A PROSPECTIVE, RANDOMIZED DOUBLE BLINDED STUDY COMPARING ULTRASOUND GUIDED TRANSVERSUS ABDOMINIS PLANE BLOCK VS ULTRASOUND GUIDED ILIOINGUINAL BLOCK FOR POSTOPERATIVE ANALGESIA IN CHILDREN UNDERGOING ELECTIVE HERNIA REPAIR

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

This is to certify that the dissertation titled.**"A PROSPECTIVE, RANDOMIZED DOUBLE BLINDED STUDY COMPARING ULTRASOUND GUIDED TRANSVERSUS ABDOMINIS PLANE BLOCK VS ULTRASOUND GUIDED ILIOINGUINAL BLOCK FOR POSTOPERATIVE ANALGESIA IN CHILDREN UNDERGOING ELECTIVE HERNIA REPAIR** " submitted by **Dr. SHINY PRIYADARSHINI.A**, in partial fulfilment for the award of the degree of Doctor of Medicine in Anaesthesiology by the Tamil Nadu Dr. M.G.R. Medical University, Chennai., is a bonafide record of the work done by her in the Institute of Child Health and Hospital for Children. INSTITUTE OF ANAESTHESIOLOGY AND CRITICAL CARE, Madras Medical College and government hospital, during the academic year 2014-2017

Prof. DR. B.KALA M.D., D.A.,
THE DIRECTOR & HOD,
INSTITUTE OF
ANAESTHESIOLOGY
AND CRITICAL CARE,
MADRAS MEDICAL COLLEGE,
CHENNAI -600 003.

DR. M.K.MURALITHARAN M.S., M.ch,
DEAN,
MADRAS MEDICAL COLLEGE &
GOVT. GENERAL HOSPITAL,
CHENNAI – 600 003.

CERTIFICATE BY THE GUIDE

This is to certify that the dissertation entitled, **"A PROSPECTIVE, RANDOMIZED DOUBLE BLINDED STUDY COMPARING ULTRASOUND GUIDED TRANSVERSUS ABDOMINIS PLANE BLOCK VS ULTRASOUND GUIDED ILIOINGUINAL BLOCK FOR POSTOPERATIVE ANALGESIA IN CHILDREN UNDERGOING ELECTIVE HERNIA REPAIR "** submitted **by Dr.SHINY PRIYADARSHINI.A**, in partial fulfilment for the award of the degree of Doctor of Medicine in Anaesthesiology by the Tamil Nadu Dr. M.G.R. Medical University, Chennai., is a bonafide record of the work done by her in the Institute of Child Health and Hospital for Children.INSTITUTE OF ANAESTHESIOLOGY AND CRITICAL CARE, Madras Medical College and government hospital, during the academic year 2014-2017.

Prof .DR .N. KRISHNAN M.D., D.A
Professor of Anaesthesiology,
Madras medical college & Govt. General Hospital
Institute of Child Health and Hospital for children
Chennai- 600 003

DECLARATION

I hereby, solemnly declare that this dissertation entitled **"A PROSPECTIVE, RANDOMIZED DOUBLE BLINDED STUDY COMPARING ULTRASOUND GUIDED TRANSVERSUS ABDOMINIS PLANE BLOCK VS ULTRASOUND GUIDED ILIOINGUINAL BLOCK FOR POSTOPERATIVE ANALGESIA IN CHILDREN UNDERGOING ELECTIVE HERNIA REPAIR"** is a bonafide record of the work done by me in the Institute of Anaesthesiology and Critical Care, Madras Medical College and Government General Hospital, Chennai, during the period 2014 – 2017 under the guidance of **DR. N. KRISHNAN M.D., D.A.,** Professor of anaesthesiology, Institute of Child health and Hospital for children, Madras Medical College, Chennai – 3 and submitted to **The Tamil Nadu Dr. M.G.R. MedicalUniversity, Guindy, Chennai – 32**, in partial fulfilment for the requirements for the award of the degree of M.D. Anaesthesiology (Branch X), examinations to be held on April 2017.

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

Place: Chennai Dr .SHINY PRIYADARSHINI.A

Date:

ACKNOWLEDGEMENT

I am extremely thankful to **DR.M.K.MURALITHARAN M.S.Mch,** Dean, Madras Medical College & Rajiv Gandhi Govt. General Hospital, for her permission to carry out this study.

I am immensely grateful to **Prof .DR. B.KALA, M.D., D.A.,** Director & HOD, Institute of Anaesthesiology and Critical Care, for her concern and support in conducting this study.

I am extremely grateful and indebted to my guide **Prof .DR .N. KRISHNAN M.D. , D.A,** Professor of Anaesthesiology, Institute of Child Health and Hospital for children, Madras Medical College, for his concern, inspiration, meticulous guidance, expert advice and constant encouragement in preparing this dissertation.

I am very grateful to express my sincere gratitude to the Professors, Institute of Anaesthesiology & Critical Care, for their constant motivation and valuable suggestions.

I am extremely thankful to my Assistant Professors especially Dr.SRINIVASAN M.D.,D.A.,, Dr. SHAHJAHAN M.D., Dr. R. AHILA M.D.,Dr.M.R.KARTHIKEYAN M.D, DR .VINOTH M.D,

DR.FREEDA M.D for their guidance and expert advice in carrying out this study.

I am thankful to the Institutional Ethics Committee for their guidance and approval for this study.

My sincere thanks to the statistician, who played an important role during my study.

I am thankful to all my colleagues, family and friends for their moral support, help and advice in carrying out this dissertation.

Last but not the least; I thank all the patients for willingly submitting themselves for this study.

Above all I pay my gratitude to the Lord Almighty for blessing me to complete this work.

INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE, CHENNAI 600 003

EC Reg.No.ECR/270/Inst./TN/2013
Telephone No.044 25305301
Fax: 011 25363970

CERTIFICATE OF APPROVAL

To
Dr.Shiny Priyadarshini.A.
Post Graduate in M.D. (Anaesthesiology)
Inst. of Anaesthesiology and Critical Care
Madras Medical College
Chennai 600 003

Dear Dr.Shiny Priyadarshini.A,

The Institutional Ethics Committee has considered your request and approved your study titled **"PROSPECTIVE RANDOMISED CONTROL DOUBLE BLINDED STUDY COMPARING ULTRASOUND GUIDED TRANSVERSUS ABDOMINIS PLANE BLOCK VS ULTRASOUND GUIDED ILIOINGUINAL BLOCK FOR POSTOPERATIVE ANALGESIA IN CHILDREN UNDERGOING ELECTIVE HERNIA REPAIR SURGERIES IN CHILDREN "- NO. (II) 28032016.**

The following members of Ethics Committee were present in the meeting hold on **22.03.2016** 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.P.Raghumani,MS, Dept.of Surgery,RGGGH,Ch-3	: Member
5.Dr.Baby Vasumathi, Director, Inst. of O&G,Ch-8	: Member
6.Prof.M.Saraswathi,MD.,Director, Inst.of Path,MMC,Ch-3	: Member
7.Prof.Srinivasagalu,Director,Inst.of Int.Med.,MMC,Ch-3	: Member
8.Tmt.J.Rajalakshmi, JAO,MMC, Ch-3	: Lay Person
9.Thiru S.Govindasamy, BA.,BL,High Court,Chennai	: Lawyer
10.Tmt.Arnold Saulina, MA.,MSW.,	:Social Scientist

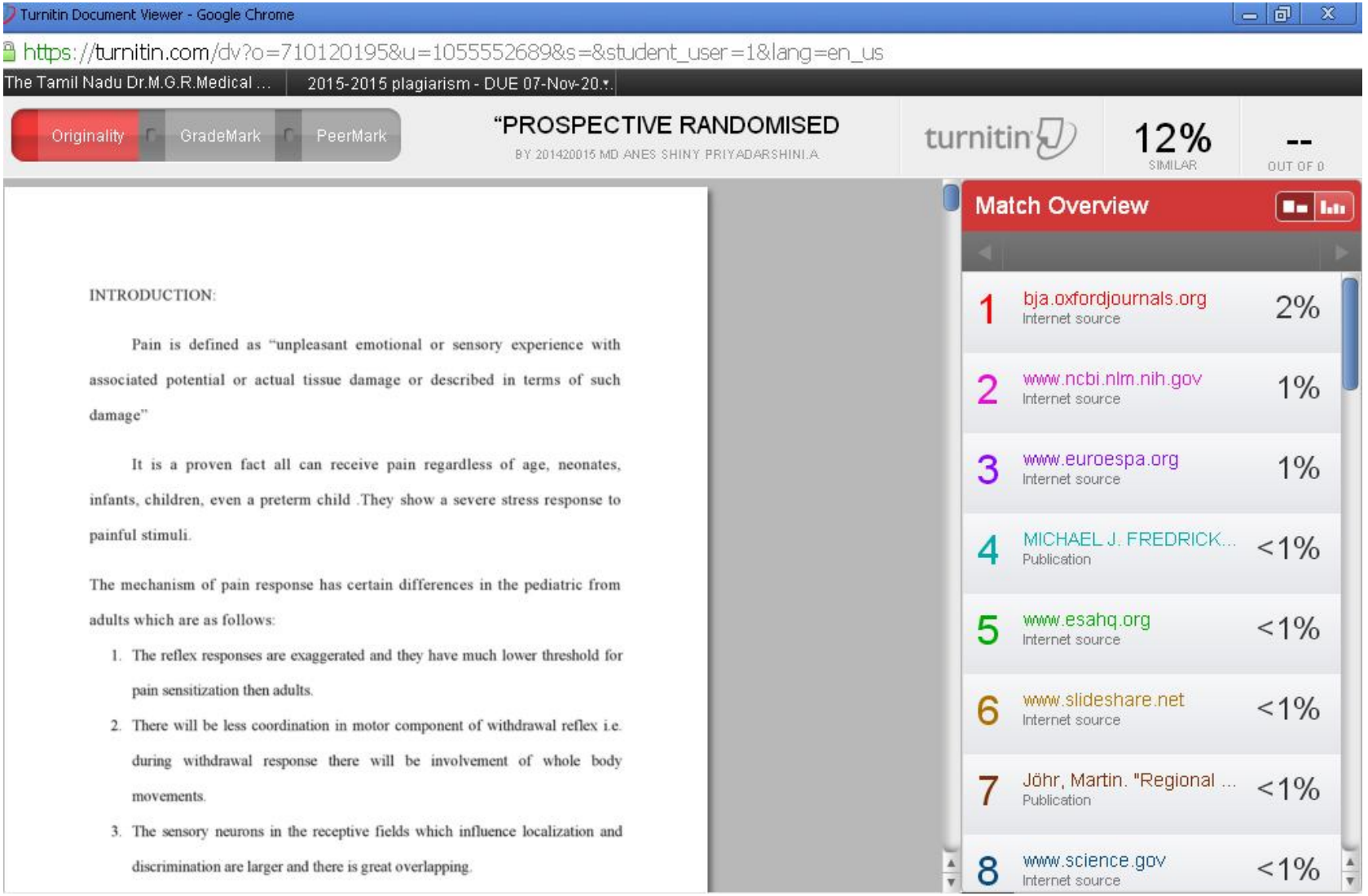
We approve the proposal to be conducted in its presented form.

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.

MADRAS MEDICAL COLLEGE
31 MAR 2016
600 003

Member Secretary – Ethics Committee

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


Turnitin Document Viewer - Google Chrome
https://turnitin.com/dv?o=710120195&u=1055552689&s=&student_user=1&lang=en_us
The Tamil Nadu Dr.M.G.R.Medical ...
2015-2015 plagiarism - DUE 07-Nov-20.
Originality
GradeMark
PeerMark
"PROSPECTIVE RANDOMISED
BY 201420015 MD ANES SHINY PRIYADARSHINI.A
turnitin
12%
SIMILAR
--
OUT OF 0
INTRODUCTION:
Pain is defined as "unpleasant emotional or sensory experience with associated potential or actual tissue damage or described in terms of such damage"
It is a proven fact all can receive pain regardless of age, neonates, infants, children, even a preterm child .They show a severe stress response to painful stimuli.
The mechanism of pain response has certain differences in the pediatric from adults which are as follows:
1. The reflex responses are exaggerated and they have much lower threshold for pain sensitization then adults.
2. There will be less coordination in motor component of withdrawal reflex i.e. during withdrawal response there will be involvement of whole body movements.
3. The sensory neurons in the receptive fields which influence localization and discrimination are larger and there is great overlapping.
Match Overview
1 bja.oxfordjournals.org Internet source 2%
2 www.ncbi.nlm.nih.gov Internet source 1%
3 www.euroespa.org Internet source 1%
4 MICHAEL J. FREDRICK... Publication <1%
5 www.esahq.org Internet source <1%
6 www.slideshare.net Internet source <1%
7 Jöhr, Martin. "Regional ... Publication <1%
8 www.science.gov Internet source <1%

turnitin

Digital Receipt

This receipt acknowledges that Turnitin received your paper. Below you will find the receipt information regarding your submission.

The first page of your submissions is displayed below.

Submission author:	201420015 Md Anes shiny priyadar...
Assignment title:	2015-2015 plagiarism
Submission title:	"PROSPECTIVE RANDOMISED CO...
File name:	new_plagiarism.docx
File size:	886.67K
Page count:	84
Word count:	10,144
Character count:	56,380
Submission date:	27-Sep-2016 12:03AM
Submission ID:	710120195

TABLE OF CONTENTS

AIM

” To compare the efficacy of post operative analgesia between ultrasound guided transversus abdominis plane block and ultrasound guided ilioinguinal nerve block in children undergoing unilateral elective herniotomy”

- **Primary objective**: Duration of analgesia
- **Secondary objectives**: Intraoperative hemodynamics, Post operative hemodynamics

INTRODUCTION

Pain is defined as “unpleasant emotional or sensory experience with associated potential or actual tissue damage or described in terms of such damage”

It is a proven fact all can receive pain regardless of age, neonates, infants, children, even a preterm child .They show a severe stress response to painful stimuli.

The mechanism of pain response has certain differences in the pediatric from adults which are as follows:

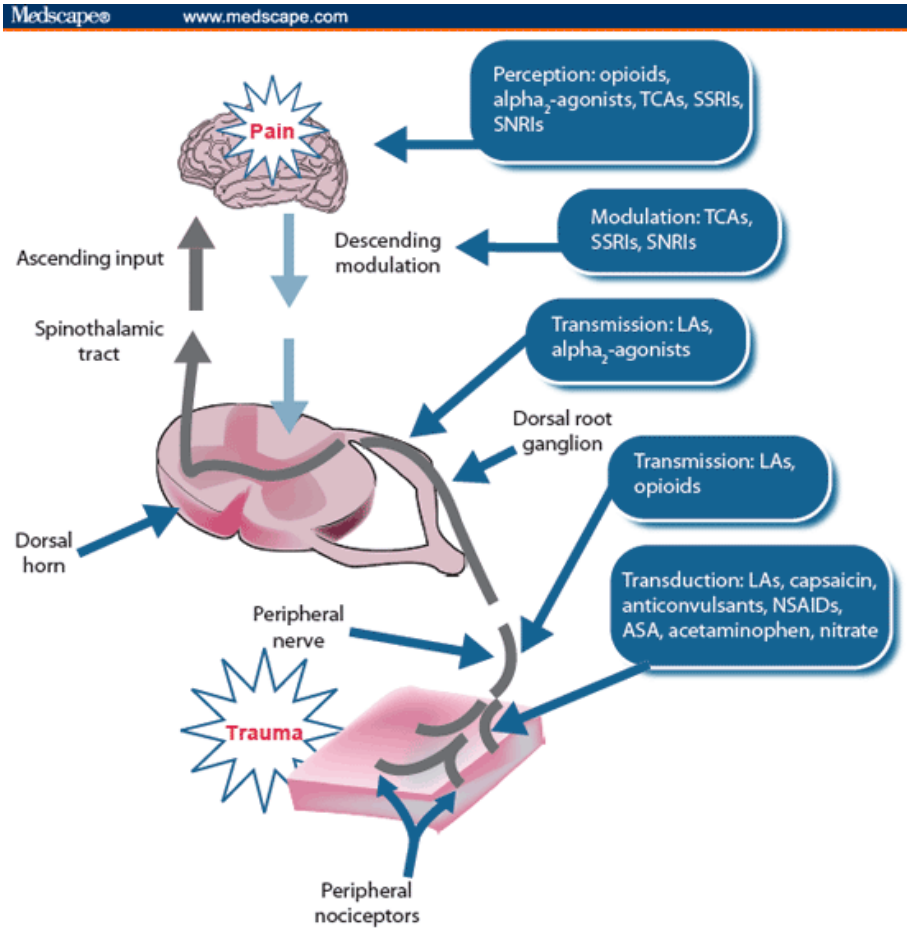
1. The reflex responses are exaggerated and they have much lower threshold for pain sensitization then adults.
2. There will be less coordination in motor component of withdrawal reflex i.e. during withdrawal response there will be involvement of whole body movements.
3. The sensory neurons in the receptive fields which influence localization and discrimination are larger and there is great overlapping.
4. In early life central sensitization is done by ‘ A ’ delta fibers rather than ‘C’ fibers since maturity of this fibers takes place after birth and that too ‘ C ’ fiber much later than ‘A’ fiber.
5. At birth the peripheral inflammatory response is immature.

PAIN PATHWAY:

At the time of injury a local inflammatory response is induced by the noxious stimulus in the periphery i.e. nociceptors get sensitized and there will be primary hyperalgesia.

'A' delta and 'C' fibers conducts this noxious stimulus to CNS which initiates a sequence of events i.e. reflex withdrawal from stimulus, aversive behavior and perception of pain.

The sustained noxious input from 'C' fibers produces a central sensitization which alters sensory processing in spinal cord (neuroplasticity) leading to allodynia and hyperalgesia at the site of injury.



Regional anesthesia and analgesia techniques are commonly used to facilitate pain control during pediatric surgical procedures,

Regional anesthesia provides efficient pain relief and has several advantages over parenteral methods which are as follows

1) Analgesia provided by regional block reduces general anesthesia requirement resulting in :
    1. More rapid recovery
    2. Decreased postoperative opioid requirement
    3. Early return of appetite
    4. Reduced incidence of PONV
    5. Early discharge

2) Regional block avoids undesirable autonomic reflexes like
    1. Laryngospasm
    2. Cardiac dysrhythmias

3) Muscle relaxation is adequate in regional anesthesia-

    Use of muscle relaxant avoided, decreased risk of respiratory insufficiency

4) After delicate surgery immobilization of child is easier because of some residual blockade and adequate pain relief

5) Intra and post-operative bleeding reduced

6) Diminished stress response

7) Greater cardiovascular stability

8) Fewer episodes of Hypoxia

9) Reduced need for postoperative ventilator support

10) Children are free from hypotensive response from Sympathectomy produced by LA

11) REGIONAL ANAESTHESIA is the technique of choice in children with

- Malignant hyperthermia history
- Bronchopulmonary dysplasia.

Amongst the various modalities of regional blocks, peripheral nerve blocks are increasingly more favored than neuraxial blocks. This is due to the lower reported incidence of complications associated with peripheral nerve blocks, and is also in keeping with the increase in laparoscopic and thoracoscopic surgery.Complications from neuraxial block is rare but serious as caudaequina or total spinal so trends are shifted toward peripheral nerve blocks or infiltration block.

Ultrasonography is of immense value in pediatric regional anesthesia. More so with peripheral nerve blocks as - Most nerves are relatively superficial, particularly in small children, and therefore high resolution imaging is possible even with portable ultrasound equipment.

- Direct visualization of the nerve or neuraxial structures, vessels, tendons and bones allows optimal placement of the local anesthetic.

  reduces the risk of intraneuronal, intravascular or, more pertinent in this study, intraperitoneal injection.
- By using real-time imaging, the location of the needle tip within the correct fascial plane could be detected and the spread of the local anesthetic.
- In this way significantly smaller amounts of local anesthetics can be used and clinically effective blocks achieved.

Inguinal hernia repair is a commonly performed day care procedure in children, associated with considerable amount of post-operative pain and discomfort , various forms of regional analgesia are available like caudal epidural block ,ultrasound guided TAP block ,ultrasound guided Ilioinguinal block that provide adequate analgesia for inguinal herniotomy.

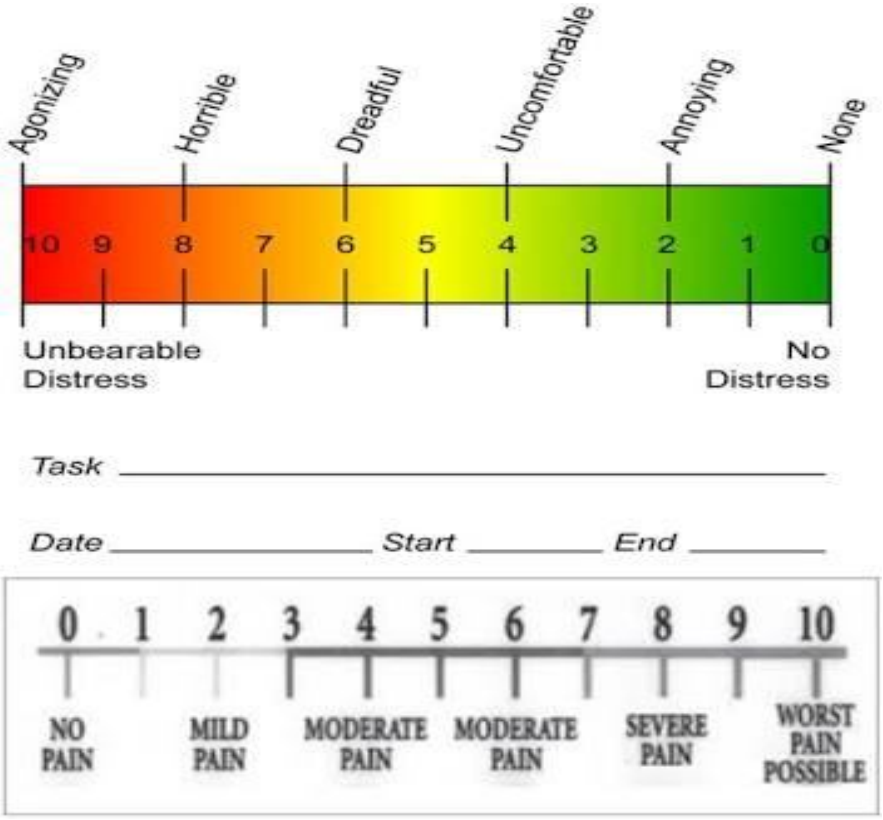
The following study was designed to compare the postoperative analgesic efficacy of two ultrasound based peripheral nerve blocks i.e. TAP block and Ilioinguinal nerve block in children undergoing inguinal hernia surgery.

PAIN ASSESMENT IN CHILDREN:

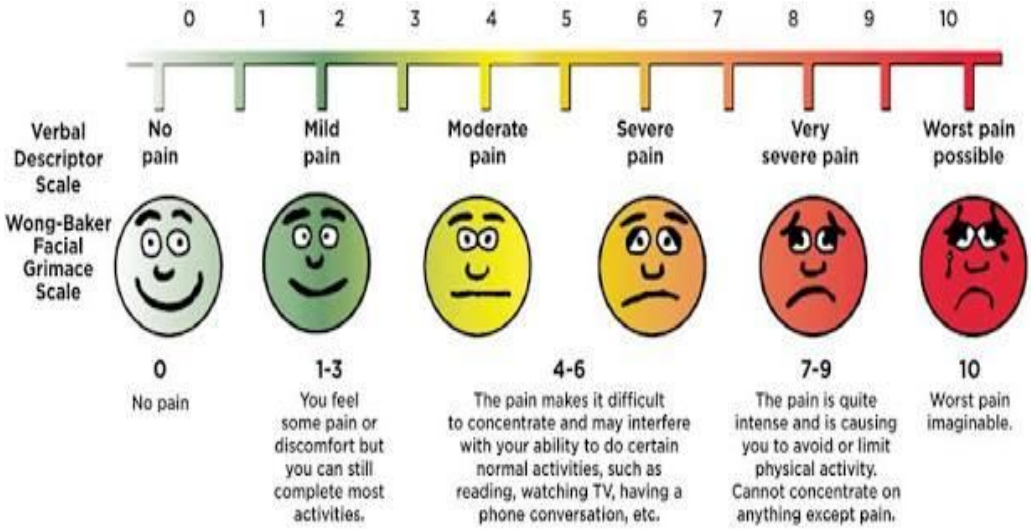
The vast range of physiological and behavioral responses, cognitive abilities, physiological development from the period between the term neonate and adolescent poses enormous problems for valid and reliable measurement.

1) **Self report measures:**

- VAS –VISUAL ANALOG SCALE



- FACES



Recommended Age: Children as young as 3 years.

2) OBSERVATIONAL BEHAVIOURAL MEASURMENTS

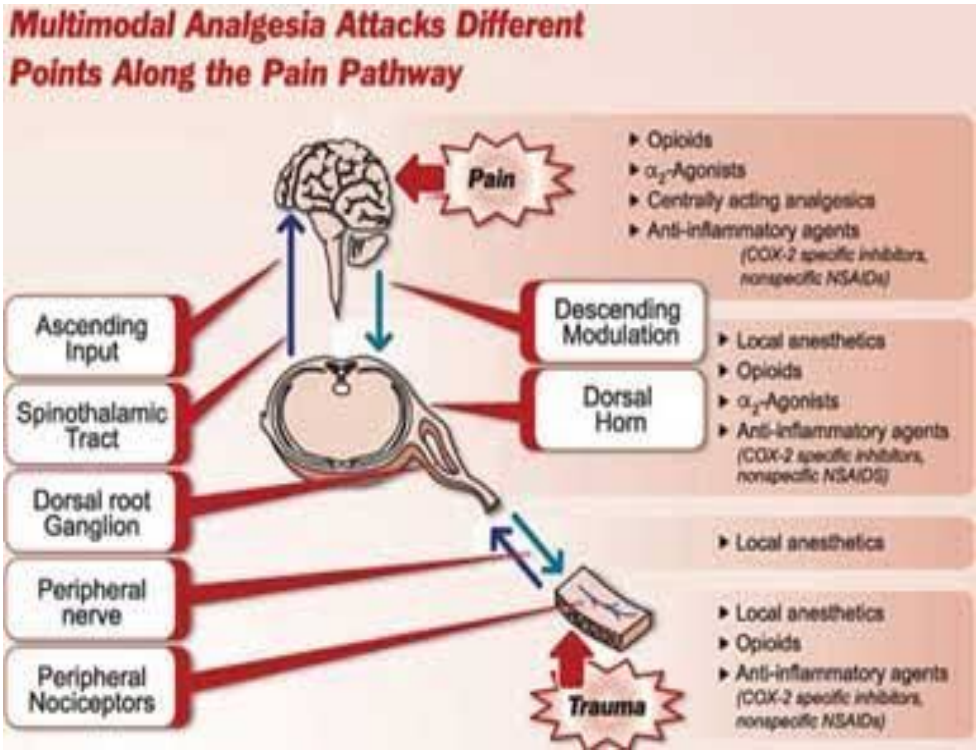
- FLACC- Faces, Legs ,Activity, Cry and Consolability
- CHEOPS-Children Hospital Of Eastern Ontario Pain Scale
- CRIES-Crying Requires Increased Oxygen administration

  Increased vital signs Expression Sleeplessness
- COMFORT
- OBJECTIVE PAIN SCORE

FLACC behavioural pain score: Total 0 to 10

CRITERIA	SCORE 0	SCORE 1	SCORE 2
FACE	No particular Expression Or smile	Occasional grimace or Frown, withdrawn, Uninterested	Frequent to constant Quivering chin, clenched jaw
LEGS	Normal position Or Relaxed	Uneasy, restless, Tense	Kicking or legs drawn up
CRY	No cry(awake Or sleep)	Moans or Whimpers; Occasional complaint	Crying steadily, screams or sobs frequent complaints
ACTIVITY	Lying quietly, Normal position Moves easily	Squirming, shifting Back and forth tense	Arched, rigid, jerking
CONSOLABILITY	Content relaxed	Reassured by Occasional Touching, Hugging or Being talked To distractable	Difficult to console or comfort

Drugs acting at various sites of pain pathway:



- peripheral level –local anesthetics , NSAIDS , opioids
- Spinal cord-opioids ,alpha 2 agonist , local anesthetics
- Cortical level –opioids

TAP BLOCK

Transversus abdominis plane block is a regional anaesthesia technique that provides analgesia to the parietal peritoneum as well as the skin and muscles of the anterior abdominal wall.

HISTORY

- Tap block was first described by RAFI[18] in 2001.
- He approached transversus abdominis plane by utilizing surface anatomical landmarks, the lumbar triangle of Petit.
- Lumbar triangle of petit enclosed medially by external oblique, posteriorly by lattismus dorsi and laterally by the iliac crest.
- In 2004, TAP blocks were presented in cadavers and in healthy volunteers at scientific meeting and American Society of Anaesthetists by Mc Donell et al[12].
- An ultrasound-guided approach was first described in 2007 by Hebbard et al[9]. The authors applied a transversely orientated ultrasound probe to the anterolateral abdominal wall where the three muscle layers are most distinct. After identification of the TAP between the internal oblique and transversus abdominis muscles, the probe was moved posterolaterally to lie across the midaxillary line just superior to the iliac crest (i.e., over the

triangle of Petit). The block needle was then introduced anteriorly and advanced in an in-plane approach Real-time ultrasonography facilitates easy needle visualization as it approaches and reaches the target fascial plane

INDICATIONS:

The Transversus Abdominis Plane block provides intraoperative and postoperative analgesia foe upper and lower abdominal incisions,where an epidural is contraindicated or considered too invasive for the minor nature of the surgery. TAP block has been described in paediatric patients for the following surgeries:

-Colorectal surgery e.g colostomy formation.

-Iliac Crest bone harvest site

-Inguinal hernia repair

-Laparoscopic and open Appendectomy

-Laparoscopic cholecystectomy

Laparoscopic nephrectomy

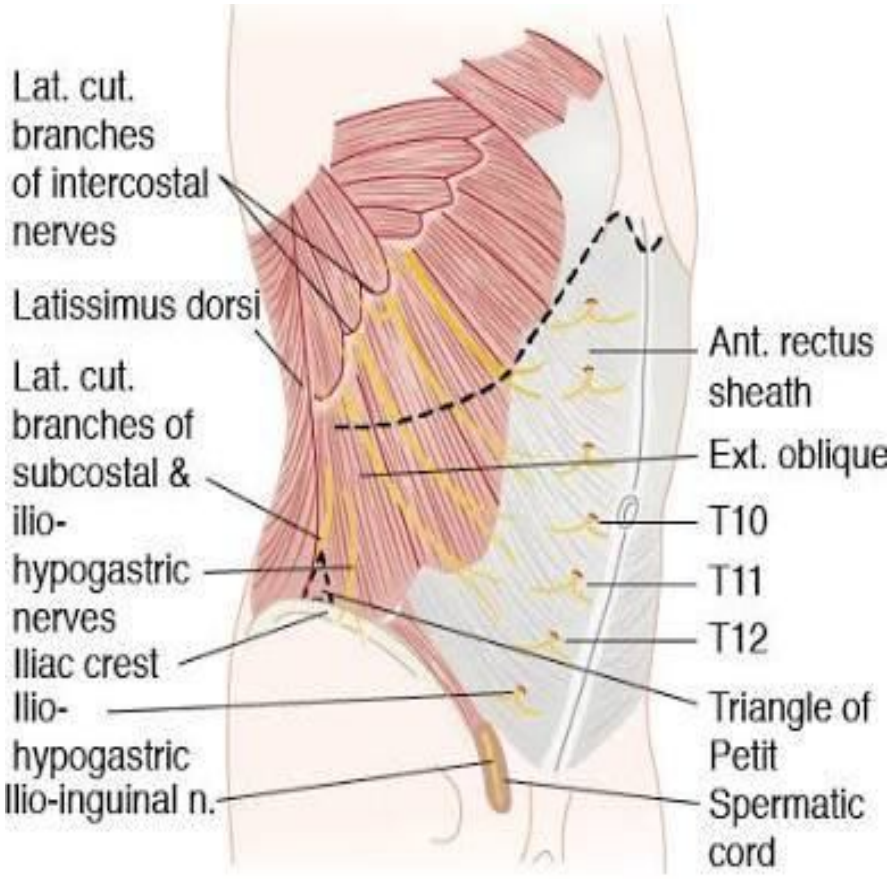
-Renal transplant recipients

Catheter based techniques are also possible.

ANATOMY:

Lateral abdominal wall musculature has three layers.

-From superficial to deep they are external oblique, the internal oblique and the transversusabdominis muscle.



- Transversusabdominis plane is the fascial layer between the internal oblique and the transverses abdominis muscles.

- ❖ Anterior rami of thoracolumbar nerves that innervate the anterior abdominal wall pass through this plane as small, but well defined neuromuscular bundles.

Nerve supply of anterior abdominal wall

The lower 6 thoracic nerves (T6-T12) and the first lumbar (4) supply sensation to the abdominal wall.

Thoracic Nerves (T6-T11)

The anterior division and nerves from T6-T11 travel along their relevant intercostals space, before passing under the costal cartilages. They enter into the facial plane between transversusabdominis and internal oblique.

They continue on the pierce the rectus abdominis muscle terminating as the anterior cutaneous branches supplying sensation to skin and the anterior abdominal wall.

The Thoracic Nerve (T6-T11) gives off lateral cutaneous branches, half way along their course, piercing the external oblique muscle to supply sensation to skin of the lateral abdomen wall.

Thoracic Nerve (T12)

The anterior division of the nerve from T12 is a large nerve.

It runs anteriorly along the inferior border and the 12^{th} nerve and passes under lumbocostal arch to run along with other lower intercostals nerve between transversusabdominis muscle and the internal oblique muscle.

The T12 nerves gives a communicating branch to L1 nerves as part of upper part of lumbar plexus.

The lateral cutaneous branch of T12 supplies the skin over the upper gluteal region.

The ilioinguinal and iliohypogastric nerves (T12/L1).

The iliohypogastric and ilioinguinal nerves of the lumbar plexus both enter the transverse abdominis plane near to the iliac crest. The iliohypogastric divides into anterior cutaneous branch, supplying the skin over the hypogastrium, and a lateral cutaneous branch supplying skin over the gluteal region.

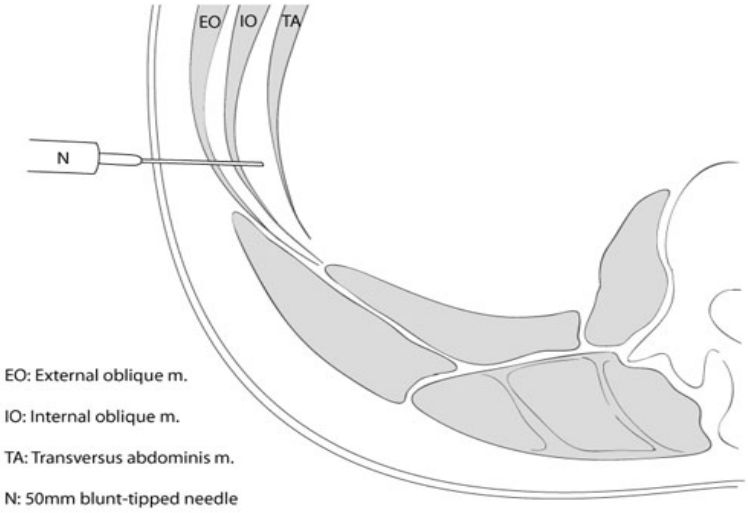
The ilioinguinal nerves supplies sensation to the skin of the upper thigh base of penis and scrotum as it travels with in inguinal canal.

TECHNIQUE

Ultrasound Guided Approach

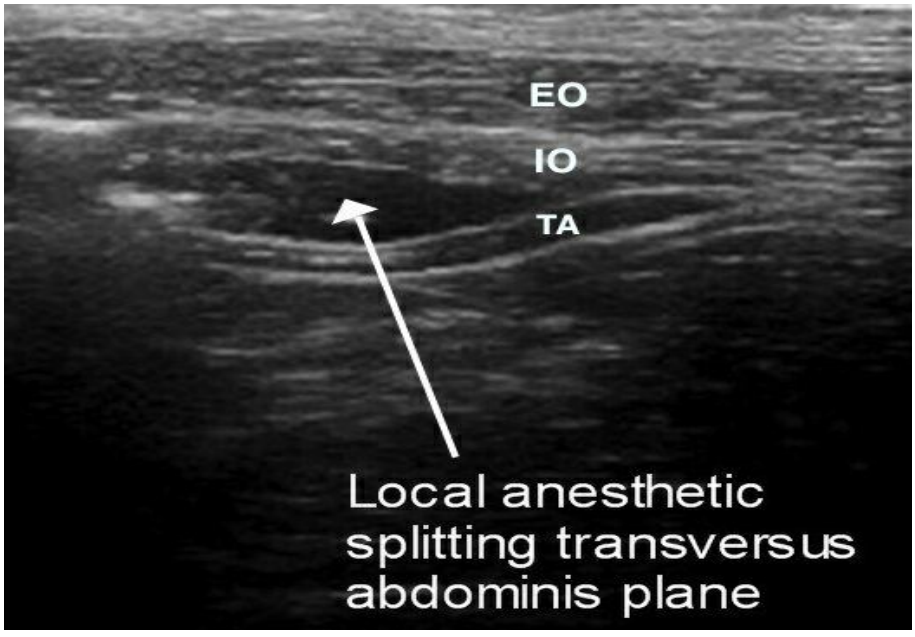
An ultrasound guided approach was first described in 2007 by Hebbard et al[9]

The ultrasound probe is applied transversely to the anterolateral abdominal wall, where the three muscles layers are most distinct.



After identification of transverses abdominis plane between internal oblique and transversusabdominis muscle, the block needle was then introduced anteriorly and advanced in an ‘in plane’ approach

A hypoechoic layer created by injection of local anaesthetics, is easily visualized



ILIOINGUINAL BLOCK

INDICATIONS:

The ilioinguinal/iliohypogastric nerve block provides intraoperative and postoperative analgesia for inguinal surgery.it is useful for providing analgesia for:

-Inguinal hernia repair

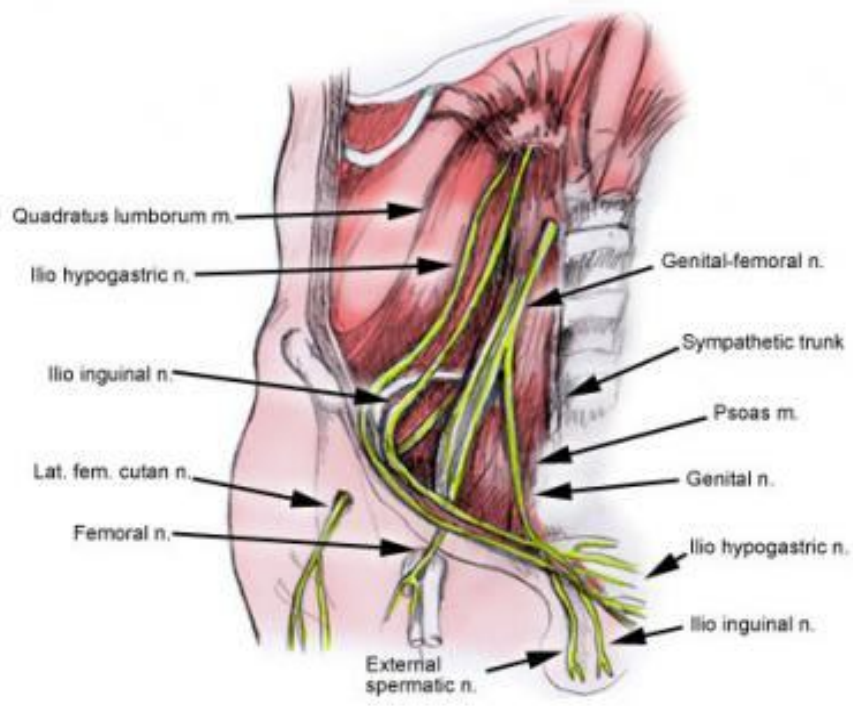
-Orchidopexy

-Hydrocoele repair

Anatomy:

The ilioinguinal and iliohypogastric nerves form part of the lumbar plexus.

- They are branches of the primary ventral ramus of L1 and receive a branch from the 12th spinal nerve.
- The L1 primary ventral ramus enters the upper part of psoas major where it branches into the ilioinguinal and iliohypogastric nerves.
- The nerves emerge at the lateral border of psoas major and pass anterior to quadratuslumborum. They pierce the lumbar fascia at the lateral border of quadratuslumborum and run in the plane between the internal oblique muscle and the transverses abdominis muscles



The iliohypogastric nerve runs superior to the ilioinguinal nerve.

- The iliohypogastric nerve divides into a lateral cutaneous branch and a medial (or anterior) cutaneous branch at the level of the iliac crest. The lateral cutaneous branch pierces the internal and external oblique muscles immediately above the iliac crest to supply skin of the gluteal region. The medial cutaneous branch pierces the internal oblique muscle and external oblique aponeurosis to supply the skin above the inguinal ligament and the suprapubic region (i.e. the hypogastric region).

- The ilioinguinal nerve pierces the internal and external oblique muscle to reach the lower border of the spermatic cord or round ligament of the uterus and enters the inguinal canal. It supplies sensation to the skin of upper medial thigh

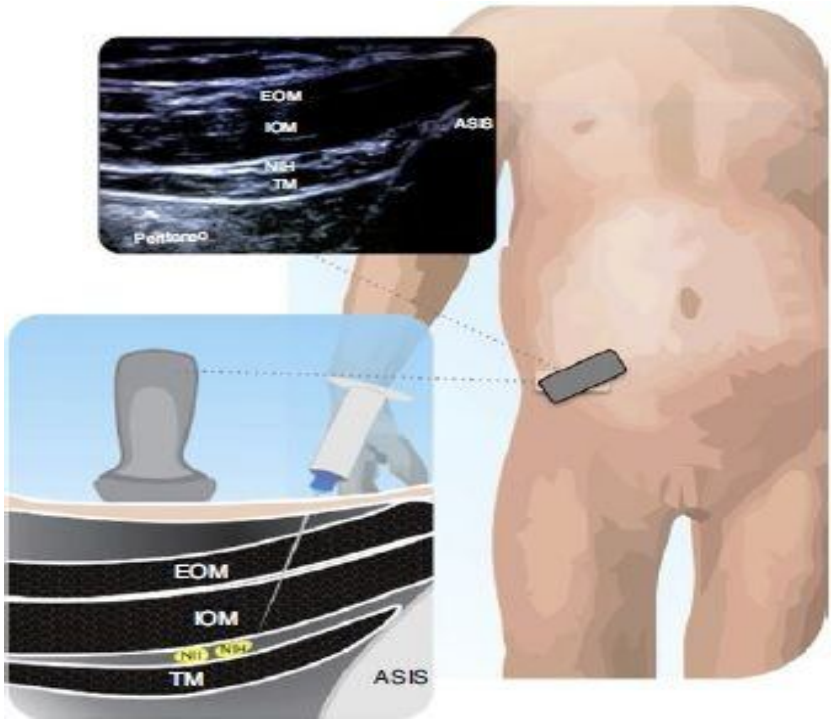
and the upper part of the scrotum and root of the penis or the skin over labium majus and the mons pubis.

Technique

Ultrasound-guided

- The patient is placed in a supine position.

  Using a high frequency linear probe (10Mhz or greater). placed on the anterior abdominal wall along the line joining the anterior superior iliac spine (ASIS) and the umbilicus such that the bony shadow from



the ASIS is visible on one side of the image on the screen. The peritoneum, transverses abdominis muscle, and internal oblique muscle are identified. The

external oblique muscle may not be visible as a distinct muscle layer at this level. Sliding the probe in a cephalad direction up over the iliac crest, while maintaining the orientation of the probe along a line to the umbilicus, will bring all three muscles into view as three distinct layers.

The ilioinguinal and iliohypogastric nerves are seen in close proximity to one another as two small round hypoechoic structures with a hyperechoicborder. They lie in the plane between the internal oblique muscle and the transversusabdominis muscle close to the ASIS

block needle is inserted in plane from medial to lateral and local anaesthetic is deposited around the nerves in the transversusabdominis plane.

Landmark technique

The needle insertion point should is approximately 2.5 mm (range 1.0 – 4.9mm) medial to the ASIS on a line drawn between the ASIS and the umbilicus .A short bevelled needle is used, the needle is inserted just through the skin into the subcutaneous tissues and then advanced slowly until a fascial click or loss of resistance is felt. This occurs as the external aponeurosis is pierced. The local anaesthetic is injected at this depth, between the external and internal oblique.

Specific Complications

- Block failure (up to 30% is some series using the landmark technique) Colon puncture, small bowel puncture, pelvic retroperitoneal haematoma, bowel haematoma,
- Transient femoral nerve palsy with transient quadriceps paresis. The latter complication has an incidence of up to 6% with the landmark technique . The quadriceps paresis resolves within hours.

PHARMACOLOGY OF BUPIVACANE

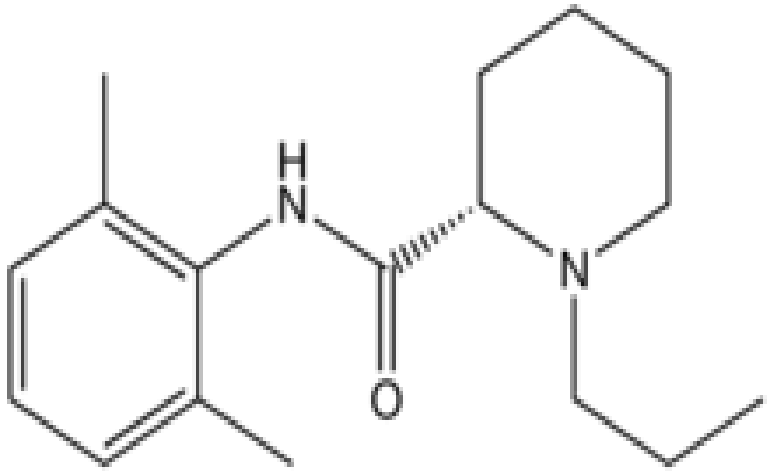
Bupivacaine is an amide local anaesthesia agent. It was first synthesized by Ekenstam in 1957 and was first used clinically by widmon and Telimo in 1963 .It belongs to n-alkyl substituted pipecholyixylidines. It is produced as racemic mixture containing both S and R in equal proportion. It is supplied as a hydrochloride salt**.**

Developmental pharmacology

Lower concentrations of local anaesthetics that are used in adults are clinically effective in children; the onset of a block occurs more rapidly but the duration is shorter. However, with the exception of caudal anaesthesia, no scientific data exist on the best dose and concentration for specific regional blocks in different age groups.

Pharmacokinetics in infants, local anaesthetics have a greater volume of distribution, a lower clearance, and a higher free non-protein-bound fraction. The larger volume of distribution counteracts the increased potential for toxicity caused by the larger free non-protein-bound fraction. This means that the amount used for single-shot procedures in terms of 1 / ml kg can be the same in children as for adults. For a continuous infusion the situation in the developing organism is much more complex; the maturation of the metabolism has to be taken into account. CYP1A2 which metabolises Ropivacaine is immature before 4 to 7 years of age, whereas CYP3A4/7, which metabolises levobupivacaine, has full enzymatic capacity by the age of 1 year. Unfortunately, no well designed study compares the two local anaesthetic molecules.

CHEMICAL STRUCTURE:



- Bupivacaine has a butyl group on the piperidine nitrogen atom of the molecule.
- It is a long acting local anaesthesia drug with high anaesthesia potency.
- It is more lipid soluble, highly protein bound and greater intrinsic potency
- It crosses the placenta and blood brain barrier.

PHYSIO-CHEMICAL PROFILE:

- Molecular weight-288
- pka-8.l
- Plasma protein binding-95%
- Partition coefficient -28(lipid solubility)

- Clearance-8.31/min
- Elimination t 1/2- 210min
- Elimination tl/2 in neonates & young infants-480-72Omin
- Umbilical vein-maternal arterial concentration ratio- 0.32

PHARMACOLOGICAL PROPERTIES:

- Onset - Moderate
- Potency - 4 times more potent than lignocaine
- Duration - Long

MECHANISM OF ACTION:

Like all local anaesthetics it inhibits Na channels. It decreases or prevents large transient increase in permeability of the cell membranes to Na ions that causes depolarization of the membrane and thereby blocks nerve conduction. The permeability of resting nerve membrane to potassium ions as well as sodium ions are reduced and hence got a stabilizing action on all excitable membranes.

PHARMACOKINETICS:

- Rapidly absorbed from the site of injection
- Peak systemic concentration reached 5-30 min after administration
- Duration of action-360 to 720 minutes
- Dose dependent first pass pulmonary extraction occurs
- Metabolism in liver- dealkylation to pipecoloxylidine, aromatic hydroxylation
- Excretion-only 5% as unchanged drug and rest as metabolites

PHARMACODYNAMICS

- In neonates and infants, nerve fibres are thinner, they have less myelin and the nodes of Ranvier are located closer to each other. Therefore, a smaller sleeve of local anaesthetic solution is sufficient to block three nodes of Ranvier or more, a prerequisite for the blockade of saltatory conduction. Nerve fibres are more susceptible to the effects of local anaesthetics, and a shift of the dose–response curve to the left has been shown in young rabbits

PREPARATION:

- O.25%,0.5% solutions in 10, 20ml vials respectively
- 0.5%(5mg/ml) bupivacaine with 80mg dextrose(to increase baricity)in 4ml ampoules for subarachnoid injection(baricity 1.0207)

MAXIMAL DOSE:

- 2.5mg/kg body weight and strength used is 0.25-0.75% with or without adrenaline. Adrenaline causes mild intensification and modest prolongation of blockade, and also reduces its toxicity.

EFFECTS:

- Local-nerve blockade
- Regional-pain, temperature, touch, motor power and vasomotor tone are blocked
- Systemic effects-due to systemic absorption or accidental i.v. administration
- It is highly potent (4 times) more than lignocaine. Its duration of action longer.
- It produces differential sensory/motor blockade

ADVERSE EFFECTS:

- Cardio Vascular System: Effect is dose related
  - Depresses automaticity and contractility of heart
  - It decreases rapid phase of depolarization (v max) in purkinje fibers & ventricular muscle causes prolonged PR and QT interval

- Re-entrant phenomenon and ventricular arrythymias can occur
- Slow rate of recovery from use dependent blockade (Na
- channels are blocked in fast in slow out manner)
- Results mostly from high lipid solubility
- R-enantiomer is more toxic than S-enantiomer
- Pregnancy increases cardiotoxic effects of bupivacaine

❖ Central Nervous System : Toxicity produces

- Circumoral numbness, metallic taste
- Light headedness, dizziness, tinnitus
- Confusion, slurred speech

Convulsions

ALLERGIC REACTION:

Due to preservative methyl paraben

USES:

❖ Central neuraxial blocks

❖ Peripheral nerve blockade

- For local infiltration subcutaneously

CONTRAINDICATION:

- Known hypersensitivity to amide local anaesthetics
- Intravenous regional anaesthesia

REVIEW OF LITERATURE

1. WILSCHKE,BOSENBERG ET AL BJA 2005[24] in that study the use of ultrasound for ilioinguinal nerve block with the conventional ilioinguinal/iliohypogastric nerve block technique was compared. One hundred children (age range, 1 month–8 years) scheduled for inguinal herniarepair, orchidopexy or hydrocele repair were included in the study. Following induction of general anaesthesia, the children received an ilioinguinal/iliohypogastric block performed either under ultrasound guidance using levobupivacaine 0.25% until both nerves were surrounded by the localanaesthetic or by the conventional 'fascial click' method using levobupivacaine 0.25% (0.3 ml kg_1). Additional intra- and postoperative analgesic requirements were recorded. Ultrasonographic visualization of the ilioinguinal/iliohypogastric nerves was possible in all cases. The amount of local anaesthetic used in the ultrasound group was significantly lower than in the 'fascial click' group (0.19 (SD 0.05) ml kg vs 0.3 ml kg_1, P<0.0001). During the intraoperative period 4% of the children in the ultrasound group received additional analgesics compared with 26% in the fascial click group (P=0.004). Only three children (6%) in the ultrasound-guided group needed postoperative rectal acetaminophen compared with 20 children (40%) in the fascial click group (P<0.0001).

Ultrasound-guided ilioinguinal / iliohypogastric nerve blocks can be achieved with significantly smaller volumes of local anaesthetics. The intra- and postoperative requirements for additional analgesia are significantly lower than with the conventional method.

2. FREDRICKSON MJ,PAINE C ET AL .2010 PEDIATRIC ANESTHESIOLOGY[8] they compared ultrasound guided TAP block with ultrasound guided ilioinguinal/iliohypogastric nerve block in pediatric patients undergoing inguinal surgery.40 children were randomly assigned to recieve an ultra sound-guided block or ilioinguinal block after induction of general anesthesia .patients were assessed in the recovery room for 30 min to 2 hrs and at 24 hrs for age appropriate numerical pain score ,analgesic consumption and found that recovery room pain was more frequent and ibuprofen use was higher in the TAP block group and concluded that following pediatric inguinal surgery Ilioinguinal block provided more effective analgesia than tap block.

3. D.J. SANDEMAN et al BJA 2011[6] They did a study on 93 children aged 7 to 16 undergoing laparoscopic appendectomy.They were randomized in to two groups receiving TAP block(Group A) and another group not receiving TAP block(Group B). All patients in group B were given port site infiltration with ropivacine and were prescribed I.V Patient Controlled Analgesia with Morphine and oral paracetomal for postoperative pain

relief. They observed proportion of patients receiving >200 microgram Morphine. They observed a statistical difference in pain scores between two groups. They concluded the study that TAP Block increases the analgesia time by 14min on an average.

4. ABDELLATIF ET AL.2012[1] In that study they compared ultrasound guided ilioinguinal/iliohypogastric nerve block with caudal block for postoperative analgesia in children undergoing unilateral groin surgery. It was a prospective randomized control trial where 50 children aged 1-6 yrs were randomized into two groups after induction of general anesthesia,group b received ultrasound guided ilioinguinal nerve block and group c received a caudal blockade with 0.25% bupivacaine and they found that the time to first rescue analgesia was longer in group B than in group C and it was concluded that ultrasound guided ilioinguinal nerve blocks is an ideal post operative analgesic for unilateral groin surgery in children, particularly hernia repairs, and it is as effective as caudal block with a lower volume of local anesthetic.

5. DALIA M. FAWY et al 2013[7] They compared the analgesic efficacy of Transverse Abdominis Plan block vs Caudal block for postoperative pain relief in children undergoing Lower abdominal surgeries. They selected 39 patients and divided them in to two groups. Group A with 20 patients received ultrasound guided TAP BLOCK using 0.3 ml/kg of 0.25 %

Bupivacine. Group B with 19 patients received CAUDAL BLOCK using 1.25 ml /kg of 0.25 % Bupivacine. All patients after induction with sevoflurane with oxygen anaesthesia, were divided randomly in to two groups and given Caudal and TAP block respectively. Children were monitored for intra operative and post operative vitals like heart rate, respiratory rate, blood pressure and oxygen saturation. Post operative pain relief assessed by FLACC pain score. The duration of analgesia and the total doses of rescue analgesia in first 24 hours were compared in all cases. The child with a pain score of >3 received i.v aceteminophen in a dose related body weight basis. There was a statistically significant difference between two groups. The time for first rescue analgesia was longer in TAP block group. They also observed that there is no significant difference between two groups with respect to intra operative hemodynamic variables.

6. SAHIN L,SAHIN ETAL 2013 EJA[18] They evaluated the analgesic efficacy of a TAP block (US guided) using 0.5 ml /kg levobupivacaine 0.25% in comparison to wound infiltration with 0.2 ml/kg during the first 24 hrs after surgery in 57 children (2-8) years undergoing hernisrepair.The mean time to first analgesic was significantly longer in the TAP block group than in the infiltration group(17+-6.8 hrsvs 4.7 +-1.6 hrs) and 45% of the patients in the TAP block group did not require an analgesic with 24 hrs.

7. MAHMOUD HASSAN, MOHAMED, et al. ASJA 2014[10] This study aimed to compare US-guided ilioinguinal / iliohypogastric (II/IH) nerve

block and US guided transverses abdominis plane (TAP) block for pediatric unilateral inguinal herniorraphy. Fifty children scheduled to undergo unilateral herniorraphy were included in the study.after induction of general anesthesia they were allocated into two groups group A which received USG ilioinguinal nerve block using levobupivacaine 0.25% 0.2 ml/kg and group B received USG TaP block. Time to first rescue analgesia, pain scores(FLACC).the number of children who required postoperative analgesia were recorded.

They found that the time to first rescue analgesia was longer and the duration of analgesia was more stable in the group that received ilioinguinal block as compared with group which received TAP block. The total number of patients who required paracetamol as a rescue analgesic was 33.3% compared to group B 60.9% .they concluded that ultrasound guided nerve block provided longer and more efficient postoperative analgesia compared with tap block

8. AHAMED M.FARIED et al : EJA 2014[2] In this study they compared the analgesic efficacy of Ultrasound guided TAP block vsIlioinguinal nerve block.60 children undergoing unilateral lower abdominal surgeries were randomized in to two groups and were allocated to receive USG guided TAP block and Ilioinguinal nerve block respectively. Group A received 0.5 ml / kg of 0.25% bupivacine and group B received 0.1 ml / kg of 0.25 % bupivacine. Postoperative pain assessed by using Children Hospital Eastern

Ontario Pain Scale (CHEOPS) scoring system .Time for first dose of rescue analgesia and number of doses of rescue analgesia were noted.

The average pain score during hospital stay between the two groups showed no statistical significance except at 240 minutes after surgery, it was significantly lower in the TAP block group. However the author did not find any significant difference in the rescue analgesic requirements between the two groups. Hence the author concluded TAP block is an regional anaesthesia technique that provided post operative pain relief for longer duration as compared to ilioinguinal nerve block.

9. WAFA MOHAMED AL SADEK et al:Egyptianjournal of anesthesiology July 2014, Pages 273–278[26] USG Guided TAP block vs USG guided caudal block for pain relief in children undergoing Lower abdominal surgery. They selected 60 patients randomly and divided them in to 3 groups.

Group A - Received TAP Block under USG Guidance.

Group B - Received Caudal Block under USG Guidance.

Group C – Received conventional analgesia.

Intra operative and Postoperative hemodynamics were observed in each group .The analgesic efficacy in each group is compared using Children's Hospital Eastern Ontario Pain Scale (CHEOPS) Scoring system and Objective Pain Score. Postoperative analgesia requirement was also noted in each group.

The results of this study was,the total intraoperative fentanyl dose was significantly lower in TAP block group. Postoperatively ,the time to first rescue analgesic was significantly longer in the TAP block group and pain scores were significantly lower in the TAPblock group.

10. M SEYEDJAZI, SHEIKHZADEH 2014 African Journal of Pediatrics[13] They compared the analgesic effects of caudal and ilioinguinal/iliohypogastric nerve block using bupivacaine-clonidine performed in children undergoing hernia repair.67 patienta of ASA I and II between 2-7 years were randomized into two groups. Group c received caudal block with1ml/kg 0.25% bupivacaine and 1 microgram/kg clonidine and group I received ilioinguinal nerve block with 0.3 ml/kg bupivacaine 0.25% and 1 microgram /kg clonidine.the results were in group c.they found that both techniques were effective in reducing pain and there were no statistically differences between the two groups with regard to the quality and duration of postoperative analgesia
11. AHMED RAMZY SHABHAN et al: Egyptian Journal of Anesthesiology july 2014[3] In this study they selected 44 children of age group 4 to 16 years, undergoing lower abdominal surgery .They were randomly divided in to two groups, 22 each .Group A received TAP block with 0.4 ml / kg of 0.25 % Bupivacaine .Group B received Local anaesthesia infiltration . Two groups were compared on the basis of FACES pain score .Mean time to 1st analgesic requirement and number of doses of analgesic requirement was

also calculated. They concluded the study that, FACES pain score was significantly lower in TAP block group. Also ,Mean time to 1st analgesic requirement is more in TAP block group. The number of doses of analgesic was significantly lower in TAP group.

12. PALETI SOPHIA et al JEMDS JULY 2014[16] 50 Children of ASA PS 1 and 2 who undergoing lower abdominal surgeries were randomized in to group A and B of 25 each. All patients received general anaesthesia standard monitoring. In group A TAP block was given with 2.5 mg /kg of 0.5 % Ropivacine. In Group B, standard systemic analgesia was given. In addition both the group received i.vparacetamol 15 mg /kg immediately after completion of surgery. Intra operative hemodynamics were monitored in both groups. Postoperative pain in both the groups were assessed using Visual Analogue Score, 4 Point Sedation Scale and PONV using Numerical Rank Score. Assessments were made immediately after surgery, 1hr, 2hr, 4hr, 6hr and 24 hr after surgery. If post operative pain score is >3, Tramadol 1 mg /kg was given as rescue analgesia. Time to 1st dose of rescue analgesia, total tramadol dose and post operative VAS score were analysed. The mean time for first rescue analgesia was 527.25 in the TAP block group. The mean VAS scores were decreased significantly in the first 24 hrs compared to the control

group. The incidence of PONV was also decreased in the TAP block group by 50% compared to the control.

13. N KANOJIA S AHUJA ET AL 2015 IJSR[15] This study aimed to evaluate TAP block and caudal block for duration and quality of analgesia postoperatively in children. 60 children aged 1- 12 years were randomly allotted into 2 groups to receive either USG TAP block with 0.3ml/kg of 0.2% ropivacaine or caudal block with 1ml/kg of 0.2% Ropivacaine after induction of anesthesia. Parameters observed included duration of analgesia by modified VAS scale, total analgesic requirement in 24 hours, quality of analgesia and adverse effects Mean VAS scores were lower in both the groups for first 3-4 hours postoperatively. Time to rescue analgesia in group TAP was 7.41 ± 0.78 hours whereas in group Caudal was 5.07 ± 0.69 hours and this difference was statistically significant. The difference was not statistically significant for total analgesic requirement between the two groups and they concluded that duration of analgesia was significantly longer in children who received TAP block as compared to caudal block and it is a good alternative for providing postoperative analgesia.

14. A REVIEW OF REGIONAL ANESTHESIA IN NEONATES INFANTA AND CHILDREN -EUROPEAN JOURNAL OF ANESTHESIOLOGY 2015[17] "With ultrasound guided ilio-inguinal block the typical complications of a landmark-based technique such as femoral nerve block and intestinal puncture can be avoided. Finally, the ilio-inguinal nerve

block scores better than a TAP-block for inguinal hernia repair. A volume of 0.1 to 0.3 ml kg is often used; however, in children, the clinical duration as well as the optimal volume is largely unknown".

15. SURESH S,TAYLOR,OLIEVIERA ET AL PEDIATRIC ANESTHESIOLOGY 2015[21] They studied the dose effect of local anesthetics on analgesic outcomes for the transversusabdominis plane (TAP) block in children: a randomized, double-blinded, clinical trial.They evaluated the effect of two escalating local anesthetic doses on postsurgical analgesic outcomes in children receiving a TAP block. Children (<8 years) were randomized to one of the two intervention groups: TAP block with bupivacaine at a dose of 2.5 mg · kg(-1) or 1.25 mg · kg(-1). Analgesic outcomes included pain scores in the postanesthesia care unit (PACU), time to analgesic requirement and total number of analgesic requirement .Thirty-six patients were recruited in the study. Pain scores in PACU were not different between study groups. The total number of analgesic dosage required in 24 h after surgery was higher in the lower dose group, median (IQR) of 4 (3 to 5) compared to 2.5 (1.5 to 3) in the greater dose group, P = 0.03. There was a clinically but not statistically significant difference in the time to first analgesic requirement in the 2.5 mg · kg(-1) group, median (IQR) of 248 (130 to 367) minutes compared to 146 (95 to 261) minutes in the 1.25 mg · kg(-1) dose group, P = 0.15.The use of higher local anesthetic doses for the TAP block in children does not

provide benefits on early pain scores but seems to improve analgesic duration and decrease the need for additional analgesics over 24 h after surgery. The use of higher, but yet safe, local anesthetic dosages for TAP blocks is a viable strategy to improve analgesia in children.

16. SETHI N,PANT D, et al JOURNAL OF CLINICAL ANESTHESIA 2016[17] this study to compare the efficacy of caudal epidural block (CEB) vs ultrasonography-guided transversusabdominis plane (TAP) block for providing postoperative pain relief in children scheduled for lower abdominal surgery. Whereas the primary objective was to compare the duration of postoperative analgesia, the secondary objectives included comparative assessment (TAP vs CEB) of quality of pain relief in the first 24hours postoperatively and rescue analgesia requirements.Eighty-children, aged 2-6years, of American Society of Anesthesiologists physical status I/II scheduled to undergo unilaterallower abdominal surgery under general anesthesia children were randomly allocated to receive under general anesthesia either CEB (group C, 0.75 mL/kg of 0.25% bupivacaine) or ultrasonography-guided administration of TAP block (group T, 0.5 mL/kg of 0.25% bupivacaine).The median duration of postoperative analgesia was significantly greater in children who received CEB than those who were administered TAP block (group C: 362.5 minutes [172.5-693.75] vs group T: 210 minutes [108.75-362.5]; P<.05). No difference

was found in the incidence of postoperative pain up to 6 hours from the point of initiation of assessment (group C: 47.2% vs group T: 55.9%; P>.05). The children who received CEB experienced greater incidence of pain in the 6- to 24-hour postoperative interval than those administered TAP block (group C: 75% vs group T: 44.1%; P<.05). Although there was no difference in the rescue analgesia requirements, the number of children not requiring any rescue analgesia in the first 24 hours postoperatively was significantly higher in the TAP group (group C: n=2 vs group T: n=8; P<.05).It was concluded that in children undergoing lower abdominal surgery, CEB provides a significantly prolonged duration of postoperative analgesia when compared with ultrasonography-guided TAP block.

MATERIALS AND METHODS

The sample size in our study was determined based on Study **"**Comparison of postoperative analgesia of ultrasound guided ilioinguinal nerve block versus ultrasound guided tap block for pediatric inguinal hernia repair".

Authored by Mahmoud Hassan Mohamed et al published in Ain-Shams Journal of Anesthesiology 2015, 08:658–663.

In this study time to first rescue analgesic was longer and the duration of analgesia was more stable in group A (273 ± 41.7 min) as compared with group B (209.6 ± 98.4 min) (P < 0.001).

Sample size calculation:

$n = [(Z\alpha/2 * \sigma)/E]^2$

where

n= sample size

σ=population standard deviation

E= margin of error

Z= the value for the given confidence interval

.the confidence interval estimated at 95%

The standard deviation41.7

Z value of 1.96

Assuming that 80 percent as the power of the study, the minimum sample size was calculated at 32 per group.

In our study we have taken 70 as the sample size.

N=35 in the TAP block group and n=35 in ILIOINGUINAL block group.

METHODOLOGY:

After obtaining Institutional Ethics Committee approval and informed consent from parents 70 ASA status I (or) II patients aged 1 to 8 years scheduled to undergo elective unilateral hernia repair were included in the study. Patients who satisfied inclusion criteria were randomised into two groups computer generated randomised numbers.

Group T: TAP block

Group I: ILIOINGUINAL nerve block.

INCLUSION CRITERIA:

Age: 1 to 8 years

Weight: 5 kg to 20 kg

ASA : 1 and 2

Surgery: Elective herniotomy.

EXCLUSION CRITERIA:

1. Children undergoing bilateral hernia surgery
2. Local infection at the site of block.

3. ASA III and IV.

MATERIALS USED

1 22G-24G intravenous cannula.

2 Laryngoscope with various size blades.

3 2 and 2.5 size Larnyngeal mask airway.

4 Ringers lactate,Inj.atropine ,Inj Ephedrine, injKetamine and other emergency drugs

5 Monitors ECG, NIBP, SPO2, temperature monitoring.

6 18G intravenous cannula.

7 Bupivacaine 20 ml vial 0.25%

8 2 cc, 5 cc and 10 cc syringe.

9 7 to 12 MHz linear ultrasound probe.

GROUP-T received a transverses abdominis plane block using ultrasound using 0.5 ml per kg of 0.25% bupivacaine.

GROUP-I received and ultrasound guided ilioinguinal nerve block using 0.2 ml per kg of 0.25% bupivacaine.

Preoperative fasting protocols were followed and all the patients were premedicated with oral midazolam 0.5 mg/kg 30 minutes prior to induction.

Patients were monitored using standard monitoring parameters(heart rate, ecg, non invasive blood pressure and pulse oximetry.)

Heart rate and blood pressure were recorded prior to induction and every 5 minutes thereafter till the end of surgery.

All the patients underwent induction with 8% sevoflurane in 33% O_2 and 66% N_2O through a Jackson-Rees circuit with appropriate size face mask.

A 22G intravenous cannula was inserted,after securing intravenous cannula Inj Atropine 0.01 mg/kg,Inj.Propofol 2 mg/Kg and Inj ketamine 1 mg/Kg was given.appropriate size LMA bases on the weight of the patient was inserted.Anesthesia was maintained with 2% Sevoflurane delivered in 33%O_2 and 66 %N_2O.

Group T –with the patient in the supine position, under strict aseptic precautions of painting and draping the area the linear probe of the ultrasound is placed transversely on the anterolateral wall of the abdomen midway between the lower costal margin and the iliac crest in the anterior axillary line and the three layers identified, needle with the syringe attached is advanced from medial to lateral using the in plane technique,drug is deposited in the plane between the internal oblique muscle and the transverses abdominis muscle, spread of the drug was visualized as separation between the two layers of the above mentioned muscles, which appeared as a hypo-echoic space in the ultrasound. A dose of 0.5 ml/kg of 0.25% Bupivacaine was administered for this group of patients.

GROUP I-with the patients in supine position,the ultrasound probe was placed on the anterior abdominal wall on the line joining the anterior superior iliac spine and the umbilicus with the probe facing a slight cephalad direction, after identification of the structures from the innermost layer to the outer most, the ilioinguinal nerve was identified in the transverses abdominis plane and the needle was entered from medial to lateral using the in plane technique, 0.25% bupivacaine 0.2 ml/kg was deposited near the nerve, hydro-dissection between the two muscle layers confirmed the spread of the drug.

Skin incision was made after 20 minutes of waiting for the block to completely act. Any increase in heart rate and mean arterial pressure of ≥20% from the baseline values with incision, after 20 minutes of administration of block was termed as inadequate blockage.

1 patient with inadequate ilioinguinal block was given intravenous fentanyl 1 µg/kg and was excluded from the study.

Intra operative systolic blood pressure, diastolic blood pressure mean arterial pressure and heart rate were recorded every 5 minutes. Ringer lactate was administered as perioperative fluid.

After completion of the surgical procedure, laryngeal mask airway removed in deep plane and the patient was transferred to PACU (post anaesthesia care unit).

Using the Paediatric observational FLACC pain scale score with its 0-10 score range, postoperative FLACC pain score was assessed upon arrival and every hour for first 8Hrs and every 4 hrs thereafter

If two coupled observations separated by a 5min waiting period yielded FLACC pain scale score anytime to be more than 3, rescue analgesia with intravenous fentanyl 1µg/KG/dose was administered to achieve FLACC score of 3 (or) less.

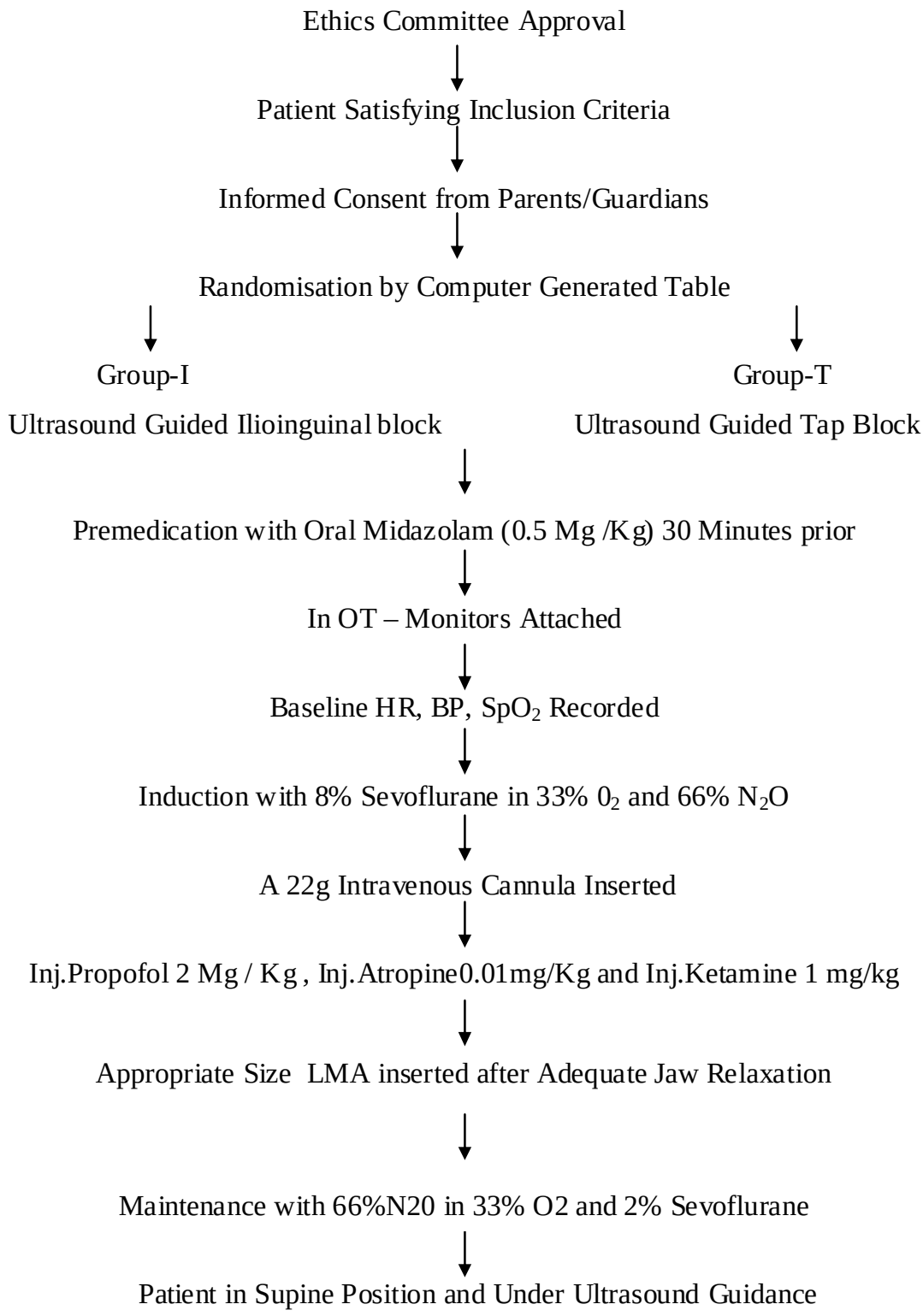
The primary outcome measures were the time to first analgesia (in minutes from the time of ILIOINGUINAL block (or) TAP block to first registration of FLACC pain score >3.

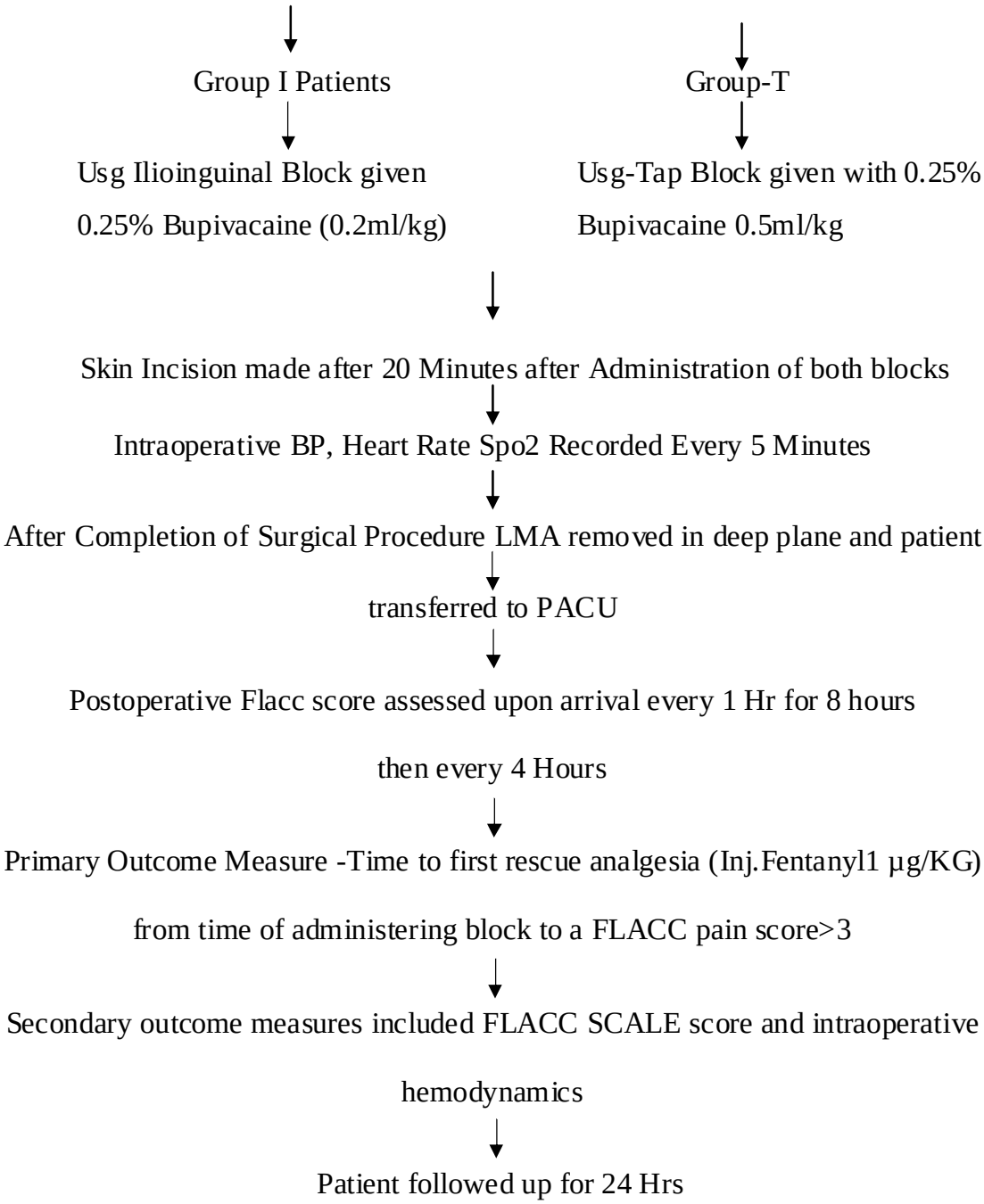
Secondary outcome measures are intra operative hemodynamic variables.

Complications like vomiting, urinary retention and respiratory depression were recorded.

Bradycardia was considered of heart rate less than 60/min and treated with Inj.Atropine,

METHODOLOGY




Group I Patients
Group-T
Usg Ilioinguinal Block given
0.25% Bupivacaine (0.2ml/kg)
Usg-Tap Block given with 0.25%
Bupivacaine 0.5ml/kg
Skin Incision made after 20 Minutes after Administration of both blocks
Intraoperative BP, Heart Rate Spo2 Recorded Every 5 Minutes
After Completion of Surgical Procedure LMA removed in deep plane and patient
transferred to PACU
Postoperative Flacc score assessed upon arrival every 1 Hr for 8 hours
then every 4 Hours
Primary Outcome Measure -Time to first rescue analgesia (Inj.Fentanyl1 µg/KG)
from time of administering block to a FLACC pain score>3
Secondary outcome measures included FLACC SCALE score and intraoperative
hemodynamics
Patient followed up for 24 Hrs

OBSERVATIONS AND RESUTS

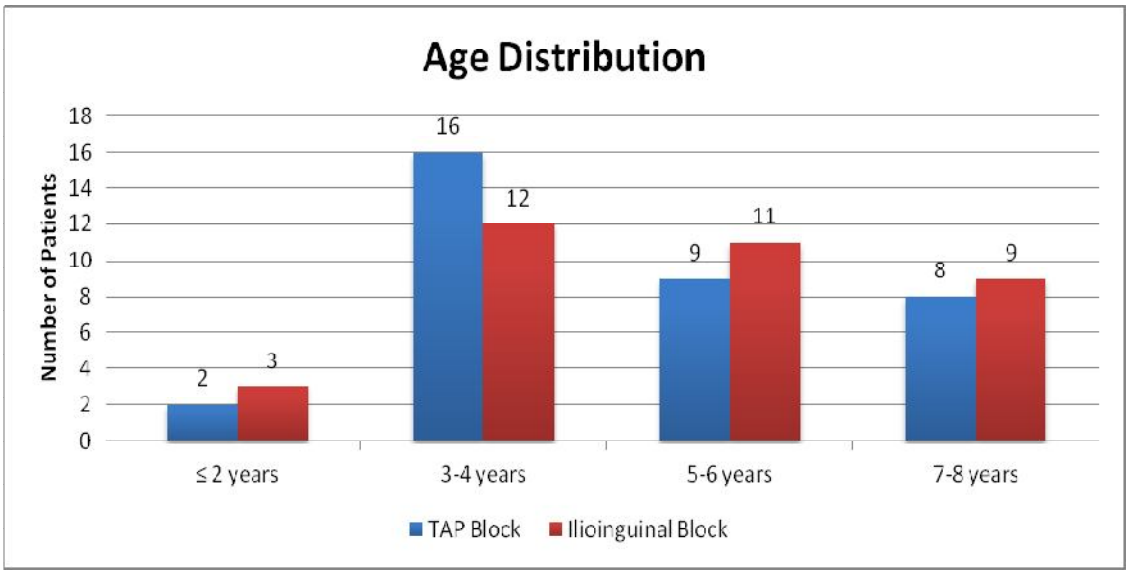
All statistical analysis was carried out using SPSS software for windows version 2.0.The results are expressed as mean and standard deviation. statistical analysis was carried out by student's t –test from parametric data like age ,weight, heart rate ,blood pressure. Then parametric data like type of surgery, duration of surgery, post operative complications were analyzed using chi square test and fisher's exact test. A pvalueof<0.05 was considered as statistically significant.

Both the groups were comparable in terms of age, sex, weight, intra operative hemodynamics, postoperativehemodynamics, FLACC pain score and Time for first rescue analgesia.

STATISTICS

Descriptive statistics was done for all data and suitable statistical tests of comparison were done. Continuous variables were analyzed with the unpaired t test and categorical variables were analyzed with the Chi-Square Test and Fisher Exact Test. Statistical significance was taken as $p < 0.05$. The data was analyzed using SPSS software (7.1.0.6 version; Center for disease control, USA) and Microsoft Excel 2010.

AGE

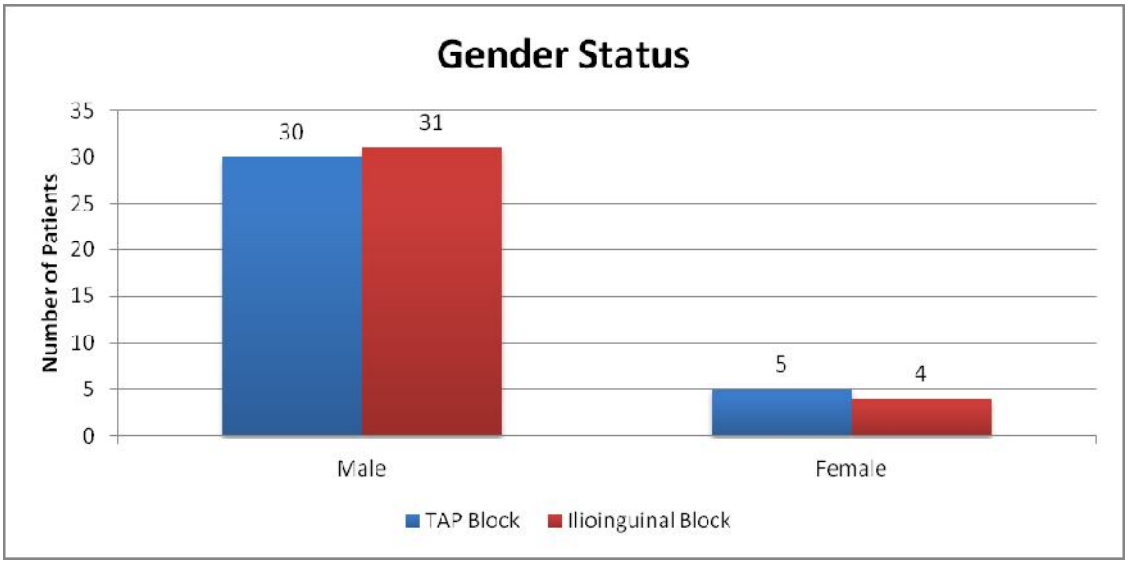


Age Distribution	TAP Block	%	Ilioinguinal Block	%
≤ 2 years	2	5.71	3	8.57
3-4 years	16	45.71	12	34.29
5-6 years	9	25.71	11	31.43
7-8 years	8	22.86	9	25.71
Total	35	100	35	100

Age Distribution	TAP Block	Ilioinguinal Block
N	35	35
Mean	4.91	5.03
SD	1.92	1.93
P value Unpaired t Test		0.8045

Majority of the TAP block group patients belonged to the 3-4 years age class intervals (n=16, 45.71%) with a mean age of 4.91 years. In the ilioinguinal block group patients, majority belonged to the 3-4 years age class interval (n=12, 34.29%) with a mean age of 5.03 years. The association between the intervention groups and age distribution is considered to be not statistically significant since $p > 0.05$ as per 2 tail unpaired t test.

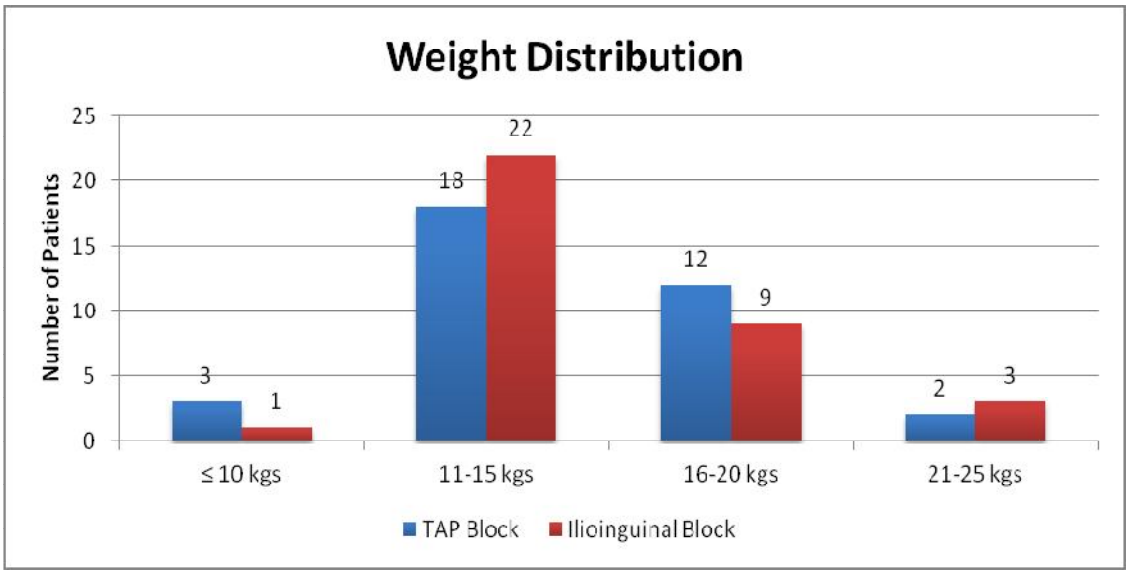
GENDER



Gender Status	TAP Block	%	Ilioinguinal Block	%
Male	30	85.71	31	88.57
Female	5	14.29	4	11.43
Total	35	100	35	100
P value Fishers Exact Test			>0.9999	

Majority of the TAP block group patients belonged to the male gender class intervals (n=30, 85.71%). In the ilioinguinal block group patients, majority belonged to the male gender class interval (n=31, 88.57%). The association between the intervention groups and gender status is considered to be not statistically significant since $p > 0.05$ as per fishers exact test.

WEIGHT

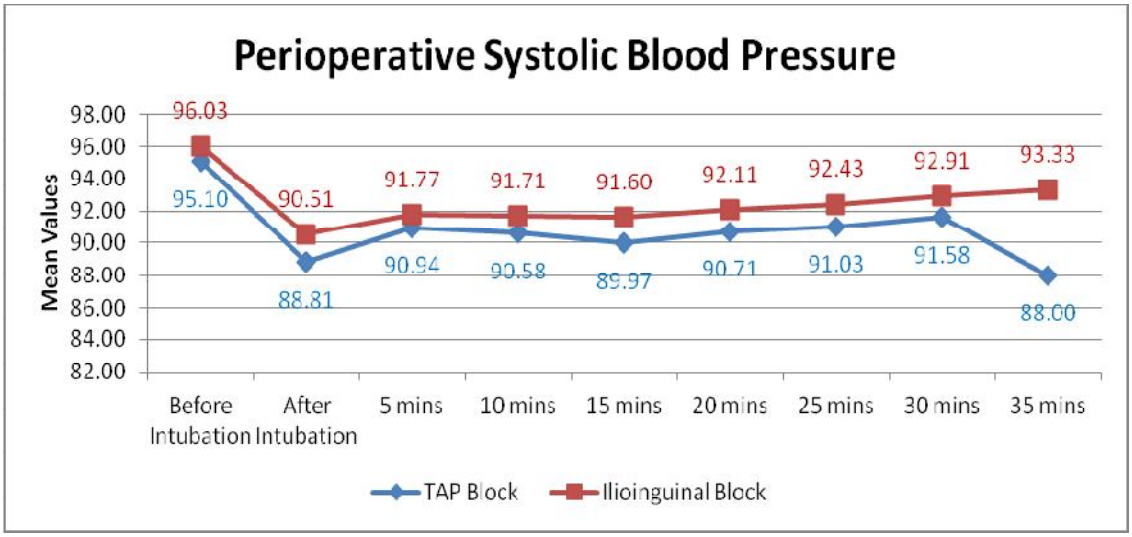


Weight Distribution	TAP Block	%	Ilioinguinal Block	%
≤ 10 kgs	3	8.57	1	2.86
11-15 kgs	18	51.43	22	62.86
16-20 kgs	12	34.29	9	25.71
21-25 kgs	2	5.71	3	8.57
Total	35	100	35	100

Weight Distribution	TAP Block	Ilioinguinal Block
N	35	35
Mean	15.20	14.94
SD	3.26	3.13
P value Unpaired t Test		0.7376

Majority of the TAP block group patients belonged to the 11-15 kg weight class intervals (n=18, 51.43%) with a mean weight of 15.20 kgs. In the ilioinguinal block group patients, majority belonged to the 11-15 kg weight class intervals (n=22, 62.86%) with a mean weight of 14.94 kgs. The association between the intervention groups and age distribution is considered to be not statistically significant since $p > 0.05$ as per 2 tail unpaired t test.

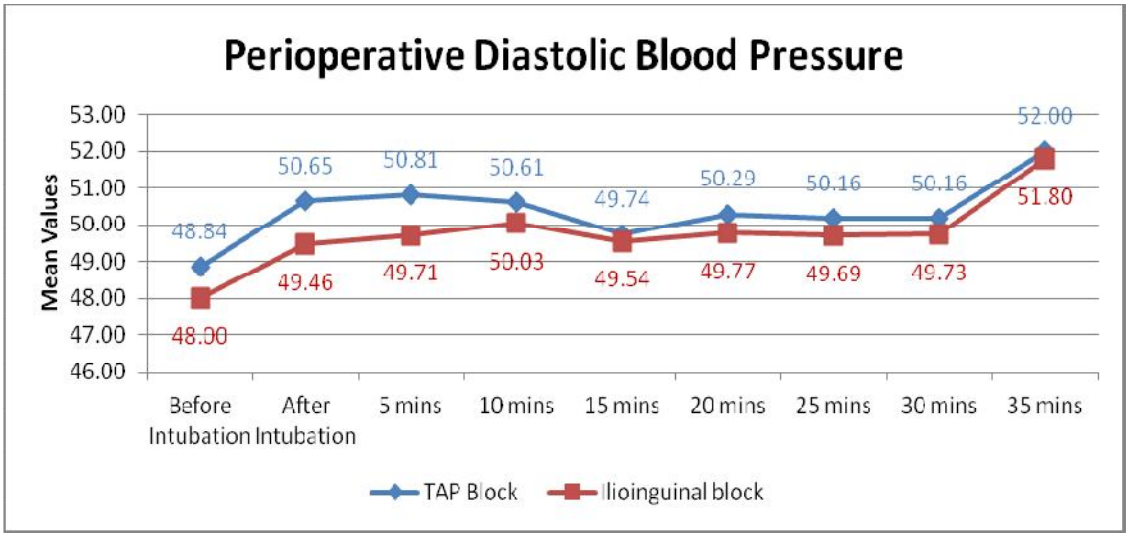
PERIOPERATIVE SYSTOLIC BLOOD PRESSURE



Perioperative Systolic Blood Pressure	TAP Block		Ilioinguinal Block		P value Unpaired t Test
	Mean	SD	Mean	SD	
Before Induction	95.10	2.41	96.03	3.11	0.1828
After Induction	88.81	4.29	90.51	4.08	0.1024
5 mins	90.94	2.43	91.77	2.39	0.1646
10 mins	90.58	2.23	91.71	2.26	0.3467
15 mins	89.97	2.86	91.60	3.02	0.4335
20 mins	90.71	2.69	92.11	2.70	0.7114
25 mins	91.03	2.70	92.43	2.48	0.6171
30 mins	91.58	2.83	92.91	2.77	0.6821
35 mins	88.00	5.66	93.33	1.15	0.1842

By conventional criteria the association between the intervention groups and perioperative systolic blood pressure among study subjects is considered to be not statistically significant since $p > 0.05$.

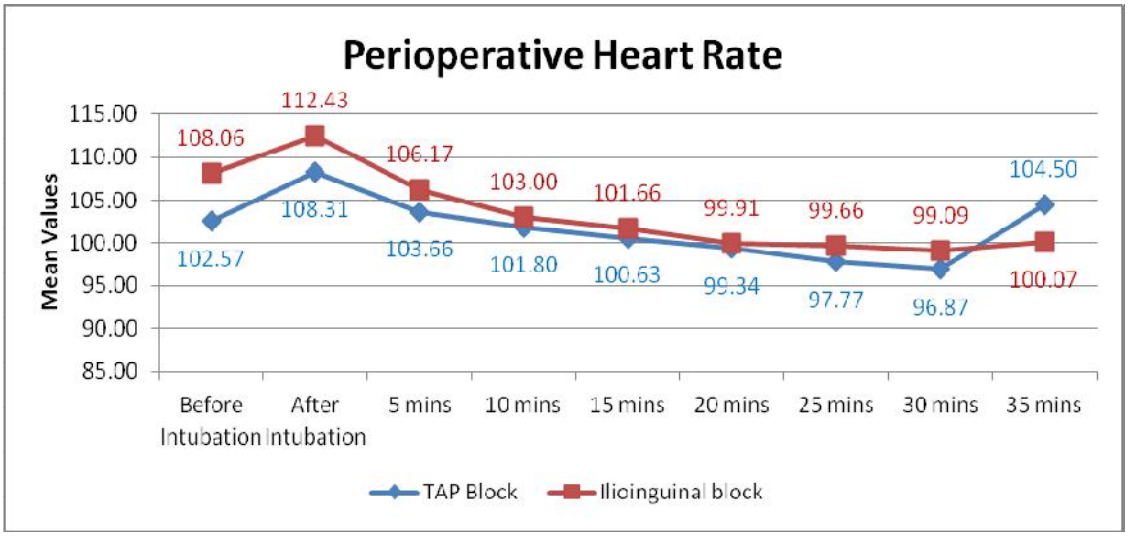
PERIOPERATIVE DIASTOLIC BLOOD PRESSURE



Perioperative Diastolic Blood Pressure	TAP Block		Ilioinguinal Block		P value Unpaired t Test
	Mean	SD	Mean	SD	
Before Induction	48.84	1.57	48.00	1.41	0.4322
After Induction	50.65	2.46	49.46	2.23	0.6392
5 mins	50.81	1.82	49.71	1.78	0.4992
10 mins	50.61	2.14	50.03	1.79	0.2316
15 mins	49.74	2.22	49.54	2.01	0.7032
20 mins	50.29	1.85	49.77	1.78	0.2504
25 mins	50.16	1.49	49.69	1.92	0.2694
30 mins	50.16	1.51	49.73	1.84	0.3081
35 mins	52.00	0.00	51.80	1.30	0.8457

By conventional criteria the association between the intervention groups and perioperative diastolic blood pressure among study subjects is considered to be not statistically significant since $p > 0.05$.

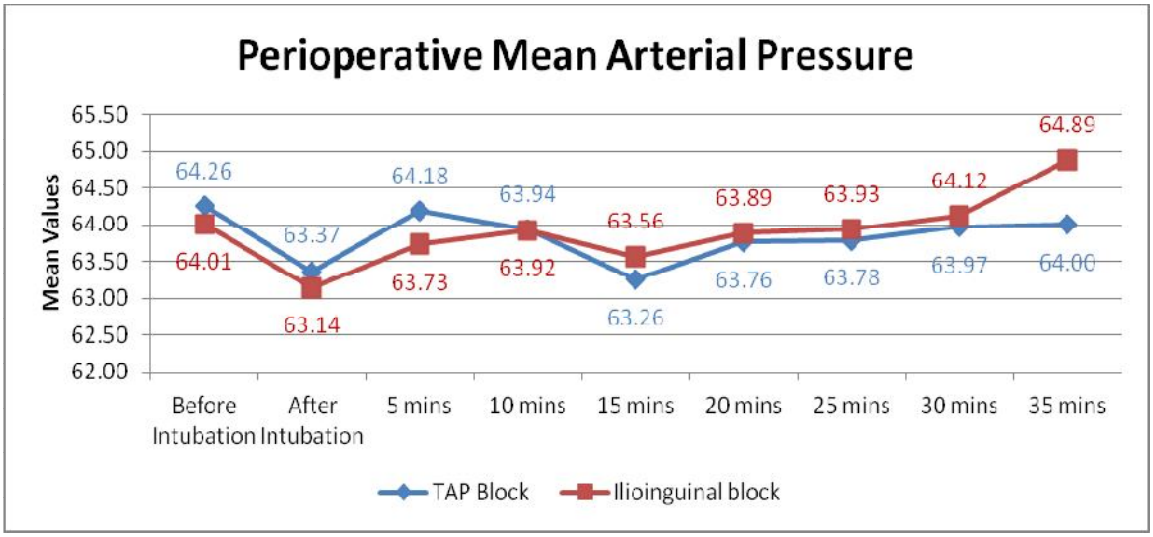
PERIOPERATIVE HEART RATE



Perioperative Heart Rate	TAP Block		Ilioinguinal Block		P value Unpaired t Test
	Mean	SD	Mean	SD	
Before Induction	102.57	8.54	108.06	6.80	0.1041
After Induction	108.31	7.22	112.43	6.52	0.1048
5 mins	103.66	8.45	106.17	6.92	0.1776
10 mins	101.80	7.09	103.00	6.10	0.4504
15 mins	100.63	8.39	101.66	6.52	0.5687
20 mins	99.34	6.76	99.91	6.19	0.7133
25 mins	97.77	7.25	99.66	5.50	0.2245
30 mins	96.87	6.57	99.09	5.12	0.1321
35 mins	104.50	17.68	100.07	5.99	0.4369

By conventional criteria the association between the intervention groups and perioperative heart rate between 5-35 minutes after intubation among study subjects is considered to be not statistically significant since $p > 0.05$.

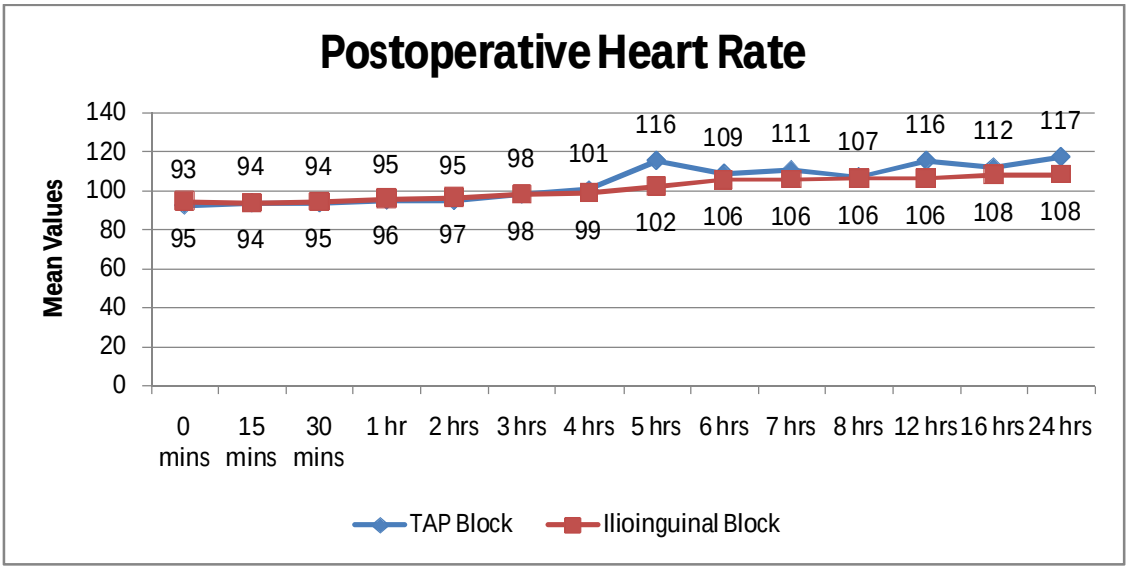
INTRA-OPERATIVE MEAN ARTERIAL PRESSURE



Perioperative Mean Arterial Pressure	TAP Block		Ilioinguinal Block		P value Unpaired t Test
	Mean	SD	Mean	SD	
Before Intubation	64.26	1.05	64.01	0.94	0.3133
After Intubation	63.37	1.63	63.14	1.91	0.6139
5 mins	64.18	1.07	63.73	1.16	0.1074
10 mins	63.94	1.33	63.92	1.20	0.9702
15 mins	63.26	1.75	63.56	1.41	0.4370
20 mins	63.76	1.40	63.89	0.93	0.6747
25 mins	63.78	1.24	63.93	1.40	0.6515
30 mins	63.97	1.26	64.12	1.35	0.6402
35 mins	64.00	1.89	64.89	0.38	0.4532

By conventional criteria the association between the intervention groups and perioperative mean arterial pressure among study subjects is considered to be not statistically significant since $p > 0.05$.

POSTOPERATIVE HEART RATE



Postoperative Heart Rate	TAP Block		Ilioinguinal Block		P value Unpaired t Test
	Mean	SD	Mean	SD	
0 mins	92.63	5.80	94.60	5.69	0.1559
15 mins	93.81	6.54	93.94	5.65	0.9278
30 mins	93.97	6.87	94.54	6.16	0.7211
1 hr	95.00	7.57	95.94	7.25	0.6073
2 hrs	94.87	7.77	96.77	7.52	0.3168
3 hrs	98.03	8.96	98.29	8.03	0.9039
4 hrs	100.55	8.85	98.80	6.38	0.3568
5 hrs	115.58	9.51	102.37	7.66	<0.0001
6 hrs	108.81	6.94	105.60	6.87	0.3446
7 hrs	106.11	8.39	110.68	6.09	0.0132
8 hrs	106.49	6.58	107.16	6.30	0.2716
12 hrs	106.43	8.09	115.58	6.31	0.4158
16 hrs	108.11	6.55	112.13	7.44	0.2523
24 hrs	108.43	9.50	117.32	7.03	0.3322

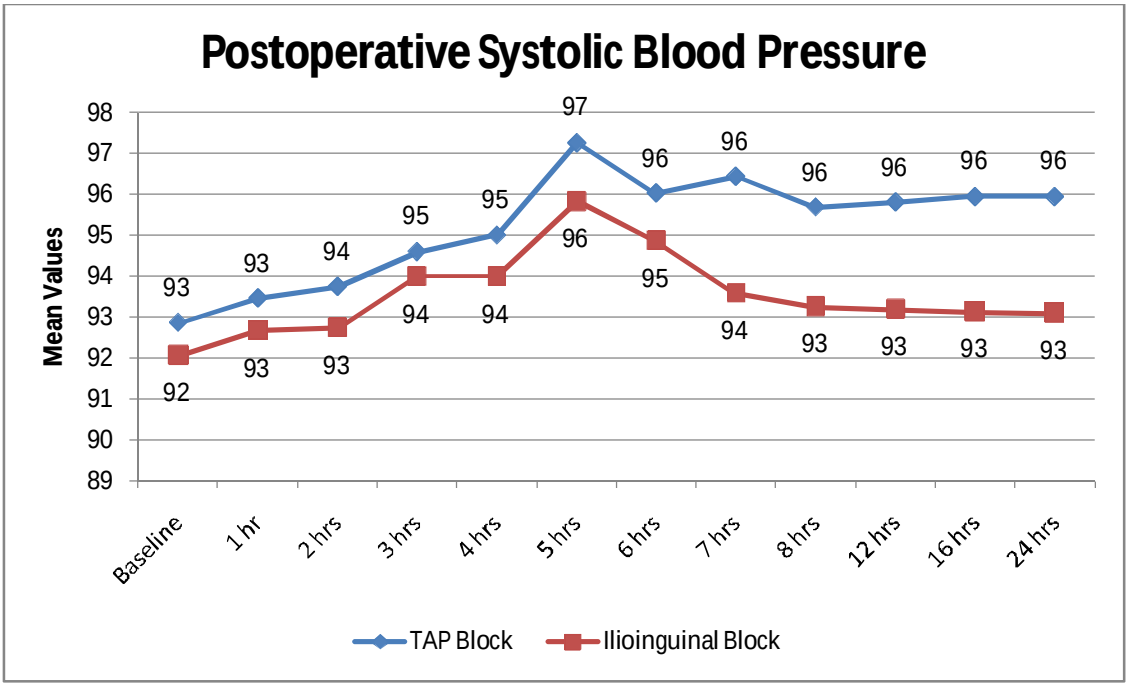
By conventional criteria the association between the intervention groups and postoperative heart rate at 5 and 7 hours postoperatively among study subjects is considered to be statistically significant since $p < 0.05$.

By conventional criteria the association between the intervention groups and and postoperative heart rate at baseline to 4 hours, 6 hours and 8-24 hours postoperatively among study subjects is considered to be not statistically significant since $p > 0.05$.

The increased mean and postoperative heart rate at the end of 5 hours postoperatively in TAP block group compared to the ilioinguinal block group is statistically significant with p value of < 0.0001 as per unpaired t- test indicating a true difference among study groups.

In the Ilioinguinal block group the mean and postoperative heart rate at 7 hours postoperatively is 110.68 beats/minutes showing that patients in the ilioinguinal block experienced pain at 7 hrs and effective analgesia was maintained till 7 hrs.

POSTOPERATIVE SYSTOLIC BLOOD PRESSURE



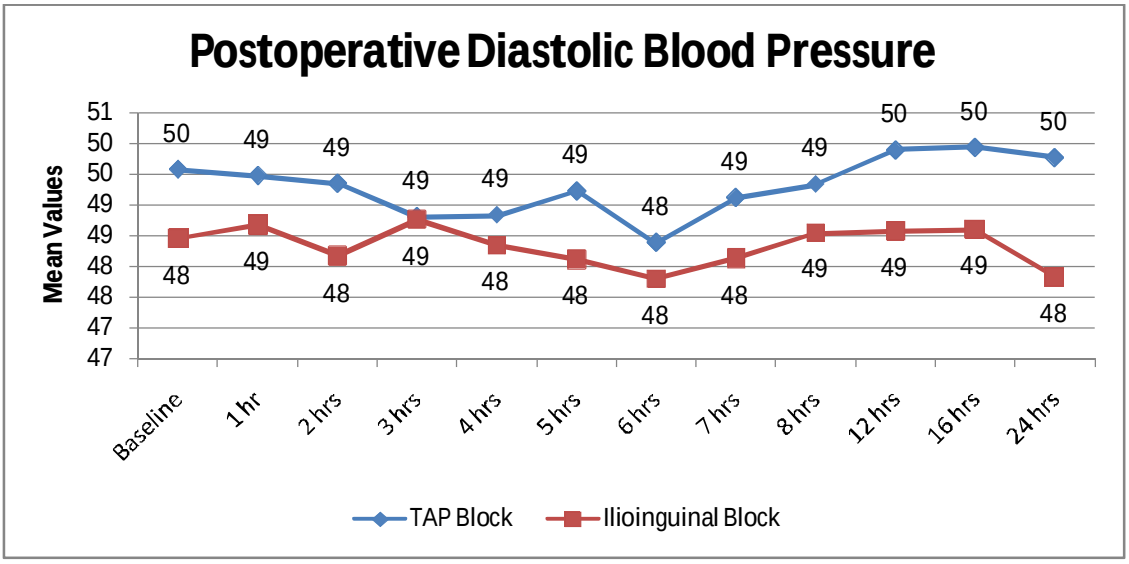
Postoperative Systolic Blood Pressure	TAP Block		Ilioinguinal Block		P value Unpaired t Test
	Mean	SD	Mean	SD	
Baseline	92.86	2.38	92.06	2.35	0.1791
1 hr	93.46	2.43	92.68	2.02	0.1593
2 hrs	93.74	2.13	92.74	1.40	0.1633
3 hrs	94.60	2.49	94.00	1.75	0.2577
4 hrs	95.00	2.50	94.00	1.64	0.0570
5 hrs	97.26	2.46	95.83	1.93	0.0116
6 hrs	96.87	1.78	94.03	1.74	0.0354
7 hrs	96.06	1.86	95.43	1.64	0.0126
8 hrs	97.26	1.91	95.69	1.60	0.0332
12 hrs	96.06	1.95	95.80	1.45	0.0585
16 hrs	95.32	1.51	94.94	1.45	0.0388
24 hrs	95.77	1.73	95.94	1.43	0.7297

By conventional criteria the association between the intervention groups and postoperative systolic blood pressure after 5th hour postoperatively among study subjects is considered to be statistically significant since $p < 0.05$.

The mean postoperative mean and postoperative systolic blood pressure after 5 hours postoperatively was meaningfully more in TAP block group compared to the Ilioinguinal block group by 1% with a mean difference of 1.43 mm Hg.

This difference is true and significant and has not occurred by chance.

POSTOPERATIVE DIASTOLIC BLOOD PRESSURE



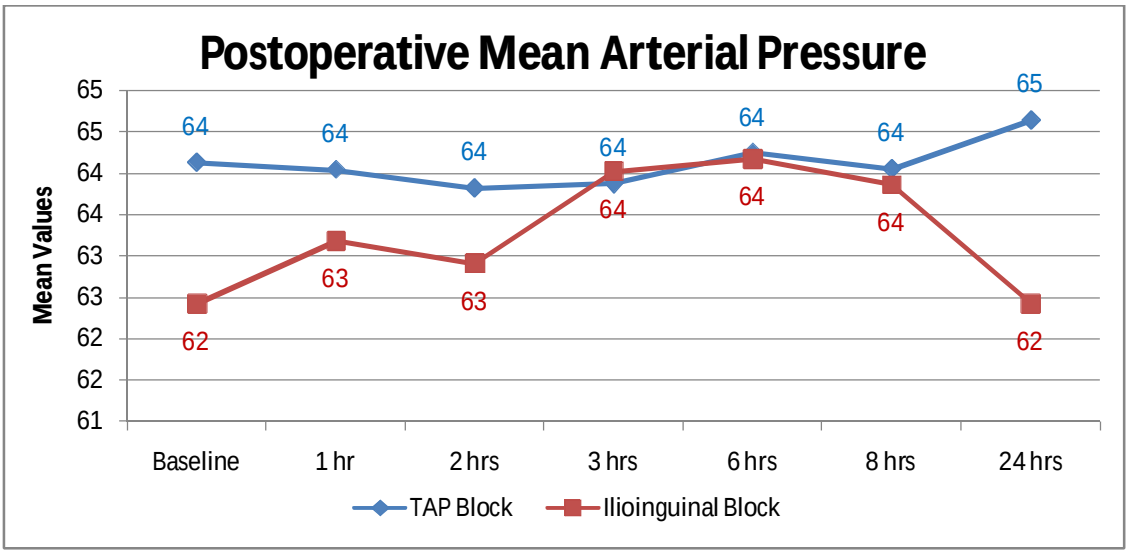
Postoperative Diastolic Blood Pressure	TAP Block		Ilioinguinal Block		P value Unpaired t Test
	Mean	SD	Mean	SD	
Baseline	49.58	1.52	48.46	2.24	0.0743
1 hr	49.48	1.82	48.69	2.17	0.1128
2 hrs	49.35	1.47	48.17	1.96	0.3278
3 hrs	48.81	2.02	48.77	1.37	0.9341
4 hrs	48.84	1.68	48.34	1.88	0.2644
5 hrs	49.23	1.59	48.11	1.86	0.0128
6 hrs	49.48	1.82	48.03	2.11	0.0041
7 hrs	49.97	0.81	47.11	1.67	0.0044
8 hrs	49.58	1.52	47.20	1.97	0.0000
12 hrs	48.89	2.31	47.58	0.80	0.2463
16 hrs	48.61	1.48	47.74	1.27	0.0123
24 hrs	48.61	1.48	47.74	1.27	0.0123

By conventional criteria the association between the intervention groups and postoperative diastolic blood pressure at 5 to 24 hours postoperatively among study subjects is considered to be statistically significant since $p < 0.05$.

The mean postoperative mean and postoperative diastolic blood pressure after 5 hours to 24 hours postoperatively was meaningfully more in TAP block group compared to the ilioinguinal block group by 2% with a mean difference of 1.11 mm Hg.

This difference is true and significant and has not occurred by chance.

POSTOPERATIVE MEAN ARTERIAL PRESSURE



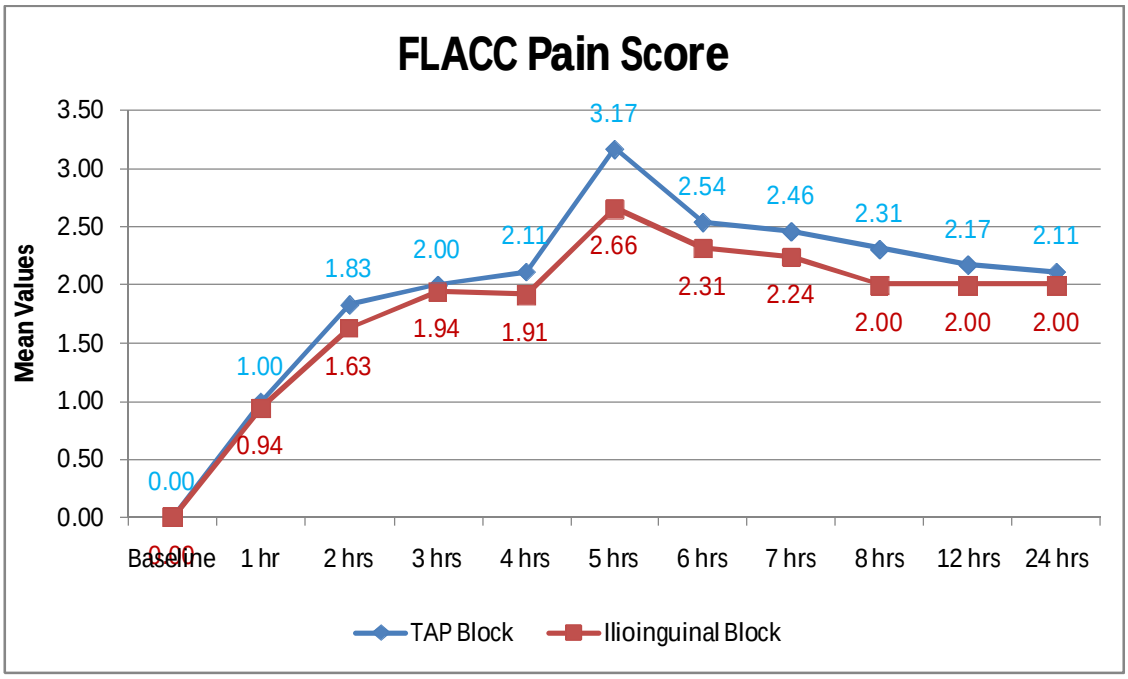
Postoperative Mean Arterial Pressure	TAP Block		Ilioinguinal Block		P value Unpaired t Test
	Mean	SD	Mean	SD	
Baseline	63.74	1.30	62.42	1.97	0.4834
1 hr	63.88	1.46	63.17	1.79	0.0845
2 hrs	63.82	1.37	62.90	1.28	0.2014
3 hrs	63.87	1.40	63.62	1.31	0.4533
4 hrs	63.89	1.24	63.47	1.56	0.2277
5 hrs	65.28	1.19	64.17	1.71	0.0023
6 hrs	64.04	1.23	63.17	1.79	0.0264
7 hrs	65.14	1.10	64.18	1.20	0.0078
8 hrs	63.86	1.37	62.90	1.28	0.0068
12 hrs	64.13	1.16	62.42	1.97	0.0004
16 hrs	64.64	0.92	62.42	1.97	0.0005
24 hrs	64.42	0.90	62.44	1.97	0.4456

By conventional criteria the association between the intervention groups and postoperative MAP at 5 to 24 hours postoperatively among study subjects is considered to be statistically significant since $p < 0.05$.

The mean postoperative mean and postoperative MAP at 5 to 24 hours postoperatively was meaningfully more in TAP block group compared to the ilioinguinal block group .

This difference is true and significant and has not occurred by chance.

FLACC PAIN SCORE



FLACC Pain Score	TAP Block		Ilioinguinal Block		P value Unpaired t Test
	Mean	SD	Mean	SD	
Baseline	0.00	0.00	0.00	0.00	>0.9999
1 hr	1.00	0.00	0.94	0.59	0.5694
2 hrs	1.83	0.38	1.63	0.55	0.0807
3 hrs	2.00	0.00	1.94	0.84	0.6880
4 hrs	2.11	0.32	1.91	0.56	0.0723
5 hrs	3.17	0.38	2.66	0.48	<0.0001
6 hrs	2.54	0.51	2.31	0.47	0.0444
7 hrs	2.46	0.32	2.24	0.61	0.0002
8 hrs	2.31	0.32	2.00	0.00	0.0429
12 hrs	2.17	0.38	2.00	0.00	0.0111
24 hrs	2.11	0.32	2.00	0.00	0.0429

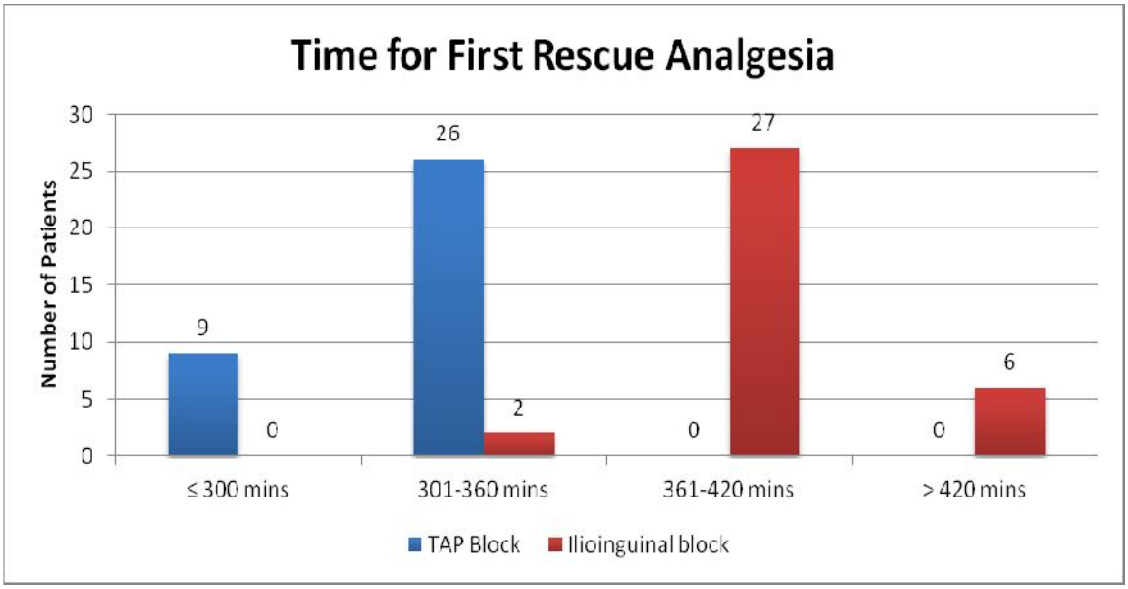
By conventional criteria the association between the intervention groups and FLACC score between 5-14 hours postoperatively among study subjects is considered to be statistically significant since $p < 0.05$.

By conventional criteria the association between the intervention groups and FLACC score between baseline to 4 hours postoperatively among study subjects is considered to be not statistically significant since $p > 0.05$.

In patients belonging to TAP block group, the mean overall FLACC score is 2.12 scoring points. In ilioinguinal block group the mean overall FLACC score is 1.98 scoring points. The increased mean FLACC score in TAP block group compared to the ilioinguinal block group is statistically significant as a lowest p value of< 0.0001 as per unpaired t- test indicating a true difference among study groups.

The mean FLACC score was meaningfully more in TAP block group compared to the ilioinguinal block group by 6% with a mean difference of 0.14 scoring points. This difference is true and significant and has not occurred by chance.

TIME FOR FIRST RESCUE ANALGESIA



Time for First Rescue Analgesia	TAP Block	%	Ilioinguinal Block	%
≤ 300 mins	9	25.71	0	0.00
301-360 mins	26	74.29	2	5.71
361-420 mins	0	0.00	27	77.14
> 420 mins	0	0.00	6	17.14
Total	35	100	35	100

Time for First Rescue Analgesia	TAP Block	Ilioinguinal Block
N	35	35
Mean	313.74	415.57
SD	11.54	58.24
P value Unpaired t Test		0.0001

By conventional criteria the association between the intervention groups and time for first rescue analgesia among study subjects is considered to be statistically significant since $p < 0.05$.

In patients belonging to TAP block group, the mean time for first rescue analgesia is 313.74 minutes. In ilioinguinal block group the mean time for first rescue analgesia is 415.57 minutes. The decreased mean time for first rescue analgesia in TAP block group compared to the ilioinguinal block group is statistically significant as the p value is 0.0001 as per unpaired t- test indicating a true difference among study groups.

The time for first rescue analgesia was significantly more in the Ilioinguinal block compared to TAP block even after administration of rescue analgesia in both groups which suggests that the Ilioinguinal block is better than tap block when used in children undergoing elective hernia repair surgeries.

DISCUSSION

Inguinal hernia repair is one of the most frequently performed surgical procedures in the paediatric population. The hernia repair in paediatrics is different from adult hernia repair. In pediatric hernia repair only herniotomy is done and herniorraphy is not done, this is the reason why there is less of post operative pain and discomfort in pediatric group.

An optimal analgesic regimen should provide safe and effective analgesia reducing the postoperative stress response and should smoothen the recovery from surgery. Regional techniques are preferred in pediatric hernia repair and various techniques like TAP block, Ilioinguinal block, Caudal epidural are commonly used for inguinal herniotomies.

Since so many methods are available, for postoperative pain relief in herniotomies, we chose to study two commonly used simple and safe non neuraxial methods of nerve block.

The usage of the ultrasound allows exact, real time localisation of the anatomical structures and increases the success rate of the blocks performed and decreases the volume of the drug required when compared to the conventional techniques.The ilioinguinal/iliohypogastric nerve block is a popular regional anaesthetic technique for surgical procedures in the sensory area of the ilioinguinal and iliohypogastric nerves. For inguinal surgery (inguinal hernia repair or orchidopexy), the ilioinguinal/iliohypogastric nerve block is as effective

as a caudal block as shown by the study done by Markham SJ,Tomlinson[9], where they compared caudal block with conventional ilioinguinal block and also Abdellatif AA[1] et al, obtained similar results when they compared the ultrasound guided ilioinguinal block with the caudal block in children undergoing groin surgery.

WAFA MOHAMED AL SADEK et al[24], compared USG Guided TAP block vs USG guided caudal block for pain relief in children undergoing lower abdominal surgery and found that the total intraoperative fentanyl dose was significantly lower in TAP block group. Postoperatively , the time to first rescue analgesic was significantly longer in the TAP block group and pain scores were significantly lower in the TAP block group.

The current study was designed to compare the efficacy of post operative analgesia between two safe and simple non neuraxial methods of regional anesthesia .Ultrasound guided ilioinguinal block with the ultrasound guided TAP block in pediatric patients undergoing elective inguinal herniotomy.

The sample size for our study was calculated based upon the difference in time to first rescue analgesia between usg guide tap block and usg guided ilionguinal block study by Mahmoud Hassan, and Mohammed et al[10] using the formula

$n = [(Z\alpha/2*\sigma)/E]^2$

where

n= sample size

σ=population standard deviation

E= margin of error

Z= the value for the given confidence interval

.the confidence interval estimated at 95%

The standard deviation41.7

Z value of 1.96

Assuming that 80 percent as the power of the study, the minimum sample size was calculated at 32 per group

In our study we have taken 70 as the sample size.

N=35 in the TAP block group and n=35 in ILIOINGUINAL block group.

The dose of bupivacaine used in our study was 0.5 ml/kg of 0.25% in the TAP block intervention group and in the Ilioinguinal block group it was 0.25 ml/kg of 0.25%

The reason for using a lower volume of 0.25 ml/kg in Ilioinguinal block in our study, is due to the anatomical differences in the course of the nerves travelling towards the inguino-scrotal region

- In the ilioinguinal region the nerves are located in close proximity to each other

- There is an easier medial spread of the local anesthetic blocking the genital branch of the genito-femoral nerve.

Postoperative assessment of pain was done using the FLACC pain score .

FLACC pain assessment scale can be an appropriate and valid alternative tool for assessing pain especially in preverbal children in the PACU, when other pain scales are not effective as per the study published in European journal of Minas, G.; Goutziomitrou, E.; Douvantzi anesthesiology[13] in june 2007 by et al

The two groups which received the Ilioinguinal block and TAP block were compared with respect to age, sex and weight. There was no statistical significance.

The two groups were compared with respect to intraoperative hemodynamics.

The intra operative pain is also assessed indirectly by measuring hemodynamics variables like rise heart rate, systolic BP, diastolic BP and mean arterial pressure. In our study we found these variables to be statistically insignificant between the two groups, as the p value is >0.05. These results are similar those obtained by the study done by Mahmoud Hassan Mohamed,et al.

The two groups were then compared with respect to postoperative heart rate and systolic and diastolic bpat various intervals {0hr and every hour till 8 hrs and then 4 th hourly till 24 hrs}. there was a statistically significant increase in

heart rate, systolic BP, diastolic Bp at the 5th hour in the TAP block group, at this period FLACC score in the TAP group rose to 3 which showed the patient was feeling pain and hence rescue analgesia was administered to the TAP block group.

In our study a FLACC score of less than 3 was taken as effective analgesia and a score of more than 3 was an indication for rescue analgesia using Inj.fentanyl 1 microgram/kg.

In our study the TAP block group the mean time for first rescue analgesia was 313 minutes and in the ilioinguinal block group a mean time of 415 minutes. This was statistically significant with a p value of <0.05 meaning that the group that underwent ilioinguinal block had a longer time for the first rescue analgesia. This is similar to the study done by FREDRICKSON ET AL[8] .2010 they compared tap block with ilioinguinal/iliohypogastric nerve block in pediatric patients undergoing inguinal surgery where they foundthat recovery room pain was more frequent and ibuprofen use was higher in the TAP block intervention group.

The two groups were compared with respect to FLACC scores achieved at various intervals{hourly for 8 hours and every 4th hour thereafter}. FLACC score of less than 3 was considered effective analgesia. Effective analgesia was observed in the Ilioinguinal block group upto 415 minutes whereas in the TAP block group it was 313.29 minutes, which was statistically significant with a p value of <0.05 and was similar to the results obtained in the study done by

FREDRICKSON MJ,PAINE ET AL[8]. in which they found that for children undergoing hernia repair,ilioinguinal block provided effective analgesia.

This statistically significant longer duration of analgesia demonstrated with the ilioinguinal nerve block may be attributed to the anatomical course of the ilioinguinal and iliohypogastric nerves as described in Anatomical cadaveric studies which showed significant variability in the anatomical course of both nerves in the TAP done by VanSchoor, AN Boon, Bosenberg[23].

COMPLICATIONS:

In our study there were no complications in the study groups.

The incidence of complication is very much reduced using ultrasound guidance, a transient femoral nerve palsy which resolves on its own is reported in children who underwent ilioinguinal nerve block.

In the TAP block group inadvertent puncture of the peritoneum and intra-peritoneal injection, inadvertent puncture of abdominal organs (liver and bowel), vascular puncture can occur

The upper incidence of overall complications associated with the TAP block in children was 0.3%.

SUMMARY

This study was conducted to compare the efficacy of postoperative analgesia in ultrasound guided TAP block and ultrasound guided Ilioinguinal block in children undergoing elective inguinal herniotomy.

The following observations were made:

Duration of analgesia was higher in the Ilioinguinal block group (415 minutes) compared to the TAP block group (313.29 minutes) which was statistically significant.

FLACC pain scores for analgesic requirement were better in the Ilioinguinal block group compared to the TAP block group, which was statistically significant.

Postoperative systolic, diastolic blood pressure and mean arterial pressure were higher in the TAP block group compared to the ilioinguinal block group, which was statistically significant.

In both groups intraoperative hemodynamics were comparable and statistically insignificant.

In both groups no adverse effects occurred.

CONCLUSION

From my study I conclude that the administration of ultrasound guided Ilioinguinal block for children undergoing elective inguinal hernia surgery increases the duration of effective postoperative analgesia with less volume of drug without producing any adverse effects compared to the ultrasound guided TAP block.

REFERENCES:

JOURNALS:

1. ABDELLATIF AA. ultrasound guided ilioinguinal/iliohypogastric nerve blocks versus caudal block for postoperative analgesia in children undergoing unilateral groin surgery saudi journal anesthesia 2012
2. AHAMED M.FARIED et al :In this study they compared the analgesic efficacy of Ultrasound guided TAP block vsIlioinguinal nerve block in children undergoing lower abdominal surgeries.
3. AHMED RAMZY SHABHAN et al: In this study they selected 44 children of age group 4 to 16 years, undergoing Laparoscopic Appendectomy
4. ANAND K J, CARR D The Neuroanatomy, Neurophysiology, Neurochemistry of pain stress, analgesia in newborn and children – pediatric clinics of North America 1989-36:795
5. ANN AND ROBERT et alIn this study they compared the efficacy of TAP Block using two different concentrations of Bupivacaine for postoperative pain relief.
6. D.J. SANDEMAN et al .In children undergoing laparoscopicappendectomy they compared the efficacy of TAP BLOCK using ropivacine

7. DALIA M. FAWY et al They compared the analgesic efficacy of Transverse Abdominis Plan block vs Caudal block for postoperative pain relief in children undergoing Lower abdominal surgeries.

8. FREDRICKSON MJ,PAINE C ET AL .2010 PEDIATRIC ANESTHESIOLOGY et al :They compared the effectiveness of TAP block and Ilioinguinal nerve block in children undergoing lower abdominal surgeries.

9. Hebbard P., Y Fujwara, Y Shivata ultrasound guided TAP block, anesthesia and intensive care 2007.

10. Mahmoud Hassan, Mohamed, et al. ASJA2015They compared the effectiveness of TAP block and Ilioinguinal nerve block in children undergoing hernia repair surgeries.

11. Markham,J Tomlinson 1986 Anesthesiology, Ilioinguinal nerve block a comparision between intraoperative and post operative analgesia.

12. McDonell,B O'Donnell.,The analgesic efficacy of Transversus abdominis plane block for abdominal surgeries. Anesthesia and Analgesia 2007

13. MATHER L MACKIE J The incidence of postoperative pain in children 1983-15:271-282

14. M SEYEDJAZI, SHEIKHZADEH 2014 AJPS

They compared the analgesic effects of caudal and ilioinguinal/iliohypogastric nerve block using bupivacaine-clonidine performed in children undergoing hernia repair

15. MINAS, G.; GOUTZIOMITROU, E.; DOUVANTZIANESTHESIOLOGY IN JUNE 2007 by et al EUROPEAN JOURNAL OF ANESTHESIOLOGY, FLACC pain assessment scale can be an appropriate and valid alternative tool for assessing pain especially in preverbal children in the PACU, when other pain scales are not effective as per the study published in European journal of Anesthesiology

16. N KANOJIA S AHUJA ET AL 2015 IJSR This study aimed to evaluate TAP block and caudal block forduration and quality of analgesia postoperatively in children undergoing lower abdominal surgeries using ropivacaine

17. PALETI SOPHIA et alThey compared the analgesic efficacy of TAP block vs standard systemic analgesia using 0.5 % ropivacaine in children undergoing lower abdominal surgeries.

18. RAFI Abdominal field blocks, new approach, anesthesia

15. REGIONAL ANESTHESIA IN NEONATES, INFANTS AND CHILDREN-an educational review- European journal of anesthesiology 2015

16. SAHIN L,SAHIN ETAL 2013 EJA

17. SETHI N,PANT D, et al JOURNAL OF CLINICAL ANESTHESIA 2016 This study to compare the efficacy of caudal epidural block (CEB) vs ultrasonography-guided transversusabdominis plane (TAP) block for providing postoperative pain relief in children scheduled for lower abdominal surgery

18. SURESH S,CHAN VW.ULTRASOUND GUIDED TRANSVERSUS ABDOMINI PLANE BLOCK IN CHILDREN AND INFANTS PEDIATRIC ANES 2009

19. TSUIB,SURESH S,ULTRASOUND IMAGING FOR REGIONAL ANESTHESIA IN INFANTS,CHILDREN,AND ADOLESCENTS PEDIATRIC ANESTHESIOLOGY 2010.

20. SURESHS,TAYLOR,OLIEVIERA ET AL PEDIATRIC ANESTHESIOLOGY 2015

21. TRANSVERSUSABDOMINIS PLANE BLOCK IN CHILDREN: A Multicenter Safety Analysis of 1994 Cases from the PRAN (Pediatric Regional Anesthesia Network) Database ANESTHESIA AND ANALGESIA AUGUST 2014.

22. VANSCHOOR AN,BOON JM,BOSENBERG AT,ABRAHAMS PH,anatomical considerations of pediatric ilioinguinal nerve block,pediatric anesth 2005

23. WILLSCHKE H, BOSENBERG A, MAROHOFER P, JOHNSTON S, ET AL , ULTRASONOGRAPHY FOR ILIOINGUINAL / ILIOHYPOGASTRIC NERVE BLOCK BJA 2005

24. WAFA MOHAMED AL SADEK et al: USG Guided TAP block vs USG guided caudal block for pain relief in children undergoing Lower abdominal surgery

BOOKS-

25. COUSINS &BRIDENBAUGH's neural blockade in clinical anaesthesia and pain medicine - 4th edition:595-699

26. DALLENS pediatric anaesthesia principles and practice, 2002,0528-575

27. FITZERALD M -The Neurobiology of foetal and infant pain. The textbook of pain 4th edition, 199,235-252

28. G.EDWARD MORGAN, Clinical anaesthesiology 4th edition, 314-316

29. GOODMAN & GILLMAN textbook of pharmacology

30. GREGORY'S pediatric Anaesthesia 5th edition

31. HAROLD ELLIS Anatomy for anaesthetists – 8th edition: 107-112

32. MALVIYA A practice of regional anaesthesia for infants and children 2002

33. MILLERS textbook of anaesthesia – 7th edition 1628-1634

34. MOTOYAMA& DAVIS SMITH'S Anaesthesia for infants and children 7th edition

35. PEDIATRIC Atlas of Ultrasound- and Nerve Stimulation-Guided Regional Anesthesia

36. REBECCA JACOB understanding pediatric anaesthesia 2nd edition, 96-110

37. STOLETING pharmacology and physiology in anaesthetic practice, 4th edition 179-202

PROFORMA

Title:

"PROSPECTIVE RANDOMISED DOUBLE BLINDED CONTROL STUDY COMPARING ULTRASOUND GUIDED ILIOINGUINAL BLOCK VS TRANSVERSUS ABDOMINIS PLANE BLOCK FOR POSTOPERATIVE ANALGESIA IN CHILDREN UNDERGOING ELECTIVE HERNIOTOMY".

DATE: ROLL NO: GROUP:

NAME:

AGE: SEX: WEIGHT: IP NO:

PRE OP ASSESSMENT: ASSESSMENT NO:

PREMEDICATION

RANDOMIZATION:

BASELINE VITAL PARAMETERS

Heart rate	
NIBP	
SpO2	

INDUCTION:

MAINTENANCE:

TIME OF ADMINISTRATION OF BLOCK:

DURATION OF SURGERY:

INTRAOP EVENTS:

TIME	EVENTS	HR	BP	SPO2

POSTOP EVENTS:

Time																		
HR																		
SPO2																		
FLACC																		
VAS																		

Time																		
HR																		
SPO2																		
FLACC																		
VAS																		

RESCUE ANALGESIC TIME OF ADMINISTRATION AND DOSE :

COMPLICATIONS:

GROUP	NAUSEA & VOMITING	URINARY RETENTION	RESPIRATORY DEPRESSION	
Group I				
Group T				

Dose: time:

Inj.Atropine

Inj.Ephedrine

INFORMATION TO PARTICIPANTS

Investigator **:** DR.SHINY PRIYADARSHINI.A

Name of the Participant:

Title:

"A PROSPECTIVE RANDOMISED CONTROL STUDY COMPARING ULTRASOUND GUIDED TRANSVERSUS ABDOMINIS PLANE BLOCK VS ULTRASOUND GUIDED ILIOINGUINAL BLOCK FOR POSTOPERATIVE ANALGESIA IN CHILDREN UNDERGOING ELECTIVE HERNIOTOMY"**.**

Your child is invited to take part in this research study. We have got approval from the Institutional Ethics Committee. Your child is asked to participate because your child satisfies the eligibility criteria .We want to compare and study the safety and efficacy of ultrasound guided transversusabdominis plane block vsultrasound guided ilioinguinal block in children undergoing hernia repair surgeries.

What is the Purpose of the Research

This study compares the efficacy of ultrasound guided TAP block vs the conventional method of ilioinguinal nerve block in providing postoperative relief in children undergoing inguinal hernia repair surgeries.

For this purpose, patient is anesthesied and ultrasound guided TAP block is given with 0.5 ml/kg of 0.25% bupivacaine for one group and 0.2 ml/kg of 0.25% bupivacaine is used for ultrasound guided ilioinguinal nerve block.

The Study Design:

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

Group1- GROUP I ULTRASOUND GUIDED ILIOINGUINAL BLOCK

Group 2- Group T- ULTRASOUND GUIDED TAP BLOCK

All children will be given anaesthesia by LMA.

Benefits:

Prolonged postoperative pain relief, thereby reducing the postoperative analgesic requirement.

Discomforts and risks:

- Hypersensitivity to local anaesthetics.
- Respiratory depression-very rare at this dose and if at all it occurs,it is easily recognisable and treatable.
- Hypotension and bradycardia

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

Time :

Date : Signature / Thumb Impression of Parent /guardian

Place :

Patient Name:

Signature of the Investigator : _____

Name of the Investigator : _____

PATIENT CONSENT FORM

Study title :

"A PROSPECTIVE RANDOMISED CONTROL STUDY COMPARING ULTRASOUND GUIDED ILIOINGUINAL BLOCK VS ULTRASOUND GUIDED TRANSVERSUS ABDOMINIS PLANE BLOCK FOR POSTOPERATIVE ANALGESIA IN CHILDREN UNDERGOING ELECTIVE HERNIOTMY

Study centre : INSTITUTE OF CHILD HEALTH AND HOSPITAL FOR CHILDREN, MADRAS MEDICAL COLLEGE EGMORE, CHENNAI.

Participant name: **I.P. No:** **Age:** **Sex:**

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 child's participation in the study is voluntary and that I am free to withdraw at any point oftime without giving any reason.

I understand that my child's 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. I hereby give permission to undergo complete clinical examination and diagnostic tests including haematological,biochemical,radiological tests.

I hereby agree to participate in this study.

Time:

Date: Signature / thumb impression

Name of the investigator: of patient's parent/guardian

DR.SHINY PRIYADARSHINI.A

சுய ஒப்புதல் படிவம்

ஆய்வு மையம்

குழந்தை சுகாதாரம் மற்றும் குழந்தைகள் மருத்துவமனை நிறுவனம், சென்னை மருத்துவக் கல்லூரி, எழும்பூர், சென்னை.

பங்கு பெறுபவரின் பெயர் :

வயது

ஆண் / பெண் பங்கு பெறுபவரின் எண்.

நான் இவ்வாய்வில் தன்னிச்சையாகத்தான் பங்கேற்கிறேன். எந்தக் காரணத்தினாலோ எந்தக் கட்டத்திலும் எந்த சட்டசிக்கலுக்கும் உட்படாமல் நான் இவ்வாய்வில் இருந்து விலகிக் கொள்ளலாம் என்றும் அறிந்து கொண்டேன். இந்த ஆய்வின் மூலம் கிடைக்கும் தகவல்களையும், பரிசோதனை முடிவுகளையும் மற்றும் சிகிச்சை தொடர்பான தகவல்களையும் மருத்துவர் மேற்கொள்ளும் ஆய்வில் பயன்படுத்திக் கொள்ளவும். அதை பிரசுரிக்கவும் என முழுமனதுடன் சம்மதிக்கிறேன்.

இந்த ஆய்வில் பங்கு கொள்ள ஒப்புக் கொள்கிறேன். எனக்குக் கொடுக்கப்பட்ட அறிவுரைகளின்படி நடந்து கொள்வதுடன் இந்த ஆய்வை மேற்கொள்ளும் மருத்துவ அணிக்கு உண்மையுடன் இருப்பேன் என்றும் உறுதியளிக்கிறேன் என் உடல் நலம் பாதிக்கப்பட்டாலோ அல்லது எதிர்பாராத வழக்கத்திற்கு மாறாக நோய்க்குறி தென்பட்டாலோ உடனே அதை மருத்துவ அணியிடம் தெரிவிப்பேன் என உறுதி அளிக்கிறேன்.

நோயாளியின் பெயர் :

நேரம் :

தேதி உள் நுழை நோயாளியின் பெற்றோர் :

பாதுகாவலரின் பெருவிரல் ரேகை :

இடம் :

உறவு முறை :

GROUP T							PERIOP HEART RATE							
S.NO	NAME	AGE	SEX	WEIGHT[k	IP NO	DOS	BI	AI	5	10	15	20	25	30
1	SIDDARTH	2	M	10	304	30	108	118	104	102	100	98	100	101
2	SIVATHANU	4	M	15	478	30	98	108	102	104	102	100	99	91
3	JAYADEEPAN	8	F	16	579	30	86	99	104	100	96	98	92	94
4	SHARVESHVARAN	4	M	14	635	35	100	104	102	98	94	97	90	92
5	RITHESH	4	M	14	1072	30	98	110	112	106	109	103	104	108
6	SIVAKUMAR	4	M	12	534	30	81	93	90	91	90	84	80	87
7	PRITHAM	5	M	15	103	28	94	100	102	101	96	98	92	94
8	SABARISH	3	M	10	776	28	102	108	104	100	98	94	92	93
9	YAMUNA	8	F	18	828	28	106	108	104	106	100	101	96	95
10	THIRUKUMAR	6	M	16	1071	32	100	104	100	98	94	97	92	93
11	ASHWIN	8	M	21	315	28	101	106	101	102	99	96	92	93
12	PRIYADARSHINI	5	F	16	824	30	98	102	92	96	94	90	92	93
13	ABISEK	3	M	14	584	35	114	118	121	124	136	124	121	118
14	ASIF	8	M	25	490	30	116	120	114	110	104	108	96	94
15	KAMESH	3	M	13	606	30	108	114	109	101	100	96	98	94
16	NITYASHREE	6	F	17	961	29	116	117	120	114	108	104	107	106
17	MONISH	7	M	18	475	28	104	114	103	104	108	110	101	100
18	JAYABHARATHI	4	M	14	916	29	120	121	116	108	110	104	100	100
19	MANOJKUMAR	4	M	16	354	29	116	120	118	110	106	102	104	100
20	ABHISHEK	4	M	15	895	30	114	116	112	106	101	100	100	98
21	KAUSHIK	5	M	15	771	25	100	104	94	90	90	96	93	92
22	JEEVANATHAN	5	M	14	844	30	98	104	100	96	96	95	94	92
23	DEEPAK RAJ	8	M	20	606	25	95	99	90	94	96	95	90	90
24	PRAKASH	2	M	11	664	25	110	114	112	110	108	106	108	108
25	YOGESH	3	M	12	435	25	100	108	102	100	100	98	102	102
26	MOSES	3	M	14	1231	25	102	110	102	102	102	100	104	104
27	GODWIN	5	M	16	1010	25	103	108	102	100	101	99	98	99
28	DOSITH	4	M	14	709	30	102	108	100	102	102	103	102	103
29	PRAVEEN	8	M	20	856	30	96	102	95	96	95	94	95	96
30	JEGAN	3	M	12	414	25	106	112	106	105	104	103	103	104
31	ALAMEL	5	F	15	595	30	97	104	96	94	93	94	95	94
32	RAJASEKAR	8	M	19	343	30	96	98	90	92	92	93	92	92
33	KAMALESH	6	M	17	325	35	94	98	94	92	90	92	91	90
34	JOSHUA	4	M	14	581	30	110	114	112	108	106	104	106	104
35	RITHESH	3	M	10	604	25	101	108	103	101	102	101	101	102

	GROUP T													
GROUP T	POST OP HEARTRATE													
S.NO	0	15	30	1HR	2HR	3HR	4HR	5HR	6HR	7HR	8HR	12HR	16HR	24HR
1	95	94	90	96	96	98	97	118	116	114	110	116	114	118
2	94	94	98	94	94	96	94	126	111	116	114	120	120	124
3	86	88	90	94	94	93	94	108	110	104	104	112	111	118
4	88	86	89	87	87	90	91	91	104	110	108	118	110	120
5	100	104	102	106	106	110	108	120	114	120	114	118	116	120
6	80	86	82	86	86	87	88	106	100	106	104	104	106	118
7	92	94	90	96	96	92	93	110	103	110	103	118	114	116
8	90	91	94	92	92	96	97	105	104	104	102	107	105	118
9	92	90	91	94	94	99	98	110	104	110	106	121	120	130
10	91	90	94	90	90	98	95	121	116	121	116	124	121	126
11	92	96	94	91	91	93	100	126	118	118	114	126	120	114
12	90	91	92	94	94	95	106	124	114	121	116	124	118	126
13	113	116	118	116	118	119	121	136	121	124	114	118	118	128
14	98	96	100	98	98	99	102	121	110	116	114	113	118	131
15	91	96	94	99	99	114	114	126	119	121	118	126	116	124
16	100	104	102	101	101	104	110	121	110	118	113	121	116	130
17	94	98	96	99	99	101	115	124	104	118	110	124	113	122
18	91	94	98	108	108	114	114	128	112	114	104	128	110	131
19	101	104	101	102	101	110	116	129	118	121	108	129	114	124
20	96	98	100	107	106	106	106	118	114	110	103	118	111	120
21	98	96	98	101	100	108	106	114	110	106	102	114	116	110
22	92	90	94	96	94	101	104	116	108	110	108	114	118	118
23	88	85	85	84	82	95	97	110	99	110	108	116	116	116
24	96	94	90	94	93	96	97	111	100	108	104	110	106	106
25	90	91	92	90	91	92	96	112	98	98	98	110	110	106
26	91	90	92	90	90	92	94	113	102	90	90	111	106	104
27	91	94	96	94	95	96	96	110	101	98	96	99	98	100
28	96	94	93	90	91	90	94	114	116	108	109	110	108	104
29	90	88	86	84	85	86	90	106	115	108	110	112	110	114
30	92	90	88	86	85	85	94	104	102	103	104	105	102	103
31	88	86	84	86	85	84	90	105	100	96	98	97	95	98
32	86	84	82	80	80	82	85	86	88	90	86	87	88	89
33	83	80	78	80	80	80	80	88	86	87	85	87	87	85
34	93	89	88	87	85	84	88	96	94	92	92	90	91	93
35	94	94	92	90	90	90	88	88	90	94	96	98	98	100

	GROUP T															
GROUP T	PERIOP SYSTOLIC BP								PERI OP DIASTOLIC BP							
S.NO	BI	AI	5	10	15	20	25	30	BI	AI	5	10	15	20	25	30
1	96	88	92	91	89	94	92	92	49	54	52	53	54	52	50	52
2	87	83	88	90	91	92	84	84	54	54	52	49	46	48	50	51
3	96	92	90	89	87	86	90	92	48	52	50	52	55	54	51	50
4	96	88	90	87	86	88	84	82	47	50	52	51	50	52	50	51
5	96	88	92	91	89	94	92	92	50	50	51	48	48	51	52	50
6	96	80	94	92	83	86	91	94	50	50	50	51	48	50	51	51
7	94	88	90	89	88	92	90	94	50	52	51	53	53	51	52	50
8	96	90	92	89	89	86	90	92	52	51	52	51	48	50	50	51
9	96	92	90	89	86	87	89	90	50	51	50	51	48	51	51	52
10	98	91	89	88	92	90	92	94	46	52	52	54	51	52	51	50
11	101	96	90	94	94	96	94	92	45	50	51	50	49	50	50	52
12	94	88	91	92	94	92	91	94	50	50	53	51	50	50	50	51
13	94	86	92	90	89	90	92	94	51	48	51	51	50	53	52	50
14	96	90	94	91	89	94	92	90	48	50	50	52	48	51	50	52
15	98	88	89	91	92	92	96	94	48	52	54	52	51	50	49	49
16	91	80	86	88	92	90	94	92	49	50	52	54	52	51	50	51
17	94	84	89	90	92	91	89	94	46	53	54	52	52	51	54	49
18	96	90	94	96	92	92	94	94	48	53	51	50	51	51	51	50
19	94	83	88	86	89	91	94	92	48	50	48	52	49	50	49	49
20	92	84	86	88	84	86	86	88	49	51	52	53	50	52	50	51
21	96	84	90	91	94	92	90	94	49	50	53	52	51	51	52	51
22	94	88	89	92	94	92	94	90	50	52	52	51	50	51	50	52
23	94	90	90	92	92	94	92	94	52	54	51	50	50	52	51	51
24	94	88	90	92	90	89	90	92	50	52	52	53	53	50	50	52
25	96	94	92	90	92	90	90	92	47	48	48	47	47	46	48	49
26	96	94	92	90	90	90	92	90	48	47	48	47	48	48	47	48
27	94	92	94	92	92	90	92	92	48	48	49	47	48	47	48	49
28	98	96	96	94	94	94	92	92	49	50	49	48	48	48	49	47
29	94	92	94	92	92	90	92	90	50	51	50	49	50	51	51	50
30	96	94	92	90	90	92	90	90	46	47	48	47	46	47	48	47
31	95	92	94	92	92	90	92	93	47	48	47	48	48	48	48	47
32	96	94	94	92	93	94	93	92	50	49	48	48	49	48	49	50
33	95	93	94	93	94	94	93	94	48	47	48	47	46	47	47	48
34	97	95	93	94	93	92	93	92	47	48	47	46	47	46	47	46
35	91	90	89	88	89	88	90	89	47	46	47	46	47	46	47	48

	GROUP T																					
GROUP T	PERIOP MAP									POST OP SYSTOLIC BP												
S.NO	BI	AI	5	10	15	20	25	30	35	0	1	2	3	4	5	6HR	7	8	12	16	24	
1	64.66667	65.33333	65.33333	65.66667	65.66667	66	64	65.33333		94	96	95	94	95	96	94	94	93	93	93	93	
2	65	63.66667	64	62.66667	61	62.66667	61.33333	62		88	87	88	96	93	92	94	94	93	93	92	92	
3	64	65.33333	63.33333	64.33333	65.66667	64.66667	64	64		94	92	96	94	94	98	96	96	96	96	95	94	
4	63.33333	62.66667	64.66667	63	62	64	61.33333	61.33333	#REF!	84	86	90	91	91	88	90	90	90	92	92	92	
5	65.33333	62.66667	64.66667	62.33333	61.66667	65.33333	65.33333	64		94	92	94	96	98	97	95	95	95	94	95	96	
6	65.33333	60	64.66667	64.66667	59.66667	62	64.33333	65.33333		94	96	96	98	98	96	95	95	95	95	96	97	
7	64.66667	64	64	65	64.66667	64.66667	64.66667	64.66667		93	91	96	94	94	96	98	98	98	98	96	96	
8	66.66667	64	65.33333	63.66667	61.66667	62	63.33333	64.66667		94	96	94	97	97	95	95	94	94	96	97	97	
9	65.33333	64.66667	63.33333	63.66667	60.66667	63	63.66667	64.66667		89	91	92	90	90	93	94	94	94	94	96	95	
10	63.33333	65	64.33333	65.33333	64.66667	64.66667	64.66667	64.66667		90	91	95	96	94	96	96	98	96	96	96		
11	63.66667	65.33333	64	64.66667	64	65.33333	64.66667	65.33333		94	94	92	96	96	98	97	97	98	98	98	99	
12	64.66667	62.66667	65.66667	64.66667	64.66667	64	63.66667	65.33333		92	94	93	96	96	98	96	95	96	96	96	96	
13	65.33333	60.66667	64.66667	64	63	65.33333	65.33333	64.66667	#REF!	92	95	93	95	95	94	96	96	96	96	96	98	
14	64	63.33333	64.66667	65	61.66667	65.33333	64	64.66667		91	94	93	96	96	95	97	97	98	98	97	98	
15	64.66667	64	65.66667	65	64.66667	64	64.66667	64		93	96	94	95	95	97	96	94	94	94	94	95	
16	63	60	63.33333	65.33333	65.33333	64	64.66667	64.66667		92	95	94	96	96	97	96	98	97	97	96	96	
17	62	63.33333	65.66667	64.66667	65.33333	64.33333	65.66667	64		93	94	94	96	96	97	97	98	96	96	95	96	
18	64	65.33333	65.33333	65.33333	64.66667	64.66667	65.33333	64.66667		96	95	95	97	97	99	97	98	97	96	96	97	
19	63.33333	61	61.33333	63.33333	62.33333	63.66667	64	63.33333		90	93	94	96	96	94	95	95	97	96	96	97	
20	63.33333	62	63.33333	64.66667	61.33333	63.33333	62	63.33333		90	92	94	96	96	97	95	95	98	97	97	98	
21	64.66667	61.33333	65.33333	65	65.33333	64.66667	64.66667	65.33333		92	91	93	95	95	94	96	96	97	97	96	97	
22	64.66667	64	64.33333	64.66667	64.66667	64.66667	64.66667	64.66667		92	93	91	94	94	96	95	95	96	96	96	96	
23	66	66	64	64	64	66	64.66667	65.33333		94	93	91	90	90	92	94	94	95	94	94	95	
24	64.66667	64	64.66667	66	65.33333	63	63.33333	65.33333		94	92	90	92	92	90	92	92	92	90	93	93	
25	63.33333	63.33333	62.66667	61.33333	62	60.66667	62	63.33333		93	92	90	92	92	92	93	93	94	92	94	94	
26	64	62.66667	62.66667	61.33333	62	62	62	62		94	94	94	92	90	96	94	94	96	96	97	97	
27	63.33333	62.66667	64	62	62.66667	61.33333	62.66667	63.33333		92	92	92	92	94	96	96	94	94	94	96	96	
28	65.33333	65.33333	64.66667	63.33333	63.33333	63.33333	63.33333	62		92	92	90	90	90	90	94	92	94	94	93	93	95
29	64.66667	64.66667	64.66667	63.33333	64	64	64.66667	63.33333		90	90	90	90	90	90	94	92	94	93	93	95	95
30	62.66667	62.66667	62.66667	61.33333	60.66667	62	62	61.33333		94	94	92	92	92	96	94	95	96	95	96	97	
31	63	62.66667	62.66667	62.66667	62.66667	62	62.66667	62.33333		90	90	90	90	92	94	94	95	95	96	96	96	
32	65.33333	64	63.33333	62.66667	63.66667	63.33333	63.66667	64		92	90	92	92	90	90	90	90	90	91	92	92	
33	63.66667	62.33333	63.33333	62.33333	62	62.66667	62.33333	63.33333		94	93	94	93	93	93	94	94	94	93	94	94	
34	63.66667	63.66667	62.33333	62	62.33333	61.33333	62.33333	61.33333		92	92	91	92	91	92	91	92	90	92	92	92	
35	61.66667	60.66667	61	60	61	60	61.33333	61.66667		89	90	90	91	90	91	92	92	90	90	90	90	

	GROUP T																						
GROUP T	POST OP DIASTOLIC BP												POST OP MAP										
S.NO	0	1	2	3	4	5	6	7	8	12	16	24	0	1	2	3	4	5	6	7	8	12	16
1	49	49	50	51	49	50	48	49	49	48	50	50	64	64.66667	65	65.33333	64.33333	65.33333	64.66667	64	63.66667	63	64.33333
2	49	50	50	49	50	50	48	47	46	47	51	51	62	62.33333	62.66667	64.66667	64.33333	64	64	62.66667	61.66667	62.33333	64.66667
3	51	51	50	50	46	46	46	47	49	48	49	49	65.33333	64.66667	65.33333	64.66667	62	63.33333	63.33333	63.33333	64.66667	64	64.33333
4	48	46	51	53	49	49	48	47	46	47	52	52	60	59.33333	64	65.66667	63	62	62	61.33333	60.66667	62	65.33333
5	50	51	51	49	46	46	46	47	50	51	49	49	64.66667	64.66667	65.33333	64.66667	63.33333	63	63	63	65	65.33333	64.33333
6	49	50	49	46	50	50	49	48	49	48	50	50	64	65.33333	64.66667	63.33333	66	65.33333	65.33333	63.66667	64.33333	63.66667	65.33333
7	51	50	50	49	48	48	49	48	48	48	49	49	65	63.66667	65.33333	64	63.33333	64	64	64.66667	64.66667	64.66667	64.66667
8	50	46	49	47	49	49	48	47	47	48	50	50	64.66667	62.66667	64	63.66667	65	64.33333	64.33333	62.66667	62.66667	64	65.66667
9	51	52	50	53	50	50	49	49	50	51	50	50	63.66667	65	64	65.33333	63.33333	64.33333	64.33333	64	64.66667	65.33333	65.33333
10	51	53	50	49	51	51	50	49	49	49	48	48	64	65.66667	65	64.66667	65.33333	66	66	65.33333	64.66667	64.66667	64
11	51	50	51	47	49	49	50	49	50	48	47	47	65.33333	64.66667	64.66667	63.33333	64.66667	65.33333	65.33333	65	66	64.66667	64
12	50	49	50	50	46	48	47	48	50	49	50	50	64	64	64.33333	65.33333	62.66667	64.66667	63.33333	63.66667	65.33333	64.66667	65.33333
13	49	49	50	49	47	47	47	48	48	47	48	48	63.33333	64.33333	64.33333	64.33333	63	62.66667	62.66667	64	64	63.33333	64
14	51	50	49	45	49	49	48	48	49	58	47	47	64.33333	64.66667	63.66667	62	64.66667	64.33333	64.33333	64.33333	65.33333	71.33333	63.66667
15	50	49	50	49	50	49	49	49	51	50	50	50	64.33333	64.66667	64.66667	64.33333	65	65	65.66667	64	65.33333	64.66667	64.66667
16	50	48	52	49	49	49	49	48	48	48	49	49	64	63.66667	66	64.66667	64.66667	65	65	64.66667	64.33333	64.33333	64.66667
17	50	49	50	48	47	46	47	47	48	47	46	46	64.33333	64	64.66667	64	63.33333	63	63.66667	64	64	63.33333	62.33333
18	49	51	49	50	49	48	47	48	49	48	47	47	64.66667	65.66667	64.33333	65.66667	65	65	65.66667	64.66667	65	64	63.33333
19	51	50	48	50	49	49	48	49	49	48	49	46	64	64.33333	63.33333	65.33333	64.66667	64	64	64.33333	65	64	64.66667
20	52	52	50	46	50	50	49	48	51	50	49	49	64.66667	65.33333	64.66667	62.66667	65.33333	65.66667	65.66667	63.66667	66.66667	65.66667	65
21	51	52	50	51	49	49	50	48	46	47	48	48	64.66667	65	64.33333	65.66667	64.33333	64	64	64	63	63.66667	64
22	52	51	49	50	50	50	50	49	50	50	49	49	65.33333	65	63	64.66667	64.66667	65.33333	65.33333	64.33333	65.33333	65.33333	64.66667
23	50	51	51	51	53	53	52	50	53	53	51	53	64.66667	65	64.33333	64	65.33333	66	66	64.66667	67	66.66667	65.33333
24	48	48	49	50	51	51	50	49	48	47	48	49	63.33333	62.66667	62.66667	64	64.66667	64	64	63.33333	62.66667	61.33333	63
25	47	48	46	46	47	48	49	48	46	46	47	47	62.33333	62.66667	60.66667	61.33333	62	62.66667	62	63	62	61.33333	62.66667
26	48	47	48	47	48	47	47	48	47	47	47	48	63.33333	62.66667	63.33333	62	62	63.33333	64	63.33333	63.33333	63.33333	63.66667
27	46	47	46	46	47	48	46	47	48	47	48	48	61.33333	62	61.33333	61.33333	62.66667	64	63.33333	62.66667	63.33333	62.66667	64
28	47	48	46	47	48	47	47	48	48	47	47	48	62	62.66667	60.66667	61.33333	62	62.66667	63.33333	63.33333	63.33333	62.33333	62.33333
29	48	47	48	47	47	48	48	48	47	48	48	49	62	61.33333	62	61.33333	61.33333	63.33333	62.66667	63.33333	62.33333	63	63.66667
30	50	51	50	50	51	50	50	49	49	48	47	48	64.66667	65.33333	64	64	64.66667	65.33333	66	64.33333	64.66667	63.66667	63.33333
31	48	49	48	49	50	48	49	48	47	48	47	48	62	62.66667	62	62.66667	64	63.33333	64.66667	63.66667	63	64	63.33333
32	50	48	48	47	48	47	48	49	48	49	49	50	64	62	62.66667	62	62	61.33333	62	62.66667	62	63	63.33333
33	48	48	49	49	50	49	49	49	49	48	49	48	63.33333	63	64	63.66667	64.33333	63.66667	64.33333	64	64	63	64
34	46	47	47	48	47	47	46	47	46	47	46	47	61.33333	62	61.66667	62.66667	61.66667	62	62	62	60.66667	62	61.33333
35	48	48	47	48	49	47	48	48	48	49	48	48	61.66667	62	61.33333	62.33333	62.66667	61.66667	63	62.66667	62	62.66667	62

		GROUP T																						
GROUP T											TIME TO FIRST RESCUE ANALGESIA IN MINUTES													
S.NO	24	OHR	1HR	2HR	3HR	4HR	5HR	6HR	7HR	8HR	12HR	24HR			RESPIRATORY DEPRESSION			URINARY RETENTION				APNOEA		PONV
1	64.33333	0	1	2	2	2	3	1	2	2	2	2		300			0	0	0	0	0	0	0	0
2	64.66667	0	1	2	2	2	3	2	2	2	2	2		320		0	0	0	0	0	0	0	0	0
3	64	0	1	2	2	2	3	1	2	2	2	2		310		0	0	0	0	0	0	0	0	0
4	65.33333	0	1	2	2	2	3	1	2	2	2	2		300		0	0	0	0	0	0	0	0	0
5	64.66667	0	1	2	2	2	4	1	2	2	2	2		310		0	0	0	0	0	0	0	0	0
6	65.66667	0	1	2	2	2	3	2	2	2	2	2		325		0	0	0	0	0	0	0	0	0
7	64.66667	0	1	2	3	2	3	2	2	2	2	2		321		0	0	0	0	0	0	0	0	0
8	65.66667	0	1	2	2	2	3	2	2	2	2	2		320		0	0	0	0	0	0	0	0	0
9	65	0	1	2	2	3	3	2	2	2	2	2		310		0	0	0	0	0	0	0	0	0
10	32	0	1	2	2	2	3	2	2	2	2	2		320		0	0	0	0	0	0	0	0	0
11	64.33333	0	1	2	2	2	3	2	2	2	2	2		300		0	0	0	0	0	0	0	0	0
12	65.33333	0	1	2	2	2	3	2	2	2	2	2		310		0	0	0	0	0	0	0	0	0
13	64.66667	0	1	2	2	2	3	2	2	2	2	2		310		0	0	0	0	0	0	0	0	0
14	64	0	1	2	2	2	3	2	2	2	2	2		320		0	0	0	0	0	0	0	0	0
15	65	0	1	2	2	2	3	1	2	2	2	2		320		0	0	0	0	0	0	0	0	0
16	64.66667	0	1	2	2	2	3	1	2	2	2	2		310		0	0	0	0	0	0	0	0	0
17	62.66667	0	1	2	2	3	3	1	2	2	2	2		300		0	0	0	0	0	0	0	0	0
18	63.66667	0	1	2	2	2	3	1	2	2	2	2		310		0	0	0	0	0	0	0	0	0
19	63	0	1	2	2	2	3	1	2	2	2	2		325		0	0	0	0	0	0	0	0	0
20	65.33333	0	1	2	2	2	3	1	2	2	2	2		340		0	0	0	0	0	0	0	0	0
21	64.33333	0	1	2	2	2	4	1	2	2	2	2		330		0	0	0	0	0	0	0	0	0
22	64.66667	0	1	2	2	2	3	1	2	2	2	2		320		0	0	0	0	0	0	0	0	0
23	67	0	1	2	2	2	3	1	2	2	3	2		300		0	0	0	0	0	0	0	0	0
24	63.66667	0	1	1	2	3	3	2	2	2	2	2		300		0	0	0	0	0	0	0	0	0
25	62.66667	0	1	2	2	2	3	2	2	2	3	2		310		0	0	0	0	0	0	0	0	0
26	64.33333	0	1	1	2	2	3	2	2	2	2	2		325		0	0	0	0	0	0	0	0	0
27	64	0	1	2	2	2	3	2	2	2	2	2		340		0	0	0	0	0	0	0	0	0
28	63.66667	0	1	2	2	2	3	2	2	2	2	2		330		0	0	0	0	0	0	0	0	0
29	64.33333	0	1	2	2	2	3	2	2	2	2	2		320		0	0	0	0	0	0	0	0	0
30	64.33333	0	1	1	2	2	3	2	2	2	2	2		300		0	0	0	0	0	0	0	0	0
31	64	0	1	2	2	3	4	2	2	2	2	2		300		0	0	0	0	0	0	0	0	0
32	64	0	1	1	2	2	4	2	2	2	2	2		310		0	0	0	0	0	0	0	0	0
33	63.33333	0	1	1	2	2	3	2	2	2	2	2		305		0	0	0	0	0	0	0	0	0
34	62	0	1	2	2	2	4	2	2	2	2	2		300		0	0	0	0	0	0	0	0	0
35	62	0	1	1	2	2	4	2	2	2	2	2		310		0	0	0	0	0	0	0	0	0

Group I																
							PERIOP HEART RATE									
S.NO	NAME	AGE	SEX	WEIGHT(K	IP NO		BI	AI	5	10	15	20	25	30	35	
1	JOSHUA	5	M	16	581	30	100	106	100	98	96	90	94	91		
2	GOKUL	4	M	12	643	25	104	110	104	106	100	96	98			
3	YAMINI	8	F	16	590	30	98	106	100	101	99	96	94	92		
4	SULAIMAN	4	M	13	897	30	108	114	104	106	104	100	104	102		
5	LOKESH	5	M	14	864	30	116	120	104	104	100	101	97	96		
6	SNEHA	5	F	16	964	30	110	114	116	104	106	100	100	102		
7	VISHWA	3	M	11	617	30	114	116	106	100	96	94	96	97		
8	KISHORE	8	M	18	932	30	118	120	114	100	106	102	104	100		
9	AJITH	7	M	18	144	30	106	110	104	99	98	96	97	96		
10	MADAN	8	M	20	715	30	114	116	111	107	106	104	101	97		
11	JAYAPRAKA	5	M	15	115	30	107	110	106	100	98	97	94	97		
12	THAVASEL	3	M	11	551	30	118	120	116	110	108	107	104	100		
13	LAKSHMAN	8	M	21	151	35	120	126	118	112	110	112	106	98	97	
14	SUSENDER	6	M	15	980	26	106	110	108	102	100	94	94	95	94	
15	RAMKUMA	4	M	13	706	29	103	106	100	98	97	94	96	98		
16	VICKY	4	M	12	648	30	106	110	106	100	98	96	97	97		
17	ABINAVAS	3	M	12	706	30	107	110	104	101	96	98	93	97		
18	KAVIYA	5	F	14	613	30	104	109	101	102	98	94	96	98		
19	PAVAN	5	M	15	861	29	101	108	96	94	92	94	96	97		
20	YESHWINA	6	F	15	717	29	98	106	97	94	96	94	97	97		
21	DHARSHAN	5	M	14	771	29	114	121	114	110	116	107	106	104		
22	AKASH	5	M	15	931	29	118	126	116	112	108	106	107	108		
23	SRINIVASA	8	M	19	987	35	102	114	106	100	94	96	94	96	98	
24	HAREEN	5	M	15	1146	30	104	110	106	105	105	104	104	103	103	
25	TAMIL SEL	3	M	12	715	35	110	114	112	108	107	108	106	106	105	
26	HARAN SA	4	M	14	628	30	108	110	106	102	103	102	103	100	101	
27	EASHWAR	7	M	18	719	35	98	100	94	92	92	93	92	92	93	
28	NAREN KA	8	M	21	789	30	96	98	90	90	88	90	90	90	90	
29	JOHN LEVI	2	M	10	573	30	112	114	110	108	107	107	106	105	104	
30	ADITHYA E	4	M	16	184	35	114	118	113	112	110	110	108	106	106	
31	SHYAM	2	M	11	330	30	116	117	112	110	110	108	106	108	107	
32	YOGESH	3	M	13	435	30	114	116	112	110	108	106	106	105	104	
33	PRASHANT	4	M	15	337	35	108	112	104	102	102	100	102	102	102	
34	MANOJ	2	M	11	359	30	112	116	110	112	110	108	108	107	107	
35	DIWAKAR	8	M	22	923	30	98	102	96	94	94	93	92	90	90	

Group I														
	ILIONGUINAL													
	POST OP HEARTRATE													
S.NO	0	15	30	1HR	2HR	3HR	4HR	5HR	6HR	7HR	8HR	12HR	16HR	24HR
1	92	96	98	100	104	100	100	110	104	120	104	106	110	110
2	94	98	100	104	100	104	104	105	109	121	109	107	110	110
3	92	91	96	98	100	107	105	106	108	121	108	108	110	110
4	101	100	101	104	105	106	107	109	108	120	108	108	110	110
5	96	97	94	98	99	101	102	104	110	120	110	110	111	111
6	98	94	98	96	99	99	100	107	104	116	104	108	114	114
7	96	94	96	96	99	101	103	104	109	119	109	110	118	118
8	103	101	103	104	107	108	104	106	119	119	109	112	118	118
9	98	96	96	98	100	101	102	104	118	118	108	110	110	110
10	102	102	104	108	106	112	112	116	119	120	113	112	114	114
11	96	96	94	98	99	104	103	108	106	120	106	108	110	110
12	100	102	102	108	106	110	108	114	116	121	116	114	118	118
13	108	108	110	114	116	112	110	118	120	131	120	124	128	128
14	96	96	94	96	98	99	98	103	106	118	106	108	110	110
15	92	94	93	94	96	99	98	106	108	119	108	110	110	110
16	93	92	96	94	96	99	98	107	109	117	109	112	114	114
17	94	96	96	98	100	104	102	101	111	121	111	110	110	110
18	94	94	96	94	95	96	97	96	99	119	99	100	101	101
19	93	92	91	96	98	99	98	100	104	125	104	106	110	110
20	94	94	96	96	98	100	98	104	108	115	108	108	110	110
21	104	94	96	98	98	101	100	106	104	114	104	108	110	110
22	101	100	101	104	108	110	108	114	121	118	118	116	118	118
23	96	95	96	98	98	100	98	102	106	119	106	106	108	108
24	98	96	94	94	92	92	92	94	92	118	118	98	99	100
25	96	94	94	95	94	94	95	96	114	116	119	108	102	104
26	95	95	94	92	90	92	92	92	110	117	119	112	110	108
27	88	88	84	86	86	88	94	100	98	106	118	98	100	102
28	84	82	82	82	84	84	84	84	90	105	120	98	96	97
29	92	90	90	90	90	90	92	92	94	112	119	99	98	99
30	90	90	90	90	90	91	91	92	98	116	118	99	99	98
31	92	90	92	90	90	89	90	90	98	116	119	98	99	99
32	88	88	88	90	90	91	92	99	100	114	118	98	99	100
33	86	86	86	88	88	88	90	98	102	115	117	98	99	101
34	87	87	86	87	87	87	95	97	101	115	119	99	100	102
35	82	80	82	80	81	82	96	99	102	115	117	99	101	103

Group I	GROUP I																	
	PERIOP SYSTOLIC BP									PERIOP DIASTOLIC BP								
S.NO	BI	AI	5	10	15	20	25	30	35	BI	AI	5	10	15	20	25	30	35
1	94	98	90	89	88	92	92	94		49	49	49	53	52	51	51	50	
2	96	90	94	91	89	94	94			46	52	49	52	48	50	52		
3	96	92	90	89	87	86	86	92		49	52	48	52	55	54	50	52	
4	103	88	92	91	89	94	94	92	92	46	51	52	52	54	49	50	51	52
5	94	88	89	92	94	90	90	96		49	48	51	51	50	48	52	52	
6	96	84	90	91	94	92	92	90		47	48	53	52	49	50	51	52	
7	92	84	86	88	84	86	86	90		51	46	48	50	49	51	48	50	
8	94	83	88	86	86	89	89	96		49	43	48	47	49	53	49	50	
9	100	90	94	96	92	92	92	90		48	52	51	49	51	51	50	52	
10	94	84	89	90	92	91	91	92		50	53	51	52	52	51	53	52	
11	91	82	88	92	90	94	94	94		51	52	51	52	52	50	50	50	
12	98	88	89	91	92	92	92	96		49	52	54	51	51	50	55	53	
13	94	86	92	90	89	90	90	92	94	49	48	51	52	50	54	51	52	53
14	94	88	91	92	94	92	92			49	50	51	50	51	50	46		
15	100	96	91	94	95	96	96	94		46	49	51	50	49	49	49	48	
16	98	91	89	88	92	90	90	92		49	49	52	52	50	51	51	50	
17	96	90	92	89	86	87	87	90		49	53	51	51	48	51	49	48	
18	98	94	96	92	89	86	86	92		49	51	49	51	53	51	52	51	
19	105	92	94	92	89	92	92	94		46	49	49	52	51	50	51	52	
20	96	88	92	91	89	94	94	92		46	50	51	48	48	51	51	50	
21	101	88	90	91	94	92	92	95		46	52	50	51	50	50	51	50	
22	100	91	93	92	96	94	94	96		47	52	51	51	49	50	50	50	
23	96	88	92	91	89	94	94	92	94	48	52	50	48	48	51	50	52	53
24	96	94	95	95	96	94	94	92		48	49	50	51	49	48	49	49	51
25	94	92	93	94	95	94	94	92		47	48	47	48	49	48	47	48	50
26	95	94	94	95	94	93	93	92		48	49	48	49	48	49	47	48	
27	97	96	94	95	94	95	95	93		47	48	49	48	47	48	49	48	
28	96	95	94	93	93	94	94	92		49	48	49	48	47	48	49	48	
29	95	94	93	92	93	94	94	92		48	47	48	49	48	47	48	47	
30	94	92	90	92	93	94	94	93		47	48	49	48	47	48	49	48	
31	96	94	93	92	94	95	95	95		47	48	48	47	48	49	48	47	
32	93	94	94	93	94	92	92	94		46	49	48	49	48	48	47	48	
33	94	94	95	94	95	94	94	92		48	48	47	49	48	47	49	48	
34	93	92	92	92	90	91	91	94		49	49	48	47	48	49	47	47	
35	92	94	94	95	96	95	95	94		48	47	48	49	48	47	48	48	

Group I																								
																			POSTOP SYSTOLIC BP					
	PERIOP MAP																							
S.NO	BI	AI	5	10	15	20	25	30	35	OHR	1HR	2HR	3HR	4HR	5HR	6HR	7HR	8HR	12HR	16HR	24HR	0	1HR	
1	64	65.33333	62.66667	65	64	64.66667	64.66667	64.66667		93	93	91	94	94	96	95	95	95	95	96	96	46	48	
2	62.66667	64.66667	64	65	61.66667	64.66667	64.66667			91	91	93	95	95	94	95	96	96	96	97	97	47	45	
3	64.66667	65.33333	62	64.33333	65.66667	64.66667	64.66667	65.33333		92	92	94	96	96	97	96	95	95	97	98	98	45	46	
4	65	63.33333	65.33333	65	65.66667	64	64	64.66667	65.33333	93	93	94	96	96	94	95	95	95	96	97	97	46	46	
5	64	61.33333	63.66667	64.66667	64.66667	62	62	66.66667		95	95	95	97	97	99	98	98	98	97	97	97	48	49	
6	63.33333	60	65.33333	65	64	64	64	64.66667		95	95	94	96	96	97	97	98	98	97	96	96	46	47	
7	64.66667	58.66667	60.66667	62.66667	60.66667	62.66667	62.66667	63.33333		94	94	94	96	96	97	98	98	98	97	96	96	47	46	
8	64	56.33333	61.33333	60	61.33333	65	65	65.33333		96	96	94	95	95	97	94	94	94	96	95	95	46	48	
9	65.33333	64.66667	65.33333	64.66667	64.66667	64.66667	64.66667	64.66667		94	94	93	96	96	95	97	97	97	97	98	98	45	47	
10	64.66667	63.33333	63.66667	64.66667	65.33333	64.33333	64.33333	65.33333		95	95	93	95	95	94	96	96	96	97	98	98	46	48	
11	64.33333	62	63.33333	65.33333	64.66667	64.66667	64.66667	64.66667		94	94	93	96	96	98	95	95	95	96	96	96	47	46	
12	65.33333	64	65.66667	64.33333	64.66667	64	64	67.33333		94	94	92	96	96	98	97	97	97	98	99	99	46	46	
13	64	60.66667	64.66667	64.66667	63	66	66	65.33333	64.667	91	91	95	96	96	96	98	98	98	97	96	96	45	46	
14	64	62.66667	64.33333	64	65.33333	64	64			96	96	94	97	97	95	94	94	94	96	97	97	47	49	
15	64	64.66667	64.33333	64.66667	64.33333	64.66667	64.66667	63.33333		91	91	92	90	90	93	94	94	94	95	95	95	43	45	
16	65.33333	63	64.33333	64	64	64	64	64		91	91	96	94	94	96	98	98	98	97	96	96	46	45	
17	64.66667	65.33333	64.66667	63.66667	60.66667	63	63	62		96	96	96	98	98	96	95	95	95	96	97	97	47	48	
18	65.33333	65.33333	64.66667	64.66667	65	62.66667	62.66667	64.66667		92	92	96	94	94	98	96	96	96	95	95	94	48	51	
19	65.66667	63.33333	64	65.33333	63.66667	64	64	66		86	86	90	91	91	88	90	90	90	90	92	92	42	46	
20	62.66667	62.66667	64.66667	62.33333	61.66667	65.33333	65.33333	64		92	92	94	96	96	97	95	95	95	95	96	96	46	51	
21	64.33333	64	63.33333	64.33333	64.66667	64	64	65		96	96	95	94	94	96	94	94	94	93	93	93	47	55	
22	64.66667	65	65	64.66667	64.66667	64.66667	64.66667	65.33333		94	94	94	92	92	94	96	96	96	95	94	94	50	47	
23	64	64	64	62.33333	61.66667	65.33333	65.33333	65.33333	64.667	94	94	93	93	94	95	94	94	95	96	94	95	49	49	
24	64	64	65	65.66667	64.66667	63.33333	63.33333	63.33333		95	95	94	94	93	95	96	95	96	94	96	95	50	50	
25	62.66667	62.66667	62.33333	63.33333	64.33333	63.33333	63.33333	62.66667		94	94	95	94	94	95	96	95	95	95	94	94	49	49	
26	63.66667	64	63.33333	64.33333	63.33333	63.66667	63.66667	62.66667		95	95	94	94	95	96	97	96	95	96	96	96	48	48	
27	63.66667	64	64	63.66667	62.66667	63.66667	63.66667	63		94	94	94	94	95	95	96	95	95	95	95	95	49	49	
28	64.66667	63.66667	64	63	62.33333	63.33333	63.33333	62.66667		92	92	92	93	94	95	96	95	94	95	95	96	49	49	
29	63.66667	62.66667	63	63.33333	63	62.66667	62.66667	62		94	94	94	94	95	97	98	97	96	97	97	96	47	47	
30	62.66667	62.66667	62.66667	62.66667	62.33333	63.33333	63.33333	63		93	93	93	93	96	97	97	96	96	97	96	96	48	48	
31	63.33333	63.33333	63	62	63.33333	64.33333	64.33333	63		92	92	92	92	95	96	96	95	96	95	95	96	49	49	
32	61.66667	64	63.33333	63.66667	63.33333	62.66667	62.66667	63.33333		93	93	93	94	96	97	98	97	97	96	97	96	48	48	
33	63.33333	63.33333	63	64	63.66667	62.66667	62.66667	62.66667		94	94	94	94	96	97	98	97	97	96	96	97	50	50	
34	63.66667	63.33333	62.66667	62	62	63	63	62.66667		94	94	95	96	96	97	98	97	97	96	97	97	51	51	
35	62.66667	62.66667	63.33333	64.33333	64	63	63	63.33333		96	96	96	96	96	97	98	97	96	97	96	96	49	49	

Group I																						
	POSTOP DIASTOLIC BP										POST OP MAP											
S.NO	2HR	3HR	4HR	5HR	6HR	7HR	8HR	12HR	16HR	24HR	0	1HR	2HR	3HR	4HR	5HR	6HR	7HR	8HR	12HR	16HR	24HR
1	46	48	47	47	48	51	51	48	49	49	61.66667	63	61	63.33333	62.66667	63.33333	63.66667	65.66667	65.66667	63.66667	64.66667	64.66667
2	47	49	46	46	47	49	49	49	50	50	61.66667	60.33333	62.33333	64.33333	62.33333	62	63	64.66667	64.66667	64.66667	65.66667	65.66667
3	47	49	49	49	48	48	48	46	46	46	60.66667	61.33333	62.66667	64.66667	64.66667	65	64	63.66667	63.66667	63	63.33333	63.33333
4	46	49	49	49	48	49	49	47	47	47	61.66667	61.66667	62	64.66667	64.66667	64	63.66667	64.33333	64.33333	63.33333	63.66667	63.66667
5	47	49	46	46	47	48	48	47	46	46	63.66667	64.33333	63		63	63.66667	64	64.66667	64.66667	63.66667	63	63
6	47	51	47	47	46	46	46	48	49	49	62.33333	63	62.66667	66	63.33333	63.66667	63	63.33333	63.33333	64.33333	64.66667	64.66667
7	46	50	50	50	48	46	46	47	48	48	62.66667	62	62	65.33333	65.33333	65.66667	64.66667	63.33333	63.33333	63.66667	64	64
8	46	50	50	50	48	47	47	48	49	49	62.66667	64	62	65	65	65.66667	63.33333	62.66667	62.66667	64	64.33333	64.33333
9	46	49	46	46	48	51	51	50	49	49	61.33333	62.66667	61.66667	64.66667	62.66667	62.33333	64.33333	66.33333	66.33333	65.66667	65.33333	65.33333
10	46	50	46	46	47	49	49	48	46	46	62.33333	63.66667	61.66667	65	62.33333	62	63.33333	64.66667	64.66667	64.33333	63.33333	63.33333
11	43	49	48	48	49	50	50	48	49	49	62.66667	62	59.66667	64.66667	64	64.66667	64.33333	65	65	64	64.66667	64.66667
12	46	49	53	53	50	49	49	48	46	46	62	62	61.33333	64.66667	67.33333	68	65.66667	65	65	64.66667	63.66667	63.66667
13	51	48	49	49	48	49	49	47	49	49	60.33333	61	65.66667	64	64.66667	64.66667	64.66667	65.33333	65.33333	63.66667	64.66667	64.66667
14	48	49	51	51	50	49	49	48	46	49	63.33333	64.66667	63.33333	65	66.33333	65.66667	64.66667	64	64	64	63	65
15	46	45	48	48	48	48	48	47	49	49	59	60.33333	61.33333	60	62	63	63.33333	63.33333	63.33333	63	64.33333	64.33333
16	49	50	48	48	47	47	47	48	48	48	61	60.33333	64.66667	64.66667	63.33333	64	64	64	64	64.33333	64	64
17	49	45	48	48	49	49	49	48	47	47	63.33333	64	64.66667	62.66667	64.66667	64	64.33333	64.33333	64.33333	64	63.66667	63.66667
18	48	49	49	49	48	46	46	47	48	48	62.66667	64.66667	64	64	64	65.33333	64	62.66667	62.66667	63	63.66667	63.33333
19	51	50	42	42	43	43	43	47	49	49	56.66667	59.33333	64	63.66667	58.33333	57.33333	58.66667	58.66667	58.66667	61.33333	63.33333	63.33333
20	46	48	49	49	48	50	50	49	48	48	61.33333	64.66667	62	64	64.66667	65	63.66667	65	65	64.33333	64	64
21	47	51	48	48	46	44	44	48	49	49	63.33333	68.66667	63	65.33333	63.33333	64	62	60.66667	60.66667	63	63.66667	63.66667
22	48	46	48	48	47	46	46	47	46	46	64.66667	62.66667	63.33333	61.33333	62.66667	63.33333	63.33333	62.66667	62.66667	63	62	62
23	48	48	48	47	47	48	48	48	49	49	64	64	63	63	63.33333	63.66667	62.66667	63.33333	63.66667	64	64	64.33333
24	49	49	48	47	48	48	47	48	49	49	65	65	64	64	63	63.66667	64	63.66667	63.33333	63.33333	64.66667	64.33333
25	48	49	49	48	47	48	48	49	48	48	64	64	63.66667	64	64	64.33333	63.33333	63.66667	63.66667	64.33333	63.33333	63.33333
26	47	48	48	47	47	48	48	48	48	48	63.66667	63.66667	62.66667	63.33333	63.66667	64	63.66667	64	63.66667	64	64	64
27	48	49	49	49	49	48	49	48	48	48	64	64	63.33333	64	64.33333	64.33333	64.66667	63.66667	64.33333	63.66667	63.66667	63.66667
28	48	49	49	49	48	48	48	48	46	46	63.33333	63.33333	62.66667	63.66667	64	64.33333	64	63.66667	63.33333	63.66667	62.33333	62.66667
29	47	48	48	47	48	48	48	48	47	47	62.66667	62.66667	62.66667	63.33333	63.66667	64.33333	64.66667	64.33333	64	64.33333	63.66667	63.33333
30	47	48	48	47	47	47	48	48	46	46	63	63	62.33333	63	64	64.33333	63.66667	63.33333	64	64.33333	62.66667	62.66667
31	48	48	48	49	48	48	48	48	47	47	63.33333	63.33333	62.66667	62.66667	63.66667	64	64	63.66667	64	63.66667	63	63.33333
32	47	48	49	48	47	48	47	47	46	46	63	63	62.33333	63.33333	64.66667	65	64	64.33333	63.66667	63.33333	63	62.66667
33	50	50	49	49	49	48	49	48	49	49	64.66667	64.66667	64.66667	64.66667	64.66667	65	65.33333	64.33333	65	64	64.66667	65
34	50	50	51	50	50	49	48	49	48	48	65.33333	65.33333	65	65.33333	66	66.33333	66	65	64.33333	64.66667	64.33333	64.33333
35	49	50	51	50	50	49	48	49	47	47	64.66667	64.66667	64.66667	65.33333	66	66.33333	66	65	64	65	63.33333	63.33333

Group I																				
			Flacc score Group I																	
												time to first rescue analgesia	POST OP COMPLICATIONS							
S.NO	0hr	1hr	2hr	3hr	4hr	5hr	6hr	7hr	8hr	12hr	24hr		RESPIRATORY DEPRESSIO			URINARY RETENTION			APNOEA	PONV
1	0	0	1	1	3	2	3	2	2	2	2	400		0	0	0	0	0	0	0
2	0	0	0	1	2	3	2	2	2	2	2	360	0	0	0	0	0	0	0	0
3	0	0	0	1	2	3	2	2	2	2	2	400	0	0	0	0	0	0	0	0
4	0	1	3	2	2	2	3	1	2	2	2	420	0	0	0	0	0	0	0	0
5	0	0	1	2	2	2	3	2	2	2	2	450	0	0	0	0	0	0	0	0
6	0	1	1	3	2	3	2	2	2	2	2	410	0	0	0	0	0	0	0	0
7	0	1	2	3	2	2	3	2	2	2	2	450	0	0	0	0	0	0	0	0
8	0	2	2	2	2	3	2	2	2	2	2	380	0	0	0	0	0	0	0	0
9	0	1	2	3	2	3	2	2	2	2	2	400	0	0	0	0	0	0	0	0
10	0	1	2	3	2	2	3	2	2	2	2	420	0	0	0	0	0	0	0	0
11	0	1	2	3	2	3	2	2	2	2	2	400	0	0	0	0	0	0	0	0
12	0	1	2	2	3	3	2	2	2	2	2	345	0	0	0	0	0	0	0	0
13	0	2	2	2	2	2	2	2	2	2	2	430	0	0	0	0	0	0	0	0
14	0	1	1	3	1	2	3	2	2	2	2	450	0	0	0	0	0	0	0	0
15	0	1	2	3	3	2	3	2	2	2	2	420	0	0	0	0	0	0	0	0
16	0	1	2	3	1	3	2	2	2	2	2	400	0	0	0	0	0	0	0	0
17	0	2	2	2	2	3	2	2	2	2	2	380	0	0	0	0	0	0	0	0
18	0	1	2	2	2	3	3	2	2	2	2	420	0	0	0	0	0	0	0	0
19	0	1	2	3	3	3	2	2	2	2	2	400	0	0	0	0	0	0	0	0
20	0	1	1	3	2	3	2	2	2	2	2	400	0	0	0	0	0	0	0	0
21	0	1	1	3	1	3	2	3	2	2	2	400	0	0	0	0	0	0	0	0
22	0	2	2	2	1	3	2	2	2	2	2	400	0	0	0	0	0	0	0	0
23	0	1	2	2	2	2	3	2	2	2	2	420	0	0	0	0	0	0	0	0
24	0	2	2	2	1	3	2	2	2	2	2	410	0	0	0	0	0	0	0	0
25	0	1	1	2	1	2	3	2	2	2	2	420	0	0	0	0	0	0	0	0
26	0	1	1	1	2	3	2	2	2	2	2	410	0	0	0	0	0	0	0	0
27	0	1	1	1	2	3	2	2	2	2	2	400	0	0	0	0	0	0	0	0
28	0	1	1	1	2	3	2	2	2	2	2	380	0	0	0	0	0	0	0	0
29	0	1	1	1	1	3	2	2	2	2	2	390	0	0	0	0	0	0	0	0
30	0	1	1	1	2	3	2	2	2	2	2	380	0	0	0	0	0	0	0	0
31	0	1	1	1	2	3	2	2	2	2	2	400	0	0	0	0	0	0	0	0
32	0	1	1	1	2	3	2	2	2	2	2	400	0	0	0	0	0	0	0	0
33	0	1	1	1	2	2	3	2	2	2	2	420	0	0	0	0	0	0	0	0
34	0	1	1	1	2	3	2	2	2	2	2	400	0	0	0	0	0	0	0	0
35	0	1	1	1	2	2	3	2	2	2	2	420	0	0	0	0	0	0	0	0