufactured as the pure S- enantiomer ,so it has decreased cardiotoxicity.

NEGATVE INOTROPY:

Compared to bupivacaine, Ropivacaine has a smaller direct negative inotropic and arrhythmogenic effect.

In a study where the effect of bupivacaine and ropivacaine on multiple electrophysiologic parameters in isolated Purkinje fiber-ventricular

muscle were measured ,it showed that bupivacaine produced much more depression of cardiac excitability and conduction.

In addition, bupivacaine induced electrophysiological alterations can make re-entrant type ventricular arrhythmias more likely.Some other studies suggest that direct myocardial toxicity of ropivacaine is about half that of bupivacaine.

REDUCED CNS TOXICITY:

Convulsions are less likely with ropivacaine and produce only mild CNS effects like light headedness, tinnitus, tongue numbness. If convulsions occur, they are of shorter duration than produced by bupivacaine and resuscitation is almost always effective if started immediately.

PREPARATIONS AVAILABLE:

0.5% Ropivacaine in 10 ml and 20 ml ampoules

0.75% Ropivacaine in 4, 10 and 20 ml ampoules.

1% Ropivacaine in 10 ml ampoule

Recommended Safe Dose: 3.5mg/kg

REVIEW OF LITERATURE

1) **Uma Srivastava,et al** [36] (Sep 2015) conducted a double-blind, randomized trial to evaluate the Efficacy of transverse abdominis plane block for post cesarean delivery analgesia.

62 parturients undergoing caesarean section were randomized in a double-blind manner to receive either bilateral TAP block at the end of surgery with 20 ml of 0.25% bupivacaine or no TAP block, in addition to standard analgesic comprising 75 mg diclofenac 8 hourly and intravenous patient-controlled analgesia (PCA) tramadol.

Each patient was assessed at 0, 4, 8, 12, 24, 36, and 48 hr after surgery by an independent observer for pain at rest and on movement using numeric rating scale of 0-10, time of 1st demand for tramadol, total consumption of PCA tramadol, satisfaction with pain management and side effects.

The results were use of tramadol was reduced in patients given TAP block by 50% compared to patients given no block during 48 hr after surgery ($P < 0.001$). Pain scores were lower both on rest and activity at each time point for 24 hr in study group ($P < 0.001$), time of first analgesia was significantly longer, satisfaction was higher, and side effects were less in study group compared to control group.

2) **Ryoko Kawahara et al[30](**March,2015) conducted a randomised control trial regarding the analgesic efficacy of ultrasound (US)-guided TAP block with the mid-axillary approach and was investigated in patients undergoing laparoscopic gynaecologic surgery.

Adult patients (n = 119) undergoing laparoscopic gynaecologic surgery were randomized to undergo either TAP block with ropivacaine (Group A, n = 60) or that with saline (Group B, n = 59), in a blinded manner. Following general anesthesia, TAP block was performed bilaterally by infusion of either 20-mL 0.375% ropivacaine/one side in Group A or 20-mL saline/one side in Group B, under US guidance with a mid-axillary approach. Patient-controlled analgesia (PCA) was performed postoperatively with tramadol.

The analgesic effect was postoperatively evaluated using a four-grade pain score and the prince Henry pain scale (PHS) at 0, 6, 12, and 24 hr. Postoperative tramadol PCA consumption and vomiting/nausea were recorded. Statistical analyses were performed using the Mann-Whitney U-test or Fisher's exact probability test. A $P < 0.05$ was considered significant.

The dose of remifentanil was significantly higher in Group B ($P = 0.01$). The pain score ($P = 0.02$) and PHS ($P = 0.01$) were significantly lower in Group A at 0 h. Tramadol PCA consumption in the period of 0-6 h ($P = 0.01$) and postoperative nausea ($P = 0.04$) were significantly less in Group A.

Thus they concluded Postoperative pain/nausea and PCA consumption were significantly lower in patients with TAP block in the early postoperative stage. TAP block with a mid-axillary approach holds considerable promise as a part of a balanced postoperative analgesic regimen following laparoscopic gynaecologic surgery.

3)Neha Fuladi et al[23], (April,2014)did a comparative study of bupivacaine 0.25% versus ropivacaine 0.5% in transversus abdominis plane block for postoperative analgesia in lower abdominal surgeries.

They evaluated the efficacy of unilateral TAPB with bupivacaine and ropivacaine for postoperative analgesia in lower abdominal surgeries like hernia repair, appendicectomy in a hospital based, single blind, and prospective, randomized controlled clinical trial. 75 adult patients undergoing elective unilateral lower abdominal surgery were randomized to undergo TAPB with ropivacaine (n = 25) or bupivacaine (n = 25) or Normal saline (n = 25). At end of surgery performed under spinal anaesthesia unilateral TAPB on side of surgery was performed using 20 ml of 0.5 % ropivacaine or 0.25 % bupivacaine or saline. Each patient was assessed postoperatively by a blinded investigator in post-anaesthesia care unit every 5 minutes for half an hour, then every 15 minutes till 2 hours and at 4, 6, 12, 24, 48 hours postoperatively in ward. The results were Mean duration of analgesia was 420.6 minutes with SD of +14.01 in Bupivacaine group and 2187 minutes with SD of +1011.09 in Ropivacaine group which was found to be statistically significant. Hence they

concluded that 0.5% ropivacaine provided longer duration of analgesia than 0.25 % bupivacaine when used in TAPB on patients of lower abdominal surgeries. There were no complications attributable to TAPB or drugs under study.

4)**Abdallahet al[10],**(Aug,2012)conducted a study regarding the analgesic utility of transversus abdominis plane (TAP) block after Caesarean delivery. This systematic review and meta-analysis examined whether TAP block can reduce i.v. morphine consumption in the first 24 hr after CD. The authors retrieved randomized controlled trials comparing TAP block with placebo in CD. Postoperative i.v. morphine consumption during the first 24 hr was selected as a primary outcome. Pain scores and both maternal and neonatal opioid-related side-effects were secondary outcomes. Where possible, meta-analytic techniques and random effects modelling were used to combine data.

Trials were stratified based on whether or not spinal morphine was used as part of the analgesic regimen. Five trials including 312 patients were identified. TAP block reduced the mean 24 hr i.v. morphine consumption by 24 mg [95% confidence interval (CI) 239.65 to 27.78] when spinal morphine was not used. TAP block also reduced visual analogue scale pain scores (10 cm line where 0 cm, no pain, and 10 cm, worst pain) by 0.8 cm (95% CI 21.53 to 20.05, P¼0.01), and decreased the incidence of opioid-related side- effects. The differences in primary and secondary outcomes were not significant when spinal morphine was used.

TAP block provides superior analgesia compared with placebo and can reduce the first 24 hour morphine consumption in the setting of a multimodal analgesic regimen that excludes spinal morphine. TAP block can provide effective analgesia when spinal morphine is contraindicated or not used.

5) **Hyun Jun Shin et al[13],** (2011) conducted a study in which about 32 patients were randomised into 2 groups, one undergoing Transverse Abdominis Plane block and the other not receiving this block.

Patients were operated under general anaesthesia and block performed under ultrasonogram guidance after surgery and prior to extubation. About 20ml of 0.375% ropivacaine was given bilaterally. Postoperative pain relief was given by intravenous Patient Controlled Analgesia containing ketorolac 90mg, sufentanyl 200µg and ramosetron 0.3mg in 120ml of NS totally for the first 24 hours. Fentanyl was given when pain scores were very high.

Pain scores were 3.6±2.3 at the end of 10 hours in control group whereas 2.3±2.4 in Transverse Abdominis Plane group with rest. Total analgesic requirements were 62.5±35.4µg of fentanyl in control group and 20.3±20.9µg in Transverse Abdominis Plane group.

It was concluded that Transverse Abdominis Plane block has some opioid sparing action and reduced postoperative pain. It also improved patient satisfaction when multimodal analgesic regimen used and also no serious complications were associated with this method.

6**)) Rao V Kadam et al**[8],(2011) Conducted a study in which 20 patients were randomly allocated into two groups – Transverse Abdominis Plane group and control group. The study was conducted to evaluate the efficacy of ultrasound guided Transverse Abdominis Plane block, comparing with patient controlled analgesia with fentanyl in patients undergoing major abdominal surgeries.

Both groups were done under General anaesthesia and Transverse Abdominis Plane block was given at the end of the surgery under ultrasound guidance and an epidural catheter placed within the plane.

Transverse Abdominis Plane group received 15ml of 0.5% ropivacaine initial bolus bilaterally followed by continuous infusion of 8 – 10ml of 0.2% ropivacaine for next 72 hours. Control group did not receive any Transverse Abdominis Plane block.

Both groups were given 1g of paracetamol infusion every 6 hourly and patient controlled analgesia with fentanyl. The total requirement of fentanyl was observed.

Pain scores were analysed using Numerical Rating Scale, both at rest and during movement or cough. Any episodes of nausea, vomiting, sedation and complications due to catheter placement were also noted.

Median pain scores were less in the Transverse Abdominis Plane block group when compared to control group from first postoperative day onwards with a significant difference, with P values of <0.05. Mean fentanyl use was

1237±145µg in control group whereas 664±134µg in Transverse Abdominis Plane group.

Thus this study concluded that Transverse Abdominis Plane block significantly reduced the requirement of fentanyl, and the complications associated with fentanyl usage.

7)Jumanam baaJ et al[15],(Oct,2010) conducted a study regarding Ultrasound-guided transversus abdominis plane (TAP) block for intra-operative and postoperative analgesia. Here they evaluated the efficacy of TAP block for postoperative caesarean delivery analgesia and did a randomized, double-blind, placebo-controlled trial was at King Khalid University Hospital on 40 patients undergoing caesarean delivery under spinal anaesthesia with bupivacaine and fentanyl. At the end of surgery the patients received bilateral ultrasound-guided TAP block either with bupivacaine 0.25% (B group) 20 patients, or saline (S group, or placebo group) 20 patients, followed by patient controlled analgesia with IV morphine only. Each patient was assessed 24 hours after delivery for pain, morphine consumption, nausea, vomiting, sedation, patient's satisfaction, and also pain relief during mobilization (24 hours postcaesarean section).

The Results were Total morphine consumption was reduced more than 60% in the bupivacaine group; the bupivacaine group also reported improved satisfaction with their pain relief over 24 hours after surgery, reduced morphine consumption, less nausea, vomiting, and better patient's satisfaction.

Thus Ultrasound-guided TAP block improved postoperative analgesia, reduced morphine consumption and improved patient's satisfaction regarding analgesia after caesarean delivery.

8) D. Belavy et al[9] (Aug,2009) evaluated the analgesic efficacy of the ultrasound (US)-guided TAP block in patients undergoing Caesarean delivery.

They conducted a randomized, double-blind, placebo-controlled trial at a tertiary maternity hospital. Fifty women undergoing Caesarean delivery received bilateral USG-guided TAP blocks with either ropivacaine 0.5% or saline. All participants received a spinal anaesthetic with bupivacaine and fentanyl, followed by postoperative acetaminophen, non-steroidal anti-inflammatory drugs, and patient-controlled i.v. morphine without long-acting intrathecal opioids. Each patient was assessed 24 h after delivery for morphine usage, average pain score, nausea, vomiting, pruritis, drowsiness, and satisfaction with pain relief.

The Results were Total morphine use in 24 hr was reduced in the active group (median 18.0 mg) compared with the placebo group (median 31.5 mg, P,0.05). The active group reported improved satisfaction with their pain relief measured by visual analogue scale compared with the placebo group (median 96 vs 77 mm, P¼0.008) and came to conclude that USG-guided TAP block reduces morphine requirements after Caesarean delivery when used as a component of a multimodal analgesic regimen.

9) **John G. McDonnell,et**[14] al(Jan 2008)evaluated the analgesic efficacy of transverse abdominus plane block over the first 48 postoperative hours after cesarean delivery performed through a Pfannensteil incision, in a randomized controlled, double-blind, clinical trial.

Fifty women undergoing elective caesarean delivery were randomized to undergo TAP block with ropivacaine (n 25) versus placebo (n 25), in addition to standard postoperative analgesia comprising patient-controlled IV morphine analgesia and regular diclofenac and acetaminophen. All patients received a standard spinal anaesthetic, and at the end of surgery, a bilateral TAP block was performed using 1.5 mg/kg ropivacaine (to a maximal dose of 150 mg) or saline on each side. Each patient was assessed postoperatively by a blinded investigator: in the post anaesthesia care unit and at 2, 4, 6, 12, 24, 36, and 48 hr postoperatively

TAP block with Ropivacaine compared with placebo reduced postoperative visual analogue scale pain scores. Mean total morphine requirements in the first 48 postoperative hours were also reduced (6626 vs 1814 mg, p 0.001), as was the 12-hr interval morphine consumption up to 36 hr postoperatively. The incidence of sedation was reduced in patients undergoing TAP blockade. There were no complications attributable to the TAP block. They concluded that TAP block, as a component of a multimodal analgesic regimen, provided superior analgesia when compared with placebo block up to 48 postoperative hours after elective caesarean delivery.

MATERIALS AND METHODS

This study was conducted at the Institute of Obstetrics and Gynaecology, Egmore, Chennai-600008, attached to Madras Medical College on 75 patients undergoing lower segment caesarean section both emergency and elective surgeries.

The study was conducted after getting Institutional Ethical committee clearance. Informed written consent was obtained from the patients included in the study.

Study Design :

This was a Prospective, Randomized, single Blinded, Placebo controlled Clinical study. Patients were divided into 3 groups of 25 each. Only patients meeting the selection criteria were included in the study.

Randomisation was done by closed cover method to

Group -1(Transversus Abdominis Plane block with normal saline)

Group -2(Transversus abdominis plane block with 0.25% bupivacaine)

Group -3(Transversus abdominis plane block with 0.5% ropivacaine).

AIMS AND OBJECTIVES:

To compare post operative analgesia using Ropivacaine 0.5% and Bupivacaine 0.25% in bilateral transversus abdominis plane block administered after Lower segment caesarean section under spinal anaesthesia .

Secondary objectives

1. To evaluate the duration of post operative analgesic efficacy of these drugs.
2. To assess post operative haemodynamics
3. Post operative visual analogue scale pain score.
4. Complication rate.
5. To evaluate postoperative iv/im analgesic initiation time

INCLUSION CRITERIA:

- Age : 20 years to 35 yrs
- BMI :<30kg/m2
- Surgery : Elective And Emergency
- Normal liver and renal function test, coagulation profile
- Who have given valid informed consent.

EXCLUSION CRITERIA:

- Not satisfying inclusion criteria.
- Lack of written informed consent
- Allergy to drugs used.
- Patient refusal.
- Abnormal liver function test
- Patients with severe cardiovascular ,respiratory, renal, hepatic diseases
- Infection at injection site
- Clotting abnormalities

Materials:

- 18G venflon
- 25G /23G Quinckes spinal needle, short bevel needle
- Ultrasound machine
- Drugs–inj Ropivacaine0.5%,inj bupivacaine0.25%,inj hyperbaric bupivacaine0.5%, inj.tramadol, emergency drugs and normal saline
- Monitors – ECG, NIBP, SPO2, ECG.

OUTCOMES MEASURED:

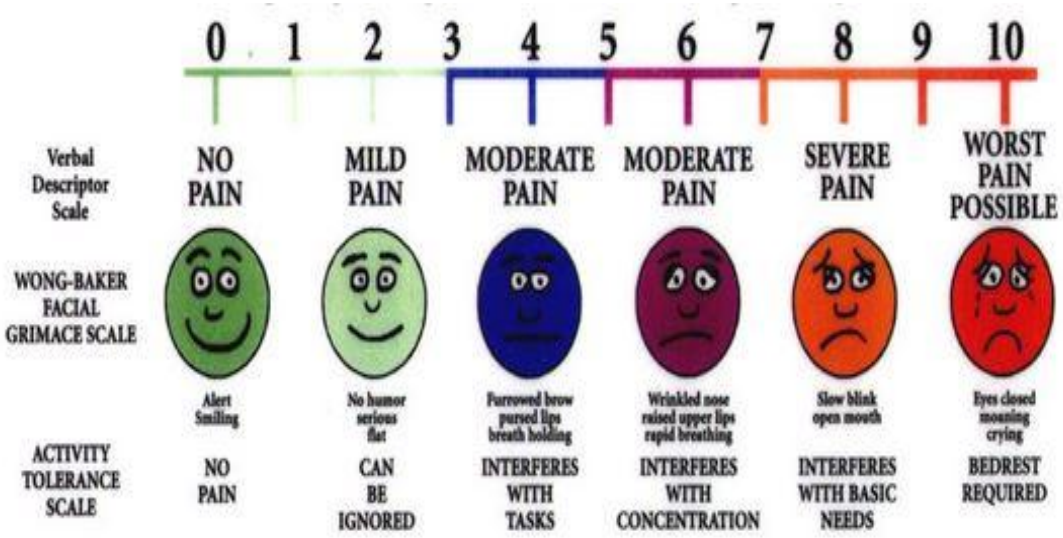
Primary outcome:

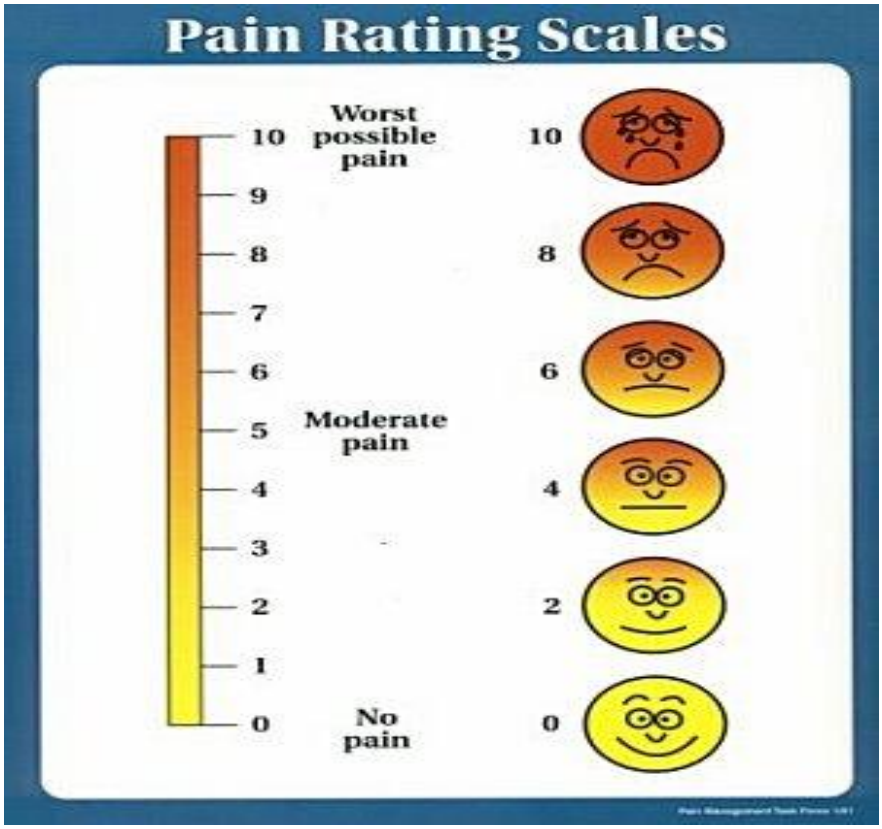
The duration of post operative analgesia of these drugs.

Secondary outcomes:

1. Post operative haemodynamics
2. Post operative visual analogue scale pain score.
3. Complication rate.
4. Postoperative iv/im analgesic initiation time

ASSESSMENT OF PAIN USING VISUAL ANALOGUE SCORE[5,18]





STUDY METHOD:

All patients were assessed in our pre-anaesthetic clinic. Patients with exclusion criteria were excluded. After getting informed consent, patients who satisfied our inclusion criteria were taken under our study.

Patients were divided into 3 groups of 25 each. Randomisation was done and patients were divided to 3 groups as Group 1,Group 2,Group 3

Group 1:Bilateral Transversus Abdominis Plane block with Normal saline

Group 2: Bilateral Transversus Abdominis Plane block wth 0.25% Bupivacaine.

Group 3:Bilateral Transversus Abdominis Plane block with 0.5% Ropivacaine.

Inside the operation theatre, all basic monitors were connected (ECG, NIBP, SpO2, temperature monitoring). All basal parameters were noted.

Patient was given subarachnoid block under sterile aseptic precautions with 2ml of 0.5% HYPERBARIC BUPIVACAINE and after attaining a block height of T6, surgery proceeded and monitored intraoperatively.

At the end of surgery, Transversus abdominis plane block was given bilaterally under ultrasound guidance with either saline,bupivacaine or ropivacaine.

PROCEDURE:

Patient in supine position, ultrasound probe placed transverse to the abdominal wall between lower costal margin and iliac crest.

Transverse abdominis plane was identified after visualising external oblique aponeurosis,internal oblique aponeurosis and transversus abdominis muscle and reached using 18G needle with bevel facing superiorly .

Correct placement of needle tip confirmed by injecting 2-3ml Bolus dose which cause hydrodissection and 20 ml of the test drug was administered. Procedure repeated on the opposite side.

Post operatively patients were monitored in Postoperative ward. Various parameters like HR, Blood pressure (both systolic and diastolic), SPO_2, Visual Analogue Scale (VAS) were observed for 48 hours post operatively. Incidences of side effects were also noted and the time for analgesic initiation was noted.

STATISTICAL ANALYSIS:

Data was analysed using SPSS (Statistical Package for Social Sciences) for windows version 22. Mean heart rates, systolic BP, Diastolic BP, Mean arterial BP,VAS scores between the three groups were compared using ANOVA (analysis of variances) p value of <0.05 was taken as statistically significant.

OBSERVATION AND ANALYSIS

DEMOGRAPHIC DATA:

The three groups were compared with respect to their age, weight, and ASA status

Variable	Group 1 (Normal Saline)	Group 2 (0.25% Bupivacaine)	Group 3 (0.5% Ropivacaine)
Age (Years)	25.6(±2.9)	26.84(±4.1)	24.9(±3.8)
Weight (Kg)	67.28(±9.61)	70.16(±9.80)	67.8(±10.30)
Height (cm)	154.08(±6.66)	156.24(±7.72)	154.84(±4.40)
LSCS			
Elective	8(32%)	11(44%)	11(44%)
Emergency	17(68%)	14(56%)	14(56%)

Table 1. Patient Characteristics

The mean age of the patients in the control group was 25.6(±2.9)yrs. In the Bupivacaine treatment group was 26.84(±4.1) yrs and the Ropivacaine group was 24.9(±3.8)

The mean weight of the patients in the control group was 67.28(±9.61)kg. In the Bupivacaine treatment group was 70.16(±9.80)kg and in the Ropivacaine group was 67.8(±10.30)kg

The mean height of the patients in the control group was 154.08(±6.66)cm. In the Bupivacaine treatment group was 156.24(±7.72)cm .And in the Ropivacaine group was 154.84(±4.40)cm.

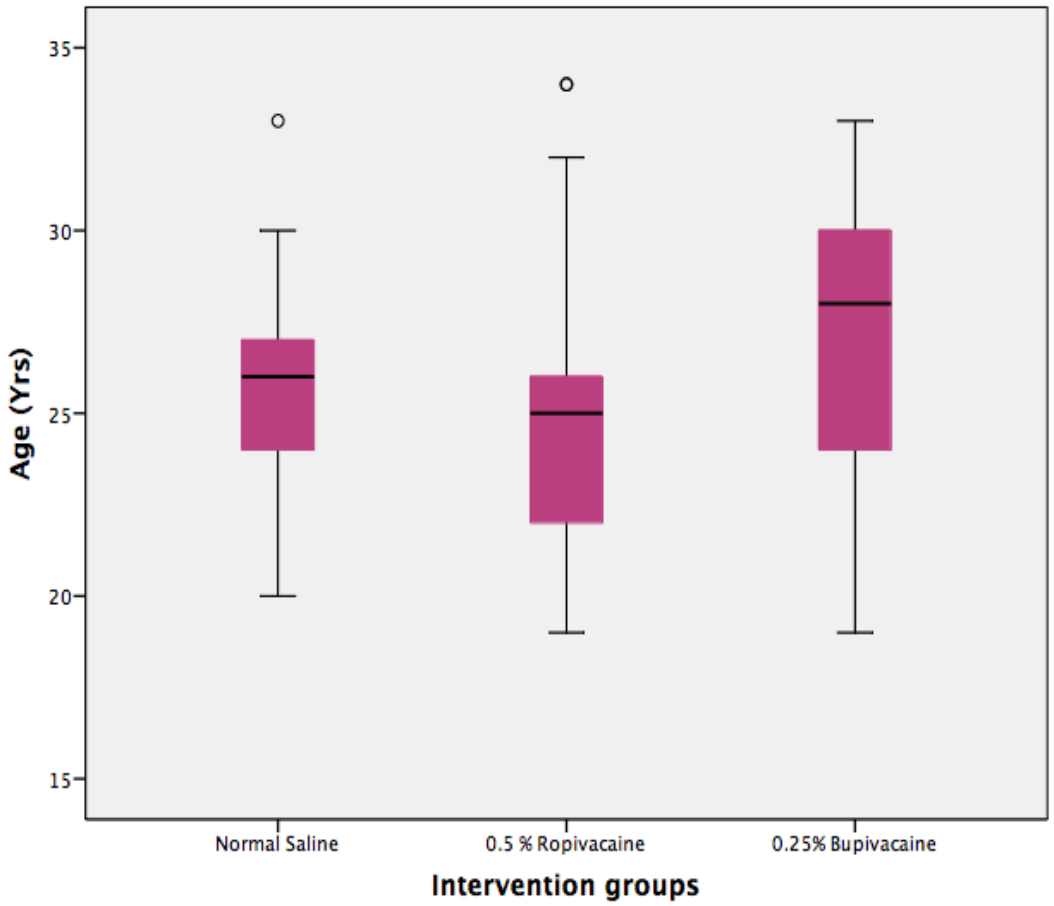


Figure 1. Mean age of the Intervention groups

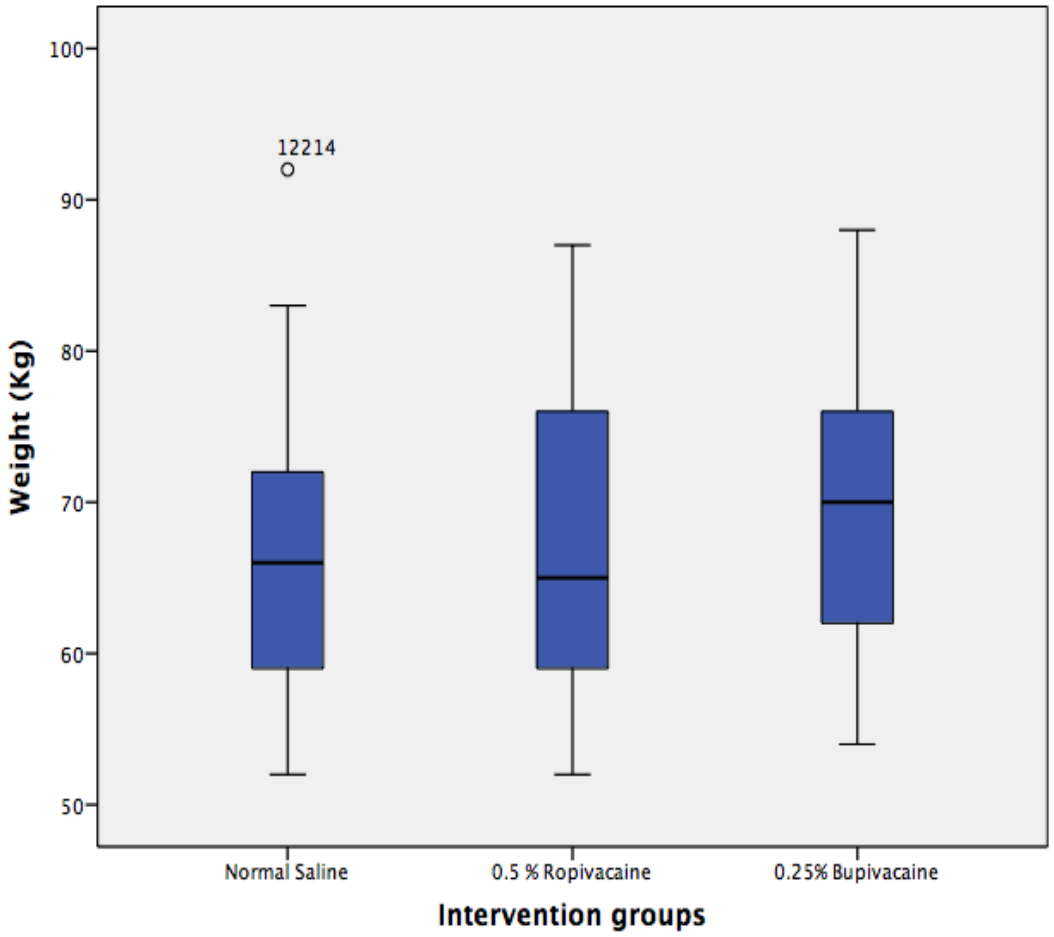


Figure 2. Mean weight of the Intervention groups

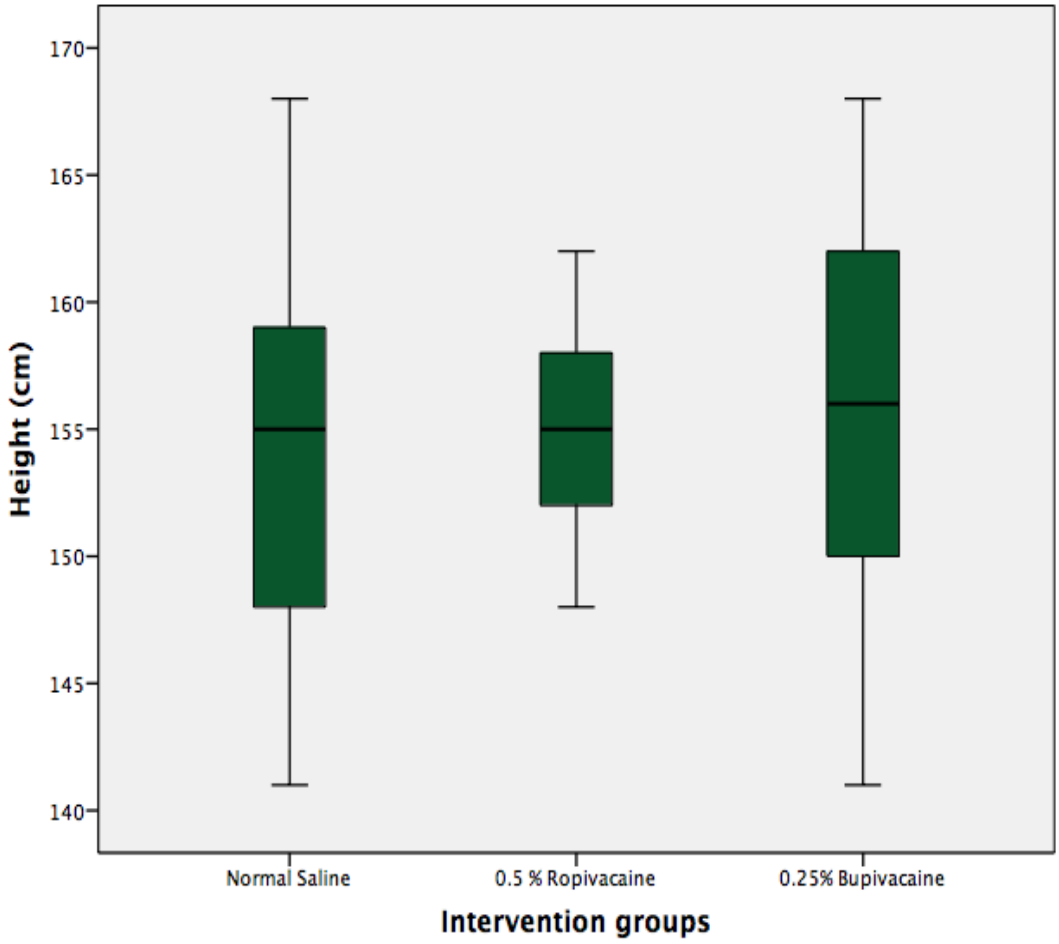


Figure 3. Mean Height of the Intervention groups

In the placebo group, 8(32%) underwent elective LSCS, 17(68%) underwent emergency LSCS.

In the Bupivacaine group, 11(44%) underwent Elective LSCS, 14(56% underwent emergency LSCS)

In the Ropivacaine group, 11(44%) underwent Elective LSCS, 14(56% underwent emergency LSCS)

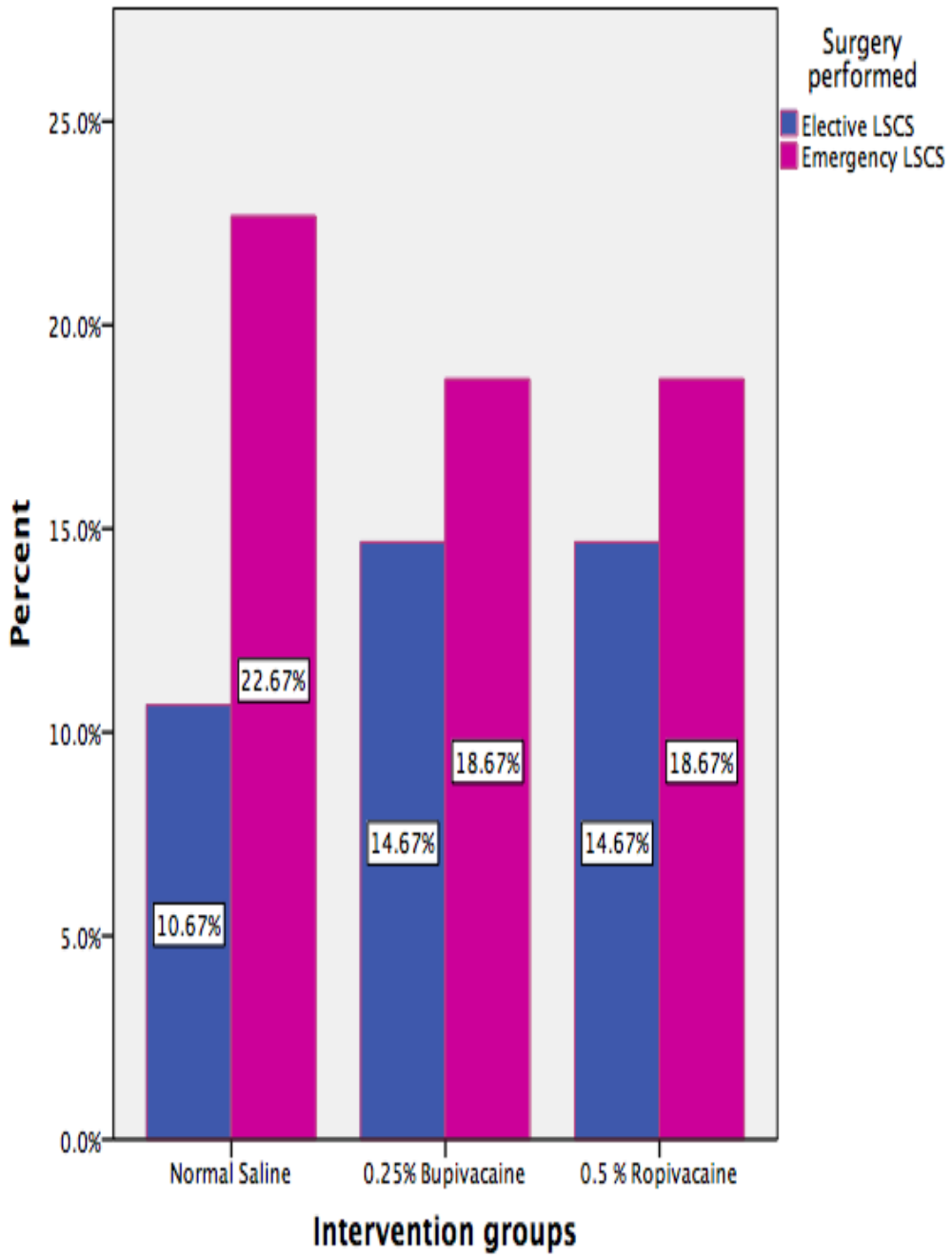


Figure 4. Type of Surgery in Intervention groups

Table 2.Indications for surgery

Indications	Group 1 (Normal Saline)	Group 2 (0.25% Bupivacaine)	Group 3 (0.5% Ropivacaine)
Mobile head	1(4%)	0(0%)	0(0%)
Failed induction	2(8%)	1(4%)	2(8%)
Fetal distress	1(4%)	2(8%)	4(16%)
Oligohydramnios	2(8%)	0(0%)	2(8%)
PIH	1(4%)	0(0%)	2(8%)
Post dated	1(4%)	0(0%)	0(0%)
Previous LSCS	10(40%)	15(60%)	10(40%)
CPD	7(28%)	2(8%)	4(16%)
Breech	0(0%)	3(12%)	0(0%)
Twins	0(0%)	2(8%)	1(4%)

Table 3. Mean duration of analgesia (in hours)

	Mean duration of analgesia in Hours	Range	95% C.I	F Statistic	p value
Group 1 (Normal Saline)	1.49±0.54	0.5-2.5	1.2-1.7	141.096	<0.01*
Group 2 (0.25% Bupivacaine)	6.22±1.19	4- 8	5.72-6.71		
Group 3 (0.5% Ropivacaine)	20.6±7.13	7 – 31	17.65-23.54		

The mean duration of analgesia in the control group was 1.49 hours, ranging from 0.5 to 0.25 hours.

The mean duration of analgesia in the intervention group who received 0.25% Bupivacaine was 6.22 hours, ranging from 4 to 8 hours.

The mean duration of analgesia in the group which received 0.5% Ropivacaine was 20.6 hours, ranging between 17.65 to 23.54 hours.

The mean duration of analgesia was compared between different intervention groups using ANOVA, the difference was found to be statistically significant.

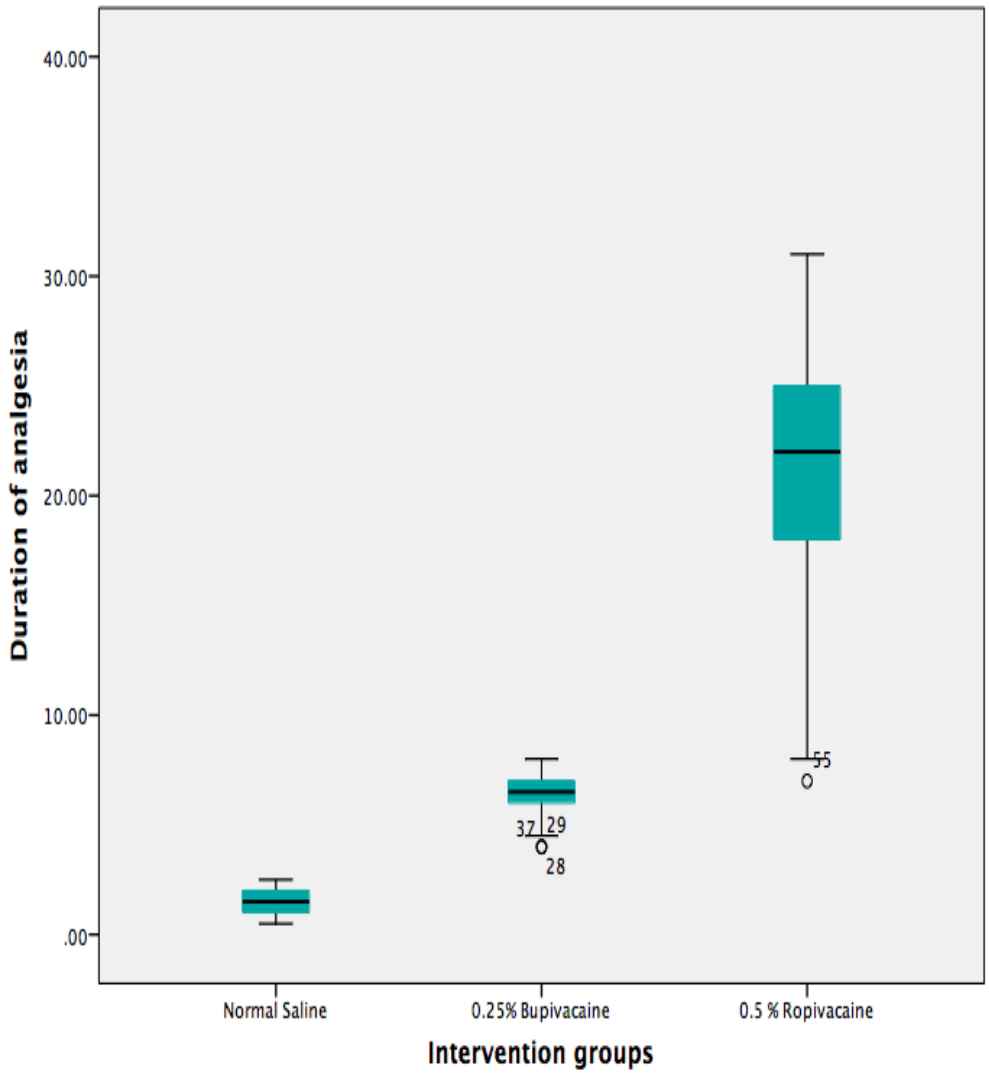
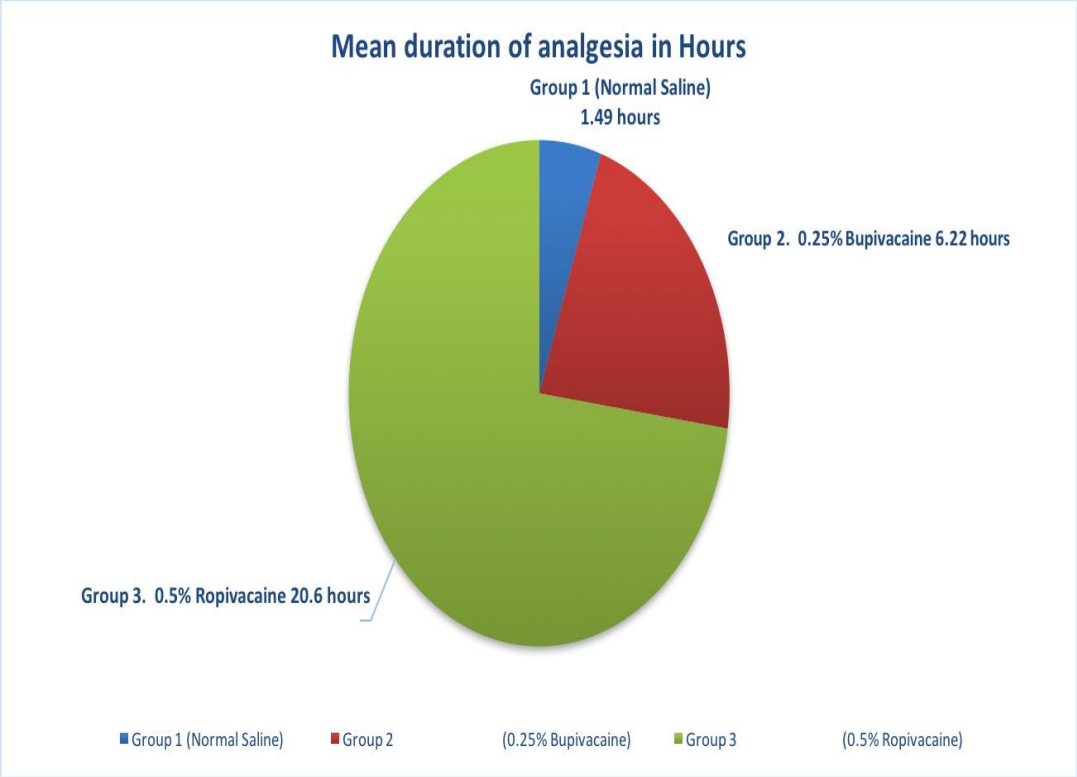


Figure 5. Mean Duration of Analgesia (in hours) in the Intervention groups



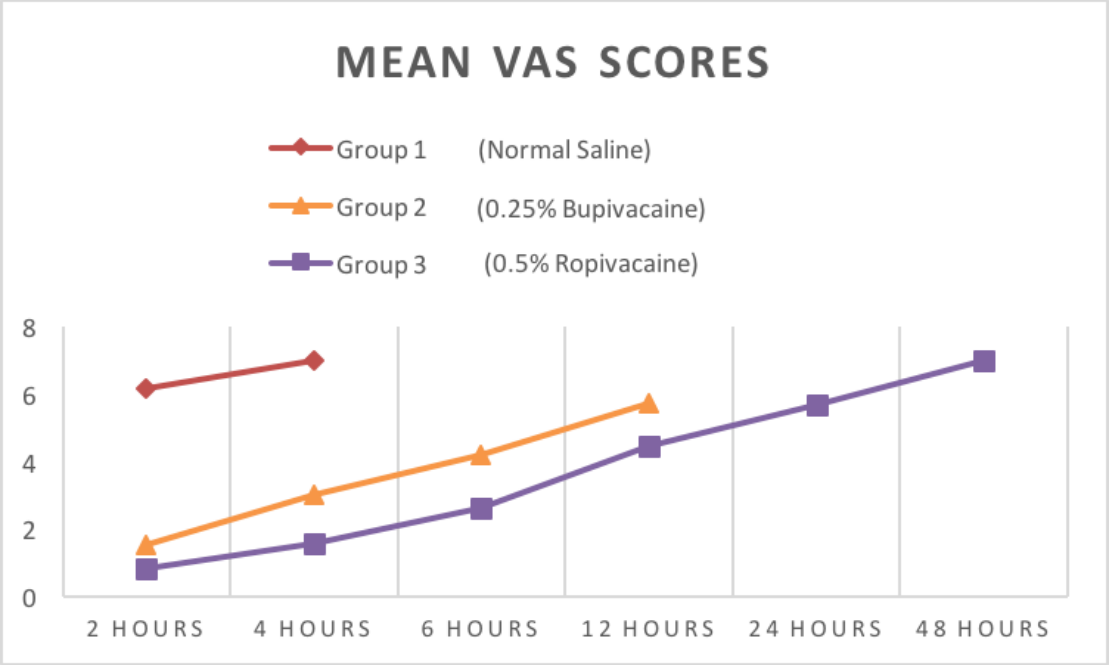
The above Figure shows that the mean duration of analgesia is more in Ropivacaine Group when compared to Bupivacaine Group and Saline Group.

Table 4. Mean Pain scores between intervention groups

Time duration	Intervention groups		
	Group 1 (Normal Saline)	Group 2 (0.25% Bupivacaine)	Group 3 (0.5% Ropivacaine)
15 min	0.96	0	0
30 min	2.2	0.2	0.04
1 hour	4.28	0.72	0.36
2 hours	6.16	1.52	0.84
4 hours	7	3	1.6
6 hours		4.18	2.64
12 hours		5.73	4.44
24 hours			5.68
36 hours			6.14
48 hours			7

In comparing mean pain scores using VAS across intervention groups, Group 3 which received Ropivacaine, reached the threshold VAS for analgesic injection after 36 hours. In the Bupivacaine group, it was 12 hours, while in the Control group it was just 2-4 hours.

Comparision of Mean VAS Scores between the three groups.



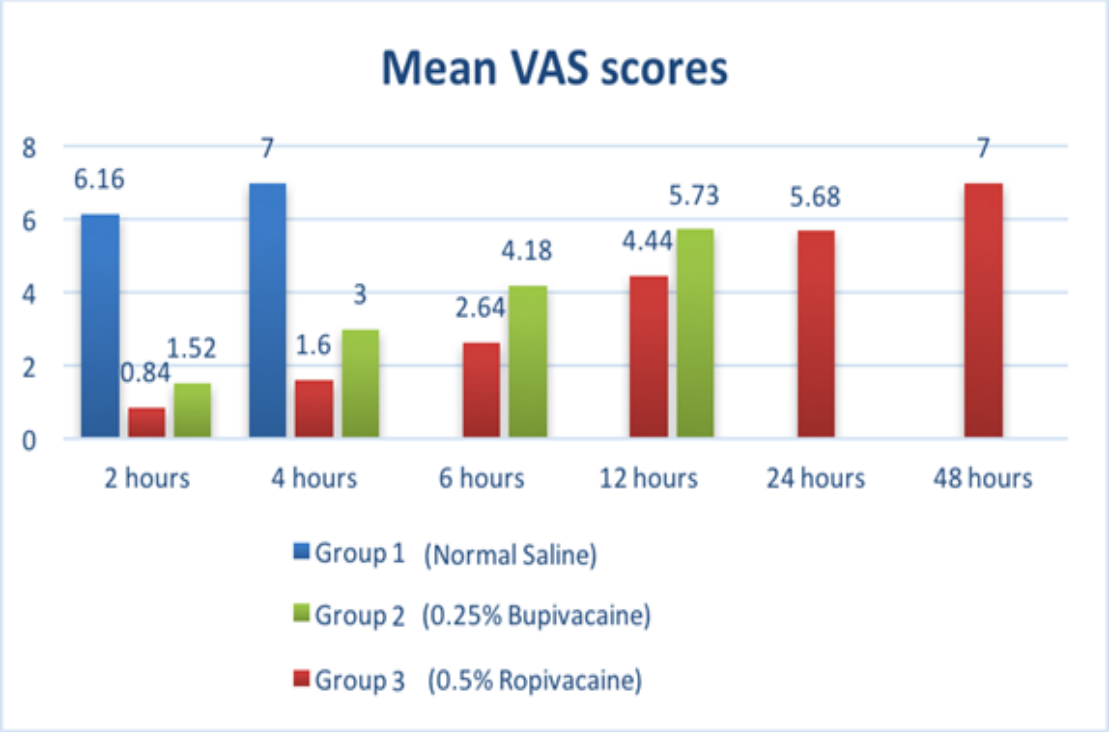


Table 5. Comparing mean VAS scores between intervention groups using ANOVA

	F Statistic	p value
VAS 15 min	61.714	<0.01*
VAS 30 min	60.693	<0.01*
VAS 1 hour	141.225	<0.01*
VAS 2 hours	438.226	<0.01*
VAS 4 hours	30.389	<0.01*
VAS 6 hours	14.06	<0.01*
VAS 12 hours	12.138	<0.01*

* - statistically significant

The mean pain scores as measured using Visual Analogue scale was compared across intervention groups, at 15 min, 30 min, 1 hour, 2 hours, 4

hours, 6 hours, and 12 hours. The difference was found to be statistically significant at each instance.

Table 6. Mean Heart rate of intervention groups

Mean Heart rate	Intervention groups		
	Group 1 (Normal Saline)	Group 2 (0.25% Bupivacaine)	Group 3 (0.5% Ropivacaine)
15 min	84.76	83.36	82.24
30 min	88.76	83.44	83.48
1 hour	94.56	84.44	82.88
2 hours	96.5	87.36	85.32
4 hours	91.5	91.6	89.16
6 hours		97.23	93.4
12 hours		98.45	96.96
24 hours			100.45
36 hours			105.75
48 hours			121

Table 7. Comparing mean HR between intervention groups using ANOVA

Heart rate	F Statistic	p value
Heart rate 15 min	0.412	0.664
Heart rate 30 min	2.512	0.088
Heart rate 1 hour	12.122	<0.01*
Heart rate 2 hours	11.178	<0.01*
Heart rate 4 hours	0.811	0.45
Heart rate 6 hours	2.71	0.107
Heart rate 12 hours	0.289	0.595

There was **no significant variation** overall in the Mean Heart rate across the three intervention groups.

Table 8. Mean Systolic BP of intervention groups

Mean systolic BP	Intervention groups		
	Group 1 (Normal Saline)	Group 2 (0.25% Bupivacaine)	Group 3 (0.5% Ropivacaine)
15 min	122.44	121.56	118.44
30 min	126.88	121.56	120.68
1 hour	133.24	122.6	123.72
2 hours	135	130.36	126.4
4 hours	137	134.16	129
6 hours		138.14	131.32
12 hours			134.16
24 hours			136.47
36 hours			138.43

Table 9. Mean Diastolic BP of intervention groups

Mean diastolic BP	Intervention groups		
	Group 1 (Normal Saline)	Group 2 (0.25% Bupivacaine)	Group 3 (0.5% Ropivacaine)
15 min	75.44	74.84	75.8
30 min	81.36	76.76	77.6
1 hour	86.24	78.83	79.72
2 hours	86.82	83.88	83.48
4 hours	91.5	87.32	85.6
6 hours		91.73	87.96
12 hours		92	89.92
24 hours			92.06
36 hours			93.71

Table 10. Mean arterial pressure between intervention groups

Mean arterial Pressure	Intervention groups		
	Group 1 (Normal Saline)	Group 2 (0.25% Bupivacaine)	Group 3 (0.5% Ropivacaine)
15 min	91.1	90.4	90.01
30 min	96.5	91.69	91.96
1 hour	101.9	94.01	94.38
2 hours	102.88	99.37	97.78
4 hours	106.66	102.93	100.06
6 hours		107.91	102.4
12 hours			104.66
24 hours			106.8
36 hours			108.6

Table 11. Comparing mean HR between 0.5% Ropivacaine & 0.25% Bupivacaine

Variable	Intervention groups	Mean	SD	Std. Error Mean	Mean diff.	Std. Error Diff.	p value	95% C.I	
								Upper bound	Lower bound
HR 1hour	0.5 % Ropivacaine	82.88	7.299	1.46	-1.56	2.024	0.445	-5.63	2.51
	0.25% bupivacaine	84.44	7.012	1.402					
HR 2 hours	0.5 % Ropivacaine	85.32	6.731	1.346	-2.04	1.96	0.303	-5.981	1.901
	0.25% Bupivacaine	87.36	7.123	1.425					

The mean heart rate at 1 hour for the group which received 0.5% Ropivacaine was 82.88, and for 0.25% Bupivacaine group was 84.44. The mean difference was -1.56 with a 95% Confidence interval ranging from -5.63 to 2.61. The difference was not statistically significant.

The mean heart rate at 2 hours for the group which received 0.5% Ropivacaine was 85.32, and for 0.25% Bupivacaine group was 87.36. The mean difference was -2.04 with a 95% Confidence interval ranging from -5.981 to 1.901. The difference was not statistically significant.

Hence in terms of hemodynamic stability, 0.5% Ropivacaine and 0.25% Bupivacaine do not differ significantly from each other.

Table 12. Comparing hemodynamics between 0.5% Ropivacaine & 0.25% Bupivacaine

Variable	Intervention groups	Mean	S.D	Std. Error Mean	Mean diff	Std. Error Diff	P value	95% C.I	
								Upper bound	Lower bound
Sys BP 30 min	Ropivacaine 0.5%	120.68	10.758	2.152	-0.88	2.616	0.738	-6.14	4.38
	Bupivacaine 0.25%	121.56	7.439	1.488					
Sys BP 1 hour	Ropivacaine 0.5%	123.72	10.718	2.144	1.12	3.159	0.724	-5.231	7.471
	Bupivacaine 0.25%	122.6	11.601	2.32					
Sys BP 2 hours	Ropivacaine 0.5%	126.4	9.12	1.824	-3.96	2.427	0.109	-8.84	0.92
	Bupivacaine 0.25%	130.36	8.005	1.601					
Sys BP 6 hours	Ropivacaine 0.5%	131.32	9.15	1.83	-6.816	2.485	<0.01*	-11.822	-1.811
	Bupivacaine 0.25%	138.14	7.692	1.64					
Dia BP 1 hour	Ropivacaine 0.5%	79.72	6.828	1.366	0.887	1.674	0.599	-2.481	4.254
	Bupivacaine 0.25%	78.83	4.631	0.945					

The mean systolic BP (30 min) in Ropivacaine group was 120.68 and Bupivacaine group was 123.72. The mean difference was -0.88 with 95% C.I -6.14 to 4.38. The difference was not statistically significant.

The mean systolic BP (1 hr) in Ropivacaine group was 123.72 and Bupivacaine group was 122.6. The mean difference was 1.12 with 95% C.I -5.231 to 7.471. The difference was not statistically significant.

The mean systolic BP (2 hrs) in Ropivacaine group was 126.4 and Bupivacaine group was 130.36. The mean difference was -3.96 with 95% C.I -8.84 to 0.92. The difference was not statistically significant.

The mean systolic BP (6 hrs) in Ropivacaine group was 131.32 and Bupivacaine group was 138.14. The mean difference was -6.816 with 95% C.I -11.822 to -1.811 The difference was statistically significant. Systolic BP in the Ropivacaine group was significantly lower than the Bupivacaine group at 6 hours.

The mean diastolic BP (1 hr) in Ropivacaine group was 79.72 and Bupivacaine group was 78.83. The mean difference was 0.887 with 95% C.I.-2.481 to 4.254. The difference was not statistically significant.

Table 16. Comparing MAP between 0.5% Ropivacaine & 0.25% Bupivacaine

Variable	Intervention groups	Mean	SD	Std. Error Mean	Mean diff	Std. Error diff	p value	95% C.I	
								Upper bound	Lower bound
MAP 30 min	0.5 % Ropivacaine	91.96	8.16061	1.63212	0.26667	1.94976	0.892	-3.65359	4.18693
	0.25% Bupivacaine	91.6933	5.33326	1.06665					
MAP 1 hour	0.5 % Ropivacaine	94.3867	7.60524	1.52105	0.37278	1.86503	0.842	-3.37917	4.12473
	0.25% Bupivacaine	94.0139	5.16536	1.05437					
MAP 2 hours	0.5 % Ropivacaine	97.7867	6.86435	1.37287	-1.58667	1.74517	0.368	-5.09557	1.92224
	0.25% Bupivacaine	99.3733	5.38716	1.07743					
MAP 6 hours	0.5 % Ropivacaine	102.4133	6.0425	1.2085	-4.78364	1.61478	<0.01*	-8.03596	-1.53131
	0.25% Bupivacaine	107.197	4.86393	1.03699					

The Mean Arterial Pressure in the Ropivacaine group at 30 min was 91.96 and Bupivacaine group was 91.69. The mean difference was 0.26 with 95% C.I -3.65 to 4.18. The difference was not statistically significant.

The Mean Arterial Pressure in the Ropivacaine group at 1 hr was 94.38 and Bupivacaine group was 94.01. The mean difference was 0.37 with 95% C.I -3.3797 to 4.124. The difference was not statistically significant.

The Mean Arterial Pressure in the Ropivacaine group at 2 hr was 97.78 and Bupivacaine group was 99.37. The mean difference was -1.58 with 95% C.I -5.09 to 1.92. The difference was not statistically significant.

The Mean Arterial Pressure in the Ropivacaine group at 6 hr was 102.41and Bupivacaine group was 107.197. The mean difference was -4.78 with 95% C.I -8.035to 1.53. The difference was statistically significant. Mean arterial pressure was significantly lower in the Ropivacaine group than Bupivacaine group.

DISCUSSION

Transversus Abdominis Plane Block has a major role in abdominal surgeries as an analgesic regimen but it is not fully defined. In our study we demonstrate its probable efficacy in patients undergoing lower segment caesarean section in terms of reducing pain scores and opioid usage for the first 48 hours. We did transversus abdominis plane block under ultrasound guidance.

In our study, the demographic profile was comparable with respect to mean age, body weight and ASA physical status. We did bilateral Transversus Abdominis Plane block in the group A with normal saline, group B with 0.25% bupivacaine and group C with 0.5% ropivacaine .They received 20 ml of the respective drug on each side. In many studies Epidural Ropivacaine was found to be significantly less potent than Bupivacaine by a factor of 0.4. Ropivacaine was 60% as potent as Bupivacaine when used for epidural pain relief in labour. The analgesic potency of Ropivacaine was 0.6 relative to Bupivacaine.So we used 20 ml of either 0.25 % Bupivacaine or 0.5 % Ropivacaine compared with saline as the drugs under study for use in TAP block considering Ropivacaine to be approximately half as potent as Bupivacaine. In the postoperative ward the pain scores were monitored and the time of initiation of analgesia with opioid were observed. And the hemodynamic parameters like Heart rate, systolic BP, diastolic BP and Mean arterial BP were measured.

The results showed that there is no significant difference in the heart rate, blood pressure in the two groups of women who received 0.25% Bupivcaine and 0.5% Ropivacaine.

This is correlating with the following studies:

1)**Neha Fuladi et al[23],** did a comparative study of bupivacaine 0.25% versus ropivacaine 0.5% in transversus abdominis plane block for postoperative analgesia in lower abdominal surgeries.

They evaluated the efficacy of unilateral TAPB with bupivacaine and ropivacaine for postoperative analgesia in lower abdominal surgeries like hernia repair, appendicectomy in a hospital based, single blind, and prospective, randomized controlled clinical trial. Each patient was assessed postoperatively by a blinded investigator in post-anaesthesia care unit every 5 minutes for half an hour, then every 15 minutes till 2 hours and at 4, 6, 12, 24, 48 hours postoperatively in ward. The results were Mean duration of analgesia was 420.6 minutes with SD of +14.01 in Bupivacaine group and 2187 minutes with SD of +1011.09 in Ropivacaine group which was found to be statistically significant.But the hemodynamic parameters remained the same. Hence they concluded 0.5% ropivacaine provided longer duration of analgesia than 0.25 % bupivacaine when used in TAPB on patients of lower abdominal surgeries.

2)**Himat Vaghadia et al**[12], did a multicentre trial of ropivacaine 7.5 mg.m1-1*vs* bupivacaine 5 mg.m1-1for supraclavicular brachial plexus anesthesia and compared the efficacy of ropivacaine 7.5 mg/ml with bupivacaine 5.0 mg/ml for subclavian perivascular brachial plexus block.

Onset times and duration of sensory and motor block were similar between groups. Hemodynamic parameters like heart rate and blood pressure were similar. Quality of muscle relaxation judged as excellent by the investigators was not significantly different (ropivacaine - 35/49, bupivacaine - 30/49). The median time to first request for analgesia was comparable between the two groups (I I- 12 hr).

The VAS scores were significantally low in Group 3 and Group 2 ,in which 0.5% Ropivacaine and 0.25% Bupivacaine were used respectively. This is correlating with the studies as follows:

1) **Kawahara R, et al**[21] conducted a randomised control trial to study the analgesic efficacy of ultrasound-guided transversus abdominis plane block with midaxillary approach after gynaecologic laparoscopic surgery.

Adult patients (n = 119) undergoing laparoscopic gynaecologic surgery were randomized to undergo either TAP block with ropivacaine (Group A, n = 60) or that with saline (Group B, n = 59), in a blinded manner. The analgesic effect was postoperatively evaluated using a four-grade pain score

and the prince Henry pain scale (PHS) at 0, 6, 12, and 24 h. Postoperative tramadol PCA consumption and vomiting/nausea were recorded.

They concluded that Postoperative pain/nausea and PCA consumption were significantly lower in patients with TAP block in the early postoperative stage. TAP block with a mid-axillary approach holds considerable promise as a part of a balanced postoperative analgesic regimen following laparoscopic gynaecologic surgery.

2) Loadsman JA et al[25] ,did a retrospective review regarding the role of transversus abdominis plane blocks in women undergoing total laparoscopic hysterectomy.

Women with a TAP block had a significantly shorter length of stay ,lower total perioperative and postoperative opioid use when compared with those without a TAP block. There were no complications related to a TAP block.

3) **McDonnell, et al**[14] studied the Analgesic Efficacy of Transversus Abdominis Plane Block After Caesarean Delivery over the first 48 postoperative hours , in a randomized controlled, double-blind, clinical trial and concluded that The TAP block, as a component of a multimodal analgesic regimen, provided superior analgesia when compared with placebo block up to 48 postoperative hours after elective caesarean delivery.

4) **Patel SA**, **et al**[24] evaluated the role of Transversus abdominis plane block for postoperative analgesia after caesarean delivery. They compared the postoperative adjunctive oral narcotic use in women who underwent caesarean delivery and received the TAP block vs those who received neuraxial narcotics. After adjusting for confounders and the presence of antecedent labor, there remained a significant reduction in the total oral narcotic doses given to women who underwent a TAP block compared to other forms of analgesia. The TAP block is thus associated with decreased oral narcotic usage 24-48 h following caesarean delivery.

5) **Abdallah et al**[10]**,** conducted a study regarding the analgesic utility of transversus abdominis plane (TAP) block after Caesarean delivery. This systematic review and meta-analysis examines whether TAP block can reduce i.v. morphine consumption in the first 24 hr after CD. The authors retrieved randomized controlled trials comparing TAP block with placebo in CD. Postoperative i.v. morphine consumption during the first 24 hr was selected as a primary outcome. Pain scores and both maternal and neonatal opioid-related side-effects were secondary outcomes

They found that TAP block provides superior analgesia compared with placebo and can reduce the first 24 hr morphine consumption in the setting of a multimodal analgesic regimen that excludes spinal morphine. TAP block can provide effective analgesia when spinal morphine is contraindicated or not used.

6) **) D. Belavy et al**[9] evaluated the analgesic efficacy of the ultrasound (US)-guided TAP block in patients under- going Caesarean delivery.

They conducted a randomized, double-blind, placebo-controlled trial at a tertiary maternity hospital. Fifty women undergoing Caesarean delivery received bilateral US-guided TAP blocks with either ropivacaine 0.5% or saline.. Each patient was assessed 24 h after delivery for morphine usage, average pain score, nausea, vomiting, pruritis, drowsiness, and satisfaction with pain relief.

The Results were Total morphine use in 24 h was reduced in the active group (median 18.0 mg) compared with the placebo group (median 31.5 mg, P,0.05). The active group reported improved satisfaction with their pain relief measured by visual analogue scale compared with the placebo group (median 96 vs 77 mm, P¼0.008) and came to conclude that US-guided TAP block reduces morphine requirements after Caesarean delivery when used as a component of a multimodal analgesic regimen.

7) **Uma Srivastava,et al**[36] conducted a double-blind, randomized trial to evaluate the Efficacy of transversus abdominis plane block for post caesarean delivery analgesia.

62 parturients undergoing caesarean section were randomized in a double-blind manner to receive either bilateral TAP block at the end of surgery

with 20 ml of 0.25% bupivacaine or no TAP block, in addition to standard analgesic and intravenous patient-controlled analgesia (PCA) tramadol.

Each patient was assessed after surgery by an independent observer for pain at rest and on movement using numeric rating scale of 0-10, time of 1st demand for tramadol, total consumption of PCA tramadol, satisfaction with pain management and side effects for a period of 24 hours.

The results were Use of tramadol was reduced in patients given TAP block by 50% compared to patients given no block during 48 h after surgery.Pain scores were lower both on rest and activity at each time point for 24 hr in study group,time of first analgesia was significantly longer, satisfaction was higher, and side effects were less in study group compared to control group.

The mean analgesic duration and the time for requirement of opioid was significantly increased in Group 3 (0.5%Ropivacaine) and Group 2(0.25% Bupivacaine) when compared to Group 1(Normal saline). Also 0.5% Ropivacaine produces longer duration of analgesia than 0.25% Bupivacaine. This is consistent with the following studies:

1)**Shradha sinha et al[32],** did a Comparison of ultrasound-guided transversus abdominis plane block with bupivacaine and ropivacaine as adjuncts for postoperative analgesia in laparoscopic cholecystectomies .

He investigated whether ropivacaine with its inherent advantages (anaesthetic potency, long duration of action, favourable toxicity profile) is superior to bupivacaine for providing post-operative analgesia when used for TAP block in patients undergoing laparoscopic cholecystectomy and found that the ultrasound-guided deposition of ropivacaine 0.375% in the TAP provided superior analgesia in the early post-operative period in comparison to bupivacaine 0.25%.

2) **Neha Fuladi et al[23],** did a comparative study of bupivacaine 0.25% versus ropivacaine 0.5% in transversus abdominis plane block for postoperative analgesia in lower abdominal surgeries.

They evaluated the efficacy of unilateral TAPB with bupivacaine and ropivacaine for postoperative analgesia in lower abdominal surgeries like hernia repair, appendicectomy in a hospital based, single blind, and prospective, randomized controlled clinical trial. Each patient was assessed postoperatively by a blinded investigator in post-anesthesia care unit every 5 minutes for half an hour, then every 15 minutes till 2 hours and at 4, 6, 12, 24, 48 hours postoperatively in ward. The results were Mean duration of analgesia was 420.6 minutes with SD of +14.01 in Bupivacaine group and 2187 minutes with SD of +1011.09 in Ropivacaine group which was found to be statistically significant.But the hemodynamic parameters remained the same. Hence they concluded 0.5% ropivacaine provided longer duration of analgesia than 0.25 %

bupivacaine when used in TAPB on patients of lower abdominal surgeries. There were no complications attributable to TAPB or drugs under study.

No significant complications were observed during our study except a few of incorrect plane of drug deposition and they were excluded from the study.

SUMMARY

Women having a Caesarean delivery present a unique set of challenges to the anaesthesiologist after operation. These motivated women want to be alert, comfortable and mobile in order to care for their baby. As part of a multimodal analgesic regimen, opioids are required initially to achieve effective analgesia. However, opioids are associated with dose-dependent side-effects including nausea, vomiting, pruritus, sedation, and respiratory depression. Techniques that reduce opioid requirements may be of benefit in this population.

The Transversus abdominis plane (TAP) block reduces morphine use after abdominal surgery, including Caesarean delivery. The block has opioid-sparing effects, reduces antiemetic use, and improves satisfaction with pain relief. There are no major neurovascular structures near the area of block which is of great advantage to perform this block.

However, there is a small proportion of patients in whom neuraxial techniques are contraindicated or not possible due to coagulation abnormalities and other issues like sympathetic blockade after epidural anaesthesia.These patients may be benefited by Transversus abdominis plane block.

The complications of TAP block which are very rare like Intraperitoneal injection, Bowel injury, Hepatic injury can be avoided with the use of ultrasound guidance while giving the block.Thus transversus abdominis plane block is a superior and less harmful mode of postoperative analgesia to the patients undergoing lower abdominal surgeries like caesarean section.

In this block ropivacaine with its inherent advantages (anaesthetic potency, long duration of action, favourable toxicity profile) is superior to bupivacaine for providing post-operative analgesia.

CONCLUSION

In conclusion, our study showed that ultrasound-guided TAP blocks in the manner we have described resulted in reduced systemic opioid consumption and a positive impact on maternal satisfaction in women undergoing caesarean section. We propose that the TAP block is another arsenal in the obstetric anaesthesiologist's armamentarium in managing pain after caesarean section , or in those with contraindications to long-acting neuraxial opioids.

Also we conclude that 0.5% Ropivacaine provided longer duration of analgesia than 0.25% Bupivacaine when used in TAPB for providing postoperative analgesia after lower abdominal surgeries. It has an excellent safety profile to date. It shows outstanding clinical utility in terms of reliability & effective analgesia.

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INFORMATION TO PARTICIPANTS

Investigator **:** Dr. NITHYA.G

Name of the Participant:

Title. "**Bilateral transverse abdominus plane block using Ropivacaine & Bupivacaine for Lower Segment Caesarean Section under Spinal Anaesthesia**".

(A Prospective, randomized, double blinded , placebo controlled study for evaluating the analgesic efficacy of (0.5%)Ropivacaine Vs(0.25%) Bupivacaine)

You are invited to take part in this research study. We have got approval from the IEC. You are asked to participate because you satisfy the eligibility criteria. We want to compare and study the safety and post operative analgesic efficacy of ropivacaine(0.5%)and bupivacaine (0.25%) in bilateral transverse abdominis plane block after spinal anaesthesia for lower segment caesarean section .

What is the Purpose of the Research:

For lower segment caesarean section, transverse abdominis plane block performed using ultrasound after spinal anaesthesia to study

1. To evaluate the duration of post operative analgesic efficacy of these drugs.
2. To assess Intraoperative and post operative haemodynamics
3. Post operative visual analogue scale pain score.
4. Complication rate.
5. To evaluate post operative IV/IM analgesic initiation time

The Study Design:

All the patients in the study will be divided into three groups.

Group1- post operative bilateral transverse abdominis plane block performed using ultrasound after spinal anaesthesia using normal saline

Group 2- post operative bilateral transverse abdominis plane block performed using ultrasound after spinal anaesthesia using bupivacaine (0.25%).

Group 3- post operative bilateral transverse abdominis plane block performed using ultrasound after spinal anaesthesia using ropivacaine (0.5%) .

Benefits

Transversus abdominis plane block improves post operative hemodynamic, reduces opioid requirement, causes post operative pain relief.

Discomforts and risks

Intravascular local anaesthetic injection

Damage to neuro vascular structure

This intervention has been shown to be well tolerated as shown by previous studies. And if you do not want to participate you will have alternative of setting the standard treatment and your safety is our prime concern.

Confidentiality of data and details of study and patient details concerned with this research will be strictly maintained.

Time :

Date :

Place :

Signature / Thumb Impression of Patient

Patient Name:

Signature of the Investigator : _____

Name of the Investigator : _____

PATIENT CONSENT FORM

Study title "**Bilateral transversus abdominis plane block using Ropivacaine & Bupivacaine for Lower Segment Caesarean Section under Spinal Anaesthesia**".

(A Prospective, randomized, single blinded , placebo controlled study for evaluating the analgesic efficacy of (0.5%)Ropivacaine Vs(0.25%) bupivacaine)

Study center: **DEPARTMENT OF ANAESTHESIOLOGY,**

INSTITUTE OF OBSTETRICS AND GYNAECOLOGY,

RAJIV GANDHI GOVT. GENERAL HOSPITAL,

MADRAS MEDICAL COLLEGE,

CHENNAI-08.

Participant name: Age: Sex:

I.P.No:

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

I have been explained about the pitfall in the procedure. I have been explained about the safety, advantage and disadvantage of the technique.

I understand that my participation in the study is voluntary and that I am free to withdraw at anytime without giving any reason.

I understand that investigator, regulatory authorities and the ethics committee will not need my permission to look at my health records both in respect to current study and any further research that may be conducted in relation to it, even if I withdraw from the study. 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 the study.

Time:

Date:

Signature/thumb impression of patient

Place: Patient name:

Signature of the investigator:

Name of the investigator:

COMPARISION OF THE ANALGESIC EFFICACY OF 0.5%ROPIVACAINE AND 0.25% BUPIVACAINE IN BILATERAL TRANSVERSUS ABDOMINIS PLANE BLOCK AFTER LSCS

PROFORMA

DATE: ROLL NO:

NAME:

AGE: SEX: IP NO:

DIAGNOSIS:

SURGICAL PROCEDURE :

Ht: CVS:
HB:

Wt: RS:
BT: CT:

AIRWAY:MMS - IID -
DENTITION -

Examination of spine:

ASA:

PRE OP ASSESSMENT:

HISTORY: Any Co-morbid illness

H/O Documented Difficult Airway

H/O previous surgeries/treatment

H/O Difficult spinal anaesthesia

H/O Drug allergy

MEASURES OF STUDY OUTCOME:

B/L Transverse abdominis plane block : Drugs

COMPLICATIONS IN POST OPERATIVE PERIOD:

Hemodynamics: intra operative

Events	Time	Systolic BP (mmHg)	Diastolic BP (mmHg)	MAP	Heart rate Beats/min	SPO2
Baseline						
Immediately after spinal anaesthesia						
5 mins						
10 mins						
15 mins						
20 mins						
End of surgery						

POST OPERATIVE ANALGESIC INITIATION TIME:

TIME	**0 Min**	**05 Min**	**10 min**	**15 Min**	**20 min**	**25 min**	**30 min**	**45 min**	**60 min**	**75 min**	**90 min**	**2 hrs**	**4 hrs**	**6 hrs**	**12 hrs**	**24 hrs**	**48 hrs**
VAS																	
HR																	
SBP																	
DBP																	
MAP																	
Rescue analgesia																	

<u>ஆராய்ச்சி ஒப்புதல் படிவம்</u>

ஆராயச்சியின் தலைப்பு

சிசேரியன் அறுவை சிகிச்சைக்குப்பின் வலியில்லாமல் இருப்பதற்கு டிரான்ஸ்வெர்ஸ் அப்டாமினஸ் பிளேன் பிளாக் மூலம் புபிவெகெய்ன் அல்லது ரோபிவெகெய்ன் மருந்தினை ஒப்பிடுதல்

ஆய்வு நிலையம் : குழந்தைகள் மற்றும் மகப்பேறு மருத்துவமனை, சென்னை மருத்துவக் கல்லூரி, எழும்பூர், சென்னை.

பங்கு பெறுவரின் பெயர் :

பங்குபெறுபவரின் எண் :

பங்குபெறுபவர் இதனை (✓) குறிக்கவும்

மேலே குறிப்பிட்டுள்ள மருத்துவ ஆய்வின் விவரங்கள் எனக்கு விளக்கப்பட்டது. என்னுடைய சந்தேகங்களை கேட்கவும், அதற்கான தகுந்த விளக்கங்களை பெறவும் வாய்ப்பளிக்கப்பட்டது. ☐

நான் இவ்வாய்வில் தன்னிச்சையாகதான் பங்கேற்கிறேன். எந்த காரணத்தினாலோ எந்த கட்டத்திலும் எந்த சட்ட சிக்கலுக்கும் உட்படாமல் நான் இவ்வாய்வில் இருந்து விலகி கொள்ளலாம் என்றும் அறிந்து கொண்டேன். ☐

இந்த ஆய்வு சம்பந்தமாகவோ, இதை சார்ந்த மேலும் ஆய்வு மேற்கொள்ளும் போதும் இந்த ஆய்வில் பங்குபெறும் மருத்துவர் என்னுடைய மருத்துவ அறிக்கைகளை பார்ப்பதற்கு என் அனுமதி தேவையில்லை என அறிந்து கொள்கிறேன். நான் ஆய்வில் இருந்து விலகிக் கொண்டாலும் இது பொருந்தும் என அறிகிறேன். ☐

இந்த ஆய்வின் மூலம் கிடைக்கும் தகவல்களையும், பரிசோதனை முடிவுகளையும் மற்றும் சிகிச்சை தொடர்பான தகவல்களையும் மருத்துவர் மேற்கொள்ளும் ஆய்வில் பயன்படுத்திக்கொள்ளவும் அதை பிரசுரிக்கவும் என் முழு மனதுடன் சம்மதிக்கின்றேன். ☐

இந்த ஆய்வில் பங்கு கொள்ள ஒப்புக்கொள்கிறேன். எனக்கு கொடுக்கப்பட்ட அறிவுரைகளின்படி நடந்து கொள்வதுடன் 'இந்த ஆய்வை மேற்கொள்ளும் மருத்துவ அணிக்கு உண்மையுடன் இருப்பேன் என்று உறுதியளிகிறேன். ☐

பங்கேற்பவரின் கையொப்பம் ..... இடம்..... தேதி.....

கட்டைவிரல் ரேகை

பங்கேற்பவரின் பெயர் மற்றும் விலாசம் .....

ஆய்வாளரின் கையொப்பம் ..... இடம்..... தேதி.....

ஆய்வாளரின் பெயர் .....

<u>ஆராய்ச்சி தகவல் தாள்</u>

ஆராய்ச்சி தலைப்பு

சிசேரியன் அறுவை சிகிச்சைக்குப்பின் வலியில்லாமல் இருப்பதற்கு டிரான்ஸ்வெர்ஸ் அப்டாமினஸ் பிளேன் பிளாக் மூலம் புபிவெகெய்ன் அல்லது ரோபிவெகெய்ன் மருந்தினை ஒப்பிடுதல்

ஆராய்ச்சியாளர் பெயர் : மருத்துவர்.கு.நித்யா

பங்கேற்பாளர் பெயர் :

ஆராய்ச்சியின் நோக்கம்

சிசேரியன் அறுவை சிகிச்சைக்குப்பின் வலியில்லாமல் இருப்பதற்கு டிரான்ஸ்வெர்ஸ் அப்டாமினஸ் பிளேன் பிளாக் மூலம் புபிவெகெய்ன் அல்லது ரோபிவெகெய்ன் மருந்தினை ஒப்பிடுதல்

1) மேலே குறிப்பிட்டுள்ள மருந்துகளின் மறத்துப்போகும் தன்மை அவகாசத்தை ஒப்பிடுதல்
2) அறுவை சிகிச்சைக்குப்பின் இரத்த அழுத்தம் மற்றும் நாடித்துடிப்பு மாற்றங்கள்
3) அறுவை சிகிச்சைக்குப்பிந்தைய வலி நிவாரணம் அளவு (விசுவல் அனலாக் அளவுகோல்)
4) சிக்கல்கள் விகிதம்
5) அறுவை சிகிச்சைக்குப்பின் முதன்முறை வலி நிவாரணி தேவைப்படும் நேரம்.

ஆய்வு முறை

ஆய்வில் பங்குபெறும் நோயாளிகள் மூன்று குழுக்களாகப் பிரிக்கப்படுவர்.

குழு-1 அறுவை சிகிச்சைக்குப்பின் வயிற்றில் டிரான்ஸ்வெர்ஸ் அப்டாமினஸ் பிளாக் மூலம் நார்மல் சலைன் கொடுக்கப்படும்.

குழு-2 அறுவை சிகிச்சைக்குப்பின் வயிற்றில் டிரான்ஸ்வெர்ஸ் அப்டாமினஸ் பிளாக் மூலம் பூபிவெகெய்ன் 0.25% கொடுக்கப்படும்.

குழு-3 அறுவை சிகிச்சைக்குப்பின் வயிற்றில் டிரான்ஸ்வெர்ஸ் அப்டாமினஸ் பிளாக் மூலம் ரோபிவெகெய்ன் 0.5% கொடுக்கப்படும்.

நன்மைகள்

1) அறுவை சிகிச்சையின்போது நாடித்துடிப்பு மற்றும் இரத்த அழுத்தம் சீராக செயல்பட உதவுகின்றன.

2) இதர வலி நிவாரணிகளின் தேவை வெகுவாக குறைக்கப்படுகின்றன.

3) அறுவை சிகிச்சைக்குப் பின்னர் வலி நிவாரணத்தின் தன்மை நீட்டிக்கப்படுகின்றது.

பக்கவிளைவுகள்

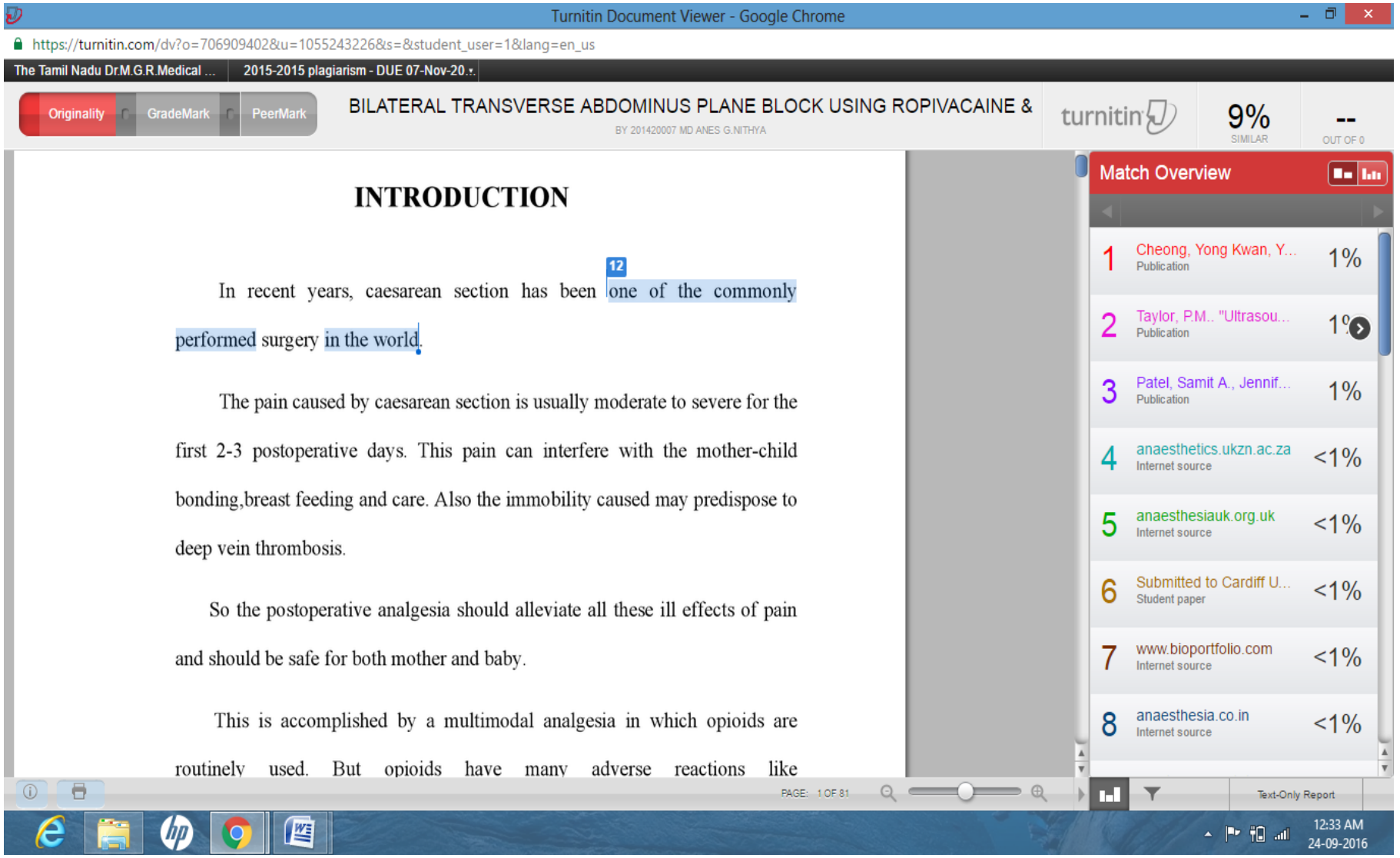
ஊசி போடும்போது அசௌகரியம் ஏற்படலாம். மரத்துப்போகும் ஊசியின் மூலம் இது தவிர்க்கப்படும். குறைந்த இரத்த அழுத்தம், குறைந்த நாடித்துடிப்பு ஏற்படலாம். அதற்கு மாற்று மருந்துகள் உடனடியாக கொடுக்கப்படும்.

இந்த முறையான ஆய்வு ஏற்கனவே பல இடங்களில் நடத்தப்பட்டுள்ளது. மேலும் இதன் பாதுகாப்பு உறுதிசெய்யப்பட்டுள்ளது. நீங்கள் இந்த ஆய்வில் பங்குகொள்ள விரும்பவில்லை என்றால் எப்போதும் உபயோகிக்கப்படும் மருந்தே கொடுக்கப்படும். உங்கள் பாதுகாப்பே எங்களின் முக்கிய நோக்கம்.

இந்த ஆய்வு சம்பந்தமான எல்லா புள்ளி விவரங்கள் மற்றும் நோயாளிகளின் விவரங்கள் ரகசியமாக வைக்கப்படும். இந்த ஆய்வு சம்பந்தப்பட்ட எல்லா பரிசோதனைகள், மருந்துகள் மற்றும் மருத்துவ சேவைகள் அனைத்தும் நோயாளிகளுக்கு இலவசமாக வழங்கப்படும்.

ஆய்வாளரின் பெயர் **பங்குபெறுபவரின் பெயர்**

ஆய்வாளரின் கையொப்பம் **பங்குபெறுபவரின் கையொப்பம்**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INTRODUCTION
In recent years, caesarean section has been one of the commonly performed surgery in the world.
The pain caused by caesarean section is usually moderate to severe for the first 2-3 postoperative days. This pain can interfere with the mother-child bonding,breast feeding and care. Also the immobility caused may predispose to deep vein thrombosis.
So the postoperative analgesia should alleviate all these ill effects of pain and should be safe for both mother and baby.
This is accomplished by a multimodal analgesia in which opioids are routinely used. But opioids have many adverse reactions like
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INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE, CHENNAI 600 003

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Fax: 011 25363970

CERTIFICATE OF APPROVAL

To
Dr.Nithya.G.
II Year Post Graduate in M.D.(Anaesthesiology)
Madras Medical College & RGGGH
Chennai 600 003

Dear Dr.Nithya.G.,

The Institutional Ethics Committee has considered your request and approved your study titled **"BILATERAL TRANNSVERSE ABDOMINUS PLANE BLOCK USING ROPIVACAINE & BUPIVACAINE FOR LOWER SEGMENT CESAREAN SECTION UNDER SPINAL ANAESTHESIA " - NO.25032016.**

The following members of Ethics Committee were present in the meeting hold on **01.03.2016** conducted at Madras Medical College, Chennai 3

1.Dr.C.Rajendran, MD.,	:Chairperson
2.Dr.R.Vimala,MD.,Dean,MMC,Ch-3	:Deputy Chairperson
3.Prof.Sudha Seshayyan,MD., Vice Principal,MMC,Ch-3	: Member Secretary
4.Prof.B.Vasanthi,MD.,Inst.of Pharmacology,MMC,Ch-3	: Member
5.Prof.P.Raghumani,MS, Dept.of Surgery,RGGGH,Ch-3	: Member
6.Dr.Baby Vasumathi, Director, Inst. of O&G,Ch-8	: Member
7.Prof.M.Saraswathi,MD.,Director, Inst.of Path,MMC,Ch-3	: Member
8.Prof.Srinivasagalu,Director,Inst.of Int.Med.,MMC,Ch-3	: Member
9.Tmt.J.Rajalakshmi, JAO,MMC, Ch-3	: Lay Person
10.Thiru S.Govindasamy, BA.,BL,High Court,Chennai	: Lawyer
11.Tmt.Arnold Saulina, MA.,MSW.,	:Social Scientist

We approve the proposal to be conducted in its presented form.

The Institutional Ethics Committee expects to be informed about the progress of the study and SAE occurring in the course of the study, any changes in the protocol and patients information/informed consent and asks to be provided a copy of the final report.

Member Secretary - Ethics Committee

MEMBER SECRETARY
INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE
CHENNAI-600 003

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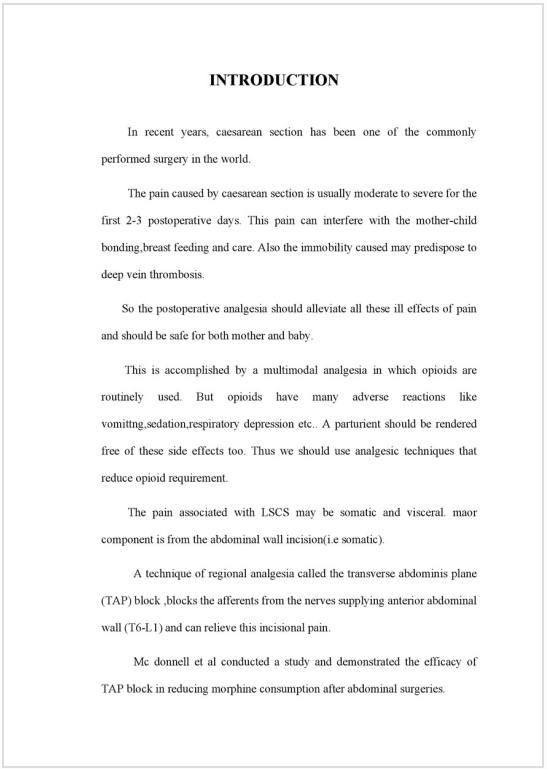

INTRODUCTION

In recent years, caesarean section has been one of the commonly performed surgery in the world.

The pain caused by caesarean section is usually moderate to severe for the first 2-3 postoperative days. This pain can interfere with the mother-child bonding,breast feeding and care. Also the immobility caused may predispose to deep vein thrombosis.

So the postoperative analgesia should alleviate all these ill effects of pain and should be safe for both mother and baby.

This is accomplished by a multimodal analgesia in which opioids are routinely used. But opioids have many adverse reactions like vomittng,sedation,respiratory depression etc.. A parturient should be rendered free of these side effects too. Thus we should use analgesic techniques that reduce opioid requirement.

The pain associated with LSCS may be somatic and visceral. maor component is from the abdominal wall incision(i.e somatic).

A technique of regional analgesia called the transverse abdominis plane (TAP) block ,blocks the afferents from the nerves supplying anterior abdominal wall (T6-L1) and can relieve this incisional pain.

Mc donnell et al conducted a study and demonstrated the efficacy of TAP block in reducing morphine consumption after abdominal surgeries.