COMPARISION OF ANALGESIC EFFICACY OF PLAIN BUPIVACAINE WITH BUPIVACAINE AND CLONIDINE IN ULTRASOUND GUIDED TRANSVERSUS ABDOMINIS PLANE BLOCK

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CHENNAI

BONAFIDE CERTIFICATE

This is to certify that this dissertation titled **“COMPARISION OF ANALGESIC EFFICACY OF PLAIN BUPIVACAINE WITH BUPIVACAINE AND CLONIDINE IN ULTRASOUND GUIDED TRANSVERSUS ABDOMINIS PLANE BLOCK"** is a bonafide record work done by **Dr. A. K. PRASATH** under my direct supervision and guidance, submitted to The Tamilnadu Dr. M.G.R. Medical University, Chennai, in partial fulfilment of university regulation for M.D degree, Branch X – Anaesthesiology, for the April 2013 examination.

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DECLARATION

I, Dr.A.K.PRASATH declare that the dissertation entitled **“COMPARISION OF ANALGESIC EFFICACY OF PLAIN BUPIVACAINE WITH BUPIVACAINE AND CLONIDINE IN ULTRASOUND GUIDED TRANSVERSUS ABDOMINIS PLANE BLOCK"** has been done by me. This is submitted to The Tamil Nadu Dr. M.G.R. Medical University, Chennai, in partial fulfilment of the requirement for the award of M.D., Degree, Branch X – Anaesthesiology degree Examination to be held in April 2013. I also declare that this dissertation, in part or full was not submitted by me or any other to any other University or Board, either in India or abroad for any award, degree or diploma.

Place: Madurai

Date: **Dr. A.K.PRASATH**

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CONTENTS

INTRODUCTION

Lower segment caesarean section is a common surgical procedure associated with postoperative pain and discomfort. Pain free post operative period is necessary to give better infant care, breast feeding and early ambulation of these patients. The post operative analgesia should be safe with minimal adverse effects for both mother and the child. It can be provided with multimodal analgesic approach.

Most often postoperative pain is treated with systemic or neuraxial opioids. Despite the effective analgesia produced by neuraxial analgesic technique, it is associated with side effects like vomiting, nausea, and pruritus which decreases the satisfaction of the patient. These opioid side effects can be decreased or omitted by regional anaesthesia with local anaesthetics. Adequate post operative pain relief can be achieved by blocking the nerves which supply the anterior abdominal wall like ilioinguinal, iliohypogastric nerves and field block of the abdomen. But the abdominal wall blockade becomes difficult in patients planned for caesarean section due to the lack of clearly defined anatomical landmarks. This resulted in the development of new technique for post operative pain relief .

The incision put over the abdominal wall is the most common reason for significant pain in the post operative period. The abdominal wall is supplied by nerves which course between internal oblique and transversus abdominis muscles. These nerves can be blocked by injecting local anaesthetic drugs in the

transverses abdominal plane in the region of triangle of Petit. Here the nerves are blocked before they enter the musculature of the anterior abdominal wall

In earlier years, abdominal field blocks were provided by multiple injection of local anaesthetics along the abdominal wall layers..Instead of multiple punctures, single needle puncture technique through Petit triangle is used in TAP block.

TAP block was first discribed by Rafi in 2001. McDonell et al described about TAP blocks in cadavers and human volunteers in 2004. Hebbeard et al described about the usage of ultrasound for TAP Block in 2007. The results were better in ultrasound guided techniques of TAP block. Most commonly done ultrasound guided technique is posterior approach technique. Hebbard described another technique of ultrasound guidance known as oblique subcostal approach for upper abdominal surgery in 2008.

Success of regional anaesthesia depends on injecting the right drug ,in right dose, in right place. So the success of TAP block depends on injection of local anaesthetic drugs between transverse abdominis and internal oblique muscles, where the neuro-fascial plane lies.

Use of image guidance for locating the peripheral nerve and neurofascial plane improves success of this block with less complications. There are various technique of imaging for nerve blocks. Among that ultrasound technique seems to be most reliable for nerve blocks. With the help of ultrasound various structures like pleura, blood vessels and nerves are visualized in real time. It

helps to guide the needle towards the nerves or structures targeted and see the spread of injected local anaesthetic drugs. The opioid requirement is reduced with TAP block using USG and it also improves the analgesia.

The adjuvant drugs used with local anesthetics reduced the dose requirement of each agent with enhanced analgesic efficacy and decreased incidence of adverse reactions. Injection of Alfa 2 adrenergic agonistic drugs has been suggested for enhancing the quality of nerve block. Clonidine has selective agonistic activity in α2 adrenergic receptors with some agonist activity towards α1 receptors. The onset time, block efficacy and post operative anlagesic duration is increased with the usage of clonidine with local anaesthetic agents

Thus analgesic efficacy of bupivacaine and addition of clonidine with bupivacaine and using an ultrasonography in performing Transversus abdominis plane (TAP) block bilaterally for providing postoperative analgesia in caesarean section is evaluated in this study.

AIM OF THE STUDY

The aim of the study is to compare postoperative analgesic efficacy of plain bupivacaine with bupivacaine and clonidine in ultrasound guided transversus abdominis plane block in patients undergoing caesarean section under spinal anaesthesia.

TRANSVERSUS ABDOMINIS PLANE (TAP) BLOCK:

Anatomy

The following abdominal wall muscles are related to TAP block**.**

1. External Oblique Muscle

The external oblique muscle is the superficial and largest of the three muscles. It arises along the inferior border of 8 lower ribs. The fibers originating from the upper and middle part course antero inferiorly and terminate in to thick aponeurosis. The fibers which originate from the lower part course inferiorly and attach to iliac crest. The external oblique aponeurosis and transvers abdominis aponeurosis combine to form the linea alba anteriorly. In the inferior region it terminates as inguinal ligament.

2. Internal Oblique Muscle

This thin and small muscle arises from the iliac crest and inguinal ligament . These fibers course over the anterolateral aspect of abdomen and terminate into linea alba. In the superior region it is inserted into cartilage of lower ribs.

3.Transversus Abdominis Muscle

This is the inner most of all muscles. The fibers originate from inner surface of cartilagenous part of lower 6 ribs, inguinal ligament, dorso lumbar fascia and iliac crest. These fibers course over the abdomen transversly and terminate into a broad aponeurosis, lateral to internal oblique and external oblique aponeurosis. The fibers terminate medially into linea alba.

Nerve Supply of abdominal wall:

The following nerves supply the abdominal wall muscles and skin over it. lower six thoracic nerves which are the continuation of T7-T11 intercostal nerves, subcostal nerve T12, Ilioinguinal nerve, Iliohypogastric nerve.(fig-1)

Lower thoracic nerves (T7-T11)

The anterior divisions of thoracic nerves from T7 – T11 passes through the corresponding intercostal space and gives rise to anterior cutaneous and Lateral cutaneous branches. These nerves course through the plane formed by internal oblique and transverse abdominis. Anterior cutaneous branch after piercing the rectus abdominis muscle gives sensory supply to the skin of anterior abdomen. Lateral cutaneous branch travel posteriorly gives of its sensory supply to the skin in the lateral part of abdomen and back after piercing the external abdominis muscle.

Subcostal nerve T12

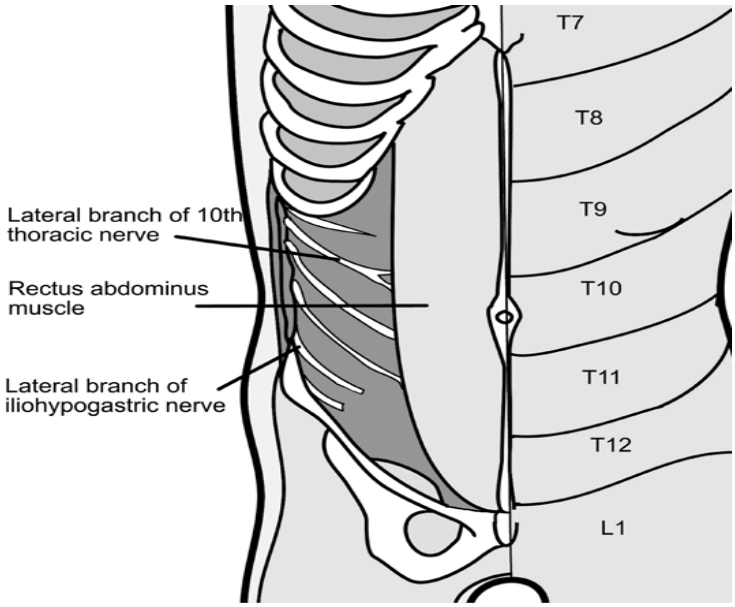
The subcostal nerve arises from the ventral rami of T12 nerve root. It course through the plane formed by transverse abdominis and internal oblique before giving the lateral cutaneous branch. The lateral cutaneous nerve supplies skin over the upper part of gluteal region. This lateral cutaneous branch cross the iliac crest posterior to anterior superior iliac spine.

Iliohypogastric nerve- (L1):

It arises from first lumbar nerve and pierces the internal oblique muscle and slopes down between external oblique and internal oblique muscles. It supplies lower part of rectus abdominis ,lower abdomen & front of pubis

Ilioinguinal nerve- (L1):

It is a collateral branch and lies between transversus abdominis and internal oblique muscle and enters the inguinal canal and gives of sensory supply to the skin over the scrotum, root/ base of penis and medial and upper part of thigh.



(fig.1) Nerve supply and dermatomes of anterior abdominal wall

The layers of the antero-lateral abdominal wall supplied by T7-L1 thoracolumbar nerves from superficial to deep are as follows, Superficial Skin and subcutaneous layer ,muscles including, rectus abdominis muscle, external

oblique, internal oblique and transversus abdominis muscle, fascia transversalis and parietal part of peritonium.

INDICATIONS FOR TAP BLOCK

Greatest advantage of TAP block is absence of major neurological or vascular structures in this area.

Other advantages of TAP block are,

1. Simple and ease when ultrasound is used for this block

2. Large area of the abdominal wall sensory block can be given with one injection

3.TAP block avoids the side effects associated with central neuraxial blockade such as hypotension and wide motor blockade, and its complications such as epidural haematoma, epidural abscess and paraparesis .

4.TAP block is mainly useful when epidural anaesthesia is refused/not indicated .

5 TAP block is used in abdominal surgeries as a part of an analgesic regimen. Earlier studies showed that the level of block extend from T7-L1 with bilateral injections of local anaesthetics but further studies were not able to prove the T7- L1 blockaed. Most other studies showed that the maximum sensory block up to T9 to T10. . So posterior TAP block is useful for analgesia in lower abdominal surgeries like, inguinal hernia repair, appendectomy, lower segment caesarian section, abdominal hysterectomy, prostatectomy and

urological surgeries. Subcostal approach of TAP block is used in surgeries where analgesia is needed above the umbilicus. Only few case reports are available where they have performed TAP block using ultrasound as a single anaesthetic technique in high risk emergency surgery .

CONTRAINDICATIONS

Contraindications to transversus abdominis plane block includes refusal by the patient, allergic to local anaesthetics, infection at the site of injection, coagulation abnormalities and in patients with anticoagulation therapy, surgery at the site of injection , local sepsis

COMPLICATIONS ASSOCIATED WITH THIS TECHNIQUE

Complicatons of this block includes block failure, toxicity to local anesthetics, accidental injection of drugs intraperitoneally, Injury to bowel , hematoma,liver injury in patients with hepatomegally and transient femoral nerve palsy. All the above complications are rare when ultrasound is used to identify the plane.

TECHNIQUES

In Transversus abdominis plane block the main aim is be to inject large volume of selected local anaesthetics into the transversus abdominis plane that lies in between internal oblique and transversus abdominis muscle with minimum of 20 ml on each side. The calculated dose of local anaesthetic should not exceed toxic dose.

Techniques used to give analgesia over anterior abdominal wall ,

(1) Landmark technique through petit triangle,

(2) Ultrasound guided TAP block (posterior TAP block),

(3) Ultrasound guided sub costal TAP block (for upper abdomen).

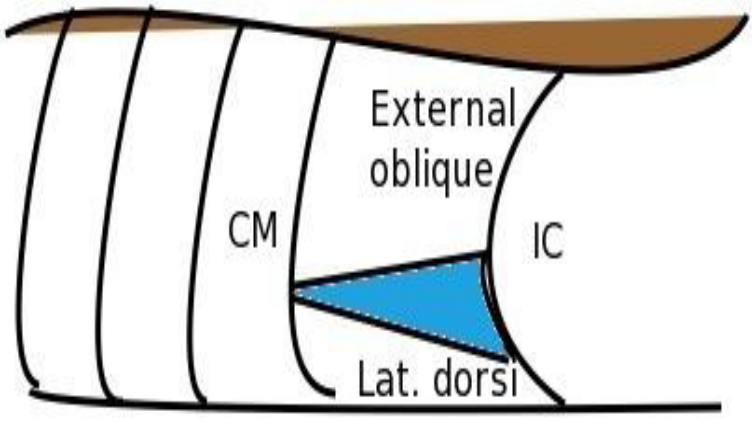
General Preparation

It is impotent to keep ready all resuscitation equipment, ultrasonography machine , high frequency transducer (10-15 MHz), disposable cover to ultrasound probe, monitoring equipments - ECG, pulse oximeter, BP apparatus, antiseptic lotions for skin preparation, sterile gloves, short beveled needle (50 – 100 mm), or 16-G/18-G Tuohy needle with an extension set,syringes - 10ml, 20ml, local anaesthetic drug.

The landmark technique

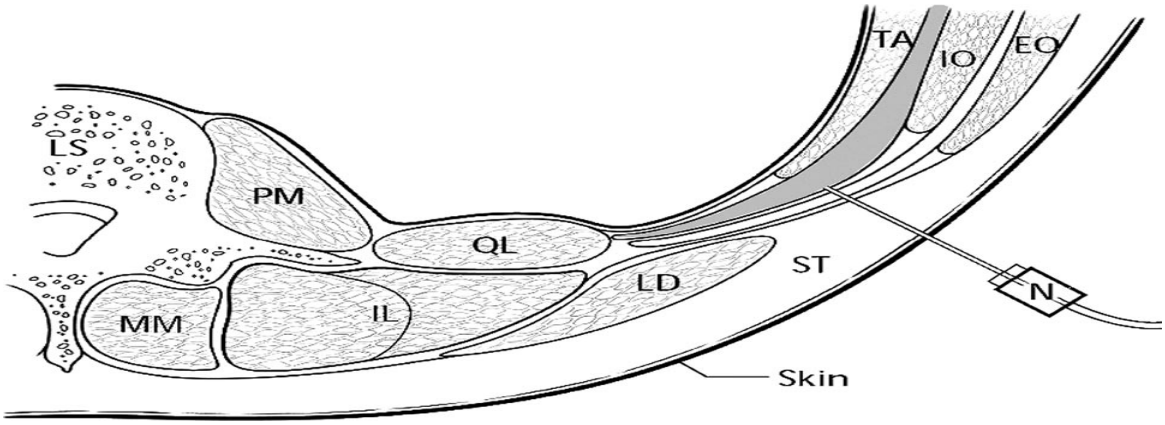
In this technique **t**ransversus abdominis plane is approached through the Petit triangle,*(fig.2)* which is formed anteriorly by posterior border of external oblique muscle, posteriorly by anterior border of lattissimus dorsi muscle, inferiorly iliac crest and superiorly by the lower costal margin.

***(*fig.2) Petit triangle**



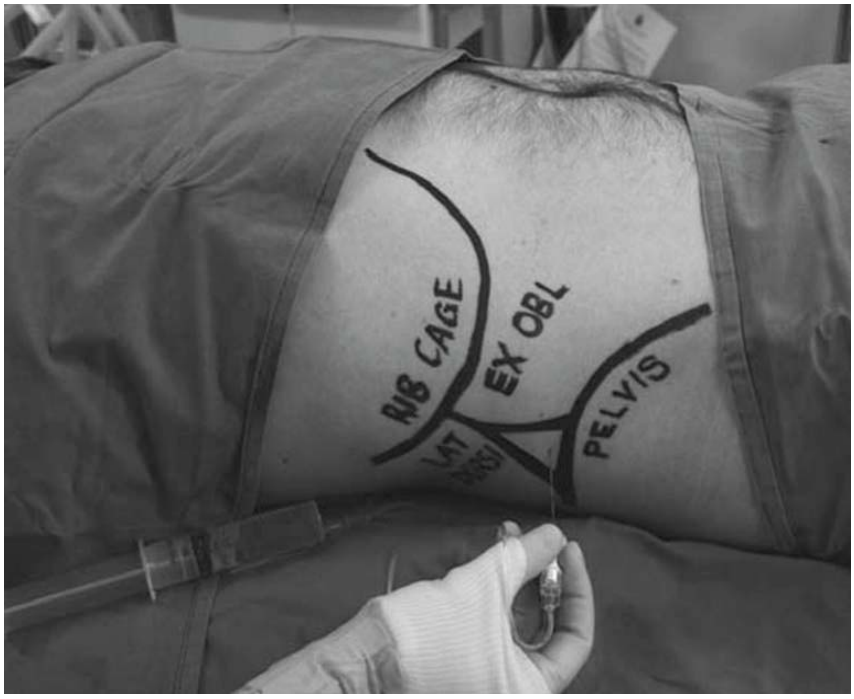
Block technique

First, Petit Triangle is located anatomically by landmark. It is felt as a depression in between the borders of external oblique and lattissmus dorsi along the posterior axillary line. The block needle is inserted perpendicular to the skin surface(*fig-4)*. After piercing the skin, the needle is passed through muscular plane until a give way is felt. It is further passed until the second give way is felt. Here the needle lies between transversus abdominis and internal oblique muscles in transversus abdominis plane*(fig-3)*



(fig-3) Figure showing the anatomical landmarks

The technique of loss of resistance can be added with fascial click to identify correct plane. Careful aspiration should be done to rule out wrong position of needle. Then local anaesthetic drug is injected into the fascial plane. The volume of local anaesthetic (20-30 ml per side is used) should not exceed the toxic dose



(fig-4). Figure showing the Petit triangle and injection site in landmark technique

Ultrasound Guided Technique

Basics of an Ultrasound machine:

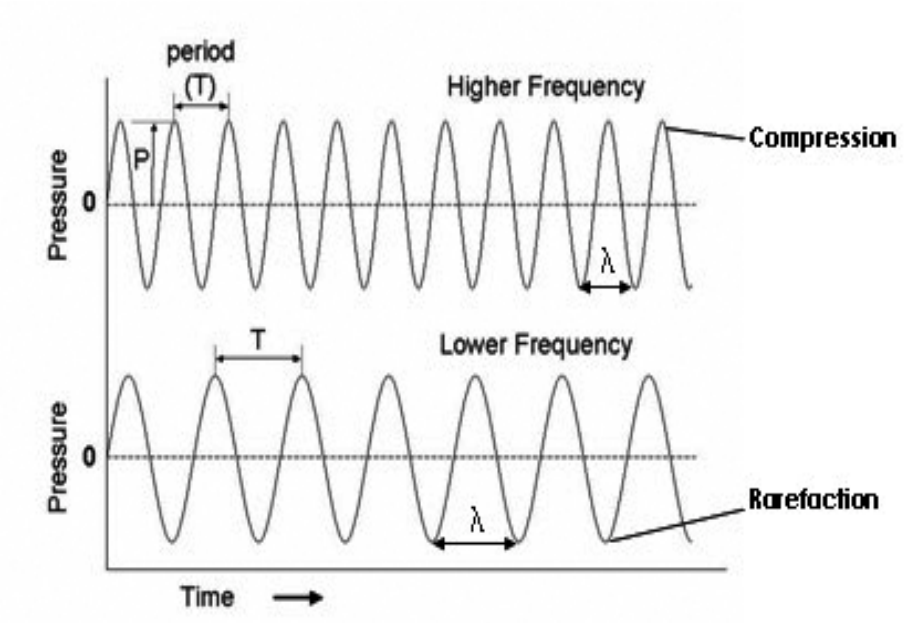
Anaesthetist need to know the basic physics related to image generation, image optimization, and image interpretation. These machines have transformed from bulk to light-weight and hand held.

Ultrasound uses the frequency of more than 20,000 Hz (or 20KHz). Commonly used medical ultrasound is in the range of 2.5-15MHz.The frequency of sound for hearing in human ranges between 20-20,000 Hz .

In ultrasound, the sound energy is transmitted mechanically in the substances as a wave forms with alternative rarefactions and compression.

(fig-5). Properties of ultrasound waves include frequency measured as Hertz, wavelength, velocity of sound waves and amplitude.

Piezoelectric crystals present in the patient end of the probe produces ultrasound wave . The ultrasound waves have different speed in different biological substances with a mean of 1,540 meter/second in soft tissues of human beings.

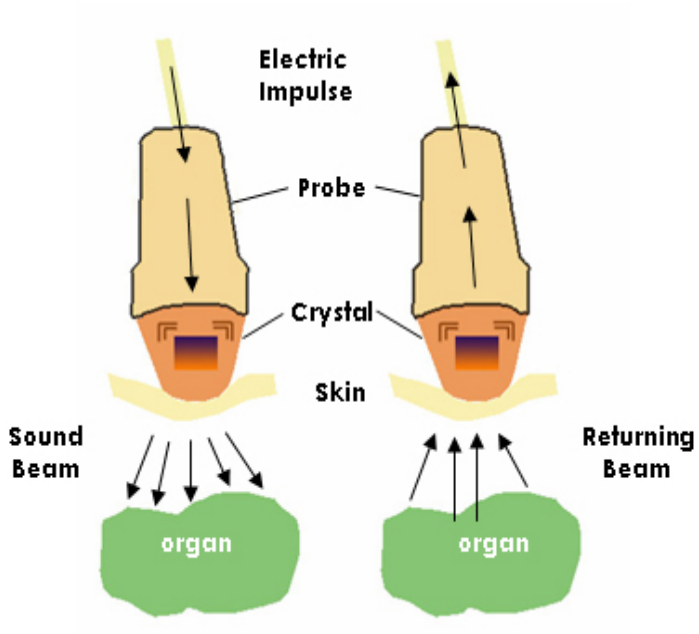


(*fig-5). Wave forms with alternative rarefactions and compression*

As waves travel deeper through the biological medium, it gets attenuated by loosing heat energy. Thus in ultrasound higher frequency leads to more attenuation and lesser penetration while the lesser frequency leads to more depth of penetration. Therefore superficial structures are better seen with high frequency waves and the deep structures with low frequency waves.

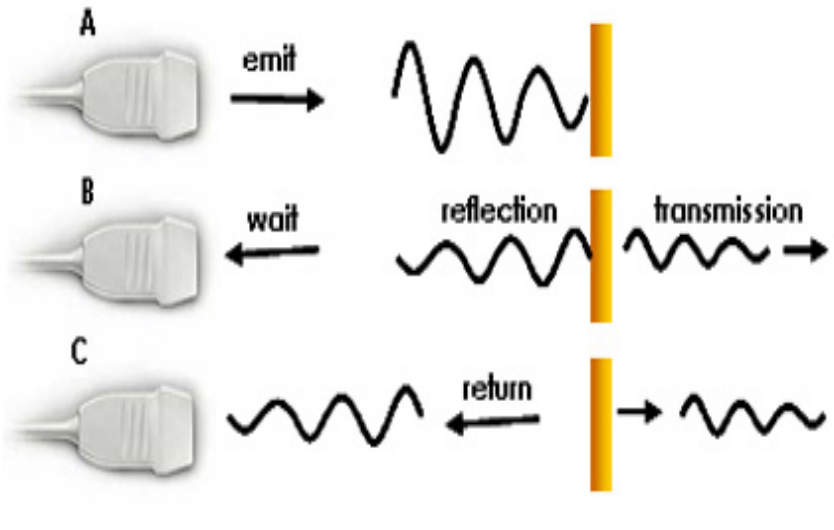
Ultrasound Image generation

The ultrasound images are formed when the transducer emits ultrasound beam. It receive the reflected wave which is produced by image tissue also called echo. Optimisation of image needs selection of correct transducer, adequate gel and by adjusting the focus.



(fig.6) figure showing the piezoelectric effect

Then transducer converts the sound energy into an electrical signal which is then converted into an image and shown on the screen. This formation of electrical energy from sound energy is known as piezoelectric effect.(fig.6) (Pierre Currie 1880).



The different modes of image display are:

(1) A mode - Amplitude

(2) B mode - Brightness

(3) M mode-Motion

The brightness (B)mode is most commonly used for nerve blocks the ultrasound machine has the following basic components for display, storage and generation of images.

1. Pulser :energizes crystal by application of high voltage
2. Display : images of different modes are displayed

3.Transducer : mechanical energy is produced from electrical energy and the reverse also possible.

4. Receiver : weak signalsare detected and amplified

5. Memory : images are stored.

Basic principles of ultrasound guided-blocks for peripheral nerves

The basic guidelines for ultrasound guided nerve blocks are,

1, Identification of structures like muscles, blood vessels, fascia, bones..

2, Visualising the nerve plexus.

3, Differentiate between normal and altered anatomy

4, Correct plane for needle insertion to avoid trauma

5, Secondary confirmation technique like nerve stimulation is to be considered.

6, Aseptic technique

7, Real time visualization of needle when it is advanced

8, After reaching the target inject a small volume of drug and see the spread, if spread is not seen , presume it that the needle has entered the vessel, or it is out of the plane

9, Ensure frequent aspiration during injection and complete visualization of total volume of drug injected

10, Keep ready all resuscitation equipments, standard monitoring.

Ultrasonographic guidance helps to improve the success, accuracy and safety of regional anaesthesia. It also increases the speed of onset , the quality of analgesia, and reduces the incidence of vascular injury.

The quality of ultra sonographic nerve images for each nerve location depends upon the transducer quality and type of ultrasound machine. The selection of transducer frequency and the knowledge of anaesthesiologist in interpreting the sonographic anatomy related to the peripheral nerve block , along with good hand- eye coordination is needed to follow needle during advancement.

Correct positioning of the patient and sterile technique are important. Aseptic precaution is more important when catheter is used for continuous analgesia . The transducer probe is covered by means of disposable plastic cover. Sterile gel should be used to minimize infection.

The nerve stimulators can be combined with ultrasound imaging for nerve blocks. Both technique are complimentary to others efficiency. The anatomical images is provided by ultrasonography and nerve stimulation induced motor response gives functional information of the blocked nerve. Observing the spread of local anaesthetic is valuable in ultrasound guided nerve block . The passage of needle through the structures can be assessed by ultrasongraphy.

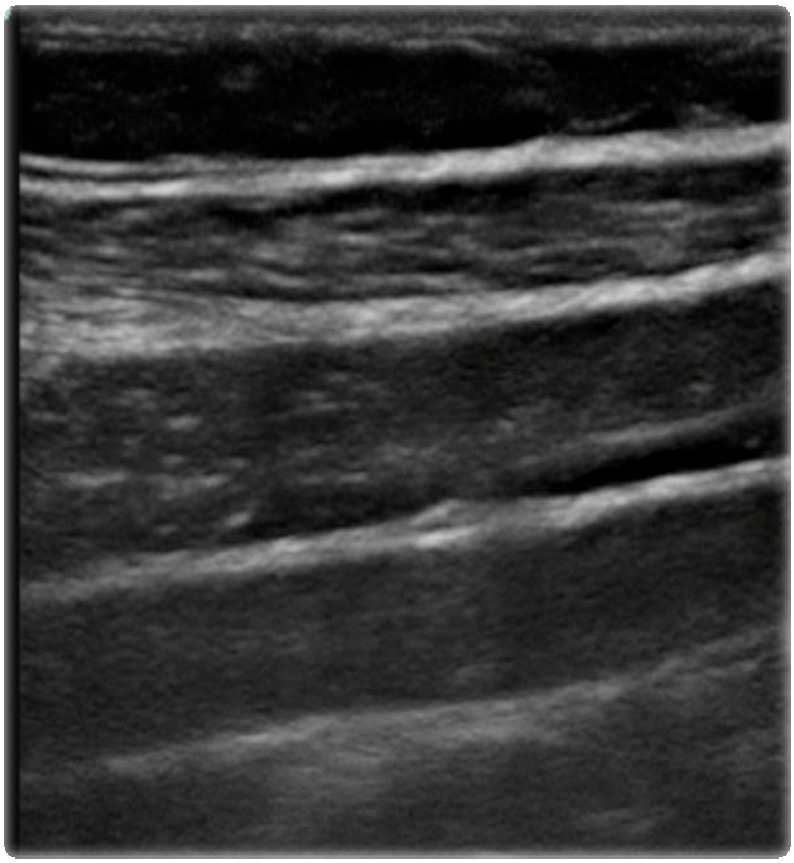
Two different approaches are available for ultrasound guided nerve blocks. One of the technique is inline technique, where the needle is passed along the long axis of ultrasound probe. In this technique the needle tip and

shaft can be clearly seen as it traverses in the pathway of ultrasound waves. This inline approach decreases the chances of inadvertent injury to adjacent structures .

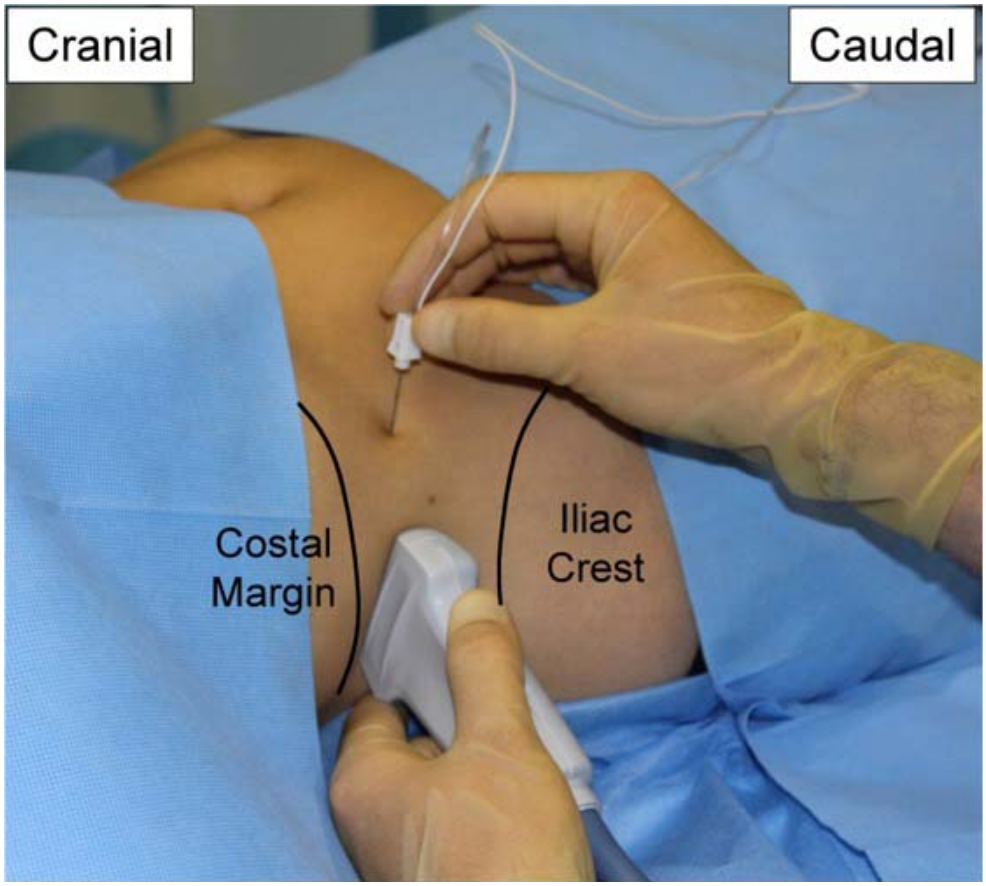
The other technique is perpendicular (out of plane or right angle to probe) approach. In out of plane approach the needle is shown as dot like hyperechoic image in transverse view. The tracing of needle tip is difficult to locate because of tissue movement. This technique is more useful when catheter is placed in fascial plane for continuous analgesia

Ultrasound guided posterior TAP block : **The Block (Posterior Injection)**

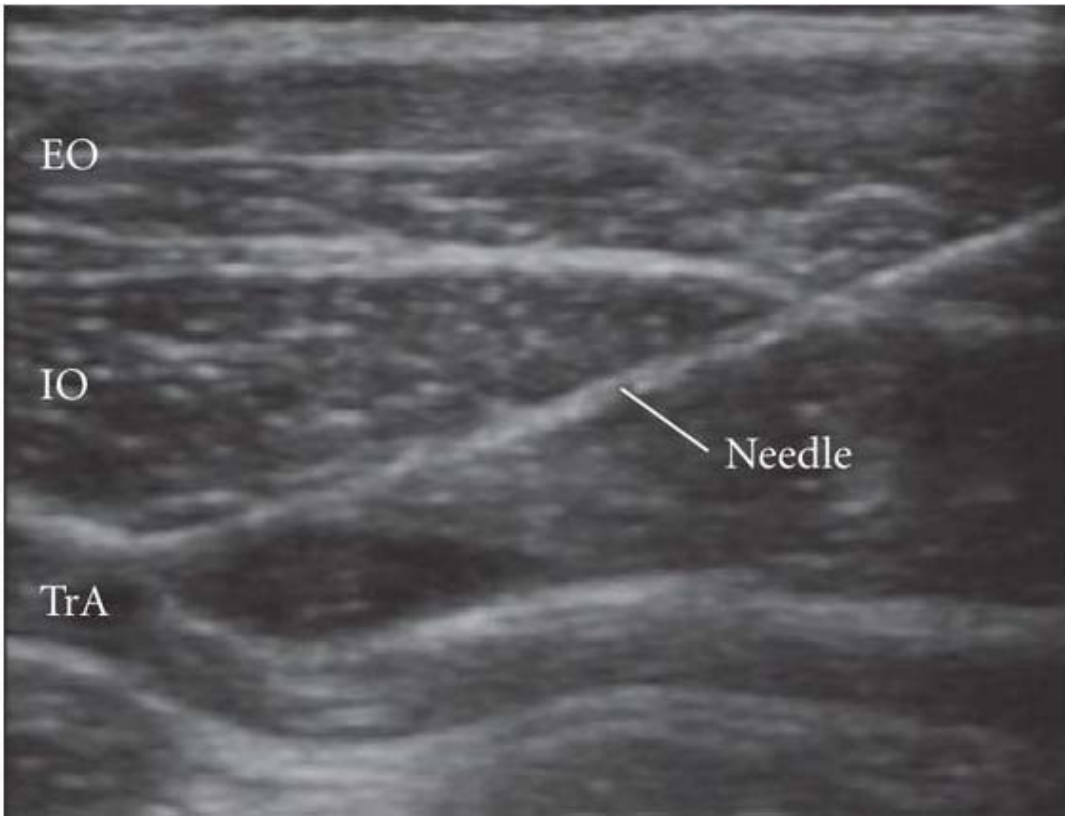
The patient is placed in supine position and the ultrasound probe is placed across the abdomen to identify different muscular layers. Then the probe is moved in between the iliac crest and costal margin along the mid axillary line to identify muscles of anterior abdominal wall. The scan probe is then moved more laterally to see all three muscle layers running parallel to each other **(fig.7).** The block needle is introduced just anterior to ultrasound probe **(fig.8),** to show the inplane view of needle as one pierces the muscle layers. During insertion of needle one can appreciate the "pop" while piercing the muscle layers, which also helps in identifying the correct plane (tansversus abdominis plane) Then small amount of local anaesthetic is slowly injected to confirm the needle position. **(fig.9)**



(fig.7) Ultrasound image obtained as the probe is moved laterally away from the midline

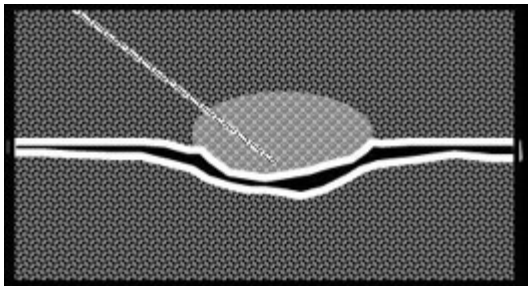


(fig.8) Ultrasound transducer position and in-plane needle technique forthe posterior TAP block on the right side of the patient.

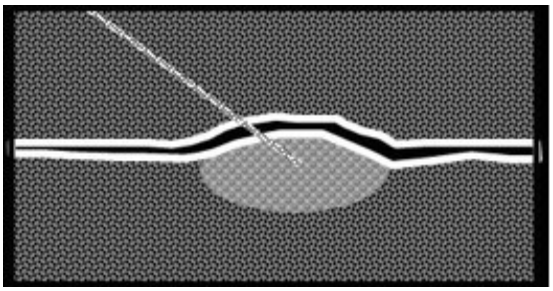


(fig.9)Ultrasound image during initial injection of a small amount of local anesthetic.(EO:external oblique, IO: internal oblique, TrA: transversus abdominis)

If the needle is in correct position, the spread of local anaesthetic drug is identified by formation of hypoechoic, well-defined, elliptical shape image between the two muscles. It is important to see the spread of local anaesthetic drug either superficial or deep to the transverse abdominis muscle plane. (***fig.10, fig .11, fig.12)***

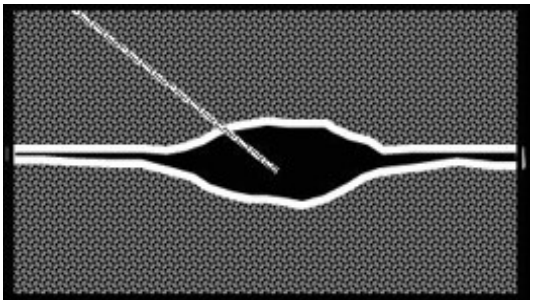


(*fig.10)* *<u>Too superficial injection of local anaesthetic</u>*



(*fig.11)* *<u>Too deep injection of local anaesthetic</u>*

Reposition the needle in such away the local anaesthetic spread in the correct plane by separating the fascia between muscles(**fig.12).**



(*fig.12)* **<u>Correct plane - to inject local anaesthetic</u>** (fascial plane between transverse abdominis and internal oblique)

If local anaesthetic spread in not seen it is essential to stop, because the needle tip may entered in to peritoneal cavity.

Ultrasound guided Subcostal Injection TAP Block

This is performed when abdominal wall analgesia required above the umbilicus (i.e. upper abdominal surgeries) which are usually not adequately provided by posterior TAP block. Here the probe is held close to the midline under the costal margin, then the upper part of the rectus muscle identified.

In the subcostal region the transversus abdominis muscle lies deep to the rectus abdominis muscle, Needle is inserted along the medial side of probe to get a inplane view. The block needle or a Tuhoy needle inserted, while visualising the needle. then the needle tip is inserted between the superior border of transversus abdominis and posterior border of rectus sheeth.

After careful aspiration a minimal volume of local anaesthetic is injected, which creates a space for further advancement of needle, the needle is directed in an oblique line from xiphoid process to anterior superior iliac spine. the usual volume of drug used is 20 ml of local anaesthetic solutions , but higher

volume in more diluted form can be used. As this is an advanced block, adequate skills for guiding the needle is required to safely achieve this block.

Continuous catheter technique

For prolonged analgesia catheter can be inserted in transverses abdominus neurofascial plane. It is important to place the catheter under ultrasound guidance. In this technique 18G tuohy needle is inserted in to the plane , after expanding the transverses abdominis plane with local anaesthetic 19G catheter is inserted 4-6 cm beyond the needle tip, which is confirmed by local anaesthetic accumulation on injection. Then needle is removed and catheter is fixed in skin It is mainly useful when neuraxial anesthesia is contraindicated. Main advantages of TAP catheter are better patient comfort, reduced use of opioids thus decreasing nausea, vomiting, sedation or respiratory depression. In unilateral surgery, it can be given unilaterally. When compared to epidural block, TAP block has no sympathetic or motor deficit and no damage to the spinal cord.

PATHOPHYSIOLOGY OF PAIN

Adequate post operative pain control is essential as it may cause increased morbidity and mortality, more hospital stay and patient expenditure.

Definition of Pain:

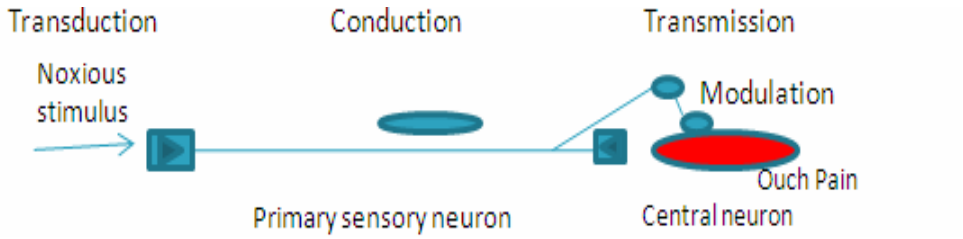
The definition of pain as given by The Taxonomy Committee of International Association for the study of Pain (IASP) is "An unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage". Initiative event for postoperative pain following surgery are inflammatory reaction and afferent neuronal barrage. Pain causes unpleasant sensory, emotional and mental changes along with changes in autonomic, endocrine, metabolic, physiological and behavioural responses due to surgical trauma.

Physiology related to pain:

Spinal cord, forms an important link between brain and various body parts through the nerves. Spinal nerves originate and leave the spinal cord at different levels along its entire length, through openings between the vertebrae . The spinal nerves are 31 pairs in number .The nerve root is the point where these nerves exit the spinal cord. It branches into many smaller nerves called peripheral nerves and controls the various parts of the body. Motor efferents and sensory afferent nerves are included under peripheral nerves. Sensory nerves

receive and transmit sensory stimuli to Substantia gelatinosa ; Motor nerves supply muscles and thus controls movement of the body.

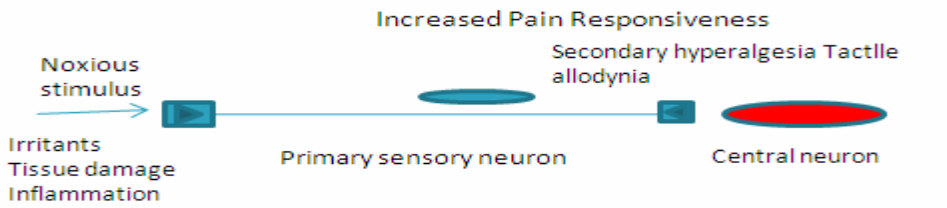
Various mechanisms are: The perception and processing of painful stimuli by the brain is referred as nociception. It has four components namely transduction, transmission, modulation and perception (fig.13). The hallmark of chronic and acute pain is allodynia or hyper responsiveness. The reason for this allodynia is neuroplasticity, a change in the response of nervous system at central and peripheral locations



(fig.13). Process of Nociception

Peripheral sensitization: It occurs following a the release of complex chemical mediators as a result of tissue inflammation, which decreases the nociceptor thresholds and exagerates response to pain.

Central sensitization: This results in more chronic pain syndromes and is primarily a physiological process following a CNS response to painful stimuli due to continuous C-nociceptor firing for longer time.



Process of Central Sensitization

Pain pathways:

Pain is conducted from the periphery to cerebral cortex through three neuron pathway following a noxious stimuli. First order neuron transmits pain from a peripheral receptor to dorsal horn. The dorsal root ganglion is the first order neuron. Second order neuron is situated in the spinal cord dorsal horn Axons from dorsal horn ascends through the spinothalamic tract after crossing the mid line to reach the thalamus. Third order neuron is located in the thalamus and passes through internal capsule and projects its fibres into post central gyrus.

Physiological responses to pain:

Pain is the combination of sensation which includes nocioceptive response to tissue damage (physiological) and pain as a suffering (psychological). In the post operative period uncontrolled pain results in various physiological effects which includes altered stress response to surgery, increased catecholamine's, more incidence of pulmonary complications, deep vein thrombosis and ultimately increasing the morbidity.

Significant postoperative respiratory dysfunction occurs due to pain following thoracic and upper abdominal surgeries. Increase in tone of muscle due to pain with voluntary reduction in respiratory muscle excursions, results in decrease in lung volumes like tidal volume, vital capacity and functional residual capacity, regional lung collapse (atelectasis) and reduced alveolar

ventilation causing hypoxemia and hypercapnia, reduced ability to cough, retention of secretions and increased risk of chest infections. These adverse respiratory effects can be reversed by coupling adequate perioperative pain relief with breathing exercises.

SYMPATHETIC SYSTEM AND PAIN:

Pain increases sympathetic activity which results in decreased gastrointestinal motility which leads to gastric stasis and paralytic ileus, increased intestinal secretions and increased smooth muscle sphincter tone. Pain can cause increased motility of the urethra and bladder and consequent difficulty with micturition.

Postoperative pain that occurs after surgery within 7 days called acute pain and that lasts for more than three months called as chronic pain. These pains arises from visceral, somatic, or cutaneous structures. Two types of Acute pain are *1.Somatic Pain:* Superficial somatic pain is well localized sharp pricking in nature and arises from skin, subcutaneous tissue, mucous membrane. Deep somatic pain is less well localized dull aching in nature and arises from muscles, tendons, joint and bones. Degree of localization depends on both the intensity and duration of pain effects.*2.Visceral Pain:* Disease or abnormal function of an internal organ or its covering may result in poorly localized, dull and vague, colicky, cramping, or squeezing in nature.

ASSESSMENT OF PAIN

Usually pain is quantified by using a pain scales which is better assessed by patients communication and expression.

Visual analogue scale (VAS) :

It was first described in 1966 It is the most common method to assess pain. it has a 10cm scale starting from no pain to worst pain and is position of mark on the line measures how much pain experienced by the subjects.

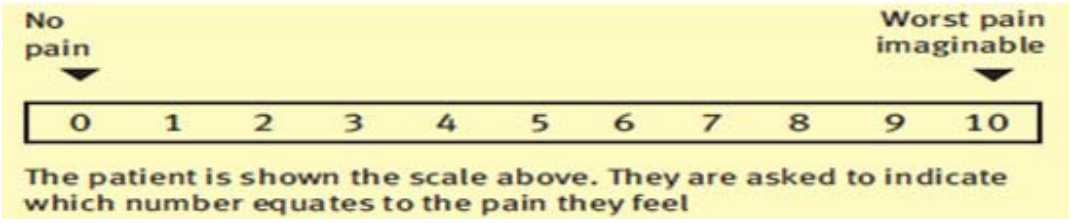
Wong-Baker Faces Pain Rating Scale and Visual Analogue Scale

Expressions in face:

There are six different facial expressions starting from smile to cry which is shown in the scale as a pictogram. This is useful in situation where there is communication diffculty in case of children, elderly patients, confused patients or patients who do not speak the local language, deaf and dumb patients

Pain scale by Numerical rating (NRS):

It is comparable with VAS scale. It has 11 points starting from 0 as no pain and 10 as worst pain which is also assessed by the patient.



Pain Scale by numerical rating

Pain scale by Verbal rating (VRS):

Verbal rating scale has 4 points which includes no pain,mild, moderate and severe pain. It is useful in those having mild cognitive impairment. The preoperative personality assessment is also helpful in assessing the patient's psychological background and his psycho reactions to surgery and the pain that follows it. The verbal and numerical rating pain scale are useful in clinical settings but the VAS scale is useful in research.

METHODS OF ACHIEVING PAIN RELIEF:

"Pain relief has always been bought at a Price" – Bromage

Pain is rather self limiting following any surgery. It lasts for the first 24 hrs and subsides in 4 days time. The post operative pain is dull in nature

aggravated by mobility, relieved by rest. Emotional elements of fear, anxiety, and depression of previous experience of pain often associated with acute pain The goals of effective and appropriate pain management are to facilitate rapid recovery and return to full function, reduce morbidity, improve quality of life of the patient and allows early discharge from hospital.

Methods adopted for providing post operative pain relief include Pharmacological and non-pharmacological methods

Pharmacological methods include Balanced (multimodal) analgesia,usage of opioids ,non-opioids ,adjuvants, patient controlled analgesia, regional analgesia, continuous central Neuraxial Blockade (CCNB) ,continuous Peripheral Nerve Blockade (CPNB) and infiltration blocks.

Non-pharmcolgical method includes Transcutaneous electrical Nerve Stimulation (TENS), acupuncture, cryotherapy and heat therapy

Pharmacological methods:

Balanced (multimodal) analgesia: It consists of two or more technique or analgesic regimen which acts by different ways to reach adequate analgesia without causing additional adverse effects when compared with single technique or agent.Balanced analgesia is therefore the method of choice wherever possible.

Opioids can be administrated by various routes, each having its own advantages and disadvantages:-

Oral: This is unsuitable for post operative patients due to erratic absorption of the drugs. Some opioids like Buprenorphine are administered by sublingual route.

Intramuscular: The largest and commonest mode of administration with the attendant drawback of erratic absorption, drug over dosage and frequent occurrence of respiratory depression.

Intravenous: This has short duration, and a rapid onset of action. Tolerance and addiction are common.

Neuraxial: This route has gained popularity because of the longer duration of segmental analgesia with smaller doses. The cardiovascular and respiratory complications are less if used judiciously.

Non opioids and Adjuvants:

Non opioids include analgesics like paracetamol, to more potent ones like Nonsteroidal anti-inflammatory drugs. Adjuvants include ketamine and clonidine. Clonidine can be administered orally, intravenously or perineurally in combination with local anaesthetics. However, the side effects could be significant. The most important ones are hypotension and sedation. Ketamine

can be administered via oral, intramuscular or intravenous routes. It also has significant side effects.

Regional analgesia:

Central neuraxial block involves either intermittent or continuous administration of local anaesthetics in order to interrupt sensory transmission. The important draw back of this technique is the accompanying motor and sympathetic blockade which can increase the incidence of post operative complications. Extradural block offers complete pain relief, permits effective coughing & better ventilation. But the total spinal, accidental dural punctures are more with inexperienced hands.

Peripheral nerve block

Peripheral nerve blocks are being increasingly used since they provide more selective but still excellent postoperative analgesia with reduced need for opioids over an extended period.

Advantages of peripheral nerve block includes safety, no retention of urine, prolonged duration, less post operative analgesic requirement and can be used in patients with coagulation abnormalities and limitation of the area of analgesia to the surgical field. Hypotension and wide motor blockade with reduced mobility and proprioception are avoided. Side effects associated with

central neuraxial blockade, and complications such as epidural haematoma, epidural abscess and paraparesis are avoided.

The disadvantages include inadequate block, large volume of local anaesthetics required, onset time may increased, trasient neurological damage, infection may occur when asepsis is not maintained and is common when catheter is used. And the most dangerous effect is toxicity to local anaesthetics, it may occur due to accidental intravascular injection or over dosage .

Most of the peripheral blocks are safe, simple and effective and easy to perform, The appropriate use of a nerve stimulator increases the success rate of these nerve blocks. Recently the use of ultrasound in nerve blocks is evolving and gives reliable safe peripheral nerve block.

Patient Controlled Analgesia pump or PCA:

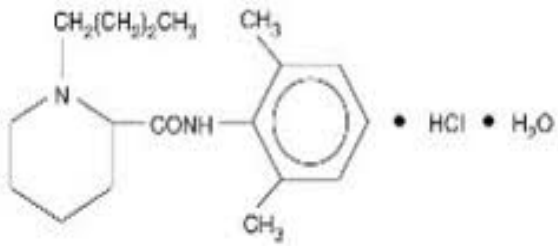
This specialised device is useful for pain relief and it can deliver medication through any route like intravenous or epidural. This device is peculiar that it can be used by patient themself, so that they can have the desired pain relief.

PHARMACOLOGY OF BUPIVACAINE

Bupivacaine is the amino amide local anaesthetic present as a racemic mixture. It is a derivative of Mepivacaine in which the methyl group of piperidine chain is replaced by the butyl group. Bupivacaine was first synthesized by Ekenstem and was first used by Telivuo in 1963**.**Being a very stable compound , it can be autoclaved many times.

PHYSICO CHEMICAL PROPERTIES

Chemically described as d(1)-1-butyl-N-(2'6' dimethylphenyl) piperidine – 2- carboxamide.



Molecular Weight of bupivacaine is 288 (base).Its Pka is 8.1.It has a Protein binding capacity of 95.6% and Plasma protein binding : 2 μgm/ml. Its Lipid solubility is 28. Partition coefficient of bupivacaine is 27.5 (n-Haptane pH7.4 buffer)

Approximate duration of action of bupivacaine is 175 minutes with elimination half life of 210minutes. When plasma concentration exceeds1.5microgram/ml it produces toxicity.

MECHANISM OF ACTION OF LOCAL ANAESTHETICS

The local anaesthetic inhibit the conduction of impulses across the nerves by following mechanism as defined by carvino

The local anaesthetic drug exist in both charged and uncharged forms. The relative concentration of the two forms are dependent on the pKa of the solution, pH of the site where injected. The positively charged cation form is the active form. It produces local anaesthetic action.

The uncharged base form is responsible for the diffusion across the liphophilic membranes across the cell. The drug acts from the inside of the cells on sodium ion channel. They occupy specific receptors on the inner side of sodium channel and inhibit the conduction of ions through them. Thus the cell remains in state of persistent depolarization. This inhibits the propogation of action potential.

Other probable site of actions are

Channel narrowing and membrane expansion due to nonspecific absorption across the cell membrane

Uncharged base form diffuses across hydrophobic pathways of lipid membranes to reach specific receptor sites and protonation of drug to bind to inner opening of sodium channel.

The surface charge theory:

This theory is based on penetration of the axonal membrane by lipophilic portion of the local anaesthetic drug and neutralisation of axolemmal negative charges on surface by the positively charged terminal amino group of drug. The electronegativity of the external membrane is counteracted by the acquired positive charges. This results in increase in the trans membrane potential without altering much of the intracellular resting potential. This inhibits the conduction of nerve impulses from the normal areas to anaesthetized areas of the nerve membrane. Thus it produces a conduction block across the two portions. According to surface charge theory the active form of local anaesthetic drug is the charged form of drug.

To summarise bupivacaine acts through the sodium channel blockade. It produces a non-depolarising type of blockade. It interferes with the transmembrane sodium channel thereby interferes with sodium ion transport. This delays the depolarization process and the channel remains in a state of persistent repolarization.

The propable site of action of the drug is on spinal nerve rootlets, fine nerve filaments and the lateral and posterior part of spinal cord.

The order of blockade will be pain then followed by temperature and touch.Lastly proprioception and skeletal muscle tone gets blocked.

PHARMACOKINETIC PROPERTIES

Absorbtion:

In plasma the concentration of drug depend on the route and site of absorbtion, vascularity and presence of vasoconstrictors . From the intrathecal route the drug is absorbed by nerve roolets. Bupivacaine has a higher lipid solubility and thus it easily penetrates the nervous and vascular tissues.

Distribution:

About 80 -95% of the total drug is bound to plasma protein especially alpha-1-acid glycoprotein. It has got a bimodal distribution phase containing a rapid distribution phase and slow distribution phase. In the rapid distribution phase the drug is first distributed to vascular tissues with a half life of about 2.7 minutes. Later in the slow distribution phase the drug is distributed to all tissues with a half life of about 28 minutes. The total half life involving the biotransformation and excretion is about 3.5 hours and the plasma clearance is about 0.47liters/minute.

Metabolism:

The metabolism of bupivacaine begins with hydroxylation of the aromatic ring and removal of piperidine side chain. Thus it forms pipecolyxylidine derivatives. It is one eighth as toxic as bupivacaine and both compounds are excreted in urine. It also forms a more conjugated water soluble metabolite N-desbutyl bupivacaine. As it is more water soluble conjugated form it is freely excreted in urine. There is a dose dependent pulmonary extraction of

the local anaesthetics drugs and release back of drugs. Bupivacaine undergoes extensive pulmonary extraction. The pulmonary extraction is inhibited by propanolol.

Elimination:

Most of the drug and metabolites are excreted through the kidneys. 4% to 10% of the drug is excreted in unchanged form. The metabolite N-desbutyl bupivacaine is more water soluble and excreted in urine. The plasma clearance is about 0.47liters/minute.

Pharmacodynamic actions

Effect on nervous system

Bupivacaine acts on both the A delta and C fibers. It causes profound motor block in high concentration. The higher lipid solubility of bupivacaine makes it fast acting and longer duration of block, compared to ropivacaine. In low concentration it spares the motor fibers and produces sensory blockade. This property is useful for post operative analgesia. But the effect of motor blockade is more than that of ropivacaine.

Effect on central nervous system

It causes both excitation and inhibition of the central nervous system. The toxic effects are manifested as tremors, convulsions , respiratory arrest and coma.

Effect of Cardiovascular system

These depend on the level of sympathetic blockade and number of segments blocked. The profound effect is that produced by bradycardia and hypotension due to sympathetic blockade. High spinal block inhibits the cardio acceleratory fibers and produce cardiac arrest. The cardiotoxicity of bupivacaine is more than that of lignocaine. Bupivacaine is a potent myocardial depressant. This effect is exacerbated with hypoxia, hypercarbia and by pregnancy. Ventricular arrhythmias and fibrillation occur due to high lipid solubility of bupivacaine and is resistant of revival with bretyllium. Convulsions occur with plasma concentration of about 5.4microgram/ml.

Effect on respiratory system

There is no apparent change in respiratory function in normal doses. The tidal volume, respiratory rate and minute volume are maintained. In high spinal, it produces respiratory depression due to paralysis of intercostals and diaphragm.

Indications:

It is indicated in central neuraxial blocks such as sub arachnoid block, epidural and caudal anaesthesia. It is also used in peripheral nerve blocks and infiltration anaesthesia. Epidural infusion of bupivacaine as intermittent bolus, continuous infusion or patient controlled infusion is used in post operative pain management and labour analgesia.

Contraindications:

It is contraindicated in known cases of allergic reactions to amide type of local anaesthetics,intravenous regional anaesthesia (Bier's block) and obstetric para cervical anaesthesia. It should not be used in patient with septicemia and local site infection. It is contraindicated in hemodynamically unstable patients.

Adverse effects:

The adverse reactions to bupivacaine are related to excessive plasma levels which are caused by over dosage of drug used, unintentional intravascular injection and slow metabolic degradation of drug. The maximum effective dose (c max) is 0.7µgm/ml. The signs of toxicity begin to appear with doses of about 1.6µgm/ml. The toxicity ratio of Bupivacaine is about (c tox/c max) 2.3.

The various side effects produced are in Central and peripheral nervous system. It produces dyskinesia, hypokinesia, neuropathy, vertigo, tremors, paresis, neuropathy and coma. Convulsions are produced due to toxic level of drugs. In Cardiovascular system it produces bradycardia, hypotension, vasovagal reaction, syncope, arrhythmias and ventricular fibrillation.

The effects on gastrointestinal system are nausea and vomiting, painful defecation. It causes weakness, hypothermia, malaise, tinnitus and hard of hearing . It also causes metabolic abnormalities, elevation of bilirubin levels and myalgia. Psychiatric disorders such as agitation, confusional state, memory

abnormalities, hallucination, sleeplessness, emotional liability, nightmares may be produced. Rash, urticaria, urinary incontinence, micturition disorder may also be produced. It may also cause deep vein thrombosis which may lead to pulmonary embolism.

Availability

Bupivacaine is available in concentration of 0.25% and 0.5% solutions. It is available both as isobaric and hyperbaric solution. Hyperbaric solution is prepared by adding dextrose to the local anaesthetic solution.

It is available in vials of 0.25% and 0.5% with preservative for epidural and nerve blocks and in ampoules of 0.5% preservative free for spinal anaesthesia

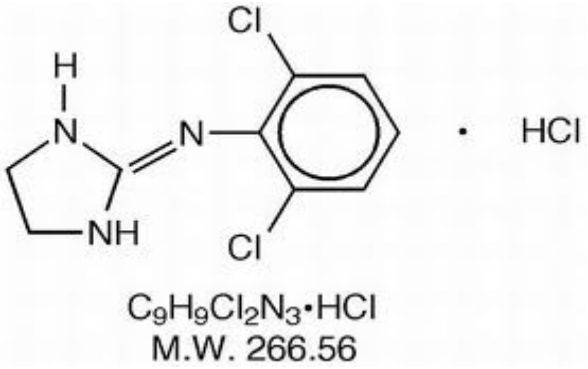
Dosages

Spinal	-	3 to 4 ml of 0.5%solution for adults
		0.3 to 0.5mg/kg of 0.5% solution for children
Epidural	-	15 to 20 ml of 0.5% or 0.25% solution
		0.125% solution produces sensory block only
Caudal	-	0.5ml/kg of 0.25% solution for sacral block
		0.75ml/kg of 0.25% solution for lumbar block
		1ml/kg of 0.25% solution for thoracic block

Peripheral nerve blocks – 15 to 20 ml of 0.25% solution(not exceeding the toxic dose)

The toxic levels are reached when more than 2mg/kg of drug volume is used.

PHARMACOLOGY OF CLONIDINE HYDROCHLORIDE



2-(2,6- dichlorophenylamino)-2 imidazoline hydrochloride.

Introduction:

Clonidine is a selective partial agonist of α2 receptor acting centrally. Introduced in early 1960s, It was during its use as a nasal decongestant its anti hypertensive property was found out. Subsequently more insights into the pharmacological properties has led to its use in clinical anaesthesia practice as well. Clonidine hydrochloride is a mesomeric imidazoline compound. Clonidine exists as a white, odourless, crystalline substance with the molecular weight of 266.56.It is soluble in alcohol and water. Clonidine improves the quality of anaesthesia, provides a more stable cardiovascular course during anaesthesia, presumably because of their sympatholytic effect and need for lower dose of cardio active anaesthetic and reduces the dose requirement of the anaesthetic agent. Clonidine may reduce the halothane MAC by upto 50% in a dose dependent manner. Clonidine potentiates the anaesthetic action of the local anaesthetics with fewer side effects in peripheral nerve blocks and central neuraxial blockade.

Availbility :

Available as one ml ampoule containing 150 micrograms and in oral tablet form. It should be stored below 25^{o}C.

Mechanism of action:

Clonidine is a centrally acting partial α2 adrenergic agonist with a selectivity ration of 220: 1 in favour of α2 receptors. The three subtypes of α2 receptors are α2a,α2b,α2c. α2a receptors mediate sedation, analgesia, sympatholysis. α2b receptors mediate vasoconstriction and anti- shivering. The startle response may reflect the activation of α2c receptors. The drug is lipid soluble, penetrates the blood brain barrier to reach the hypothalamus and medulla when injected epidurally. It stimulates the inhibitory α2 adreno receptors to reduce the central neural transmission in the spinal neurons Inhibition of substance-P release is believed to be involved in the analgesic effect.

In the spinal cord there are three group of neurons in the superficial laminae. This contains α2 adreno receptors which can perceive signals from pain pathways. Clonidine specifically targets tonic firing neurons by inhibiting voltage gated sodium and potassium channels thereby suppressing generation of action potential. The ability of clonidine to modify the function of potassium channels in the CNS may be mechanism for profound decrease in anaesthetic requirements.

Another contribution to analgesic effect may be through the release of acetylcholine in the neuraxial region. Sedation is produced by its action on locus ceruleus.

Pharmacodynamics

Cardiovascular system:

The important action of clonidine is the reduction in blood pressure. It can occur either through neuraxial route or systemic absorption. Centrally this action is based on two mechanism, First, acts via post synaptic α2 receptor in brain stem nucleus thereby reducing symphathetic activity. Second, activation of binding sites of nor adrenergic imidazoline. In the periphery it acts on the symphathetic terminal pre synaptic α2 receptors causing reduction in nor epinephrine release thereby causing vasodilatation and reduction in myocardial contractility. The clonidine acts directly on peripheral vessels causing vaso constriction through α2 adreno receptors thereby counter balancing the above effects.

Sedation:

Sedation is a desired property. Clonidine produces sedation in a dose dependent fashion regardless of the route of administration.

Respiratory system

Clonidine causes lesser respiratory depression. It does not potentiate opiod induced respiratory depression.

Peripheral nervous system:

Clonidine used as an adjuvant to local anaesthetic drug. It produces membrane hyperpolarisation by opening the potassium channels which increases the sodium channel blocking property of local anaesthetic. When added to local anaesthetic it enhance the quality and reduces the time of onset of block. It also extends the post operative analgesic duration. The above effects can be achieved with the dose range of 0.1 to 0.5 µg/kg.

Pharmacokinetics:

When clonidine is given by oral route it has 100% bioavailablity and peak plasma concentration is reached in 60 to 90 minutes, half life of clonidine is 9hous to 12 hours. Fifty percent of the drug is metabolised in liver and the remaining fifty percent is excreted by kidney in unchanged form. It is also available as a trans dermal patch which delivers fixed amount of drug for a week

300µgms intravenously over 10 min produces:

Distribution t½ : 11± 9 minutes

Elimination t½ : 9± 2 hours, 41 hours in severe Renal dysfunction.

Volume of distribution : 2.1± 0.4 l / kg

Plasma protein binding : 20 - 40% in vitro

Metabolism : It is metabolised into P – hydroxyclonidine**.**

Excretion:

70% of the dose, mainly in the form of unchanged parent drug (40 – 60%) in urine.So, the elimination t ½ of clonidine varies with creatinine clearance. Only 5% of the body clonidine store was removed in patients undergoing hemodialysis.

Dosage regimen:

Oral :3-5µg/kg

Intramuscular : 2 µg/kg

Intravenous :1-3µg/kg

Spinal :50 -100µg

Epidural :1-2µg/kg

Transdermal : 0.1-0.3 mg released per day

Peripheral nerve block: 0.1-0.5 mic/ kg

Precautions:

It should be cautiously used in renal insufficiency patients and in patients with cerebral and coronary insufficiency. Sudden withdrawal of prolonged continuous epidural infusion produces hypertensive crisis. So gradually discontinued over 2 to 4 days. Beta blockers may potentiate the hypertensive response seen with clonidine withdrawal. So it should be stopped earlier when using epidural clonidine

Contraindications:

Contraindicated in patients with known hypersensitivity to clonidine or components of the product. It is also contra indicated in brady arrhythmias , AV block, severe cardiovascular disease ,cardiovascular / hemodynamic instability.

Interactions:

CNS depression associated with barbiturates, alcohol and other sedative drugs is potentiated by addition of clonidine. Its hypotensive effect is potentiated by narcotics and antagonised by tricyclic antidepressants. Concomitant administration of drugs with a negative chronotropic dromotropic effect (beta blocker, digoxin) can cause or potentiate bradycardiac rhythm disturbances. Beta blockers may potentiate the hypertensive response seen with clonidine withdrawal. Pharmacologic effects of epidural local anaesthetics, opioids, neostigmine and other drugs may be potentiated by epidurally administered clonidine.

USES:

In Caudal anaesthesia Clonidine in addition to local anaesthetic drugs increases the anaesthesia and analgesia duration by 2 or 3 times without hemodynamic side effects .In Epidural block , Clonidine as sole agent or in combination with opioids or local anaesthetics to provide excellent analgesia during labour analgesia. Epidural injection of clonidine is used in the management of severe pain that is unresponsive to maximum doses of oral opioid.In Spinal anaesthesia, Clonidine combined with local anaesthetics

prolong the duration and improves the block quality .It minimize tourniquet pain during lower limb surgery and prevents shivering.

Oral clonidine pre anaesthetic medication (5mic/kg) blunts reflex tachycardia and rise in intra ocular pressure associated with direct laryngoscopy, decreases the intra operative variablity of blood pressure and heart rate and dramatically decreases the anaesthetic requirements for inhaled and injected drug.

In peripheral nerve blocks, Clonidine prolongs the duration of anaesthesia and analgesia with local anaesthetics by two times in a dose of 75 to 150 micro grams.

In Bier's Block, 150 microgram of clonidine enhances the tolerance of tourniquet.

It is also used in intra articular analgesia. Clonidine decreases myocardial ischemia, infarction and mortality following cardiovascular surgery.

Administration of clonidine,75µg IV stops shivering by inhibiting thermoregulatory control and used in the treatment opioid and alcohol withdrawal syndrome.

Side effects;

The most common side effects are sedation and xerostomia. Cardiovascular side effects include bradycardia, hypotension, and arrhythmias. Bradycardia produced by clonidine may require treatment with I.V anticholinergics. Orthostatic hypotension occurs rarely.

Abrupt discontinuation of clonidine can result in rebound hypertension as soon as 8 hours and as late as 36 hours after the last dose. Symptoms of nervousness, excessive sweating, headache, pain in the abdomen, and increase in heart rate precede the actual increase in systemic blood pressure. Labetalol is useful in treatment of rebound hypertension.

Skin rashes are occurs frequently and impotence occurs occasionally.

Treatment for Over dosage:

There is no specific antidote for clonidine over dosage. Measures like atropine, ephedrine, and i.v. fluids are enough. Yohimbine, partially reverses the analgesia and sedation but not the BP and heart rate changes produced by the epidural clonidine.

REVIEW OF LITERATURE

The abdominal cavity is surrounded by abdominal wall. This abdominal wall is divided into anterior, posterior and lateral parts. From superficial to deep, the abdominal wall has following layers namely skin, fascia(campers fascia and scarpas fascia),muscles, fascia transversalis and peritoneum.

The importance lies in the plane between transverses abdominis and internal oblique muscles where the lower thoracic and upper lumbar nerves passes and gives sensory innervations to skin, muscles and parietal peritonium of the anterior abdominal wall. Sensory blockade of the anterolateral abdominal wall was first described by Rafi in 2001.

Various studies to evaluate the efficacy of analgesia using TAP block:

1. McDonnell JG, Curley GCJ, Carney J, et al. The analgesic efficacy of TAP block after caesarean delivery. Anaesth Analg 2008; 106:186-91.

   In this study of analgesic effect of TAP block using ropivacaine 0.75% in one group and placebo in another group along with standard postoperative analgesia (using IV morphine analgesia and regular diclofenac and acetaminophen) was made. The results of this study showed that TAP block with ropivacaine analgesia has significant efficacy as compared with placebo and also reduces the standard analgesic drug requirement postoperatively ($p<0.001$) The visual analog scale pain scores was used for pain measurement in the participants.

2. *Jumana M Baat et al ,2010 , M.E.J Anaesthesia 20,*

This study was conducted to evaluate the efficacy of USG guided TAP block following caesarean section .Here TAP block was performed with 0.5% bupivacaine after spinal anaesthesia and they found that there was increased duration of analgesia and reduction in analgesic requirement with less side effects like vomiting nausea and sedation .

3 D. Belavy J. Cowlishaw, et al Ultrasound-guided TAP block for analgesia after Caesarean delivery. British Journal of Anaesthesia 103 (5): 726–30 (2009).

The study was conducted to find the efficacy of TAP block for postoperative analgesia using ultra sound guided technique in patients posted for cesarean section. In this study randomly selected participants are divided into two groups, those receiving bilateral ultrasound guided TAP blocks with 0.5% ropivacaine and another group receiving saline using the same technique. Here also they used visual analogue scale for pain measurement. The conclusion of this study was ultrasound guided TAP block with ropivacaine have superior analgesic effect compared to standard morphine, NSAID or acetaminophen therapy.

4. McDonnell JG,at el. The analgesic efficacy of TAP block .Anesth Analg 2007; 104:193–7.

The efficacy of TAP block using levobupivacaine was studied in large bowel surgeries via a midline abdominal incision including patient controlled standard analgesic regimen. TAP block reduced visual analog scale pain scores($p<0.05$) and decreased standard analgesic requirement postoperatively($p<0.001$).From these results the conclusion was made that TAP block provided highly effective postoperative analgesia.

5. Carney et al,. Anaesth Analg 2008; 107(6):2056-60 The study was performed in patients planned for total abdominal hysterectomy. Here one group of participants were given bilateral TAPB with ropivacaine and compared with placebo group in addition to standard post operative analgesia. The results of the study showed reduced VAS pain score. They derived a conclusion that TAP block provided efficient analgesia compared with standard analgesic regimen and also the dose requirement is low postoperatively. In this study, TAPB was included as a component of multimodal analgesic regimen.

6. Searle A, Mathews M, et al. Br J Anaesth 2009; 103(4):601-05.**,**

A trial was conducted to evaluate the efficacy of postoperative analgesia in open appendicectomy surgeries Fifty-two adult patients undergoing open

appendicectomy using bupivacaine and standard regimens. In this study TAPB was performed unilaterally using ultrasound guidance. Ultrasound-guided TAP block gives significant outcomewhen compared with postoperative morphine consumption ($p<0.002$).The visual analogue score is also reduced in the immediate and at 24 hours (both has $p<0.001$) of postoperative period. The study showed that Ultrasound-guided TAP block holds promising results as a component of a balanced postoperative analgesic regimen.-G Niraj et al

7. El-Dawlatly AA, , et al Br J Anaesth 2009:102:763-67

The study was conducted to evaluate the intra- and postoperative analgesic efficacy using TAPB using ultrasound guidance. Here they selected laparoscopic cholecystectomy under general anaesthesia with or without TAP block.Ultrasound-guided bilateral TAP block was performed using bupivacaine. They arrived at a conclusion that this study had two advantages: one is that Ultrasound provides a good anatomical view for the placement of the local anaesthetic to do TAP blocks. Other advantage is less opioid consumption in the postoperative period

8. Tran TMN, Hebbard P, et al TAP block in a cadaveric study. Br J Anaesth 2009; 102:123-27.

Interest was showed in the evaluation of ultrasound guidance to place the drug in correct plane. A in vivo anatomical study was done with dye

injection into the TAP and subsequent cadaver dissections to watch the spread of local anaesthesia.The conclusion of this study is that ultrasound-guided TAP injection involves the lower thoracic and upper lumbar nerve roots(T10–L1 nerve roots) and thus may have a limited use.

9. Popping DM, Elia N,et al . Clonidine as an adjuvant to Local Anesthetics Anesthesiology 2009; 111:406-15.

In this study clonidine as an adjuvant to local anaesthetics in brachial plexus block was done. It showed that clonidine prolongs the duration of postoperative analgesia (both sensory and motor blockade)

10. Cucchiaro G, Ganesh A. The Effects of Clonidine on Peripheral Nerve Blockade. Anesth Analg 2007; 104:532-7.

Significant results have been obtained in a study using clonidine with bupivacaine or ropivacaine in peripheral nerve blocks in children. The derivation of the study showed that clonidine prolongs both sensory and motor blockade of local anaesthetics.- Cucchiaro G, Ganesh

11. Hutscala D, Maschr H, et al. Clonidine as adjuvent to bupivacaine prolongs analgesia in brachial plexus block Euro J Anaesthesio 2004 Mar,21(3),198 to 204 .

Here three groups were studied (group1 bupivacaine + epinephrine) with 0.9%Nacl, group 2 only I.M. clonidine, group 3 bupivacaine plus

clonidine.).They concluded that clonidine+ bupivacaine + epinephrine block prolongs and enhances brachial plexus blockade

12. Casti et al 2000,anaesthesia analgesia ,aug 91, 388-92.

In this study clonidine 1 µg/kg was added as adjuvent to 0.75% ropivacaine to extend postoperative analgesic duration in sciatic nerve block and they found that there was increase in duration of analgesia with slight increase in sedation without hemodynamic alteration.

13 *Indian Journal of Pharmacology, V42, No. 2March- 2010, 74-77* Susmita Chakraborty et al Effect of clonidine in supraclavicular brachial plexus block.

This study was conducted to evaluate the effect of clonidine in peripheral nerve block where they have used 0.2 ml of clonidine in 0.5% bupivacaine and found to have increased duration of analgesia with mild sedation without any hemodynamic alteration

MATERIALS AND METHODS

Study Type: Interventional

Study design:

Prospective, randomized, double blinded, case control study.

Study population:

60 female patients who underwent caesarean section by pfannenstiel incision at GOVERMENT RAJAJI HOSPITAL**,** MADURAI, were taken up for the study.

Case definition

Female patients of age group 18-35 years with ASA I and II undergoing cesarean section by pfannenstiel incision.

Groups

GROUP A: Contains 30 patients:SAB with 0.5% hyperbaric inj.bupivacaine 10mg then TAP BLOCK with 0.25%bupivacaine 20ml.

GROUP B Contains 30 patients: SAB with 0.5% hyperbaric inj.bupivacaine 10mg then TAP BLOCK with 0.25% bupivacaine 20ml + clonidine 0.5mic.gm/kg body wt.

Outcome Measures for this Clinical Trial

Primary Measures:

- To evaluate the analgesic efficacy of bupivacaine and bupivacaine with clonidine by using Visual Analogue Scale pain scores in 1, 2, 3, 4, 5, 6, 12, and 24 hrs after surgery & to evaluate sedation score of the patient

Patient included in study

- ASA class I &II patients
- 18 to 35 years of age

Exclusion Criteria:

- Patient refusal
- Patient with known allergic reaction to local anaesthetics
- History of bleeding diathesis
- Known psychiatric illness,
- Patients on chronic analgesics.
- BMI >40kg/m²
- Liver failure and Renal failure

Probability sampling:

60 lots were randomized (30 in each group) from the people who were willing to take part in the study. All the patients stand an equal chance of getting into any group. All the patients were aware of the study and informed consent was obtained

Data collection:

Age, BMI, Duration of surgery, time to regression of sensory block to T10 level , VISUAL ANALOGUE SCALE in 1, 2, 3, 4, 5, 6,7,8,10, 12, and 24 hrs, HR, Systolic BP, Diastolic BP, Spo2, Respiratory rate, duration of analgesia, and sedation score using 6 point Ramsay score .

Materials:

- Ultrasound machine, with high frequency transducer probe,
- Sterile gel, antiseptics
- 23 G Quincke spinal needle, 0.5% heavy bupivacaine
- 18 G Tuohy needle, 0.5% Bupivacaine, sterile normal saline
- 10 ml and 20 ml syringes
- Swabs, swab holding forceps and sterile towel

Method of study

First Hospital Ethics Committee approval was obtained with proper explanation and written informed patient consent obtained. The study was conducted in 60 ASA status I and II patients undergoing caesarean section by pfannenstiel incision, in a prospective, randomized, double-blinded, controlled trial. In the preoperative waiting room detailed history and physical examination was done. Baseline data like (pulse rate, blood pressure, respiratory rate), and basic investigations were collected.

Both groups were explained about the procedures (Both SAB and TAP Block) and postoperative follow up pattern. The VAS was explained as 0-10 cm scale reading and patient was asked to tell the number.

Patients were divided randomly to receive TAP block either with 0.25% bupivacaine 20ml per side (n=30) or TAP block with 0.25% bupivacaine + clonidine 0.5mic.gm/kg (n=30).The investigator, patients and postoperative care physicians were blinded to group assigned.

Common to both groups are 18G IV Cannula was secured and preloading done with 1000ml of crystalloid. Under asepsis, in lateral position subarachnoid block given with 0.5% Bupivacaine 10 mg using 23G Quincke's spinal needle to all the patients in both groups. Patient monitored intra-operatively and after the surgical procedure was over patients sensory level was assessed, once when the sensory level reached to T10, TAP was performed.

Under asepsis TAP Block was performed bilaterally. An ultrasound guided posterior TAP block technique was used to locate the Transversus abdominis plane. Patient was positioned in supine, syringe containing local anaesthetic were prepared with asepsis. Syringes either contain bupivacaine 0.25% 40ml or bupivacaine 0.25% with clonidine 0.5mic.g/kg 40ml. Investigators were blinded to the injected solution .An high frequency (10-15Hz) Ultrasound probe was placed in mid way between costal margin and iliac crest along the mid axillary line. The satisfactory image was aimed to visualize the subcutaneous fat, and all three anterior abdominal wall muscles parallely with

peritoneum and intra peritoneal cavity. An 18G tuohy needle inserted anterior to the probe of the ultrasound probe. With continous monitoring of needle, to lie in the fascial plane between transversus abdominis muscle and internal oblique muscle, a small volume of drug is injected to confirm the correct plane and needle tip, then 20 ml of prepared solution was injected in both left and right side .Injection was said to be successful when an echo luescent lens-shape (bi convex) area come in to view between the two muscles .After observing closely for signs of toxicity patients were shifted to post operative ward.

Total duration of analgesia:

The presence and severity of pain assessment was done with visual analogue scale (VAS score 0 : no pain and 10 : worst pain) in 1, 2, 3, 4, 5, 6, 7,8,10,12, , and 24 hours by an investigator blinded to group assigned. Sedation was monitored using 6 point Ramsay sedation score, 1.Anxious or agitated and restless, 2. Oriented, calm, co-operative 3.Responsive to comment,4.Brisk response to glabellar tap or loude sound, 5.Sluggesh response to glabellar tap or loude sound, 6.Unresponsive.

Vitals parameters pulse rate, Blood pressure changes, respiratory rate changes, SpO_2, symptoms and signs of local anaesthetic toxicity and complications were recorded up to VAS score reached to ≥ 4 in immediate postoperative period after TAP block.

The primary end point of study is when the VAS score reached ≥ 4 . Rescue analgesia: Inj. Tramadol 100mg i.m. was used as first rescue analgesia either on demand or when the VAS score was ≥ 4.

DATA ANALYSIS

In this study the analgesic efficacy of bupivacaine and adjuvant clonidine in ultrasound guided Transversus abdominis plane block in caesarean section for postoperative pain relief is evaluated. The observation and results were analyzed. Data analysis was done with the help of computer using Epidemiological Information Package (EPI 2010) developed by Centre for Disease Control, Atlanta. Results were considered statistically significant when "p" value was ≤ 0.05

In order to ascertain the significance of demographic features, Kruskul Wallis chi-square test was used to test the significance of difference between quantitative variables and Yate's chi square test for qualitative variables. A 'p' value less than 0.05 is taken to denote significant relationship.

OBSERVATIONS AND RESULTS

Table 1 : Age distribution

Age group	**Group BC**		**Group B**	
	No	**%**	**No**	**%**
Upto 20 years	5	16.7	3	10
21-25 years	6	20	10	33.3
26-30 years	13	43.3	13	43.3
31-35 years	6	20	4	13.3
Total	30	100	30	100
Range	19-35 years		19-35 years	
Mean	26.6 years		26.4 years	
SD	4.8 years		4.1 years	
'p'	0.7668 Not significant			

The two groups were similar with respect to age distribution and difference was statistically insignificant ($p > 0.05$).

AGE DISTRIBUTION

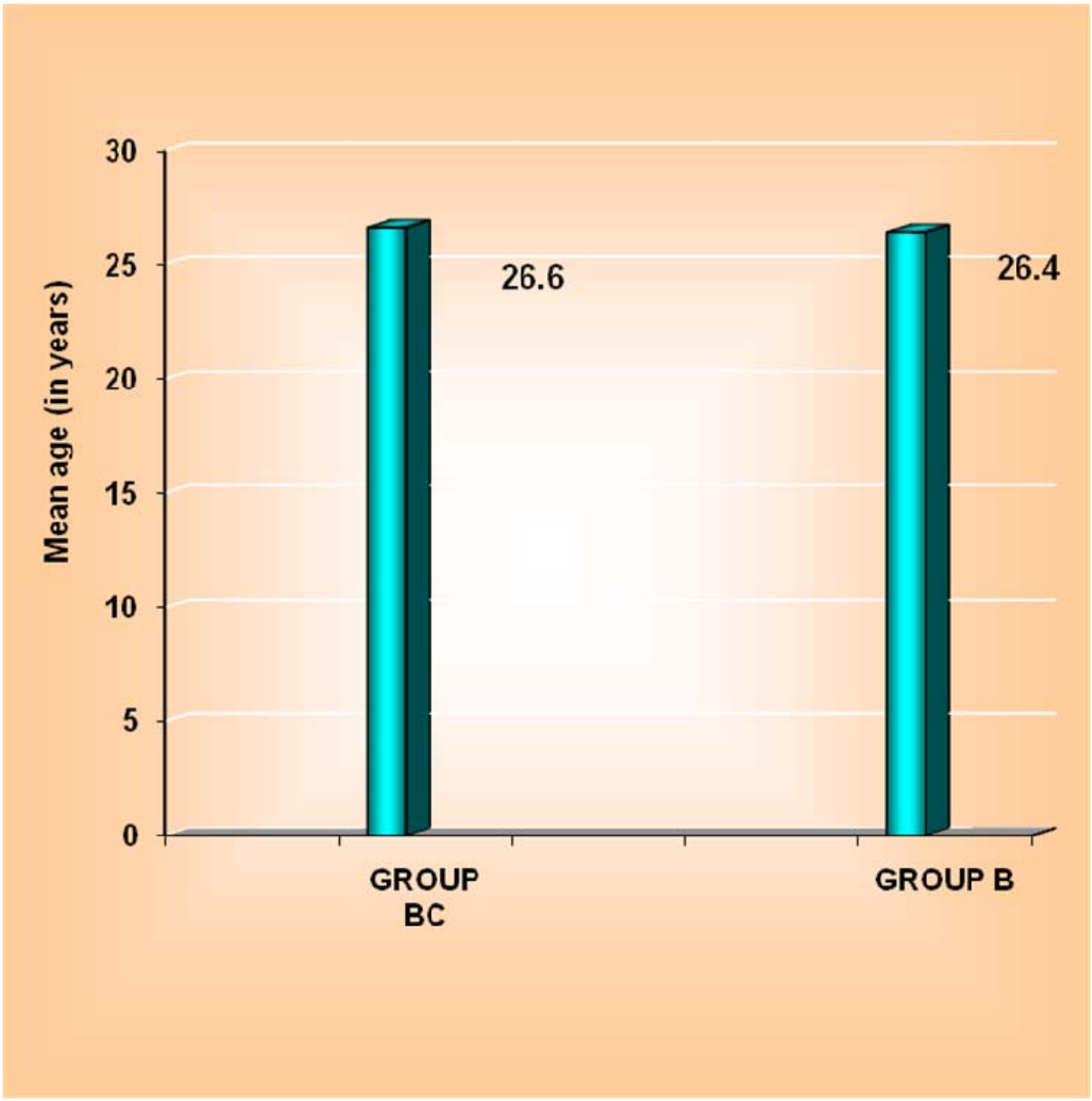


Table 2 : ASA

ASA	Group BC		Group B	
	No	**%**	**No**	**%**
I	23	76.6	22	73.3
II	7	23.3	8	26.7
'p'	>0.05 Not significant			

The two groups are comparable with respect to ASA status and difference is statistically insignificant (p >0.05).

A S A

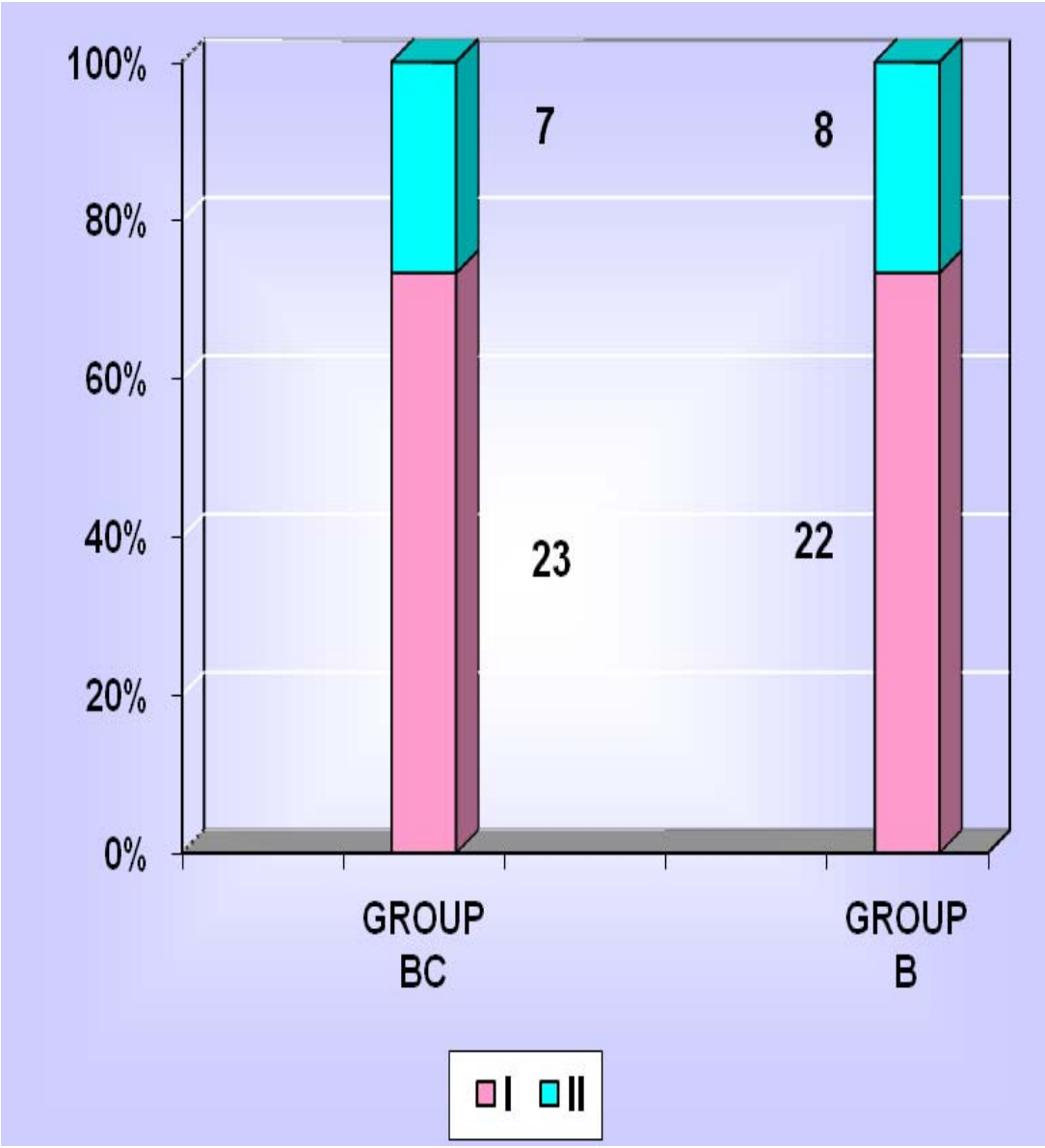


Table 3 : BMI

Group	BMI(kg/m^2)		
	Range	**Mean**	**SD**
Group BC	18-38	28.3	5.6
Group B	18-38	27.0	6.3
'p'	0.4492 Not significant		

The two groups are comparable with respect to BMI status and difference is statistically insignificant

B M I

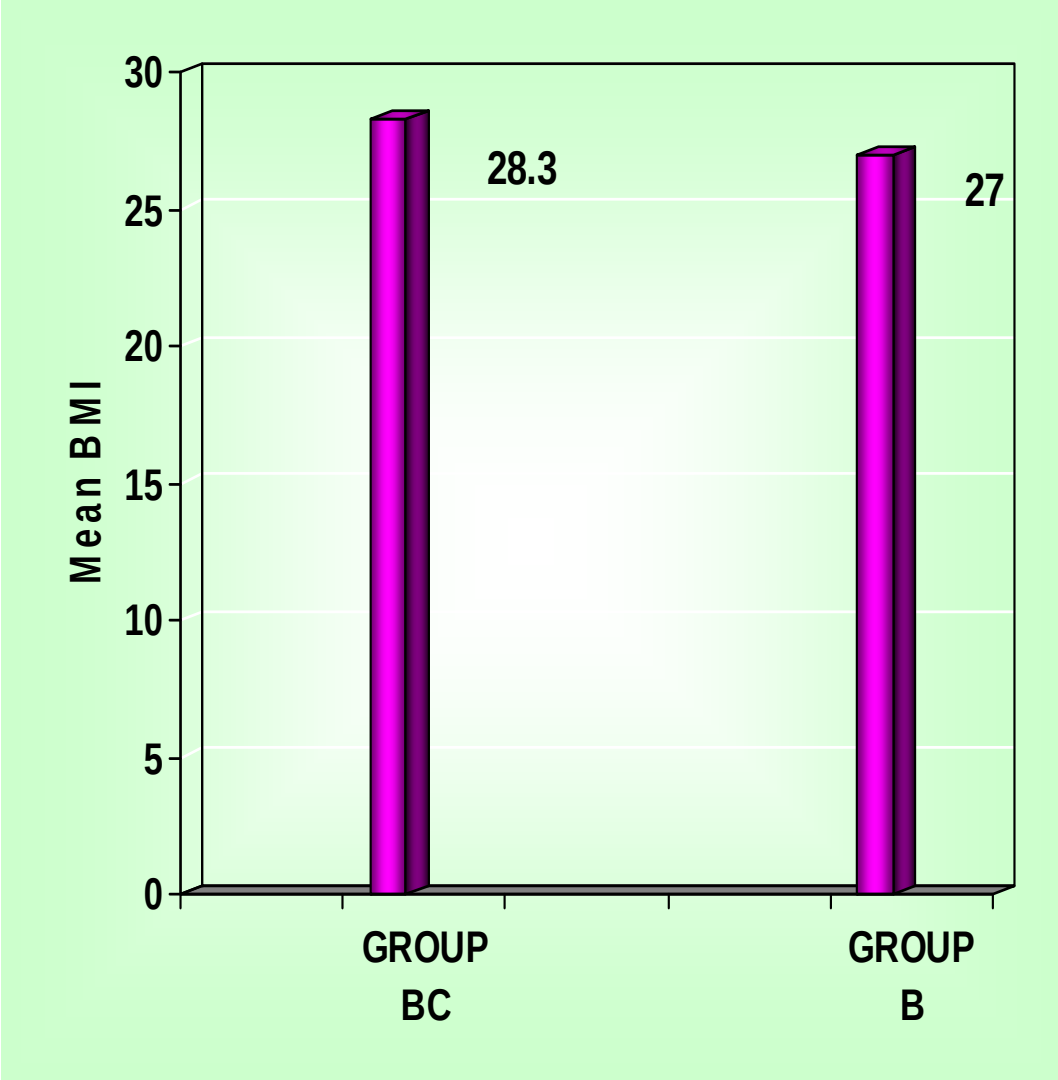


Table 4 : Preoperative hemodynamic parameters

Variables	Group BC		Group B		'p'
	No	%	No	%	
Pulse rate	82.0	9.6	81.7	9.4	0.935 Not significant
Systolic BP	117.2	13.4	119.2	12.5	0.4552 Not significant
Diastolic BP	71.9	8.3	73.0	8.7	0.6481 Not significant
SPO2	98.5	0.7	98.5	0.7	0.8418 Not significant

The two groups are comparable with respect to pre operative vital parameters and difference is statistically insignificant

PREOPERATIVE P.R. / SBP / DBP / SPO2

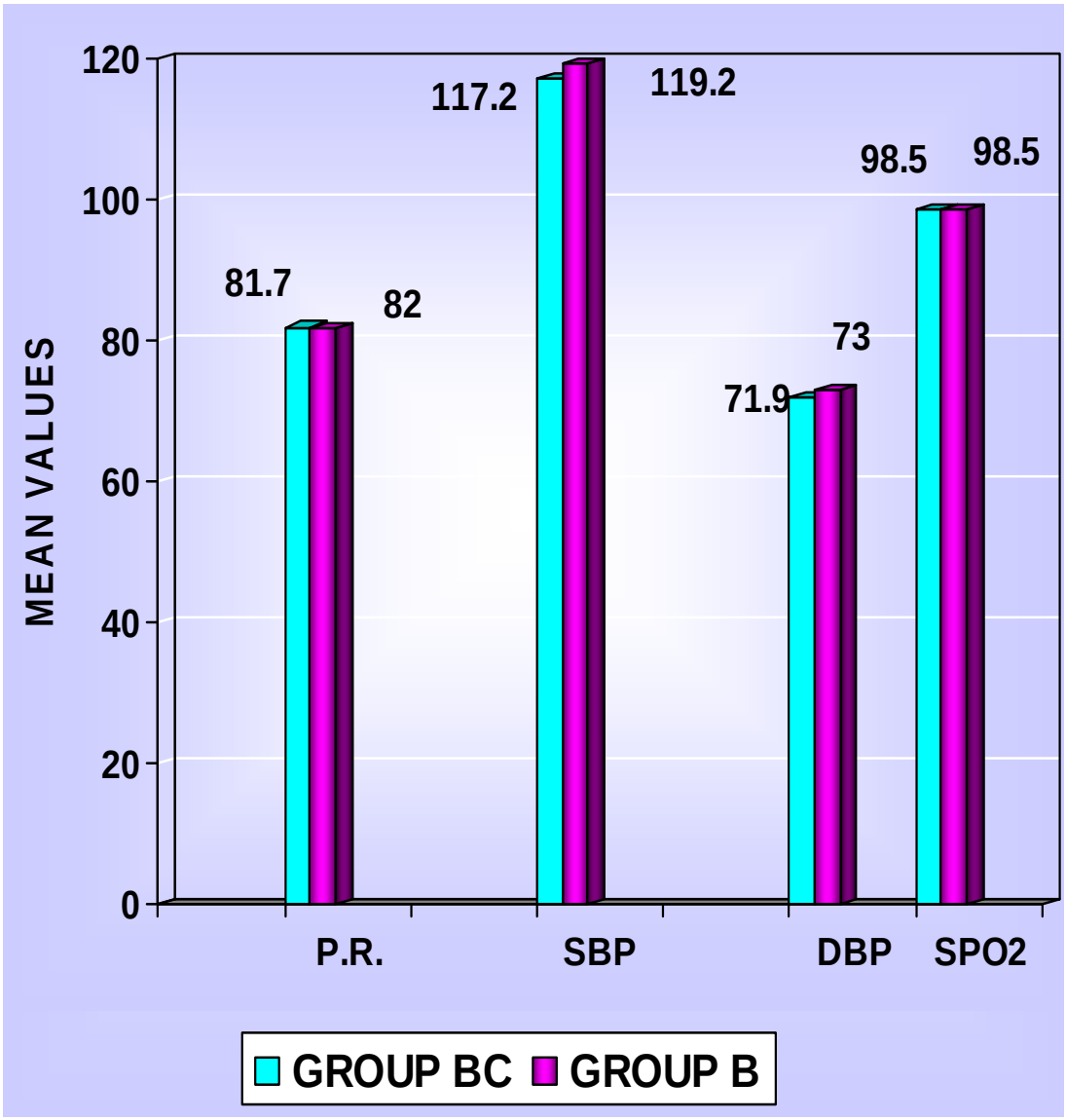


Table 5: Duration of surgery

Group	Duration of surgery (in minutes)		
	Range	**Mean**	**SD**
Group BC	35-65	47.5	8.5
Group B	35-65	45.8	8.4
'p'	0.3509 Not significant		

The two groups are comparable with respect to duration of surgery and difference is statistically insignificant

DURATION OF SURGERY

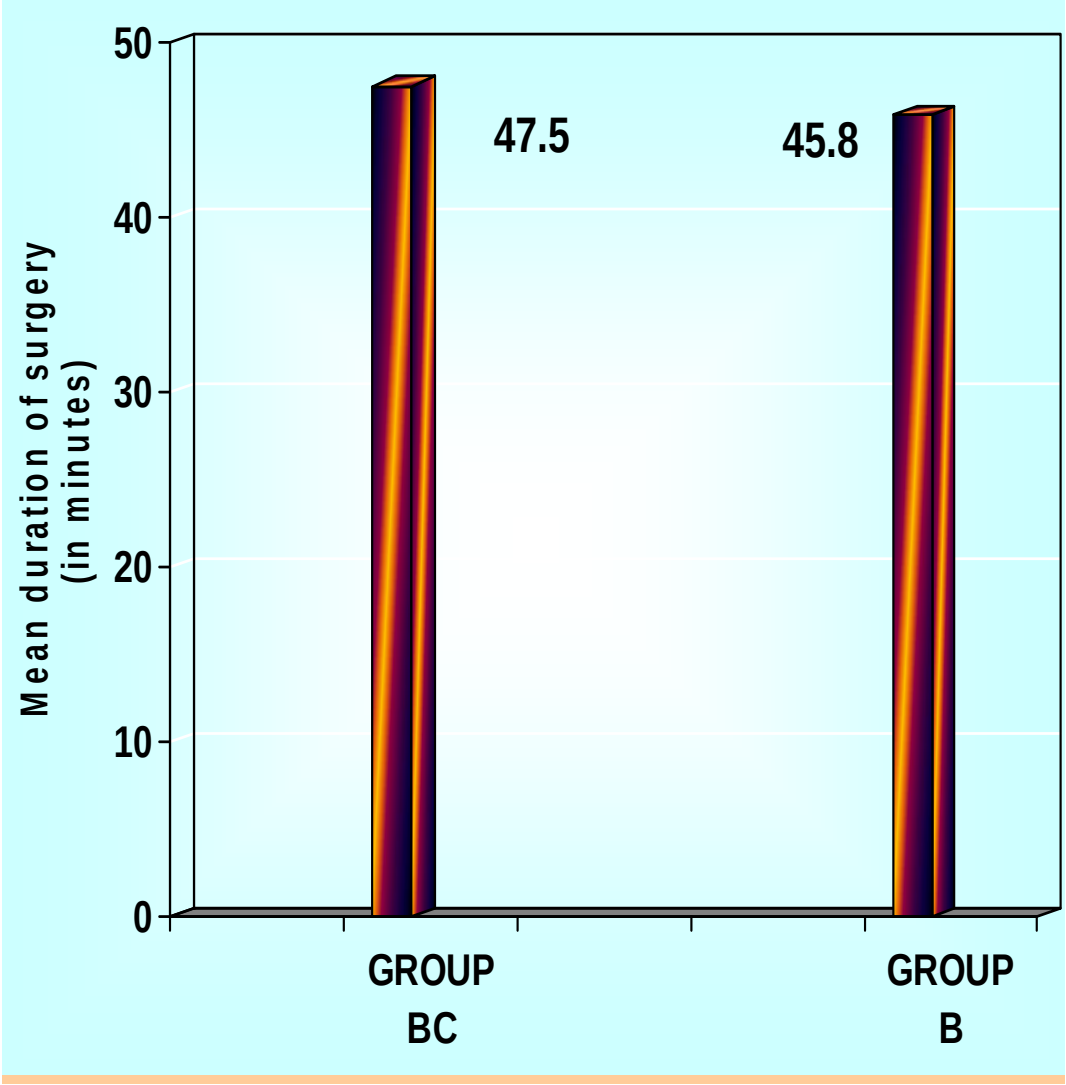


Table 6 : Time to regress T10 level of sensory block

Group	Time to T_{10} (in minutes)		
	Range	**Mean**	**SD**
Group BC	50-85	67.0	9.1
Group B	55-80	67.5	8.5
'p'	0.7645 Not significant		

The two groups are comparable with respect to regression of sensory level to T_{10} and difference is statistically insignificant

TIME TO T10

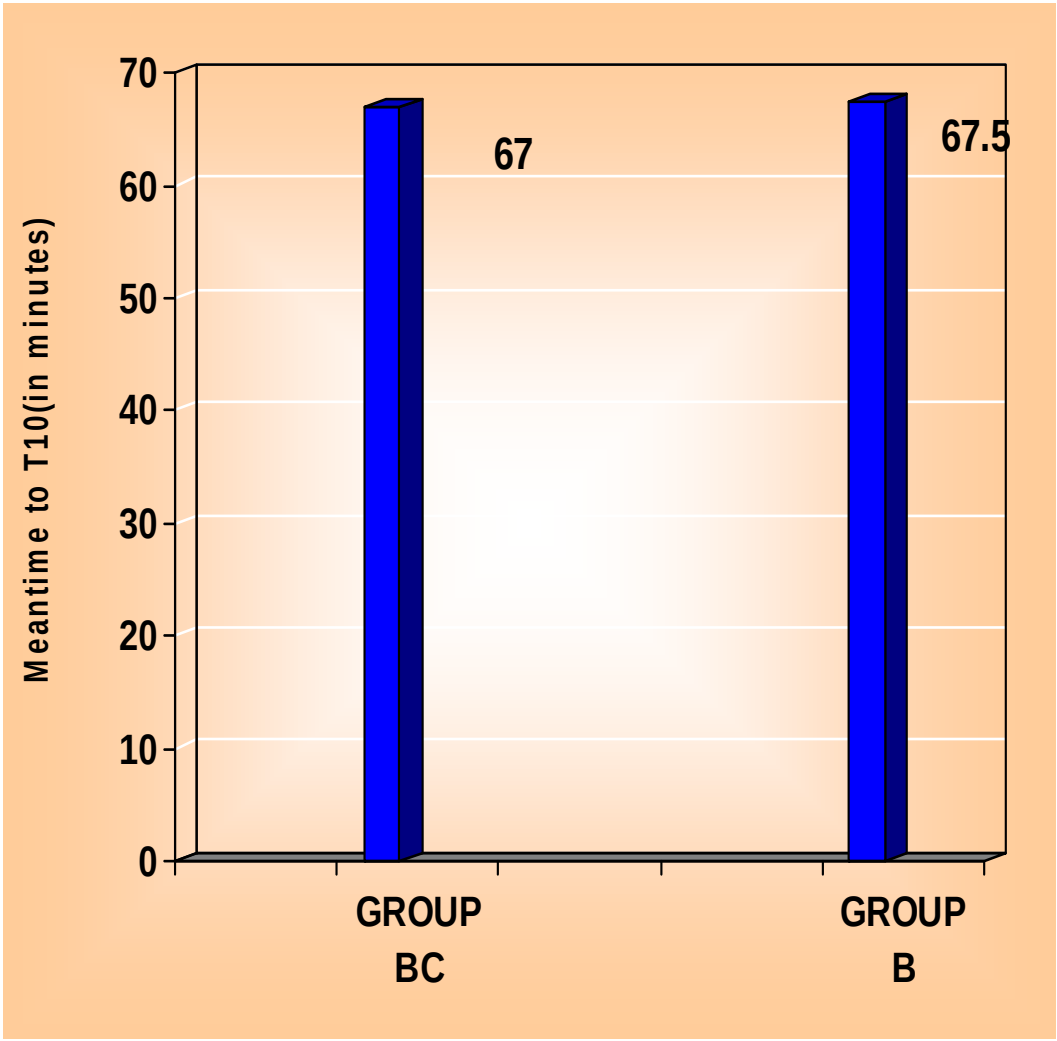

Meantime to T10(in minutes)
70
60
50
40
30
20
10
0
67
67.5
GROUP BC
GROUP B

Table 7 : Changes in VAS score

VAS at	VAS in				'p'	Significance
	Group BC		Group B			
	Mean	SD	Mean	SD		
30 minutes	0	-	0	-	-	-
1 hour	0	-	0	-	-	-
2 hours	0	-	0	-	-	-
3 hours	0	-	0	-	-	-
4 hours	0	-	0.33	0.8	0.0207	**Significant**
5 hours	0	-	3.33	0.76	0.0001	**Significant**
6 hours	0.7	1.29	4.6	0.56	0.0001	**Significant**
7 hours	3.27	0.69	-	-	-	-
8 hours	4.4	0.56	-	-	-	-
10 hours	4.5	0.51	-	-	-	-

Postoperative VAS pain scores were **significantly reduced** in Bupivacaine and clonidine group in all the time intervals when compared to Plain bupivacaine group . Even after 8hrs the mean VAS score was between 4 to 5 in Group BC. And the rescue analgesia was given when the VAS score reached ≥4.

CHANGES IN VAS score

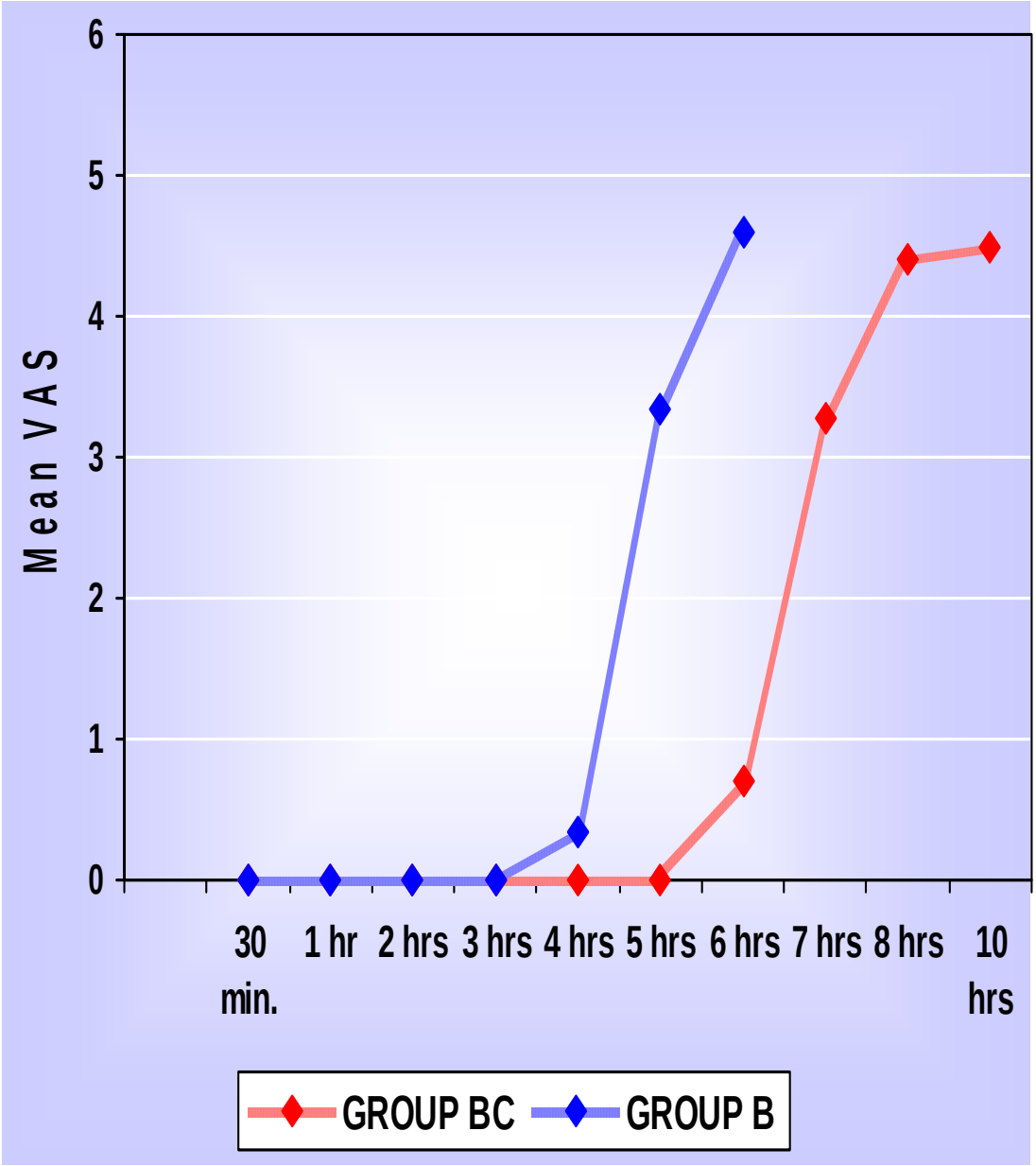


Table 8 : Duration of Analgesia

Group	**Duration of Analgesia (in minutes)**		
	Range	**Mean**	**SD**
Group BC	375 – 570	516.7	39.4
Group B	240-330	277.3	24.5
'p'	**0.0001** **Significant**		

The duration of analgesia was **significantly increased** in bupivacaine and clonidine (BC) group and the "p value is 0.0001.

DURATION OF ANALGESIA

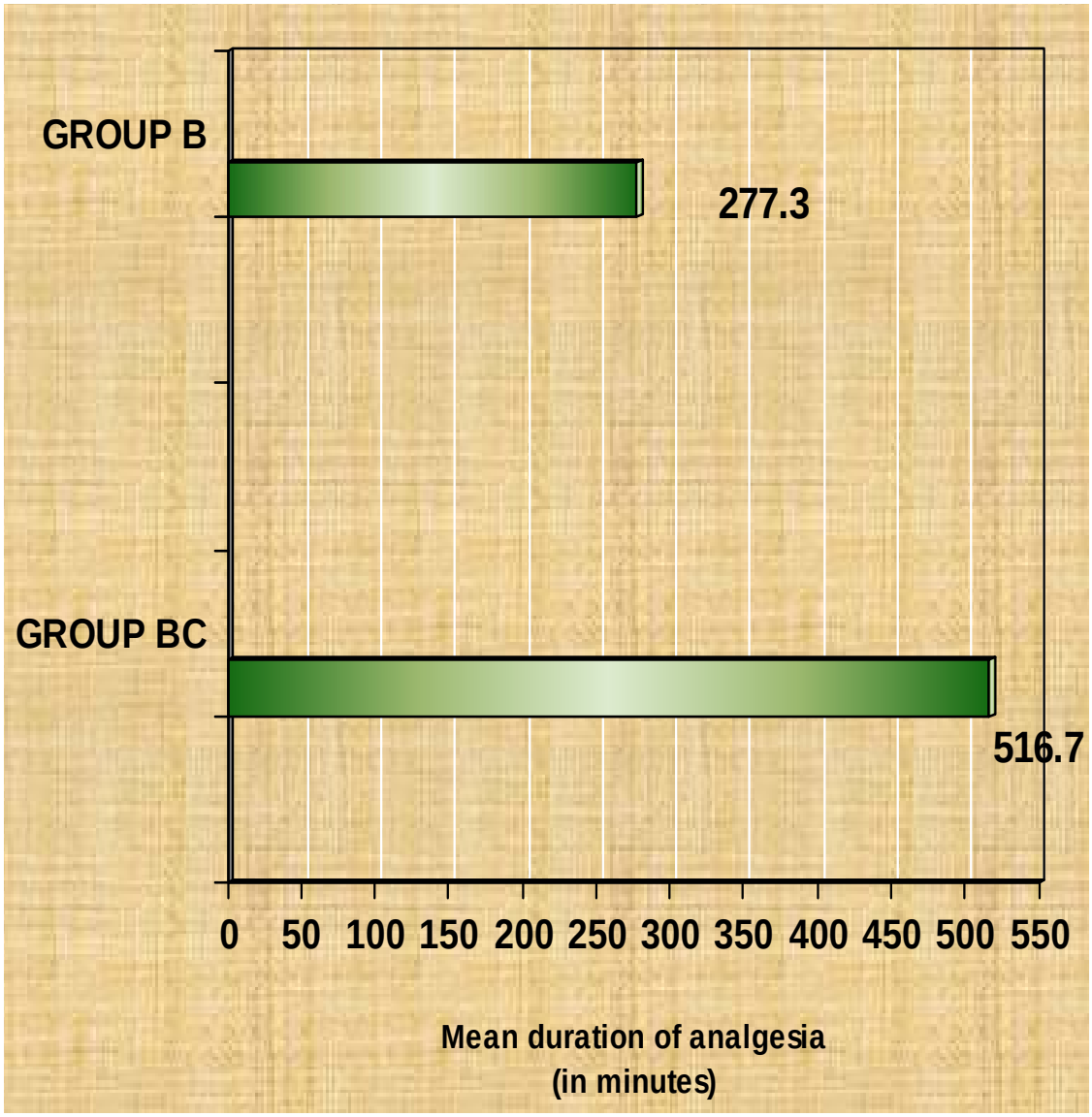


Table 9: Complications

Complications	No.of complications in				'p'
	Group BC		Group B		
	Mean	SD	Mean	SD	
Nausea	3	10	3	10	1.0 Not Significant
Hypotension	-	-	-	-	-
Bradycardia	1	3.3	-	-	0.5 Not significant

The complication rate was similar in both groups and statistically **not significant** .

Table 10 : Ramsay sedation score

Sedation score	Group BC		Group B	
	No	**%**	**No**	**%**
2	4	13.3	27	90
3	26	86.7	3	10
'p'	**0.0001** **Significant**			

86.7% in the bupivacaine and clonidine group had sedation score of 3 while only 10% in the plain bupivacaine group had score of 3. This is **statistically significant** with a 'p 'value of 0.0001

SEDATION SCORE

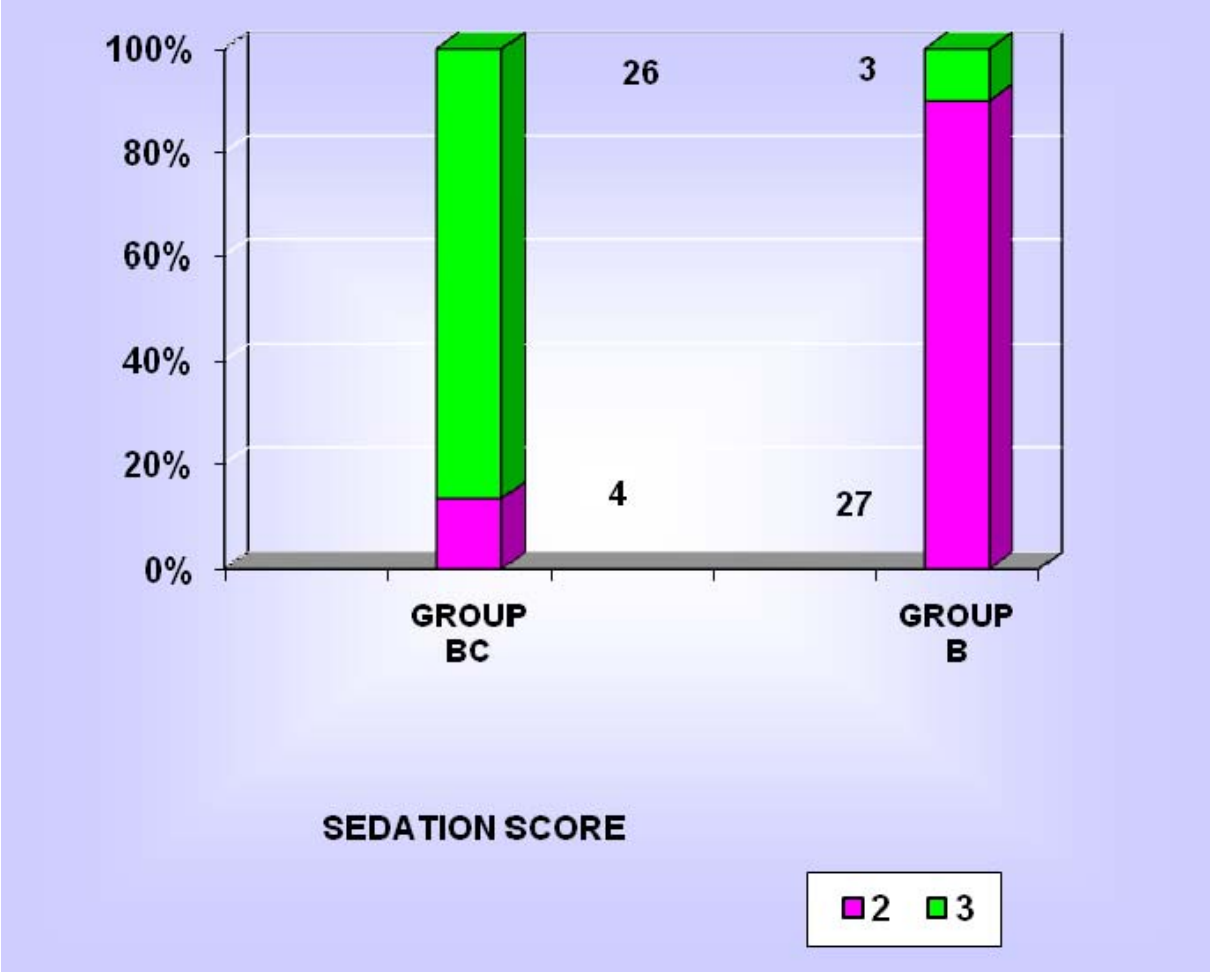


Table 11 : Changes in pulse rate after TAP block

Pulse rate at	Group BC		Group B		'p'	Significance
	Mean	SD	Mean	SD		
0 minute	83.9	8.0	84.3	9.2	0.8471	Not significant
30 minutes	86.7	8.5	83.6	9.2	0.1824	Not significant
1 hour	86.9	8.0	86.0	8.9	0.7612	Not significant
2 hours	84.7	8.4	86.6	8.3	0.3577	Not significant
3 hours	87.5	6.8	87.4	8.3	0.8297	Not significant
4 hours	86.6	8.0	87.3	9.0	0.767	Not significant
5 hours	87.5	8.5	85.3	8.5	0.2827	Not significant
6 hours	85.8	8.6	89.7	7.0	0.0696	Not significant
7 hours	85.6	8.5	-	-	-	-
8 hours	82.0	8.8	-	-	-	-

Both groups had comparable normal heart rate and the difference is **statistically not significant**

CHANGES IN PULSE RATE

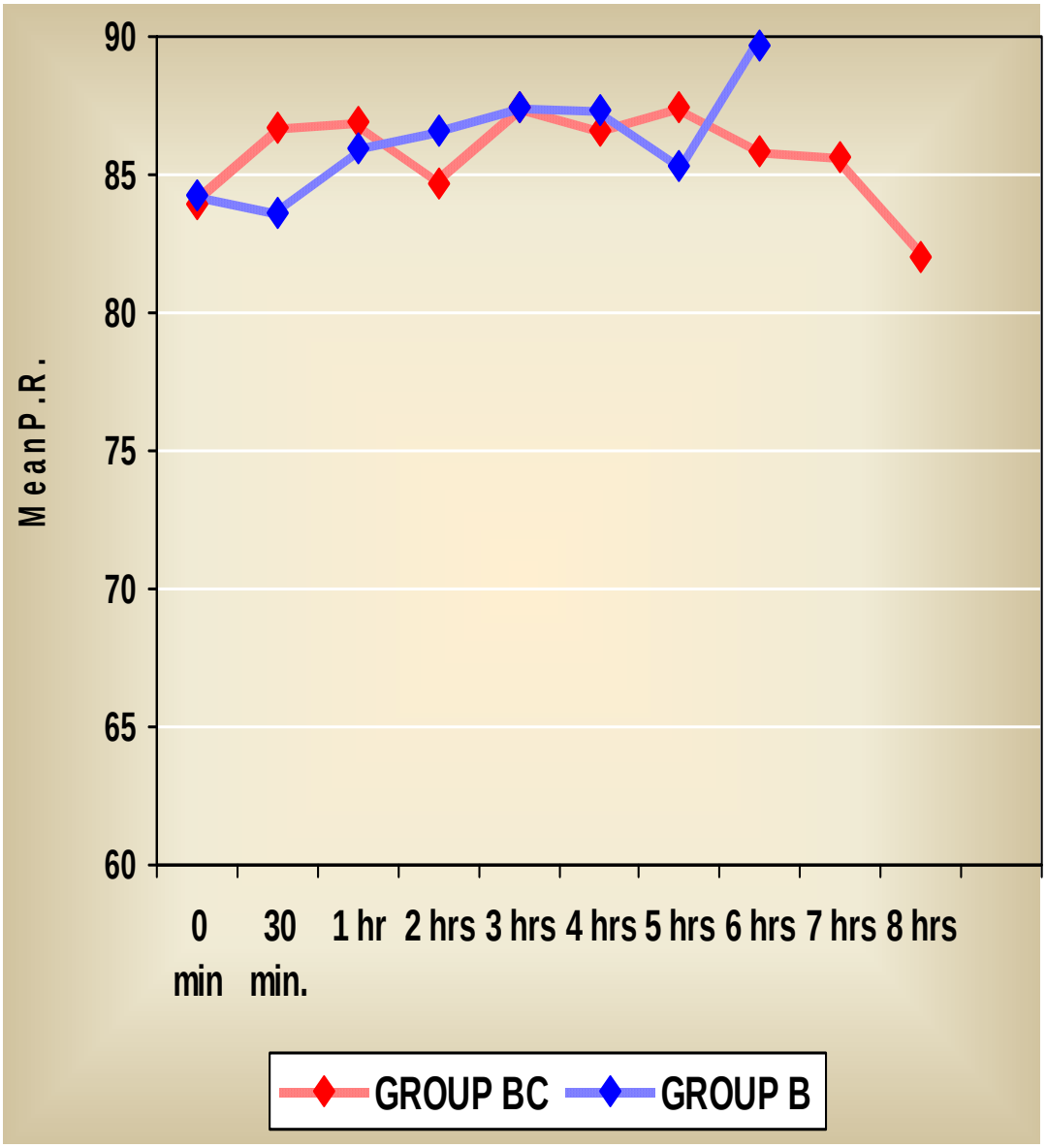


Table 12 : Changes in systolic blood pressure

SBP at	SBP in				'p'	Significance
	Group BC		Group B			
	Mean	SD	Mean	SD		
0 minute	112.5	10.2	115.3	9.7	0.2504	Not significant
30 minutes	111.9	9.8	113.8	10.3	0.4495	Not significant
1 hour	112.3	8.9	114.3	8.9	0.342	Not significant
2 hours	110.1	9.4	113.7	9.7	0.1174	Not significant
3 hours	113.3	9.0	114.5	10.1	0.8295	Not significant
4 hours	113.8	8.8	114.7	10.5	0.7215	Not significant
5 hours	113.5	8.7	116.8	8.7	0.1527	Not significant
6 hours	112.7	9.1	114.7	10.5	0.5727	Not significant
7 hours	115.9	9.0	-	-	-	-
8 hours	113.5	8.8	-	-	-	-

The mean systolic BP of both groups were with in normal limits ,and the difference is **statistically not significant**

CHANGES IN SYSTOLIC B.P

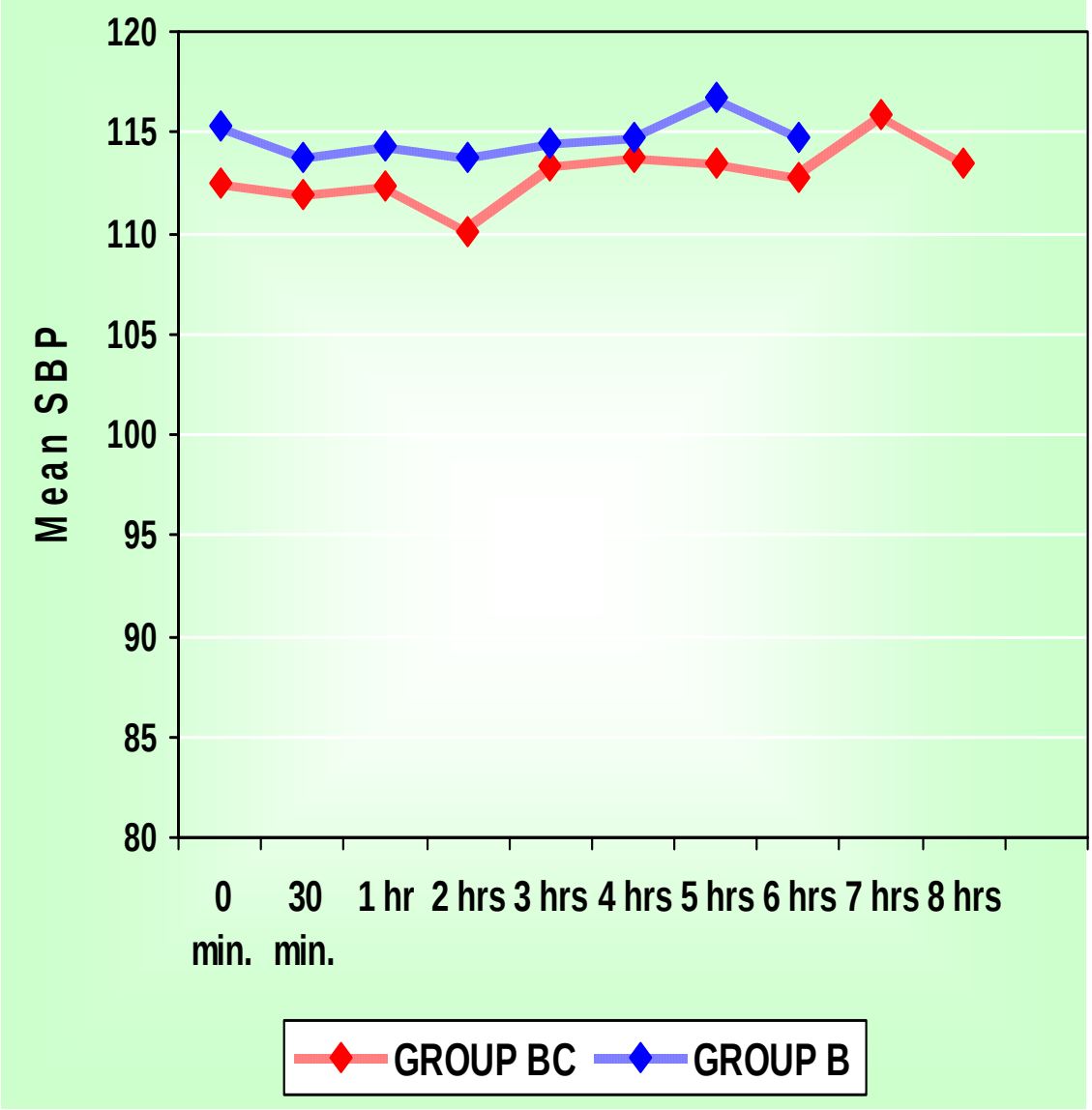


Table 13 : Changes in diastolic blood pressure

DBP at	DBP in				'p'	Significance
	Group BC		Group B			
	Mean	SD	Mean	SD		
0 minute	73.8	8.6	70.5	7.0	0.1707	Not significant
30 minutes	75.2	9.0	73.9	8.2	0.5772	Not significant
1 hour	71.1	8.0	72.2	7.4	0.6013	Not significant
2 hours	74.7	8.7	74.3	8.4	0.8817	Not significant
3 hours	72.0	7.0	72.8	8.6	0.9941	Not significant
4 hours	72.7	8.6	72.6	7.9	0.8338	Not significant
5 hours	71.8	6.5	74.9	8.7	0.1733	Not significant
6 hours	75.5	9.7	71.0	7.2	0.083	Not significant
7 hours	74.7	10.8	-	-	-	-
8 hours	70.6	8.5	-	-	-	-

The mean diastilic BP of both groups were with in normal limits ,and the difference is **statistically not significant**

CHANGES IN DIASTOLIC B.P

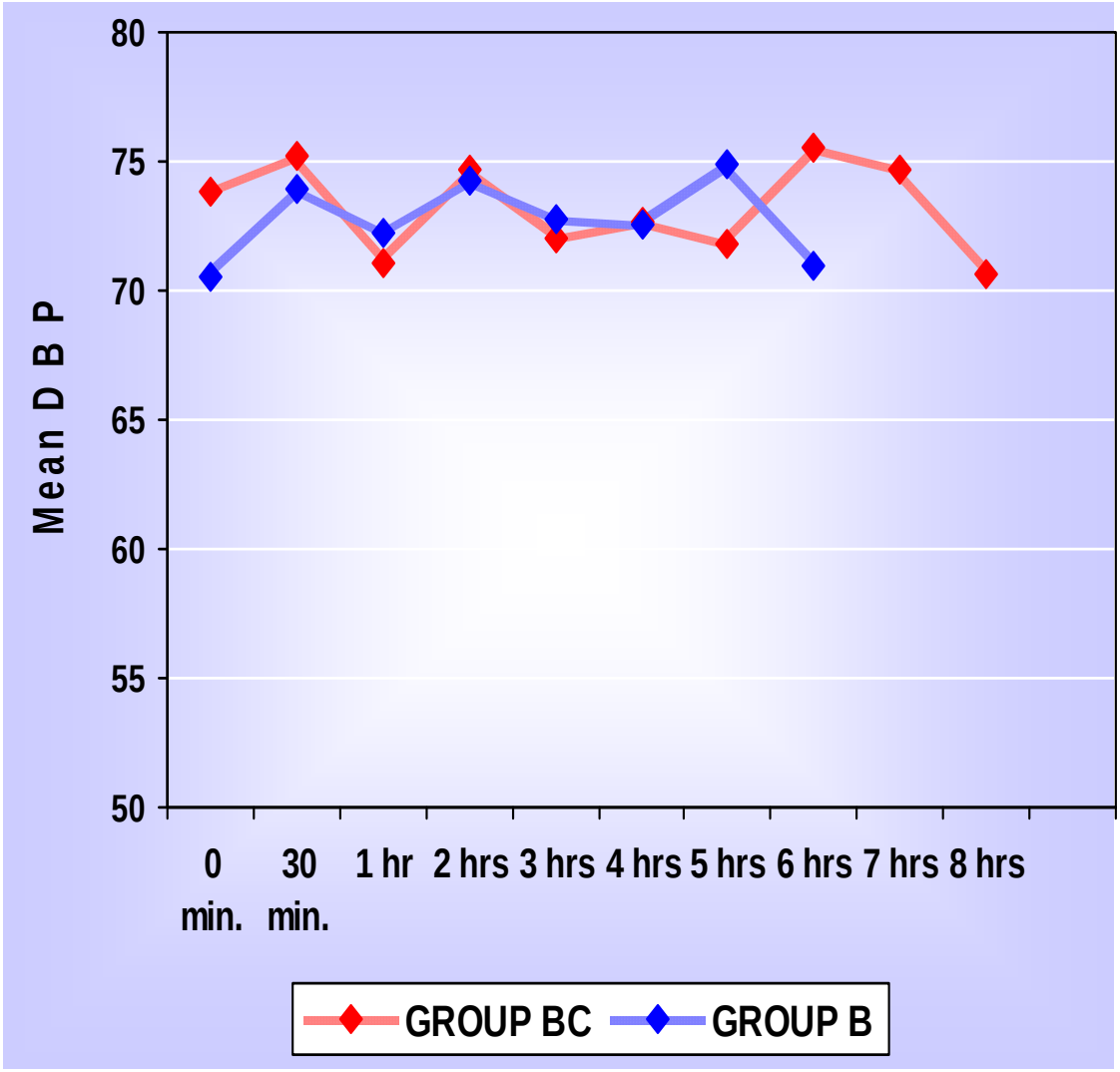


Table 14 : Changes in respiratory rate

Respiratory rate at	Group BC		Group B		'p'	Significance
	Mean	SD	Mean	SD		
0 minute	13.7	0.6	13.8	1.1	0.6221	Not significant
30 minutes	13.9	1.0	13.7	0.7	0.35	Not significant
1 hour	13.8	1.1	13.1	1.0	0.0645	Not significant
2 hours	13.7	1.0	13.8	0.9	0.7432	Not significant
3 hours	13.7	1.0	13.8	1.0	0.4491	Not significant
4 hours	13.8	1.1	13.9	0.8	0.8212	Not significant
5 hours	13.7	0.6	13.8	0.9	0.6148	Not significant
6 hours	13.9	1.1	13.9	1.1	1.0	Not significant
7 hours	13.9	1.2	-	-	-	-
8 hours	13.7	0.8	-	-	-	-

The respiratory rate of both groups were with in normal limits ,and the difference is **statistically not significant**

CHANGES IN RESPIRATORY RATE

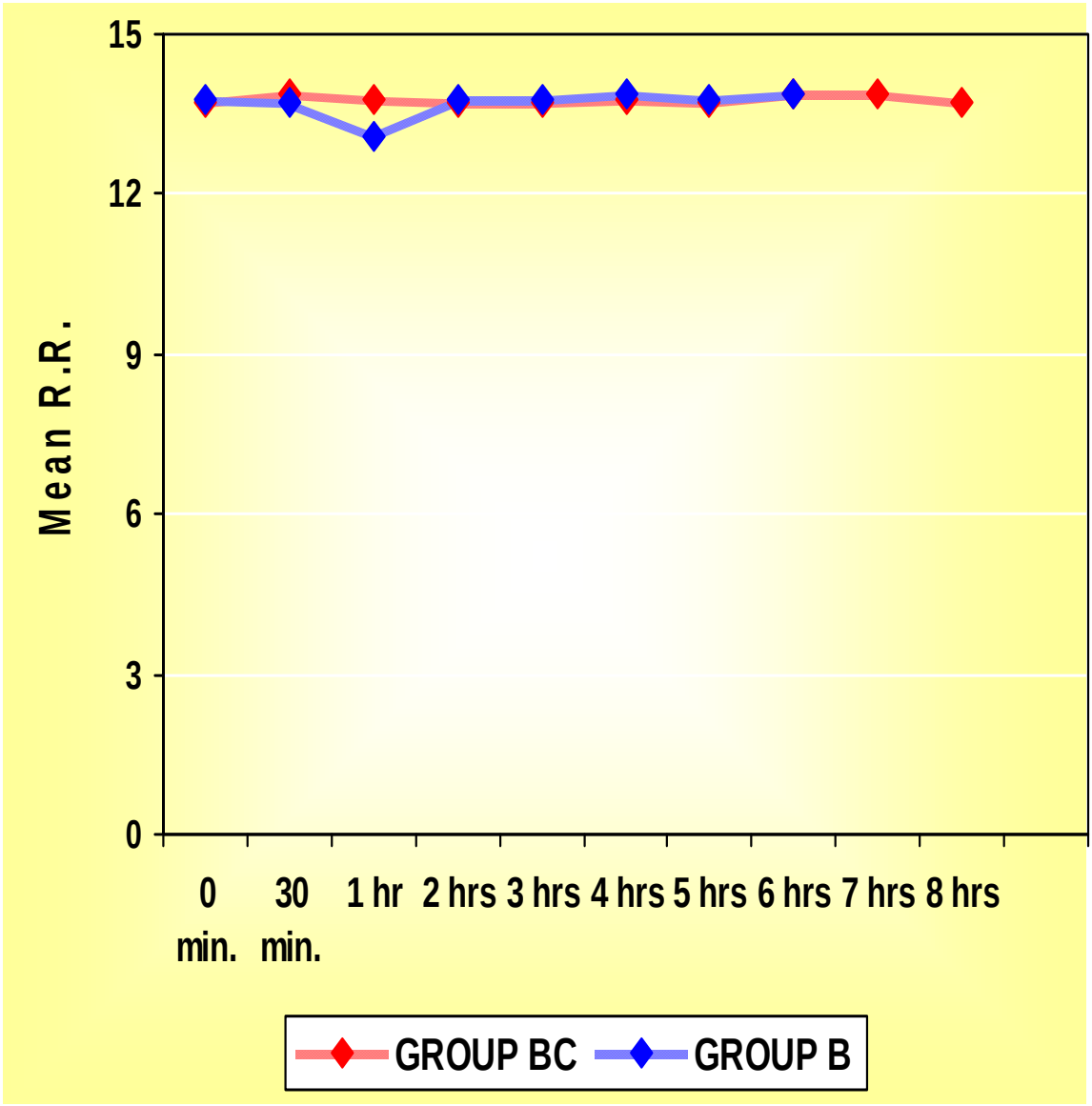
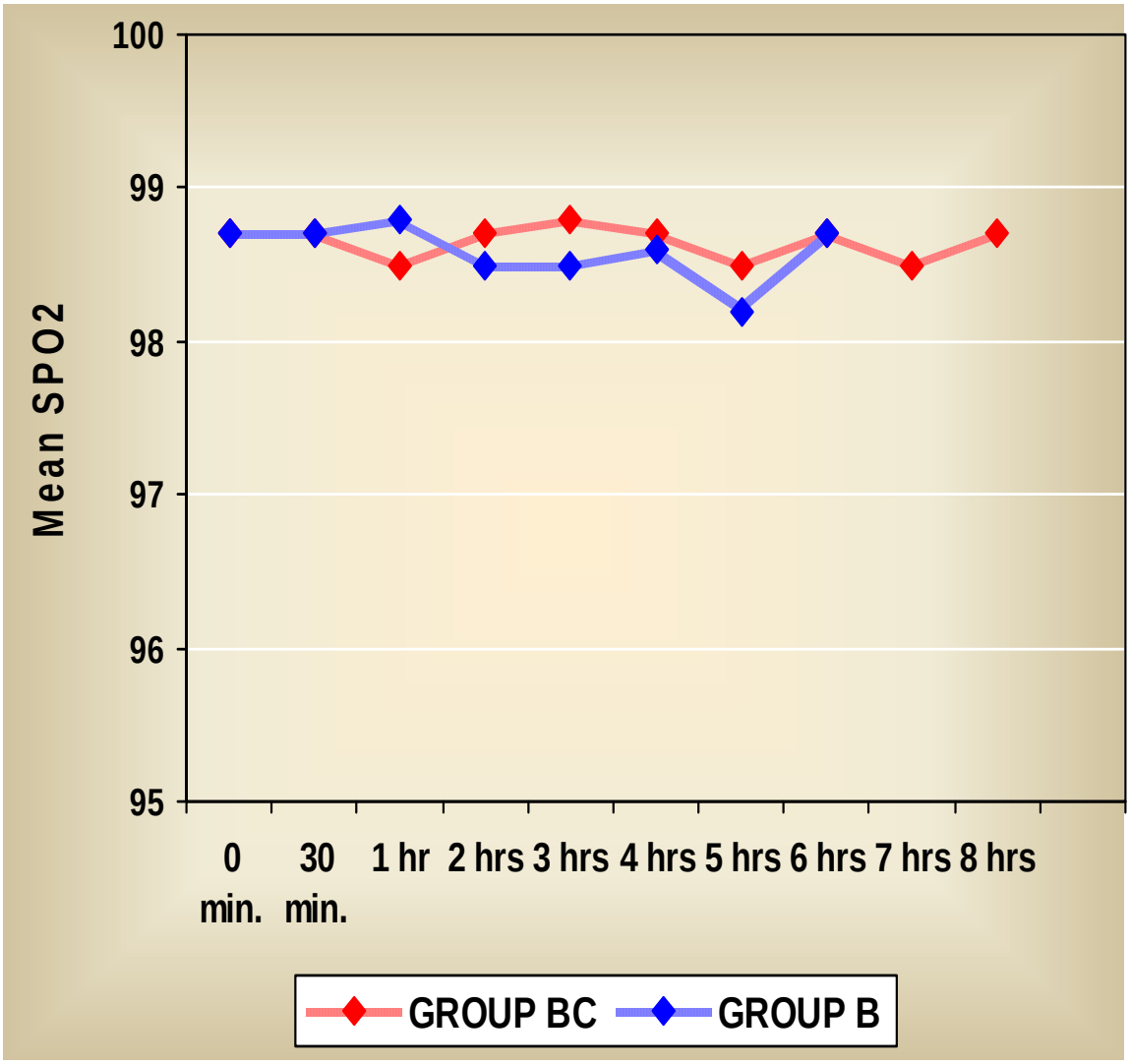


Table 15 : Changes in SPO2

SPO2 at	SPO2 in				'p'	Significance
	Group BC		Group B			
	Mean	SD	Mean	SD		
0 minute	98.7	0.7	98.7	0.7	0.674	Not significant
30 minutes	98.7	0.6	98.4	0.6	1.0	Not significant
1 hour	98.5	0.5	98.8	0.7	0.1353	Not significant
2 hours	98.7	0.6	98.5	0.6	0.1633	Not significant
3 hours	98.8	0.7	98.5	0.6	0.1848	Not significant
4 hours	98.7	0.6	98.6	0.6	0.3527	Not significant
5 hours	98.5	0.5	98.2	0.6	0.2435	Not significant
6 hours	98.7	0.6	98.7	0.5	0.1134	Not significant
7 hours	98.5	0.5	-	-	-	-
8 hours	98.7	0.6	-	-	-	-

The saturation in both groups were with in normal limits ,and the difference is **statistically not significant**

CHANGES IN SPO2



DISCUSSION

Pain after caesarean section is often severe. Effective pain relief has shown to reduce stress postoperatively and fasten recovery, early mobilisation, improve infant nursing care and reduces morbidity post operatively from caesarean section.

It is well known that, local anaesthetics used in various techniques reduces pain and requirements of post operative analgesic which can improve the quality of postoperative recovery. The efficacy of TAP block by using local anaesthetics are proved in many studies. .

In order to increase the duration of block clonidine has been used as an adjuvant to local anaesthetics in different regional techniques . It has been proved that clonidine in doses upto 0.15mg improves the quality and duration of local anaesthetic nerve blocks with minimal side effects. So clonidine as an adjuvant in TAP block is expected to prolong the duration of block thereby achieving a good postoperative analgesia

So this randomized, double-blinded, case-control study was done to evaluate the post-operative analgesic efficacy of bupivacaine alone or in combination with clonidine in ultrasound guided TAP block .

Caesarean section under regional anaesthesia provides an excellent opportunity to perform TAP block. Injection in the postoperative period avoids operating room time delays, and by that time the neonate has already been

delivered and is not placed at risk. So at the end of surgery TAP block was pefomed. The best thing while performing the procedure is patients does not feel pain, because the TAP block was performed in the area already anaesthetised by subarachnoid block. In this study the local anaesthetics were deposited in the correct plane with ultrasound guidance.

In this study 20 ml of 0.25% bupivacaine or 0.25% bupivacaine with clonidine 0.5 mic/ kg on each side for ultrasound guided TAP block was used which is comparable to study conducted by Jumana M Baaj et al, where the duration of analgesia and efficacy of TAP block was studied for lower segment caesarean section.

Tramadol is selected for rescue analgesia, as several studies have confirmed the analgesic effects of single-dose intramuscular tramadol 50–100mg can provide effective analgesia in post operative patients.

Ultrasound guided bilateral TAP block has been shown to provide adequate analgesia to the skin and anterior abdominal wall musculature in patients undergoing caesarean section. All patients in both groups breathed deeply, coughed freely, moved without limitation and showed good satisfaction. The bupivacaine with clonidine group showed increased duration of analgesia, with mild sedation.

Duration of Post Operative Analgesia

In this study results had demonstrated that post operative ultrasound guided TAP block reduced VAS score in the both groups. In group B (0.25%bupivacaine alone) the VAS score was almost zero in the first 4 hours while in Group BC the VAS score was zero for about 6 hours, which itself explains the effectiveness of TAP block. In this study the mean time to reach VAS score of ≥ 4 was 516 minutes in bupivacaine with clonidine 0.5 mic/ kg (BC) group, when compared with 277 minutes in the 0.25% bupivacaine (B) the difference of 239 minutes with p value less than 0.05 was very significant statistically as shown in table. 9. This is in accordance to study conducted by Susmita chakraborthy et al, where the addition of clonidine to bupivacaine in peripheral nerve block extended the duration of post operative analgesia.

The reason for extended analgesic duration after TAP blockade may be due to the relatively poor vascularisation and slowed drug clearance from transversus abdominis plane, and may be due to avoidance of central sensitization by giving TAP block post operatively.

The prolonged action of clonidine may be produced by membrane hyperpolarisation due to opening the potassium channels which increases the sodium channel blocking property of local anaesthetic. When added to local anaesthetic it enhance the quality and reduces the time of onset of block.

Sedation:

The mean sedation score of 3 was obtained in 86.7% of patients in bupivacaine with clonidine group compared to 10% of patients in bupivacaine group. Thus the sedation score was more in bupivacaine with clonidine group than plain bupivacaine group. Clonidine along with bupivacaine for prolonging analgesic duration also had significant sedative effect but arousable sleep. Thus TAP block as a component of multimodal analgesia has significantly increased the total postoperative analgesia, and those who received clonidine in addition to bupivacaine had prolonged duration of analgesia with adequate sedation without any complications. This is in accordance to study conducted by Casti A et al, where the addition of clonidine in peripheral nerve block extended the duration of anlagesia with adequate sedation.

Hemodynamic Stability:

Hemodynamic stability in terms of changes in pulse rate, oxygen saturation and blood pressure were compared in both groups and there were no significant difference between them. This is in accordance to study conducted by Popping DM et al and Cucchiaro G et al where the hemodynamic stability was comparable in both groups.

Complications:

In this study the incidence of post operative nausea and vomiting was very much reduced in both groups. This is similar to study conducted by Jumana M Baaj et al, where they reported reduced incidence post operative nausea and vomitting. Complications like peritoneal and visceral punctures related to TAP block were not encountered in thisstudy. Carey M, Farooq M. in 2008 reported a case of Liver injury while performing Transversus Abdominis Plane Block.

Thorough familiarity with anatomy, safe monitoring and injection technique, knowledge of local anaesthetic pharmacology and toxicity would prevent the possibility of complications and the technique TAP block is simplified by proper knowledge and correct technique of ultrasound. These precautions will prevent major complications with TAP block. By using the ultrasonography real time needle position can be confirmed and is a promising approach that should further decrease the risk of visceral injury complication.

SUMMARY

This prospective randomized double blinded case control study was done at Government Rajaji Hospital, Madurai after obtaining Hospital Ethical Committee approval and informed consent from all the patients.

60 patients who underwent lower segment cesarean section under subarachnoid block were enrolled in this study. They were divided in to two groups of 30 each. Both groups received standard dose of 10mg 0.5% Bupivacaine in subarachnoid block. After the surgery when block level receded to T10 sensory level, ultrasound guided TAP block was performed bilaterally using posterior approach. The ultrasound was used to identify the correct position of needle and also the spread of local anaesthetic solution in the neurofascial plane between internal oblique and transversus abdominis muscle.

Group BC received 20ml of 0.25% Bupivacaine with clonidine 0.5microgram/kg and Group B received 20ml of 0.25% Bupivacaine on either side.

The hemodynamic parameters like pulse rate, blood pressure, respiratory rate, oxgen saturation and sedation score by means of Ramsay score was monitored after the performance of block. The analgesic efficacy was monitored by means of VAS score.

The duration of analgesia was calculated from the time of performance of TAP block until the VAS score of 4 was obtained. The primary end point of study was when VAS score ≥4 was obtained.

All data were analysed and the demographic profile, duration of surgery and hemodynamic parameters were comparable in both group without any significant difference.

The average duration of analgesia was 516 minutes in bupivacaine and clonidine group compared to 277 minutes in plain bupivacaine group and this duration of analgesia was statistically significant in bupivacaine with clonidine group when compared to bupivacaine group.

The sedation score of 3 was obtained in about 86.7% of the patients in bupivacaine and clonidine group compared to only 10% of patients in plain bupivacaine group. Thus the sedation score was significantly higher in bupivacaine with clonidine group but it was an arousable sleep.

The incidence of complications like post operative nausea, vomiting hypotension and bradycardia was similar in both groups ,and it was not statistically significant.

Thus the addition of clonidine to bupivacine extended the duration of analgesia without any significant side effects in ultrasound guided Transversus abdominis Plane Block.

CONCLUSION

Ultrasound guided Transversus abdominis plane (TAP) block as a technique for providing postoperative analgesia is highly effective after caesarean sections. The addition of clonidine to bupivacaine in TAP block extended the duration of analgesia with minimal sedation when compared to plain bupivacaine without significant changes in hemodynamic parameters or complications. Ultrasound guided TAP block was easier to perform and provides reliable and effective analgesia.

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PROFORMA

BUPIVACAINE WITH BUPIVACAINE AND CLONIDINE IN COMPARISION OF ANALGESIC EFFICACY OF PLAIN ULTRASOUND GUIDED TRANSVERSUS ABDOMINIS PLANE BLOCK

Group: date:

Name	Ip.no
Address	Diagnosis
Age	Unit
Sex	Surgery- LSCS

PREOPERATIVE VITALS

Pulse	CVS
Bp	RS
Hb	Height
Urine: sugar	Weight
Albumin	ASA risk

INTRA OPERATIVE

Surgery :LSCS

Mode of anaesthesia: : Sub arachnoid block

Drug :0.5% bupivacaine 10 mg

Duratioin of surgery :

Max level of sensory blockade before surgery **:**

Intra operative monitoring

TIME(mts)	1	2	3	4	5	10	15	20	25	30	45	60
PR												
BP												
Spo2												

Intra.ope:

Any Usage of : Sadatives Vasopressors Atropine

Any complications

POST OPERATIVE MONITORING

Time of descend to T10 :

Time of TAP block :

MONITORING

TIME(HRS)	30min	1	2	3	4	5	6	7	8	10	12	24
PR												
BP												
VAS SCORIN												
Spo2												

SIDE EFFECTS

TIME(HRS)	30min	1	2	3	4	5	6	7	8	10	12	24
LOCAL TOXICITY												
NAUSEA												
VOMITING												
SEDATION												

Sedation was monitored with Ramsay score

POST OP DRUGS

1. Analgesics : time : dose:

Any Other complications:

TOTAL DURATION OF ANALGESIA:

GROUP BUPIVACAINE & CLONIDINE

PRE OP BP&PULSE **VAS SCORE** **pulse rate**

Sl.No.	Name	Ip.No	Age	Sex	ASA - risk	BMI KG/M²	Pulse	Systilic BP	Diastilic BP	Dose (mg) in SAB	Time TO TI0	Duration of surgery (min)	30 min	1HR	2HRS	3HRS	4HRS	5HRS	6HRS	7HRS	8HRS	10 HRS	Duration of analgesia mins	Nausea / Vomiting	Sedation Ramsay score	hypotension	Bradycardia	0 mins	30 min	1HR	2HRS	3HRS	4HRS	5HRS	6HRS	7HRS	8HRS
1	Mayakal	19123	23	F	I	26	76	130	60	10	55	35	0	0	0	0	0	0	0	3	4	5	550	NO	2	NO	NO	91	95	90	85	88	94	96	80	75	76
2	Chandra	19486	26	F	II	18	74	100	60	10	69	35	0	0	0	0	0	0	0	3	3	5	570	NO	3	NO	NO	95	85	92	88	87	78	84	85	94	74
3	Bharani	19292	27	F	I	20	74	100	60	10	70	45	0	0	0	0	0	0	0	3	4	5	540	NO	3	NO	NO	84	84	94	85	77	90	91	74	88	76
4	Nandhini	18675	29	F	I	24	70	110	70	10	60	45	0	0	0	0	0	0	0	3	4	4	535	NO	3	NO	NO	73	74	88	74	85	93	98	76	85	91
5	Muthu	19502	28	F	II	32	68	100	60	10	65	40	0	0	0	0	0	0	3	3	4	5	540	NO	3	NO	NO	72	76	85	76	84	98	100	91	74	95
6	Padmapriya	19444	33	F	I	36	84	130	80	10	75	50	0	0	0	0	0	0	0	4	5	4	495	NO	3	NO	NO	78	92	74	91	91	97	97	95	76	84
7	Kannagi	19367	32	F	II	38	90	120	70	10	65	60	0	0	0	0	0	0	0	*3*	4	5	535	NO	3	NO	NO	90	94	76	95	98	87	89	84	91	73
8	Deepa	19521	20	F	II	34	88	110	70	10	70	65	0	0	0	0	0	0	3	3	5	5	500	NO	3	NO	NO	93	88	91	84	100	77	95	73	95	72
9	Rajeshwari	19530	22	F	I	20	60	140	90	10	60	40	0	0	0	0	0	0	0	4	5	5	500	NO	3	NO	NO	85	85	95	73	97	85	85	72	84	78
10	Vani	19519	26	F	II	18	64	110	70	10	80	45	0	0	0	0	0	0	0	3	4	4	530	NO	3	NO	NO	84	74	84	72	89	79	89	76	88	90
11	Podhumponnu	19562	25	F	II	34	74	100	60	10	70	45	0	0	0	0	0	0	0	3	5	4	520	NAU	3	NO	yes	88	76	73	78	76	85	76	84	87	93
12	Kavitha	19699	34	F	I	32	82	120	70	10	80	35	0	0	0	0	0	0	0	3	4	5	565	NO	3	NO	NO	85	91	72	90	93	92	74	91	91	98
13	Shobana	19668	30	F	I	30	84	110	70	10	75	55	0	0	0	0	0	0	3	4	5	4	510	NO	3	NO	NO	74	95	78	93	85	94	76	95	98	72
14	Thenmozhi	19683	35	F	I	24	76	130	80	10	85	50	0	0	0	0	0	0	0	4	5	4	475	NO	3	NO	NO	76	84	90	85	84	88	91	84	100	76
15	Indra	19727	20	F	I	26	92	120	70	10	80	45	0	0	0	0	0	0	0	4	5	4	490	NO	2	NO	NO	95	73	93	84	91	85	95	73	97	84
16	Parameswari	15596	21	F	I	32	75	140	80	10	60	35	0	0	0	0	0	0	0	3	4	4	535	NO	3	NO	NO	85	72	85	88	98	74	84	72	89	91
17	Amsa	15750	28	F	I	27	74	120	70	10	65	45	0	0	0	0	0	0	3	4	5	5	505	NO	3	NO	NO	89	78	84	85	85	76	73	78	76	95
18	Meenakshi	15760	27	F	I	34	84	110	70	10	55	50	0	0	0	0	0	0	0	4	5	5	470	NAU	3	NO	NO	76	90	91	74	79	91	72	90	74	84
19	Usha devi	15592	20	F	I	22	88	140	80	10	60	55	0	0	0	0	0	0	0	3	4	4	535	NO	3	NO	NO	74	93	98	76	85	95	78	93	76	73
20	Alagumeena	15596	19	F	I	24	90	120	70	10	70	60	0	0	0	0	0	0	0	2	4	4	540	NO	3	NO	NO	76	98	100	91	92	84	90	85	91	88
21	Valarmathi	15561	25	F	I	32	86	110	86	10	55	45	0	0	0	0	0	0	0	3	4	4	500	NO	3	NO	NO	91	97	97	95	94	73	93	84	95	85
22	Petchi	15579	26	F	I	26	98	100	68	10	55	40	0	0	0	0	0	0	0	3	5	5	455	NO	3	NO	NO	95	87	89	84	88	72	85	88	84	74
23	Pandeswari	16110	27	F	II	29	92	136	70	10	50	35	0	0	0	0	0	0	0	3	4	4	485	NO	2	NO	NO	84	77	95	73	85	88	94	96	73	76
24	Fathima	17533	29	F	II	36	90	142	88	10	60	45	0	0	0	0	0	0	0	3	4	4	540	NO	3	NO	NO	73	85	85	72	88	87	78	84	72	91
25	Reka	17535	20	F	I	24	94	116	74	10	60	55	0	0	0	0	0	0	0	2	4	5	540	NO	3	NO	NO	72	84	84	78	85	77	90	91	78	95
26	Saraswathi	18199	21	F	I	32	86	112	68	10	65	50	0	0	0	0	0	0	0	2	4	5	560	NO	3	NO	NO	78	91	74	90	74	85	93	98	90	84
27	Parameswari	20102	30	F	I	33	82	108	66	10	80	55	0	0	0	0	0	0	3	3	5	5	550	NAU	2	NO	NO	90	98	76	93	76	84	98	100	93	73
28	Tamaraiselvi	20320	32	F	I	25	80	102	70	10	70	50	0	0	0	0	0	0	0	4	5	4	515	NO	3	NO	NO	93	100	92	91	91	91	97	97	91	72
29	Murugeswari	22063	34	F	I	28	96	112	74	10	75	55	0	0	0	0	0	0	3	5	5	4	375	NO	3	NO	NO	85	97	94	98	95	98	87	89	78	75
30	Karthigaiselvi	22896	30	F	I	32	90	118	82	10	70	60	0	0	0	0	0	0	3	4	4	5	540	NO	3	NO	NO	94	89	88	100	84	100	77	95	86	72

Systolic blood pressure										Diastolic blood pressure										RESPIRATORY RATE										SPo2 %									
0 mins	30 min	1HR	2HRS	3HRS	4HRS	5HRS	6HRS	7HRS	8HRS	0 mins	30 min	1HR	2HRS	3HRS	4HRS	5HRS	6HRS	7HRS	8HRS	0mins	30 min	1HR	2HRS	3HRS	4HRS	5HRS	6HRS	7HRS	8HRS	0mins	30 min	1HR	2HRS	3HRS	4HRS	5HRS	6HRS	7HRS	8HRS
114	110	112	98	122	##	108	102	124	120	90	68	60	74	74	70	78	60	74	60	14	14	16	14	13	15	14	12	14	14	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
102	112	132	116	120	##	104	104	122	124	64	70	60	76	78	90	86	82	80	70	14	15	13	14	13	14	14	13	15	13	98	98	98	99	99	98	99	98	98	100
100	100	120	114	124	##	108	116	120	110	60	60	70	80	80	70	64	70	86	70	14	14	12	13	14	14	14	13	14	14	99	98	98	99	99	98	98	99	99	100
106	120	110	102	110	##	126	122	124	114	84	64	60	86	66	60	72	66	90	68	14	12	14	14	13	16	13	14	14	14	98	98	98	98	98	98	98	99	98	99
124	130	108	100	114	##	108	102	110	102	74	74	80	82	76	70	70	84	64	70	14	13	15	13	13	15	14	13	16	14	99	99	98	98	98	99	98	98	98	99
122	100	124	106	102	##	114	114	116	104	72	78	70	68	74	70	68	74	60	60	14	13	14	14	14	14	13	13	15	14	98	99	99	98	98	99	98	98	98	98
120	98	122	124	104	##	108	108	100	116	64	80	70	78	60	68	84	76	84	64	13	14	14	14	14	15	14	14	14	14	99	99	99	99	99	99	99	98	98	98
108	116	120	122	116	##	124	106	114	122	72	66	90	86	82	80	70	68	88	90	14	13	16	14	14	16	14	14	15	14	98	99	99	98	100	99	99	99	99	98
106	114	124	120	122	98	122	116	108	108	70	76	70	64	70	86	70	78	80	70	13	13	15	14	15	13	13	13	15	14	99	99	99	99	100	99	99	98	99	99
100	102	110	108	108	##	120	124	104	106	68	74	60	72	66	90	68	86	66	90	14	14	14	14	14	12	12	14	15	14	98	100	99	99	99	99	98	99	98	98
98	114	116	106	106	##	124	126	108	134	84	80	70	70	84	64	70	64	76	70	14	14	15	14	12	14	15	11	15	13	99	100	98	99	99	98	98	99	99	99
100	108	100	100	98	##	110	104	126	100	68	86	70	68	74	60	60	72	74	60	13	13	15	14	13	15	14	14	14	14	98	99	99	99	99	99	98	98	98	99
132	106	114	98	100	##	116	110	112	110	84	90	68	84	76	84	64	70	80	70	12	14	15	14	13	14	14	13	15	13	98	99	98	99	99	98	98	98	99	99
120	116	108	100	110	##	100	112	132	112	70	64	70	94	80	74	74	68	86	70	15	11	15	13	14	14	12	15	16	14	98	98	99	99	100	99	99	98	98	99
124	124	104	132	112	##	114	100	120	124	70	60	60	70	60	72	66	90	68	66	14	14	14	14	13	16	14	15	17	14	98	98	98	100	100	98	99	99	99	99
124	126	108	120	124	##	108	120	110	126	69	84	64	60	70	64	70	86	70	70	14	13	15	13	13	15	13	14	17	13	99	98	99	100	99	98	98	99	99	98
110	104	126	124	126	##	104	130	108	104	64	74	74	70	60	72	66	90	68	60	12	15	16	14	14	14	14	16	16	12	99	99	98	99	98	98	98	98	99	99
116	114	122	110	104	##	108	100	124	110	74	76	78	70	70	70	84	64	70	64	14	15	17	14	14	15	14	14	13	15	99	98	98	99	99	99	98	98	98	98
100	118	112	116	110	##	126	98	122	108	78	80	80	68	70	68	74	60	60	74	13	14	17	13	13	15	13	14	17	13	99	99	98	98	98	99	99	98	98	99
114	108	100	98	122	##	108	116	120	124	80	86	66	70	68	84	76	84	64	68	14	16	16	12	14	15	14	16	16	12	99	98	98	98	99	99	99	99	98	98
108	106	102	116	120	##	104	114	124	122	66	82	76	74	70	68	74	60	60	78	14	14	13	15	11	15	14	14	13	15	100	99	99	98	98	99	99	98	99	99
104	124	104	114	124	##	108	104	126	120	76	68	74	60	68	84	76	84	64	76	13	16	15	14	14	14	13	16	15	14	100	98	99	99	99	99	99	99	98	98
108	122	116	102	110	##	126	116	108	124	74	78	60	82	80	70	68	88	90	86	14	14	14	14	13	15	14	14	14	14	99	98	99	98	98	100	99	99	99	99
126	120	122	114	116	##	112	124	104	110	80	86	82	80	80	70	64	70	86	70	14	15	14	12	15	16	14	15	14	12	99	98	98	99	99	100	98	99	99	98
108	108	108	108	100	##	132	126	108	116	86	64	70	86	66	60	72	66	90	68	14	14	14	14	14	13	14	14	14	14	98	98	98	99	98	99	99	99	98	98
104	106	106	98	122	##	108	104	126	100	90	72	66	82	76	70	70	84	64	70	14	14	14	13	16	15	14	14	14	13	98	99	98	98	98	99	98	99	98	98
108	100	98	116	120	##	104	110	112	114	64	70	84	68	74	70	68	74	60	60	14	14	15	14	14	14	14	14	15	14	98	99	98	98	98	98	99	99	98	98
126	98	100	114	124	##	108	112	132	108	60	68	74	78	60	68	84	76	84	64	14	14	14	14	15	14	14	14	14	14	99	99	99	98	98	98	98	100	99	99
112	100	110	102	110	##	126	116	108	104	84	84	76	60	68	84	76	84	64	76	14	14	15	14	14	14	14	14	15	14	100	99	99	99	99	98	99	100	98	99
132	132	112	106	98	##	116	124	104	108	74	94	80	82	80	70	68	88	90	86	14	14	14	14	14	14	14	14	14	14	100	99	99	98	99	99	98	99	99	99

GROUP B (BUPIVACAINE)								PRE OP BP & PULSE					VAS SCORE												pulse rate			
S.No.	Name	Ip. No	Age	Sex	ASA	BMI KG/M²	Pulse	Systilic BP	Diastolic BP	Dose (mg) SAB	Time TO TIO (min)	Duration of surgery(min)	30 min	1HR	2HRS	3HRS	4HRS	5HRS	6HRS	Duration of analgesia	Nausea / Vomiting	Sedation score	hypotension	Badycardia	0 mins	30 min	1HR	2HRS
1	shanthi	19723	21	F	I	22	76	110	70	10	55	45	0	0	0	0	0	2	5	300	NO	2	NO	NO	78	76	78	91
2	Maheswari	19266	25	F	II	28	74	136	90	10	60	50	0	0	0	0	0	3	4	315	NO	2	NO	NO	90	74	76	95
3	kokila	19050	23	F	I	18	74	130	80	10	75	35	0	0	0	0	2	4	5	270	NO	2	NO	NO	93	76	74	84
4	Muthupillai	19362	32	F	I	20	70	120	70	10	65	50	0	0	0	0	0	5	5	260	NO	2	NO	NO	98	91	76	73
5	Sudha	19373	30	F	I	24	68	110	70	10	70	45	0	0	0	0	0	4	5	315	NO	2	NO	NO	72	95	91	68
6	Dhanalaxshmi	19419	26	F	II	30	84	140	90	10	75	40	0	0	0	0	1	4	5	300	NO	2	NO	NO	76	84	95	88
7	Vasanthi	19249	28	F	I	36	90	110	88	10	55	60	0	0	0	0	0	4	5	275	NAU	2	NO	NO	84	73	84	87
8	Velu	19393	19	F	I	38	88	100	60	10	65	65	0	0	0	0	0	4	5	290	NO	2	NO	NO	91	72	73	77
9	Amutha	19416	35	F	I	34	60	120	70	10	75	35	0	0	0	0	2	4	5	310	NO	3	NO	NO	74	78	72	85
10	Tamilarasi	19366	30	F	II	20	64	110	70	10	80	40	0	0	0	0	3	4	5	275	NO	2	NO	NO	76	90	78	84
11	Nagalakshmi	19583	29	F	I	18	74	130	80	10	60	45	0	0	0	0	0	4	5	300	NO	2	NO	NO	91	93	90	91
12	Devi	18099	27	F	I	34	82	120	70	10	70	55	0	0	0	0	0	3	4	330	NO	2	NO	NO	95	98	93	98
13	Anusha	19523	25	F	I	32	84	140	80	10	70	50	0	0	0	0	0	3	4	290	NO	2	NO	NO	84	72	98	100
14	Tamilselvi	19598	22	F	I	28	76	120	70	10	75	40	0	0	0	0	2	3	4	280	NO	2	NO	NO	73	76	72	97
15	Panju	19476	24	F	II	24	92	110	70	10	60	45	0	0	0	0	0	4	4	265	NO	2	NO	NO	72	84	76	89
16	Sajitha banu	11899	20	F	II	26	75	140	80	10	55	40	0	0	0	0	0	4	5	275	NO	2	NO	NO	78	91	84	76
17	Periyanachi	13899	19	F	I	32	74	120	70	10	65	50	0	0	0	0	0	4	5	250	NO	2	NO	NO	90	74	91	93
18	Chitra	13837	24	F	I	27	84	130	60	10	80	60	0	0	0	0	0	4	5	240	NAU	2	NO	NO	93	76	76	85
19	Deeparani	13897	27	F	I	34	88	100	60	10	60	65	0	0	0	0	0	3	5	270	NO	2	NO	NO	98	91	91	84
20	Panju	14240	34	F	I	22	90	100	60	10	70	40	0	0	0	0	0	3	5	290	NO	2	NO	NO	97	95	95	91
21	Ilakya	14230	30	F	II	26	91	110	68	10	75	35	0	0	0	0	0	3	4	260	NO	2	NO	NO	74	84	84	98
22	Jeyalakshmi	15296	31	F	I	22	91	104	72	10	55	35	0	0	0	0	0	3	4	255	NO	2	NO	NO	76	73	93	88
23	Yasoda	15297	29	F	I	21	98	120	74	10	60	45	0	0	0	0	0	3	4	250	NO	2	NO	NO	91	72	85	85
24	Rajalakshmi	15308	26	F	I	25	85	118	82	10	55	45	0	0	0	0	0	2	5	245	NO	2	NO	NO	95	78	84	74
25	Gayathri	14698	24	F	II	34	87	120	81	10	65	40	0	0	0	0	0	2	5	260	NO	2	NO	NO	84	90	91	76
26	Pandisetha	22231	23	F	II	36	79	142	70	10	70	45	0	0	0	0	0	3	4	245	NO	3	NO	NO	73	93	98	91
27	Sumithra	15531	27	F	I	37	92	121	68	10	80	40	0	0	0	0	0	3	3	260	NO	3	NO	NO	72	98	100	95
28	Banu	14093	30	F	I	21	90	106	68	10	80	50	0	0	0	0	0	3	4	260	NAU	2	NO	NO	78	97	97	76
29	Murugeswari	15606	26	F	I	20	79	116	64	10	70	40	0	0	0	0	0	3	5	270	NO	2	NO	NO	90	87	89	93
30	Kavitha	15579	25	F	I	22	92	124	84	10	75	45	0	0	0	0	0	2	5	315	NO	2	NO	NO	93	77	95	85

pulse rate				Systolic blood pressure								Diastolic blood pressure								Respiratory rate								SpO2							
3HRS	4HRS	5HRS	6HRS	0 mins	30 min	1HR	2HRS	3HRS	4HRS	5HRS	6HRS	0 mins	30 MIN	1HR	2HRS	3HRS	4HRS	5HRS	6HRS	0mins	30 min	1HR	2HRS	3HRS	4HRS	5HRS	6HRS	0mins	30 min	1HR	2HRS	3HRS	4HRS	5HRS	6HRS
91	97	97	88	132	100	98	102	110	104	126	100	64	78	60	68	84	76	84	64	14	14	13	15	14	14	13	15	98	99	99	98	98	99	99%	99%
98	87	89	93	120	134	124	114	136	130	112	138	60	86	82	80	70	68	88	90	14	14	13	14	14	12	15	16	99	99	99	99	98	98	99	98
100	77	95	86	124	100	110	108	100	112	132	112	84	64	70	86	70	78	80	70	16	13	14	14	16	14	15	17	98	99	99	98	98	98	98	99
97	85	85	90	110	132	112	106	114	100	120	124	74	72	66	90	68	86	66	90	15	14	13	16	15	13	14	17	99	99	100	99	99	98	98	99
76	72	80	82	116	120	124	116	108	120	110	126	72	70	84	64	70	64	76	70	14	13	13	15	14	14	16	16	98	100	100	98	99	99	98	98
94	96	80	75	110	124	126	124	104	130	108	104	72	68	74	60	60	72	74	60	15	14	14	14	15	14	14	13	99	100	99	98	98	99	98	98
78	84	85	94	112	110	104	126	108	100	124	110	70	84	76	84	64	70	80	70	16	14	14	15	15	13	14	17	98	99	98	98	98	98	99	98
90	91	74	88	100	116	110	104	126	98	122	108	68	94	80	74	74	68	86	70	13	13	13	15	15	14	16	16	98	99	98	100	100	98	99	99
93	98	76	85	120	110	112	98	122	116	108	102	84	70	60	72	66	90	68	66	12	12	14	15	15	14	14	13	98	98	99	100	99	98	98	99
98	100	91	74	130	112	132	116	120	124	104	104	68	70	60	72	66	82	80	70	14	15	11	15	14	13	16	15	98	98	98	99	98	98	98	98
97	97	95	76	100	100	120	114	124	126	108	116	84	70	70	70	84	70	86	70	15	14	14	14	15	14	14	14	99	98	98	99	99	99	98	98
87	89	84	91	126	120	110	102	110	104	126	122	70	68	70	68	74	66	90	68	14	14	13	15	16	14	15	14	99	99	98	98	98	99	99	98
77	95	73	95	126	130	108	100	114	110	108	102	70	70	68	84	76	84	64	70	14	12	15	16	13	14	14	14	99	98	98	98	99	99	99	99
85	85	72	84	104	100	124	106	102	106	114	114	60	74	70	68	74	74	60	60	16	14	15	17	15	14	14	14	98	99	99	98	98	99	99	98
79	89	76	88	104	126	98	122	108	126	124	104	70	60	68	84	76	76	84	64	15	13	14	17	14	14	14	15	98	99	99	99	99	99	99	99
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91	91	97	97	116	116	110	104	126	100	122	108	70	70	70	84	64	70	84	76	13	14	14	14	14	16	14	15	99	98	100	99	99	98	98	99
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84	100	77	95	104	116	120	124	104	114	124	122	74	68	84	76	84	64	70	64	14	14	14	15	14	15	14	14	98	99	99	98	99	98	98	100
73	97	85	85	122	114	124	126	108	104	126	120	70	84	76	84	64	76	60	72	14	14	14	14	14	14	14	14	98	99	98	98	98	98	99	99
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Ref. No. 5336 /E4/3/2012

Govt. Rajaji Hospital,
Madurai.20. Dated: .08.2012

Institutional Review Board / Independent Ethics Committee.
Dr. N. Mohan, M.S., F.I.C.S., F.A.I.S.,
Dean, Madurai Medical College & 2521021 (Secy)
Govt Rajaji Hospital, Madurai 625020.
Convenor
grhethicssecy @gmail.com.

Sub: Establishment-Govt. Rajaji Hospital, aMadurai-20-
Ethics committee-Meeting Agenda-communicated-regarding.

The Ethics Committee meeting of the Govt. Rajaji Hospital, Madurai was held at 11.00 Am to 1.00Pm on 28.06.2012 at the Dean Chamber, Govt. Rajaji Hospital, Madurai. The following members of the committee have been attended the meeting.

---

1. Dr.N.Vijayasankaran,M.ch(Uro.) 094-430-58793 0452-2584397	Sr.Consultant Urologist Madurai Kidney Centre, Sivagangai Road,Madurai	Chairman
2. Dr.P.K. Muthu Kumarasamy, M.D., 9843050911	Professor & H.O.D of Medical, Oncology(Retired)	Member Secretary
3. Dr.T.Meena,MD 094-437-74875	Professor of Physiology, Madurai Medical College	Member
4. Dr. S. Thamilarasi, M.D (Pharmacol)	Professor of pharmacology	
5.Dr.Moses K.Daniel MD(Gen.Medicine) 098-421-56066	Professor of Medicine Madurai Medical College	Member
6.Dr.M.Gobinath,MS(Gen.Surgery)	Professor of Surgery Madurai Medical College	Member
7.Dr.S. Dilshadh, MD(O&G) 9894053516	Professor of OP&Gyn Madurai Medical College	Member
8.Dr.S.Vadivel Murugan., M.D, 097-871-50040	Professor of Medicine Madurai Medical College	Member
9.Shri.M.Sridher,B.sc.B.L. 099-949-07400	Advocate, 2, Deputy collectors colony 4th street KK Nagar, Madurai-20.	Member
10.Shri.O.B.D.Bharat,B.sc., 094-437-14162	Businessman Plot No.588, K.K.Nagar,Madurai.20.	Member
11.Shri. S.sivakumar,M.A(Social) Mphil 093-444-84990	Sociologist, Plot No.51 F.F, K.K Nagar, Madurai.	Member

Following Projects were approved by the committee

Sl. No	Name of P.G.	Course	Name of the Project	Remarks
1.	Dr. Prasath . A.K	M.D Anaesth	Clonidine as adjunct to bupivacaine in transversus abdominis planar block.	Approved

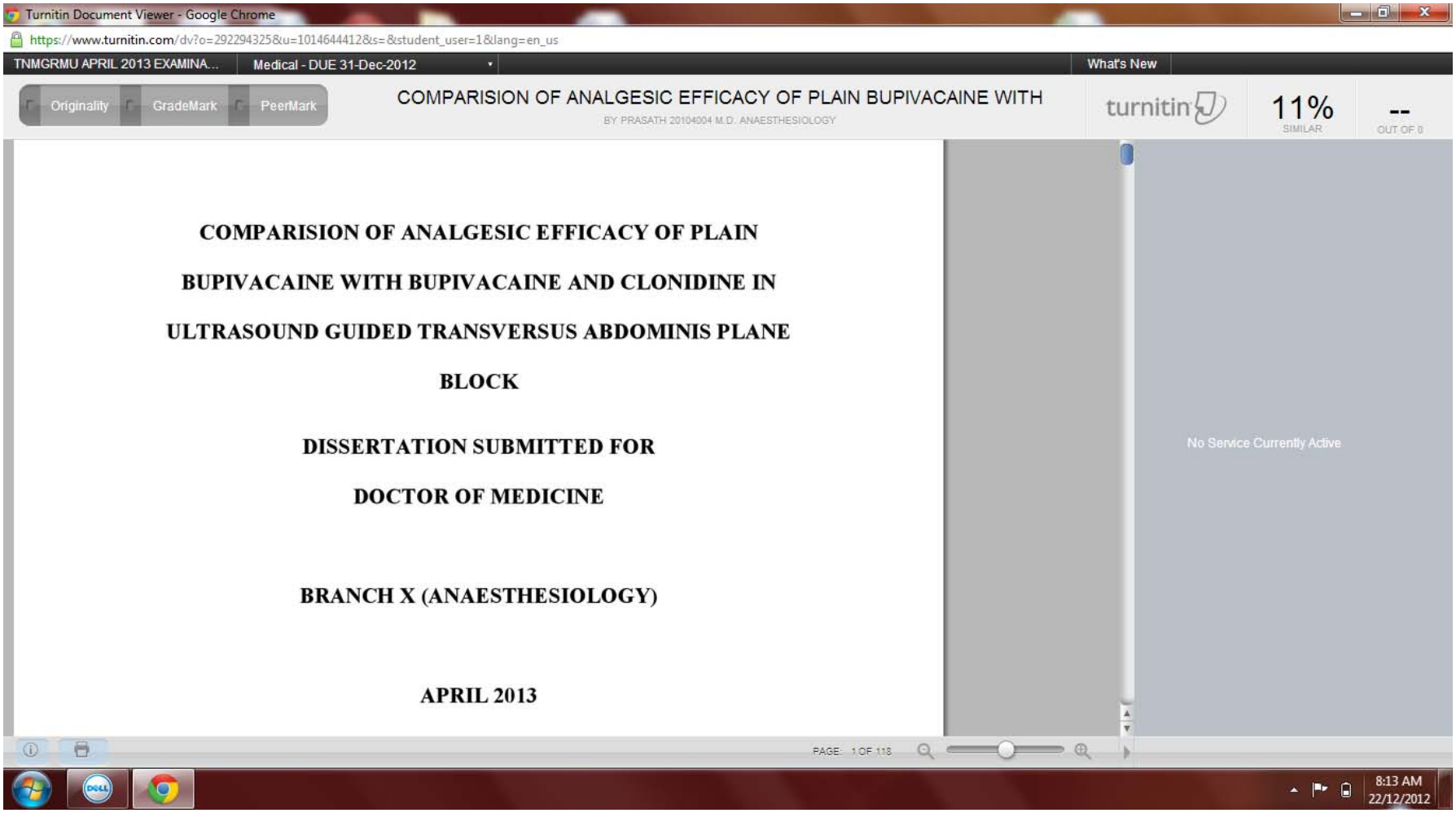
Please note that the investigator should adhere the following: She/He should get a detailed informed consent from the patients/participants and maintain Confidentially.

1. She/He should carry out the work without detrimental to regular activities as well as without extra expenditure to the institution to Government.
2. She/He should inform the institution Ethical Committee in case of any change of study procedure site and investigation or guide.
3. She/He should not deviate for the area of the work for which applied for Ethical clearance.
She/He should inform the IEC immediately, in case of any adverse events pr Serious adverse reactions.
4. She/he should abide to the rules and regulations of the institution.
5. She/He should complete the work within the specific period and apply for if any Extension of time is required She should apply for permission again and do the work.
6. She/He should submit the summary of the work to the Ethical Committee on Completion of the work.
7. She/He should not claim any funds from the institution while doing the word or on completion.
8.She/He should understand that the members of IEC have the right to monitor the work with prior intimation.

DEAN I/c 17.8.12.

To
All the above members and Head of the Departments concerned.
All the Applicants.

DIRECTOR
INSTITUTE OF ANAESTHESIOLOGY
Madurai Medical College &
Govt. Rajaji Hospital
MADURAI 625020.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