

**A COMPARATIVE EVALUATION OF EFFICACY OF
BUPIVACAINE 0.25% AND BUPIVACAINE 0.25%
WITH DEXAMETHASONE IN PARASCALENE BLOCK
FOR UPPER LIMB SURGERIES.**

Dissertation submitted to

THE TAMILNADU DR M.G.R MEDICAL UNIVERSITY

in partial fulfillment for the award of the degree of

DOCTOR OF MEDICINE

IN

ANESTHESIOLOGY

BRANCH X



INSTITUTE OF ANESTHESIOLOGY AND CRITICAL CARE

RAJIV GANDHI MEDICAL COLLEGE HOSPITAL

THE TAMIL NADU DR MGR MEDICAL UNIVERSITY

CHENNAI -600003

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CERTIFICATE

This is to certify that the dissertation titled,
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BUPIVACAINE 0.25% AND BUPIVACAINE 0.25% WITH
DEXAMETHASONE IN PARASCALENE BLOCK FOR UPPER
LIMB SURGERIES”** submitted by **Dr A.J.SAIKARTHIK** in partial
fulfillment for the award of the degree of Doctor of Medicine in
Anesthesiology by the Tamilnadu **Dr.M.G.R. Medical University**, Chennai
is a bonafide record of the work done by him in the Institute of
Anaesthesiology and critical care, Madras Medical College, during the
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CERTIFICATE OF GUIDE

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by DR.A.J.SAIKARTHIK,in partial fulfillment of the requirement
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DECLARATION

I, **Dr. A.J. SAIKARTHIK** solemnly declare that the dissertation titled
**“ A COMPARATIVE EVALUATION OF EFFICACY OF BUPIVACAINE
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work done by me in the Institute of Anaesthesiology, Rajiv Gandhi Government
Medical College and Hospital, Chennai – 3 under the able guidance
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INTRODUCTION

Regional anesthesia is the technique of blocking of nerves or plexus supplying particular region to be operated using local anesthetics and is made insensitive to pain and reflex response to surgical stimuli. It is superior to general anesthesia in many respects. Regional anesthesia preserves vital functions of the body, CNS is spared, patient is alert, awake and cooperative. Polypharmacy is avoided. It can be used for both elective and emergency surgeries. Adequately administered regional anesthesia provides excellent intraoperative as well as postoperative analgesia.

Local anesthesia traces its origin to Dr .Carl Koller, 1884 Viennese ophthalmologist who used a cocaine solution for topical corneal anaesthesia in patients undergoing eye surgeries. In the first half of 20th century, initial local anesthetic agents developed were amino ester compounds. Their main drawbacks were shorter duration of action and associated features of allergy and systemic toxicity. Then aminoamide compounds were discovered. Bupivacaine is particularly important as its long acting nature facilitates its usage to carry out prolonged surgeries in extremities with minimal toxicity. To overcome delayed onset of action and inadequate quality of blockade, various additives were used with local anesthetic solutions..

William Steward Halsted first performed Brachial plexus block in 1889. He directly exposed brachial plexus in the neck and used cocaine to block it. Sooner various approaches have been designed and used successfully to block Brachial plexus at various levels. Important approaches were

- 1) Interscalene approach
- 2) Classical supraclavicular approach by Kulenkampff
- 3) Subclavian perivascular approach by Winnie and Collins
- 4) Infraclavicular approach by Raj
- 5) Axillary approach by Accardo and Adriano.

However all these approaches have complications like Pneumothorax, inadvertent arterial puncture, subarachnoid puncture, phrenic nerve paralysis are few to cite.

To avoid these complications a different approach called Parascalene block developed by Vongvises can be utilized. Parascalene block is the injection of local anesthetic in lower part of posterior triangle of neck about 1.5 to 2 cm above mid point of clavicle at the lateral border of anterior scalenus muscle into the brachial plexus.

Dexamethasone can be used as an additive to increase analgesic duration with local anesthetic in regional anesthesia. Dexamethasone is highly potent and selective glucocorticoid. It is used as anti-inflammatory and immunosuppressant.

Its potency is about 40 times greater than that of hydrocortisone. Dexamethasone is used for treatment of many inflammatory and autoimmune conditions, but glucocorticoid are also used to treat patients suffering from neuropathic pain and complex regional pain syndromes (CRPS). So, steroids have anti-inflammatory and analgesic effects ,.

Nerve locators are now widely seen as useful aids in nerve blocks. Its use avoids paraesthesia, decreases the chance of nerve injury and gives high success rate.

So the present study is a comparative evaluation of efficacy of Bupivacaine 0.25% and Bupivacaine 0.25% with dexamethasone in parascalene block for upper limb surgeries using nerve locators.

AIM OF THE STUDY

The study of addition of Dexamethasone 8 mg with Bupivacaine 0.25% in parascalene block for upper limb surgeries has following objectives.

PRIMARY OUTCOME :

To compare the duration of analgesia which is defined as time interval from the onset of sensory blockade and the initial use of rescue analgesia for surgical pain .

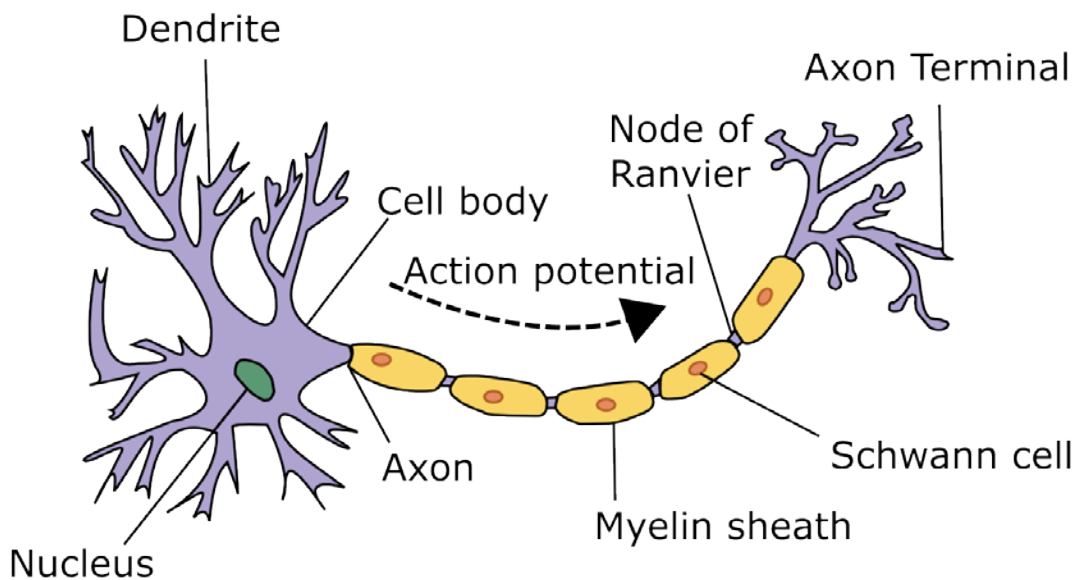
SECONDARY OUTCOME :

- 1) Onset of Motor and Sensory blockade
- 2) Post operative Visual analog score for pain
- 3) Hemodynamic variables (Bp,HR,RR,SPO2)
- 4) Rescue analgesia
- 5) Complications

APPLIED PHYSIOLOGY

Neurons are the basic structural unit of the nervous system that respond to various stimuli. Neurons relay, integrate and transmit nerve impulses.

STRUCTURE OF NEURON :



Typical neuron consists of

- 1) **Soma or Cell body** : It is the body of neuron. It contains nucleus and protein synthesis occurs here. Nucleus is about 3 to 18 microns in diameter.
- 2) **Dendrites** : The dendrites of a neuron are cellular extensions with many branches. The overall shape and structure is referred to metaphorically as a

dendritic tree. This is where the majority of input to the neuron occurs via the dendritic spine.

- 3) **Axon** : The axon is a finer, cable-like projection that can extend tens or even tens of thousands of times the diameter of the soma in length. The axon carries nerve signals away from the soma (and also carries some types of information back to it). Many neurons have only one axon, but this axon may—and usually will—undergo extensive branching, enabling communication with many target cells. The part of the axon where it emerges from the soma is called the axon hillock.

All peripheral nerves are elongated axons of neurons. A typical peripheral nerve consists of bundles of motor, sensory, other fibres enclosed. Outermost covering is called Epineurium. Inside the epineurium, the Perineurium surrounds the bundle collection. Innermost covering is called Endoneurium. Each nerve fibre is covered by a layer of neurilemma or axonal membrane.

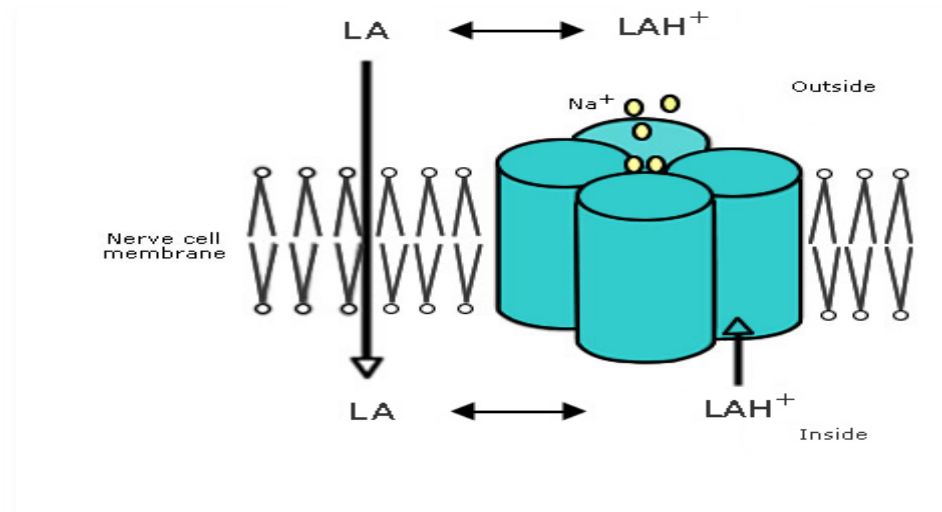
Depending on the presence or absence of myelin sheath, it can be a myelinated or unmyelinated nerve fibre. Myelin sheath helps in faster conduction.

PHYSIOLOGY OF NERVE CONDUCTION:

Axonal membrane is a bilipid membrane interspersed with large protein molecules. Membrane lipids are phospholipids with polar head group and non polar hydrocarbon tail.

A membrane bound protein sodium potassium ATPase maintains normal resting membrane potential between -50 to -90 mv by pumping sodium ions out of the membrane .

When excitatory impulse reaches the neuron, it causes opening of Na channels and sodium ions move into the membrane causing rapid Depolarization . This generates Action potential and is transmitted along the axon to motor unit. Membrane potential returns back to normal resting membrane potential when Na and K channels closes.



Local anesthetics(LA) are weak bases. unionized form diffuses into the membrane and due to equilibrium,it becomes ionized.it is called “ion trapping”.LA binds to receptor present in the innerpart of voltage gated Na channels and blocks Na conduction there by stopping action potential.It is a reversible block. LA have greater affinity for inactivated form of Na channels.

Dexamethasone produces analgesia in variety of ways :

- 1) It is a synthetic glucocorticoid that is anti inflammatory and inhibits production of inflammatory mediators like interleukins and cytokines thereby reducing pain.
- 2) When combined with LA,it produces vasoconstriction and reduces absorption thereby prolonging action of LA.
- 3) It increases inhibitory activity of potassium channels on nociceptive C fibres there by reducing their activity and prolong blockade.

HISTORY OF BRACHIAL PLEXUS BLOCKADE

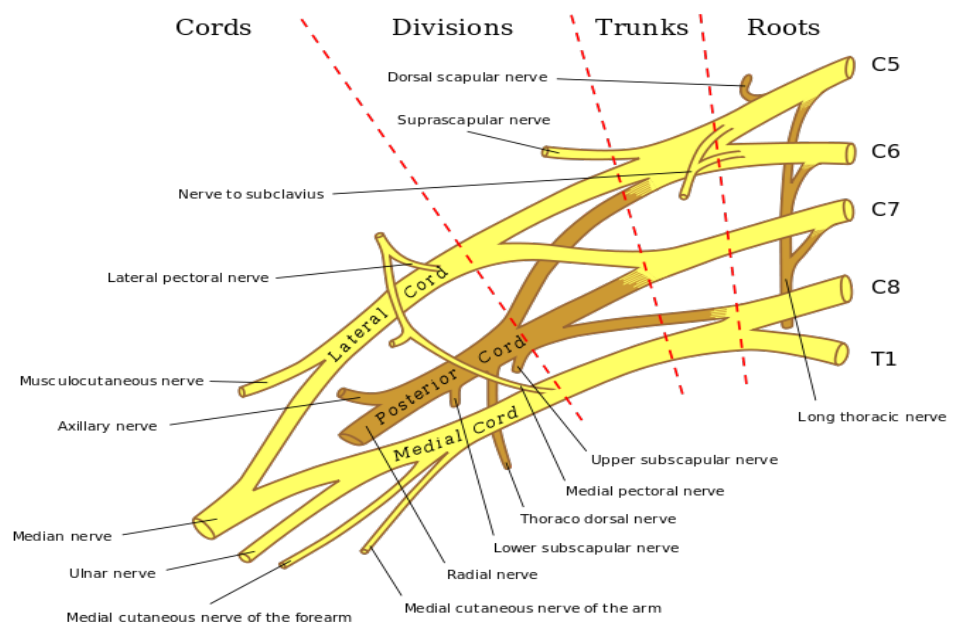
- 1) In 1889, **William Halstead** deposited cocaine to brachial plexus
- 2) In jan 1900, **Harvey Cushing** deposited cocaine to brachial plexus before dividing it during the surgery on sarcoma of the arm.
- 3) In 1911, **Diedrich Kulenkampff** (1880-1967) performed the first percutaneous brachial plexus block
- 4) In 1911, **George Hirschel** (1875-1963) performed the first brachial plexus block through axilla.
- 5) In 1946, **F. Paul Ansbro** performed continous brachial plexus block.
- 6) In 1964, **Winnie and Colins** performed subclavian perivascular brachial plexus block.
- 7) In 1973, **Raj** performed first first infraclavicular brachial plexus block.
- 8) In 1977, **Selander** described a technique for continous brachial plexus block using an IV catheter secured in tne axilla.
- 9) In 1979, **Vongvises** and **panijayamond** developed parascalene brachial plexus block.

ANATOMY OF THE BRACHIAL PLEXUS⁷

Brachial plexus is one of the commonly used plexus to be blocked in the clinical practice of anesthesiology for the surgeries in the arm, forearm and hand. Absolute knowledge about the formation and distribution of brachial plexus is very much essential for effective administration of brachial plexus blockade. It is essential to know the vascular, muscular and fascial relations with various levels of brachial plexus to master various techniques of brachial plexus blockade.

In its course from intervertebral foramina to upper arm, the brachial plexus is composed consecutively of

- 1) Roots,
- 2) Trunks,
- 3) Divisions,
- 4) Cords,
- 5) Branches.



FORMATION OF THE BRACHIAL PLEXUS:

ROOTS:

Roots of the brachial plexus are formed by anterior primary rami of 5th to 8th cervical plexus together with the bulk of first thoracic nerve(C8-T1).occasionally the plexus is derived from C4-C8 and it is called prefixed plexus or from C6-T2 and it is called postfixed plexus.

TRUNKS:

The five roots of the brachial plexus emerge from the intervertebral foramina.They lie in the groove between the anterior and posterior tubercles of the corresponding transverse process.All five roots are then sandwiched between Scalenus anterior and Scalenus medius muscle.

- 1) Roots of C5 and C6 unite to form Upper trunk
- 2) Root of C7 continues as the Middle Trunk
- 3) Roots of C8 and T1 unite to form the Lower trunk.

DIVISIONS:

Each trunk runs behind the clavicle and divides into

- 1) Anterior Divisions
- 2) Posterior Divisions

So totally six divisions are formed.

CORDS:

The six divisions then enters the axilla and unites there to form three cords as follows

- 1) LATERAL CORD is formed by the union of anterior divisions of the
Upper and middle trunks
- 2) MEDIAL CORD is formed by the continuation of the anterior division
of the lower trunk.
- 3) POSTERIOR CORD is formed by the union of the posterior divisions of
all the three trunks.

BRANCHES:

Branches are given off from roots, trunks and cords.

- 1) Branches from the roots:
 - a) Nerve to the Serratus anterior C5, C6 and C7
 - b) Muscular branches to
 - Longus cervicis C5-C8
 - Three scalene muscles C5-C8
 - Rhomboids C5
 - c) Twig to the phrenic nerve C5

2) Branches from the Trunks:

- a) Supra scapular nerve C5-C6
- b) Nerve to Subclavius C5-C6

3) Branches from the Cords :

a) Lateral cord :

- Lateral pectoral nerve C5-C7
- Lateral head of Median nerve C5-C7
- Musculocutaneous Nerve C5-C7

b) Medial cord :

- Medial pectoral Nerve C8-T1
- Medial cutaneous nerve of arm C8-T1
- Medial cutaneous nerve of forearm C8-T1
- Medial root of Median nerve C8-T1
- Ulnar nerve C7,C8-T1

C) Posterior cord :

- Upper subscapular C5-C6
- Lower subscapular C5-C6

- Axillary nerve C5-C6
- Thoracodorsal nerve or Nerve to Lattismus dorsi C6,C7,C8
- Radial nerve C5,C6,C7,C8,T1

RELATIONS OF THE BRACHIAL PLEXUS :

ROOTS :

The roots lie between Scalenus anterior and Scalenus medius. They lie above the second part of subclavian artery.

TRUNKS :

The trunks are enclosed in the sheath of prevertebral fascia in the posterior triangle of neck. They are superficially placed being covered by Skin, Platysma and deep fascia.

Upper and Middle trunks lie above the subclavian artery as they runs across the First rib. Lower trunk lie behind the subclavian artery and may groove the first rib.

DIVISIONS :

The trunks of the brachial plexus divides into anterior and posterior divisions along the lateral border of the First rib. These divisions lie behind the clavicle, Subclavius muscle and Suprascapular vessels.

CORDS :

The cords are formed at the apex of axilla and are grouped around the Axillary artery.

THE INTERSCALENE SHEATH :

As the roots emerge between the transverse process of cervical vertebra, they are enclosed in a sheath called Interscalene sheath which is a fibrofatty space. Anterior sheath arises from the anterior tubercles and covers the posterior surface of Scalenus anterior muscle. Posterior sheath arises from the posterior tubercles and covers the anterior surface of the Scalenus medius muscle. The significance of this space is that the local anesthetics can be injected at various levels to produce block by Interscalene, subclavian perivascular, Axillary block.

SYMPATHETIC SUPPLY :

- C5 and C6 nerves receive grey rami from the middle cervical sympathetic ganglion
- C7 and C8 nerves receive grey rami each from the inferior cervical sympathetic ganglion and T1 ganglion.

TECHNIQUES OF BRACHIAL PLEXUS BLOCK^{23,25,19}

All airway gadgets should be kept ready before institution of any techniques of brachial plexus block.

Surgical anesthesia of the upper extremity and the shoulder can be achieved by blocking the brachial plexus at various levels. The various approaches that can be used for this blockade are

- 1) Interscalene block
- 2) Supraclavicular block
 - a) Classic approach
 - b) Plumb bob technique
 - c) Subclavian perivascular technique
- 3) Axillary block
- 4) Infraclavicular block.

INTERSCALENE BLOCK :

This block is performed at the level of C6 vertebra. C6 vertebra lies along the line of cricoid cartilage. Standing by the side of the patient, the interscalene groove can be located. An intradermal wheal can be raised at the point of injection. A 22 G short bevelled needle is inserted at right angles to all planes of the skin.

Plexus is located by paresthesia of the shoulder or a nerve stimulator is used to evoke contractions of the deltoid or biceps brachii muscle. Then 20-40 ml of local anesthetic is injected after repeated aspiration to prevent vascular injection.



COMPLICATIONS :

- 1) Subarachnoid injection
- 2) Epidural blockade
- 3) Vertebral artery injection
- 4) Pneumothorax
- 5) Phrenic nerve block
- 6) Cervical sympathetic block.

SUPRACLAVICULAR BLOCK :

1) SUPRACLAVICULAR BLOCK OF KULENKAMPF⁴³:

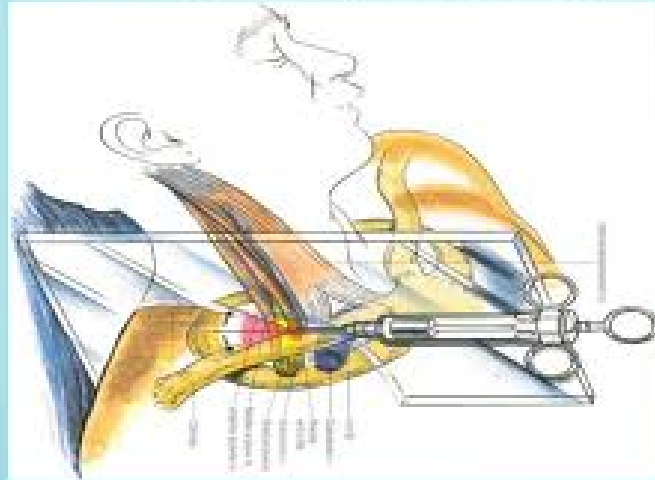
In this classic technique, needle is inserted 1 cm superior to mid clavicular point. Needle is inserted parallel to the patient neck and head. First rib is encountered at 4 to 5 cm. Needle is walked over the rib until paresthesia is elicited, local anesthetic is injected after careful aspiration or nerve locator can be used to find plexus.



2) PLUMB BOB TECHNIQUE :

Brachial plexus lies at the level of first rib behind the subclavian artery. Needle is inserted at an angle of 90 degrees immediately behind the clavicle at the lateral border of sternocleidomastoid muscle. Paresthesia is sought and local anesthesia is injected. The name plumb bob was chosen for this technique because if a plumb bob was suspended from the insertion point, the needle inserted will come in contact with the brachial plexus in most patients.

In 1988 Brown described the plumb-bob technique



3) SUBCLAVIAN PERIVASCULAR BLOCK^{46,47} :

This is the most common supraclavicular block used nowadays. Interscalene groove is identified and traced to its lowest level where it is posterior to the subclavian pulse. then needle is directed just caudad behind the subclavian pulse until paresthesia is noted. local anesthetics are injected after careful aspiration or alternatively nerve stimulator can be used to evoke contractions of the muscles of the arm and forearm and local anesthetics are injected⁴⁶.



COMPLICATIONS :

- 1) Pneumothorax
- 2) Inadvertent arterial puncture.

INFRACLAVICULAR BLOCK :

Infraclavicular brachial plexus block developed by Raj is performing block below the clavicle. This is the preferred technique for surgeries below elbow and forearm. Here block is performed at the level of cords. Needle is inserted 1 cm below the midpoint of clavicle and is directed laterally towards coracoid process or humeral head. Once paresthesia is sought, local anesthesia is injected after careful aspiration.



COMPLICATIONS :

- 1) Pneumothorax
- 2) Hemothorax
- 3) Chylothorax
- 4) Hematoma.

AXILLARY BRACHIAL PLEXUS BLOCK :

This block is performed at the axilla. Axillary arterial pulsations are best felt at the height of axilla between coracobrachialis and pectoralis major muscle. Needle is inserted superior or inferior to the pulsations until the resistance of the fascial sheath is felt and a pop indicates the correct placement. Local anesthetic is injected after careful aspiration. Alternatively TRANSARTERIAL APPROACH can be used where needle is passed through the axillary artery and transfixated. After careful aspiration to avoid vascular injection Local anesthetic is injected.



COMPLICATIONS:

- 1) Intraarterial injection
- 2) Hemothorax
- 3) Hematoma
- 4) Infection

PARASCALENE BLOCK^{43,44}

Among various techniques described above for brachial plexus block, subclavian perivascular supraclavicular block is the most commonly used. Advantages are no need for abduction of arm, local anesthesia does not spread to CSF or epidural space as in interscalene block, C8 and T1 can also be effectively blocked. However specific concerns exist regarding this block. They are

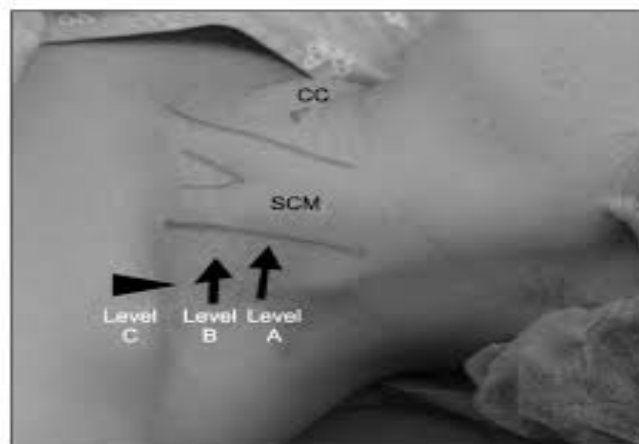
- a) Subclavian arterial pulse can be felt but cannot be accurately located for beginners.

b) Needle often used is 22G which is quite long and may slip over first rib and pierce pleura.

To avoid these complications,Parascalene block developed by Vongvises and Panijayamond in 1979 can be used⁴³.

LANDMARKS OF PARASCALENE BLOCK :

Important landmark is the identification of Chassignac tubercle.it is the tubercle of 6th cervical vertebra.It is located at the level of cricoid cartilage at the posterior border of sternocleidomastoid muscle.A line is drawn from this point to midpoint of clavicle.The junction of upper two third and lower one third of this line corresponds to the point of insertion



**B) LEVEL B CORRESPONDS TO THE POINT OF INSERTION OF
PARASCALENE BLOCK**

ADVANTAGES OF PARASCALENE BLOCK :

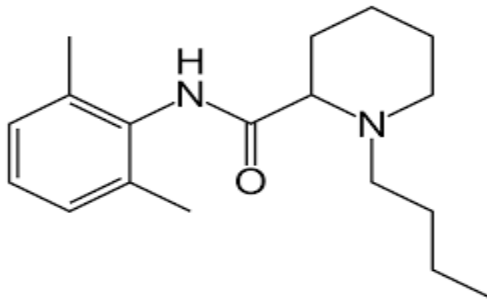
- 1) Parascalene block is lower level than the level of interscalene block, therefore avoids the complications of phrenic nerve block, vagus nerve and recurrent laryngeal nerve block.
- 2) It is also not close to pleura as in supraclavicular block and so avoids complication of Pneumothorax.
- 3) Parascalene block can be used for the surgeries on arm, forearm and hand surgeries.

DISADVANTAGES OF PARASCALENE BLOCK:

- 1) External jugular vein is close to the point of insertion.
- 2) Epidural blockade has been rarely reported during parascalene block³.

STRUCTURE OF BUPIVACAINE^{21,24}

Bupivacaine is an aminoacyl amide local anesthetic synthesized by AF EKENSTAM et al at AB BOTOR (1957). Clinically used by Teluivion in 1963. It is available for clinical use as a Racemic mixture of Enantiomer containing equal amount of R and S forms.



PHYSICOCHEMICAL PROPERTIES :

Bupivacaine has a butyryl group on the piperidine nitrogen atom on the molecule. It is a local anesthetic with very good potency. It is highly lipid soluble, highly protein bound, greater intrinsic potency. It is longer acting amide local anesthetic. It is 3 to 4 times more potent than Lignocaine. It can cross blood brain barrier as well as placental barrier.

MOLECULAR WEIGHT	: 288
PKa(25 deg C)	: 8.2
PROTEIN BINDING	: 96%
LIPID SOLUBILITY	: 28
PARTITION COEFFICIENT	: 346
% NONIONIZED FORM at pH 7.4	: - 17
pH 7.2	: - 12
ONSET OF ACTION	: Moderate
DURATION OF BLOCKADE	: 360 to 720 min
ANESTHETIC INDEX OR SAFETY INDEX	: 3-4
RECOMMENDED DOSAGE	: 2 mg/kg

SAFE BLOOD LEVEL : up to 2 mcg/ml

TOXIC BLOOD LEVEL : more than 4 mcg/ml.

AVAILABLE PREPARATIONS :

As a clear solution of 0.25/0.5% Bupivacaine hydrochloride. Hyperbaric solution contains 80 mg/ml of glucose.

MECHANISM OF ACTION :

Bupivacaine produces electrical membrane stabilization by dual action on sodium conductance.

1. Acts directly on the receptors within the sodium channels.
2. Produces non specific membrane expansion.

PHARMACOLOGICAL EFFECTS:

- a. Local Nerve blockade
- b. Regional Pain, temperature, touch, motor power and the vasomotor tone in the region supplied by the nerves are blocked
- c. Systemic Effects occurring as a result of systemic absorption or intravenous administration.

On the cardiovascular system, the effect of bupivacaine is dose related. It decreases the automaticity of the heart and myocardial contractility.

Depending on the membrane potential, Bupivacaine suppresses V_{max} considerably more than lignocaine which results in slower conduction of the cardiac action potential and it is manifested as the prolongation of the PR and QR intervals on the electrocardiogram.

This results in re-entrant phenomenon and ventricular arrhythmias. The Na^+ channels are blocked in a fast in, slow-out manner which causes difficulty in resuscitation when the ventricular fibrillation has occurred. The cardiotoxicity of bupivacaine results from high lipid solubility. The R enantiomer is more toxic than the S enantiomer.

The order of blockade depends on diameter, myelination, conduction velocity of affected nerve fibre. The order of blockade is Autonomic, Temperature, Pain, Proprioception, Motor. The analgesic effect of Bupivacaine is due to its binding to Prostaglandin E2 subtype E1 (PGE2EP1) and reduces fever, hyperalgesia, inflammation.

ROUTES OF ADMINISTRATION / DOSES:

The drug acts within 10 to 20 minutes and has an average duration of action of 5-6 hours. Bupivacaine may be administered topically by infiltration, intrathecally or epidurally. The therapeutic dose of bupivacaine is 2-3 mg / kg (with or without adrenaline).

CONCENTRATION USED :

Infiltration – 0.25%

Peripheral nerve block - 0.25 - 0.5%

Epidural Anaesthesia - 0.25% - 0.5%

Spinal Anaesthesia - 0.5% Heavy

Epidural Analgesia - 0.0625% - 0.25%

PHARMACOKINETICS :

The absorption of local anesthetics is related to

- 1) Site of injection (intercostal >epidural>brachial plexus>subcutaneous)
- 2) A linear relationship exists between dose and its peak effect.
- 3) Vasoconstrictors will delay the absorption of local anesthetic.

The Metabolic pathways of bupivacaine include aromatic hydroxylation, N-dealkylation, amide hydrolysis and conjugation. Only the N- dealkylated metabolite N desbutyl Bupivacaine has been measured in the blood or urine.

Alpha 1 acid glycoprotein is the most important protein binding site of Bupivacaine. 5% of the dose is excreted in the urine as pipcolloxylidine. 16% is excreted unchanged. Clearance is 0.47 l/min and the elimination half life is about 210 minutes

SYSTEMIC TOXICITY :

CARDIOVASCULAR :

Cardiovascular effects are due to binding of the drug to myocardium. It depresses the myocardium and causes fall of peripheral vascular resistance leading to profound hypotension and cardiovascular collapse. It depresses V_{max} of myocardium more than lignocaine. As it blocks fast sodium channels, it leads to reentrant tachycardias and ventricular arrhythmias. ECG shows PR and QR prolongation. Ventricular fibrillation caused by bupivacaine toxicity is very resistant to cardio pulmonary resuscitation. Cardiotoxic dose of bupivacaine is 8 to 10 mcg/ml.

CENTRAL NERVOUS SYSTEM :

Central nervous system toxicity is more seen in lignocaine toxicity than due to Bupivacaine. Bupivacaine exerts reversible neural blockade in CNS. So it exerts a typical biphasic response. When the drug dosage reaches toxic levels or injected accidentally into vessels, it initially causes excitatory signs like numbness of tongue, light headedness, auditory disturbances, confusion, disorientation, muscle twitching can progress to convulsions which is of generalized tonic clonic type. At very high toxic doses it can lead to depression and coma.

Typical plasma concentration of bupivacaine causing seizures is 5 to 6 mcg/ml.

TREATMENT OF SYSTEMIC TOXICITY :

If symptoms of local anesthetic systemic toxicity (LAST) occur

- 1) Prompt airway management
- 2) If seizures occur, benzodiazepines can be used, if not controlled, small doses of propofol or thiopentone can be used.
- 3) If cardiac arrest occurs, standard ACLS with modifications should be used
 - a) If epinephrine is used, smaller doses (10-100 mcg) are preferred
 - b) Vasopressin is not recommended
 - c) Avoid calcium channel blockers or beta blockers
 - d) If ventricular arrhythmias develop, Amiodarone is preferred

4) Lipid emulsion therapy :

- consider administer at the first signs of LAST after airway management
- Dosing :
 - 1.5 ml/kg 20% lipid emulsion bolus
 - 0.25 ml/kg per minute of infusion, continued for at least 10 min after circulatory stability is attained.
 - If circulatory stability is not attained, consider rebolus and increasing infusion to 0.5 ml/kg per minute.
 - Approximately 10 ml/kg lipid emulsion for 30 min is recommended as the upper limit.

- 4) Failure to respond to lipid emulsion and vasopressor therapy should prompt institution of cardiopulmonary Bypass (CPB)

PHARMACOLOGY OF DEXAMETHASONE

Dexamethasone is a synthetic adrenocorticosteroid which has glucocorticoid activity. It is one of the most active glucocorticoids. It is about 25 to 30 times as potent as hydrocortisone. Dexamethasone has very little to no mineralocorticoid activity.

PHARMACOKINETICS OF DEXAMETHASONE :

- 1) Bioavailability : 80-90%
- 2) Protein binding : 77%
- 3) Metabolism : Hepatic
- 4) Biological half Life : 190 min
- 5) Excretion : Urine (65%)
- 6) Formula : $C_{22}H_{29}FO_5$
- 7) Molecular weight : 392.461g/mol
- 8) Melting point : 262 degree C (504 degree F)

INDICATIONS :

- 1) Replacement therapy for
 - a) Acute adrenocortical insufficiency – Addison's disease, bilateral adrenalectomy
 - b) Relative adrenocortical insufficiency
 - c) Primary and secondary adrenocortical insufficiency

- 2) Treatment of following diseases
- a) Collagen diseases like SLE, Polyarteritis nodosa, dermatomyositis, giant cell arteritis, exacerbation of acute rheumatic carditis.
 - b) Pulmonary disorders like Status asthmaticus, chronic asthma, sarcoidosis, respiratory insufficiency.
 - c) Blood disorders like leukemia, idiopathic thrombocytopenic purpura in adults, acquired (auto immune) hemolytic anemia.
 - d) Rheumatic diseases like RA, Osteoarthritis
 - e) Skin diseases like psoriasis, erythema multiforme, pemphigus, neutrophilic dermatitis, sarcoidosis of skin, contact dermatitis.
 - f) Gastrointestinal disorders like Ulcerative colitis, regional enteritis.
 - g) Oedema like cerebral oedema which can be due to primary or metastatic brain tumours, neurosurgery or stroke, oedema associated with acute non infectious causes and laryngospasm
 - h) Eye disorders like allergic conjunctivitis, keratitis, allergic corneal marginal ulcers, chorioretinitis, optic neuritis, AION.
 - i) Neoplastic states like cerebral neoplasms, hypercalcemia associated with cancer, leukemias and lymphomas in adults
 - j) Endocrine disorders like adrenal insufficiency
 - k) Pre operative and post operative in any surgical procedure where adrenocortical reserve is doubtful.
 - l) As an adjunct in the treatment of shock.

CONTRAINDICATIONS :

- 1) Systemic fungal infections
- 2) Hypersensitivity to corticosteroids
- 3) Administration of live virus vaccines
- 4) In patients with myasthenia gravis, peptic ulcer, osteoporosis or psychoses
- 5) The 8 mg/2 ml vial formulation is contraindicated in patients with a known sulfite hypersensitivity.

Dexamethasone is a synthetic glucocorticoid that acts as an anti-inflammatory. It has been shown to inhibit the release of inflammatory mediators such as, interleukins and cytokines, and improves the release of anti-inflammatory mediators, decreasing postoperative pain.

MECHANISM OF ACTION :

Glucocorticoids, like dexamethasone, are characterized by exerting potent anti-inflammatory and immunosuppressive actions by inhibiting cytokine-mediated pathways. Dexamethasone works by binding in the cytoplasm and combining with glucocorticoid receptors; from here it moves into the nucleus. In the nucleus, it binds to specific DNA sequences to regulate gene transcription involved in the function of inflammatory response mediators. This results in the induction and repression of genes related to inflammatory processes.

Dexamethasone is one of the most effective ligands for glucocorticoid receptor activation. It has a strong anti-inflammatory effect, with thirty times the potency of cortisol and six times the potency of hydrocortisone, making it a very effective anti-inflammatory drug

DEXAMETHASONE IN REGIONAL ANESTHESIA :

Prolonging surgical anesthesia and analgesia is of significant interest in regional anesthesia; in order to increase the duration of local anesthetic action and improve the quality of peripheral nerve blocks, adjuvant medications are added. The addition of a glucocorticoid, specifically dexamethasone, has been shown to have high quality outcome. Theories have been postulated from various studies and will be discussed in the literature review².

1) It has been concluded that dexamethasone reduces stimulus transmission in unmyelinated c-fibers, known to carry nociceptive information by inhibiting the activity of the potassium channels on these fibers. This will decrease the amount of pain sensed by a patient.

2) it is thought that dexamethasone causes a degree of vasoconstriction to the tissues and local anesthetic will have a slower uptake and absorption thus, prolonging its duration and amount of comfort felt by the patient.

3) Dexamethasone exhibits a potent anti-inflammatory effect and inhibits the release of inflammatory mediators like interleukins and cytokines; it promotes the release of anti-inflammatory mediators leading to decreased postoperative pain.

Investigation continues as to the exact science and mechanism of action of

examethasone and its prolongation of analgesia when used as an adjunct to local anesthetic in peripheral nerve block. So dexametasone can be used as an adjunct to local anesthetic in peripheral nerve blocks, prolonging analgesia in the surgical patient.

PHARMACOKINETICS OF LOCAL ANESTHETIC IN NERVE BLOCKADE

THEORY OF WINNIE⁴⁴ :

Winnie and Ramamoorthy postulated that a nerve trunk consists of peripheral mantle fibres and central core fibres. peripheral fibres are short and motor. Central fibres are long and sensory. Local anesthetics will block the peripheral motor fibres first followed by central sensory fibres. Duration of block is also longer in peripheral fibres than central fibres and the spread is proximal to distal.

Thus the order of blockade is

- a) Loss of motor power of shoulder and arm
- b) Loss of sensation of arm
- c) Loss of motor power of forearm
- d) Loss of sensation of hand.

BASICS OF NERVE LOCATOR¹⁶ :

Perivascular technique and elicitation of paraesthesia had been the classical methods for locating nerves in peripheral nerve blocks. Peripheral nerve locator technology is a newer one and is used for effective nerve localization avoiding failure of block. Peripheral nerve locator is used to elicit Evoked Motor Response(EMR). They are used to assess functioning of Neuromuscular(NM) junction.

When high intensity current is used to assess NM junction function through cutaneous electrodes it is called as Peripheral nerve stimulator. When low intensity current is used to locate the nerve it is called peripheral nerve locator¹.

HISTORY :

Perthes in 1912 and Pearson in 1955 demonstrated that a peripheral nerve could be located by electro stimulation Greenblatt and Denson in 1962 introduced the nerve stimulator into anaesthesiology clinical practice. With growing interest in regional anaesthesia and demand for more accurate nerve localization before injection of local anaesthetics, the field of peripheral nerve locators has grown into a larger extent.

PHYSIOLOGICAL BASIS OF PNL TECHNOLOGY :

The ability of a nerve locator to evoke a motor response depends on

- i) intensity of current
- ii) duration of current
- iii) polarity of stimulating current used &
- iv) needle nerve distance .

Assuming a square pulse of the current is used to stimulate the nerve the total charge applied is the product of intensity of current and duration of the pulse.

Reobase And Chronaxie :

Reobase is the minimal current required to stimulate the nerve with a long pulse width.

Chronaxie is the duration of the stimulus required to stimulate at twice the reobase.

$$I = I_r (1 + C/t)$$

Where I - current required, C - Chronaxie,

I_r - reobase, t - duration of stimulus.

Chronaxie is useful when comparing different nerves or nerve fibre types. The larger fibres are more readily stimulated than the smaller fibres. It is possible to stimulate the larger $A\alpha$ motor fibre without stimulating the smaller $A\delta$ or C -fibres responsible for pain.

Chronaxies of Peripheral Nerves

* A- α 50 -100 μ Seconds

* A- δ 170 μ Seconds

* C-Fibres 400 μ Seconds

Principles of Peripheral nerve stimulation :

i) Preferential cathodal stimulation: Significantly less current is needed to obtain a response to nerve stimulation when cathode is adjacent to the nerve, rather than the anode.

ii) Variation of stimulus intensity with varying needle nerve distance. Stimulation intensity will be variable as determined by coulomb's law. A very high stimulus current is required to stimulate the nerve when the needle tip is far away from the nerve.

Components of peripheral nerve locators :

Oscillator

Display

Constant current generator

Controls.

Characteristics of an ideal PNL

1) Constant current output:-

The constant current designs of the locator allows for an automatic compensation for changes in tissue or connection impedance during nerve stimulation assuring accurate delivery of the specified current.

2) Options for different pulse width:-

chronaxie of motor fibres in a mixed peripheral nerve. Wider pulse width ($>100\mu$ sec) is useful for stimulating a sensory nerve or a nerve with compromised conduction i.e. Diabetic neuropathy.

3) A wide range of current output - 0.01 to 5.0 mA :-

A higher current output is needed for patients with neuropathy and sensory nerve stimulation.

4) Digital display of the delivered current.

5) Variable current output dial.

6) Clearly identifiable polarity

7) Disconnect indicator

8) Battery indicator

9) Stimulating frequency:-

If the stimulating frequency is higher, it allows faster manipulation of the needle.

Peripheral Nerve Locator Settings :

1) Mixed nerve (most PNB)

Current 1 mA

Current duration(Pulse width) 0.1ms

Frequency 1-2 HZ

2) Sensory nerve (eg. Lateral cutaneous and saphenous nerve)

Current 2-5 mA

Current duration 1ms

Frequency 1 Hz

APPROPRIATE EVOKED MOTOR RESPONSE FOR EACH PNB

PNB Technique Optimal EMR

Flexor – Deltoid, Biceps, Pectoralis major.

Extensor – Triceps, Brachioradialis, Wrist

Extensors.

(EMR of > 2 muscles)

Deep Cervical Plexus : Rhomboids, Shoulder girdle.

Infraclavicular Muscles of wrist and hand.

Radial – Extension of wrist / fingers.

Median – Flexion of wrist / fingers.

Ulnar – Adduction of thumb/4th & 5th finger flexion.

Femoral - Quadriceps , Patellar snap

Sciatic- Inversion, Plantar flexion

REVIEW OF LITERATURE

Nerve locator :

* In 1985 **smith DC et al** described an inexpensive, portable nerve stimulator which is used to increase the ease and effectiveness of blockade of peripheral nerves⁷ .

* **Zaharai DT et al** described the use of a nerve stimulator which facilitates accurate nerve blocks and causing no paraesthesiae and reduces the possibility of nerve injury⁴⁹ .

* **Bashein G et al and Ford DJ et al** in their studies concluded that, in nerve stimulator assisted nerve blocks, insulated needles are more useful in precise location of peripheral nerves than uninsulated needles¹ .

* In 1980 **Yasuda I et al** described the use of nerve stimulator with insulated needle in supraclavicular brachial plexus block. They identified the plexus at a mean depth of 27mm below the skin and the block was successful in 97% of patients when the stimulation was felt in the index, middle or ring finger⁴⁸ .

PARASCALENE BLOCK :

- 1) **Bernard Dalens et al** concluded that the Parascalene block is more reliable and effective and almost free of adverse complications in children with upper extremity surgeries.^{13,14}

They conducted a study on children about 60 in number in each group being operated for upper extremity surgeries and compared parascalene block with supraclavicular block of Kulenkampff in terms of reliability of block and safety of technique and concluded parascalene block is superior to supraclavicular block in terms of safety in children.

- 2) **Bhattarai et al** conducted a study comparing parascalene block and subclavian perivascular block on children with upper limb fractures undergoing closed manipulation and concluded that parascalene approach is feasible and comparable to classical subclavian approach in success rate. sixty children were divided into 2 groups of 30 each.

Time required for performing the block (6.3+/-2.2 min vs. 8.2+/-2.4 min), onset of subjective analgesia (4.1+/-1.6 min vs. 5.2+/-1.4 min) and onset of sensory block to pinprick (6.8+/-2.1 min vs. 8.6+/-1.7 min) were significantly shorter in Group I as compared to Group II (p<0.01). This technique was easy to perform and success rates were high. Complications were minor and the incidence was low in both the groups except Horner's syndrome in 46.7% of patients in Group II

- 3) **Young duck shin et al in 2006** utilized ultrasound technology in conducting parascalene block on 8 patients undergoing shoulder arthroscopic surgeries and concluded parascalene block is easier and free of complications using ultrasound⁵⁰.

4) **Arouza p Ortega et al** compared parascalene block with axillary brachial plexus block to surgical procedures around the elbow. they conducted study on 64 patients with them randomly allocated into 2 groups of 32 each. they found that parascalene block is as efficacious as axillary block to procedures around elbow. Important advantage is that arm need not be mobilized as in axillary block⁶.

DEXAMETHASONE AS AN ADJUVANT :

A) Dexamethasone in interscalene block:

Cummings et al., (2011) studied the effect of dexamethasone as an adjunct to ropivacaine or bupivacaine in interscalene nerve blocks⁵.

The study was a double-blinded trial. Patients received single-injection interscalene block and were randomized to one of four groups. The groups were: 0.5% ropivacaine, 0.5% bupivacaine, 0.5% ropivacaine mixed with dexamethasone eight milligrams, and bupivacaine 0.5% mixed with dexamethasone eight milligrams.

The time to first analgesic request after discharge from the post-anesthesia care unit (PACU) was the primary outcome used in this study. Patients were followed either at home by telephone or inpatient by a blinded observer. Patients were assessed for block duration. Block duration consisted of the time of initial sensory block to the administration of supplemental analgesic medication after PACU discharge. Secondary outcomes were also utilized in this study. The

outcomes were elapsed time until the patient had a significant increase in shoulder discomfort, opioid consumption, and maximum verbal response score with rest and movement. Results found that dexamethasone significantly prolonged the duration of analgesia of both ropivacaine ($P < 0.001$) and bupivacaine ($P < 0.001$). Overall, analgesia was more prolonged with plain bupivacaine than ropivacaine. The blocks were placed either by ultrasound technique or nerve stimulation technique. This was left to the discretion of the anesthesia provider and the technique they were most comfortable with. There were no differences noted in block duration when comparing ultrasound placement versus nerve stimulation technique placement. If there had been a large difference in the number of failed blocks, results would have been biased. The small number of failed blocks (ultrasound 3/147 and nerve stimulation 4/71) are consistent with accepted success rates (Cummings et al., 2011)

A randomized, double-blinded investigation by **Vieira et al., (2010)**⁴² studied dexamethasone with bupivacaine in ultrasound guided interscalene brachial plexus blockade for outpatient shoulder arthroscopy.

Eighty-eight individuals undergoing shoulder arthroscopy received interscalene brachial plexus block using twenty milliliters bupivacaine 0.5% with epinephrine 1:200,000 and randomly assigned patients to receive dexamethasone eight milligrams or 0.9% normal saline (NS) as an adjunct to the local anesthetic. Dexamethasone was found to prolong median sensory and motor compared with the control. At twenty-four hours the dexamethasone group had lower verbal pain

score as compared to the control thus, a reduction in the use of opioid for pain control. At forty-eight hours, pain scores were similar in both the dexamethasone group and the control group. The addition of dexamethasone to bupivacaine 0.5% for interscalene block for shoulder arthroscopy was found to prolong sensory block and reduce opioid use in these patients.

Dexamethasone in axillary brachial plexus block :

In a prospective, randomized, double-blinded study, **Movafegh, Razazian, Hajimaohamadi, and Meysamie (2006)**³², evaluated the addition of dexamethasone to lidocaine for prolonging the duration of block when used in axillary brachial plexus blockade on patients scheduled for elective hand and forearm surgery under axillary brachial plexus block. The patients were randomly selected to receive either thirty four milliliters of lidocaine 1.5% with two milliliters isotonic saline or thirty-four milliliters lidocaine 1.5% with two milliliters of dexamethasone (eight milligrams). All of the blocks were placed using a nerve stimulator and multiple stimulation technique. Assessment of the radial, median, musculocutaneous, and ulnar nerves took place at five, fifteen, and thirty minutes. The duration of sensory blockade was two hundred forty-two minutes in the dexamethasone group versus ninety-eight minutes in the control group. Motor blockade was three hundred ten minutes in the dexamethasone group versus one-hundred thirty in the control group. Blockade was shown to be significantly longer in the dexamethasone group than in the control group ($P < 0.01$).

Dexamethasone in sciatic and ankle block :

In two prospective, randomized, double-blind, placebo-controlled trials by **Fredrickson, Danesh-Clough, and White (2013)**, dexamethasone eight milligrams, was used as an adjunct to bupivacaine in sciatic and ankle block¹⁵. Their purpose was to assess for prolonged block duration and improved postoperative analgesia with the addition of dexamethasone. Patient presenting for elective foot and ankle surgery were divided into two groups. Sixty-six received sciatic nerve block and sixty received ankle block. The patients were assessed at twenty-four and forty-eight hours for onset of pain, numerical rating of their pain, and supplementary pain medication required. Patients receiving sciatic nerve block with dexamethasone reported less pain at twenty-four hours. For the patients receiving an ankle nerve block, there was no assessment of improved or prolonged analgesia with the addition of dexamethasone to the local anesthetic solution. It can be concluded from this study that the addition of dexamethasone to bupivacaine 0.5%, in peripheral nerve block of the lower extremity, has only a minor analgesic enhancing effect.

Perineural vs systemic Dexamethasone :

In a prospective, randomized, placebo-controlled study by **Kawanishi et al²⁸. (2014)**, patients presenting for arthroscopic shoulder surgery with interscalene block were studied for duration of block when dexamethasone was added to ropivacaine 0.75% for perineural injection versus low-dose systemic dexamethasone (four milligrams intravenously). Patients between the ages of

twenty and seventy-five, undergoing arthroscopic shoulder surgery, were randomized into three groups. The first group received twenty milliliters of ropivacaine 0.75%. The second group received twenty milliliters of ropivacaine 0.75% plus dexamethasone four milligrams that was injected perineural. The third group received perineural injection of twenty milliliters of ropivacaine 0.75% and the addition of intravenous dexamethasone four milligrams. Interscalene blocks were placed immediately post operatively, in the operating room, with the use of ultrasound guidance.

It was found that perineural dexamethasone four milligrams significantly prolonged the duration of analgesia. The median duration of anesthesia was eighteen hours. This compared to plain ropivacaine lasting eleven hours, and ropivacaine with intravenous dexamethasone as fourteen hours. There was also statistical significance found in the NRS the morning after surgery. During the first night forty-two percent of patients in the plain ropivacaine group experienced sleep disturbance due to pain, compared to zero in the group receiving ropivacaine with dexamethasone perineural.

Overall satisfaction scores of four to five were reported by forty-nine percent of patients, compared to thirty-nine percent who responded neutrally and fourteen percent with satisfaction scores of one to two. It can be concluded that perineural administration of dexamethasone, at a dose of four milligrams, significantly prolongs the duration of effective postoperative analgesia.

Dexamethasone in USG supraclavicular block :

Parrington et al. (2010)³⁷, hypothesized that the addition of dexamethasone to mepivacaine in ultrasound-guided supraclavicular brachial plexus block would prolong analgesia in patients undergoing upper-limb surgery. Their study consisted of forty-five adult patients undergoing elective hand or forearm surgery under supraclavicular brachial plexus blockade.

The authors of this study were most interested in the duration of analgesia. Secondary outcomes included: length of sensory and motor block, pain satisfaction scores, analgesic requirements, and block-related complications. It was found that the median duration of analgesia was significantly prolonged in the dexamethasone group, 332 minutes compared with the normal saline group of 228 minutes. The onset times of sensory and motor blockade were similar between the groups. At two weeks postoperatively, there were no complications or side effects reported in relation to the block. The authors concluded that the addition of dexamethasone to mepivacaine 1.5% prolongs the duration of analgesia in patients undergoing elective upper-limb surgery using ultrasound-guided supraclavicular brachial plexus block.

MATERIALS AND METHODS

The study was carried out in the orthopedic surgery theatre, Government General Hospital, Chennai after obtaining institutional approval. The aim of the study was to evaluate the efficacy of brachial plexus block using parascalene approach with Bupivacaine and adjuvant like Dexamethasone 8 mg added to Bupivacaine.

STUDY DESIGN :

A prospective randomized controlled study conducted on 60 ASA 1 and 2 patients undergoing upper limb surgeries under parascalene brachial plexus block who fulfill inclusion criteria.

The study was carried out after receiving institutional ethical committee approval and informed written consent from the patients and they were randomly allocated into two groups

STUDY DURATION : APRIL TO AUGUST 2016

TWO GROUPS :

GROUP B – 30 ml of 0.25% Bupivacaine

GROUP BD – 28 ml of 0.25% Bupivacaine with 8 mg of dexamethasone

INCLUSION CRITERIA:

- Age 18 to 65 yrs
- ASA - I & II
- Systolic blood pressure 100 to 139
- Diastolic blood pressure 60 to 89
- Who have given valid informed consent by the parents or guardians of the patients.

EXCLUSION CRITERIA:

- ASA III & IV
- Patients not satisfying inclusion criteria.
- Known allergy to local anesthetics.
- Sepsis
- Abnormal coagulation profile
- Local infection at the site where parascalene block has to be performed.

All patients were preoperatively assessed for any systemic diseases and all investigations were done prior to assessment.

The procedure was carried out in the operation theatre where facilities for resuscitation are available.

EQUIPMENTS :

- 1) Sterile tray
- 2) Sterile swabs
- 3) Sterile towel
- 4) 20 ml syringe
- 5) 2 ml syringe
- 6) BRAUN-stimuplex DIG Nerve locator
- 7) Disposable Braun stimuplex (insulated) needle 22G

DRUGS :

- 1) 0.5% Bupivacaine vial
- 2) Distilled water 2 of 10 ml vials
- 3) Dexamethasone 2ml vial
- 4) Lignocaine 2% vial

**INTRAOPERATIVE AND POSTOPERATIVE MONITORING
PARAMETERS :**

- 1) Heart rate
- 2) Non invasive BP
- 3) Oxygen saturation
- 4) ECG
- 5) Respiratory Rate

All these vital parameters were measured preoperatively and recorded as

baseline values before the block and the monitoring was done continuously through out the procedure.

Patients were monitored vigilantly for any complications.

PREMEDICATION :

- Premedication with inj Ranitidine 50 mg im 45 min before procedure. inj. Midazolam 0.05mg/kg body weight given IV 10 min before the procedure. Drug solutions are prepared.

IV line secured and monitors were connected to patients. Pulse rate,NIBP,ECG,SPO2,RR are monitored.

POSITIONING :

Patient is placed in the supine position with the head turned to opposite side.

The arm to be blocked is adducted to the side of the patient.

Proper illumination is ensured before attempting the procedure.

PROCEDURE FOR PARASCALENE BLOCK :

The area where the procedure is attempted is cleaned using povidone iodine 5% and draped after ensuring aseptic precautions.

Identifying injection site for parascalene brachial plexus block by marker.

The anaesthesiologist stands at the head end of the table.

The patient was asked to lift the head slightly to bring the clavicular head of sternocleidomastoid muscle into prominence.

1) Cricoid cartilage was palpated and a straight horizontal line was drawn up to posterior border of sternocleidomastoid muscle, from that point a vertical line is drawn up to midpoint of clavicle. The junction of upper two third and lower one third of this vertical line is the point of insertion.

2) Skin wheal was raised with local anesthetic.

3) The nerve stimulator frequency was set at 1 Hz and the intensity of the stimulating current was initially set to deliver 2 mA. The insulated needle was inserted through the skin wheal in a perpendicular plane to skin until a distal motor response was elicited. The position of the needle was considered acceptable when an output current ≤ 0.5 mA still elicited a distal motor response.

After eliciting negative aspiration of blood, the study medication was injected slowly ruling out intravascular injection intermittently.

SENSORY BLOCK :

Sensory block is evaluated by PIN PRICK method with a 23 gauge needle. The onset time was defined as the time between injection and complete loss of pin prick sensation .The time when complete sensory blockade achieved would be noted.

Sensory block was graded according to the following scale:

0 = no block (normal sensation)

1 = partial block (decreased sensation)

2 = complete block (no sensation).

MOTOR BLOCK :

Motor block was assessed by BROMAGE THREE POINT SCORE.

0= normal motor function with full flexion and extension of elbow, wrist and fingers

1= decreased motor strength with ability to move fingers and/or wrist only,

2= complete motor blockade with inability to move fingers

The time when motor block achieved would be noted.

DURATION OF ANALGESIA :

During the procedure, anaesthesia was considered satisfactory if the patient did not complain of any pain or discomfort and if no additive analgesia was necessary. Duration of analgesia is taken as the time taken from the onset of complete sensory block to time of first rescue analgesia.

COMPLICATIONS :

After the conduction of the block, patient was monitored for development of any complications like

- 1) Postoperative Nausea and vomiting
- 2) Pneumothorax
- 3) Convulsions
- 4) Arrhythmias
- 5) CSF puncture

and managed accordingly.

POSTOPERATIVE MONITORING :

Post operative monitoring was done for all vital parameters like BP, PR, ECG, NIBP, RR every half an hour for 4 hrs and then every 4 hrs for 24 hrs.

POSTOPERATIVE PAIN SCORING :

Post operative pain scoring was done using VAS pain scoring.

It was noted according to 0-10 visual analogue score (VAS) for pain at every half an hour for first 4 hours and then 4 hourly till 24 hours. When the patients began to experience the worst pain (VAS =8-10), it was considered that analgesic action of the drugs was terminated and rescue analgesic (IM Diclofenac 1-1.5mg/kg) given.

MANAGEMENT OF UNSUCCESSFUL BLOCK :

In the circumstance of inadequate or patchy action of the block, the block was supplemented with general anaesthesia. If in case surgery was prolonged and effect of block disappear rescue analgesia with IV propofol(1-2 mg/kg) and IV ketamine (1-2 mg/kg) were given along with inj Glycopyrrolate 0.2 mg iv to reduce secretions.

Side effects and complications would also be noted.

STATISTICS AND ANALYSIS :

Sample size of 30 per group was adequate for the present study.

Descriptive statistics were done for all data and reported in terms of mean values and percentages. Suitable statistical tests of comparison will be done.

Continuous variables was analysed with the unpaired t test and ANOVA single factor test.

Categorical variables was analysed with the Chi-Square Test and Fisher Exact Test.

Statistical significance was taken as $P < 0.05$. The data was analysed using SPSS version 16 and Microsoft Excel 2007.

OBSERVATION

Groups

Group	Intervention	Number
Group B	30 ml of 0.25% bupivacaine	30
Group BD	28 ml of 0.25% bupivacaine+8 mg of dexamethasone	30

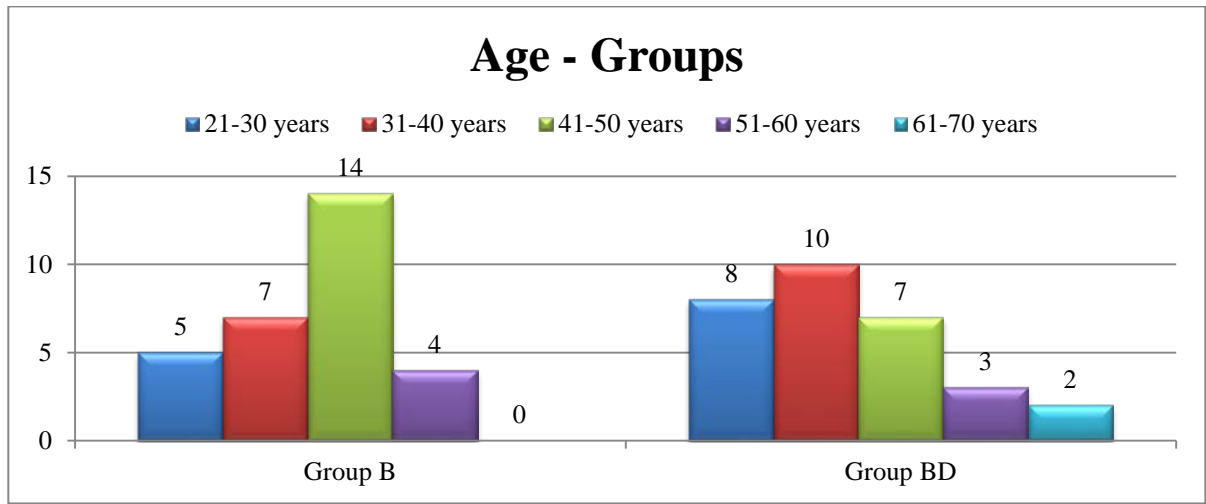
Null Hypothesis

Null Hypothesis : H0	30 ml of 0.25% bupivacaine is equal in effect to 28 ml of 0.25% bupivacaine+8 mg of dexamethasone among patients undergoing parascalene brachial plexus block for upper limb surgeries
Alternate Hypothesis : H1	28 ml of 0.25% bupivacaine+8 mg of dexamethasone is better in effect to 30 ml of 0.25% bupivacaine among patients undergoing parascalene brachial plexus block for upper limb surgeries

Data Analysis

Descriptive statistics was done for all data and were reported in terms of mean values and percentages. Suitable statistical tests of comparison were done. Continuous variables were analysed with the unpaired t test.. Categorical variables were analysed with the Chi-Square Test and Fisher Exact Test. Statistical significance was taken as $P < 0.05$. The data was analysed using SPSS version 16 and Microsoft Excel 2007.

Age

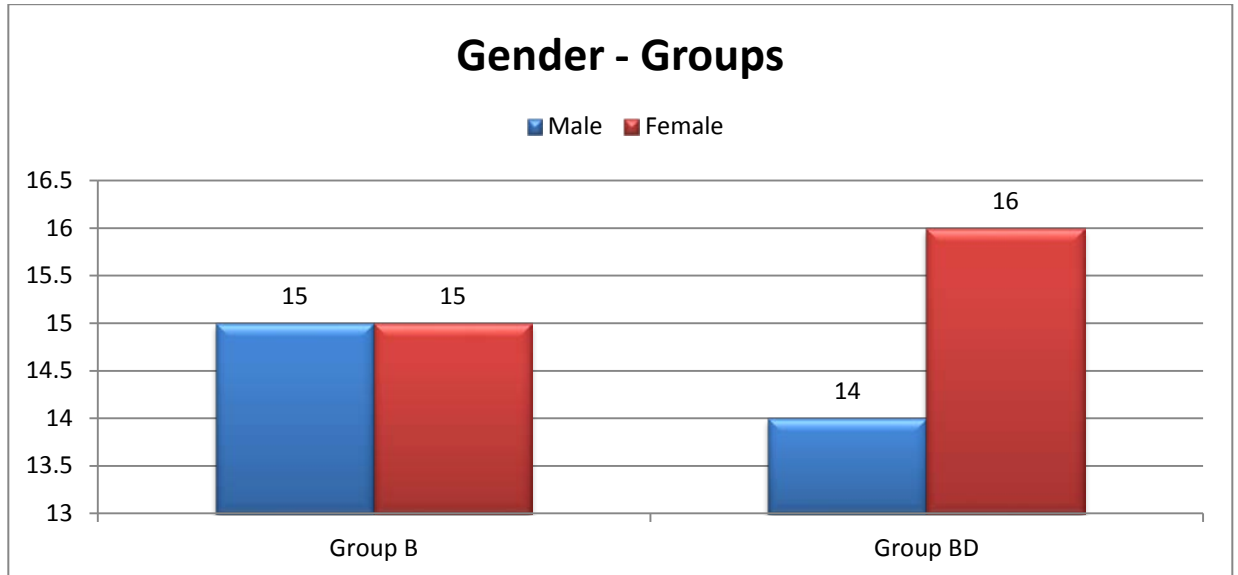


Age - Groups	Group B	%	Group BD	%
21-30 years	5	16.67	8	26.67
31-40 years	7	23.33	10	33.33
41-50 years	14	46.67	7	23.33
51-60 years	4	13.33	3	10.00
61-70 years	0	0.00	2	6.67
Total	30	100	30	100

Age Distribution	Group B	Group BD
Mean	40.97	38.97
SD	10.76	12.09
P value unpaired t Test	0.5012	

Among the patients undergoing parascalene brachial plexus block for upper limb surgeries there was no statistically significant difference in relation to age distribution between group B (mean=40.97, SD=10.76) and group BD (mean=38.97, SD=12.09) with a p value of >0.05 as per unpaired t test. Therefore we fail to reject the null hypothesis that there is no difference in age distribution between the intervention groups.

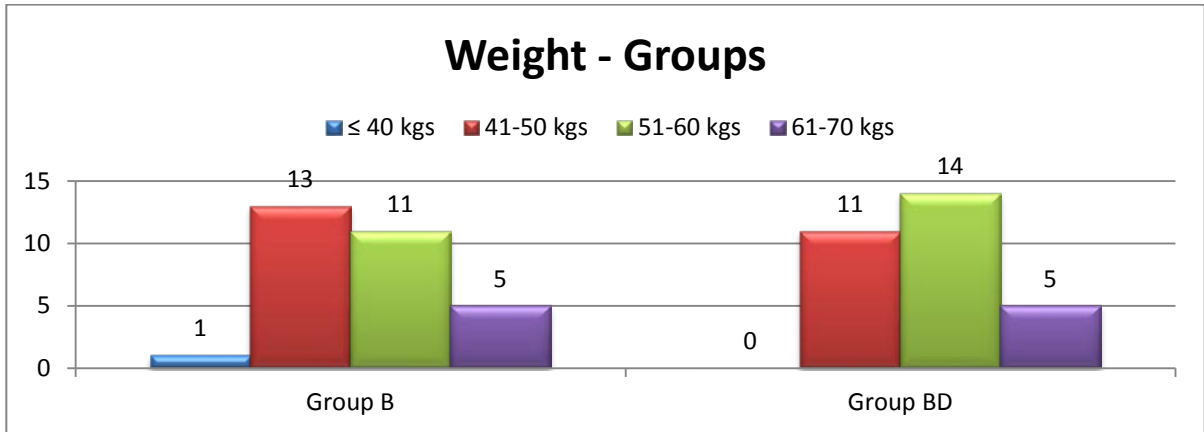
Gender



Gender - Groups	Group B	%	Group BD	%
Male	15	50.00	14	46.67
Female	15	50.00	16	53.33
Total	30	100	30	100
P value Chi Squared Test			0.7961	

Among the patients undergoing parascalene brachial plexus block for upper limb surgeries there was no statistically significant difference in relation to gender status between group B (male-50%, female-46.67%) and group BD (male-50%, female-53.33%) with a p value of >0.05 as per chi squared test. Therefore we fail to reject the null hypothesis that there is no difference in gender status between the intervention groups.

Weight

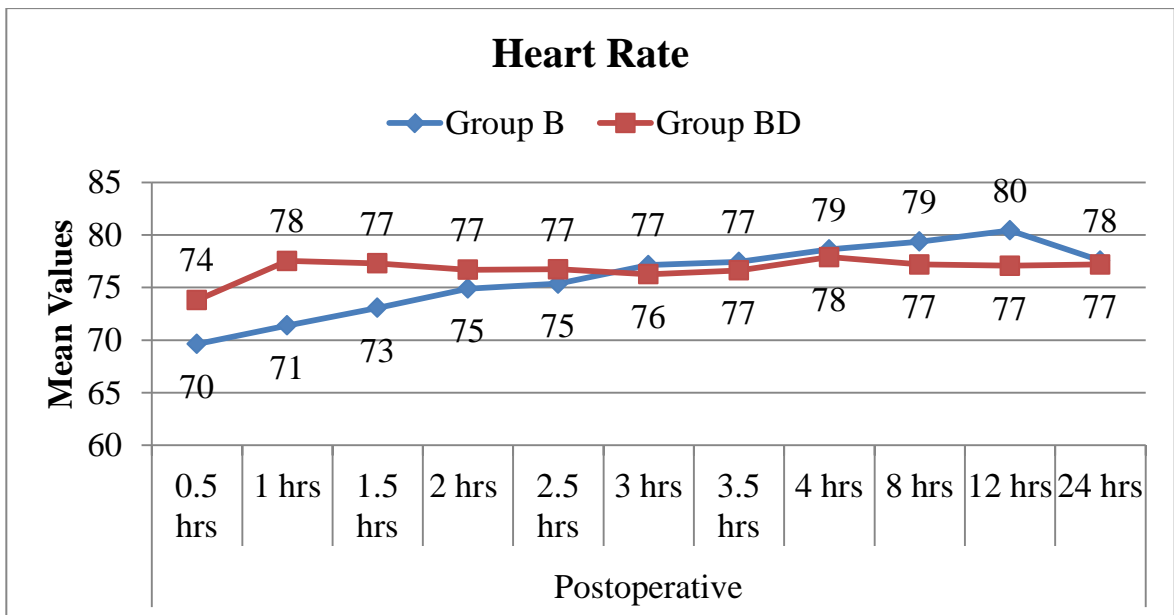
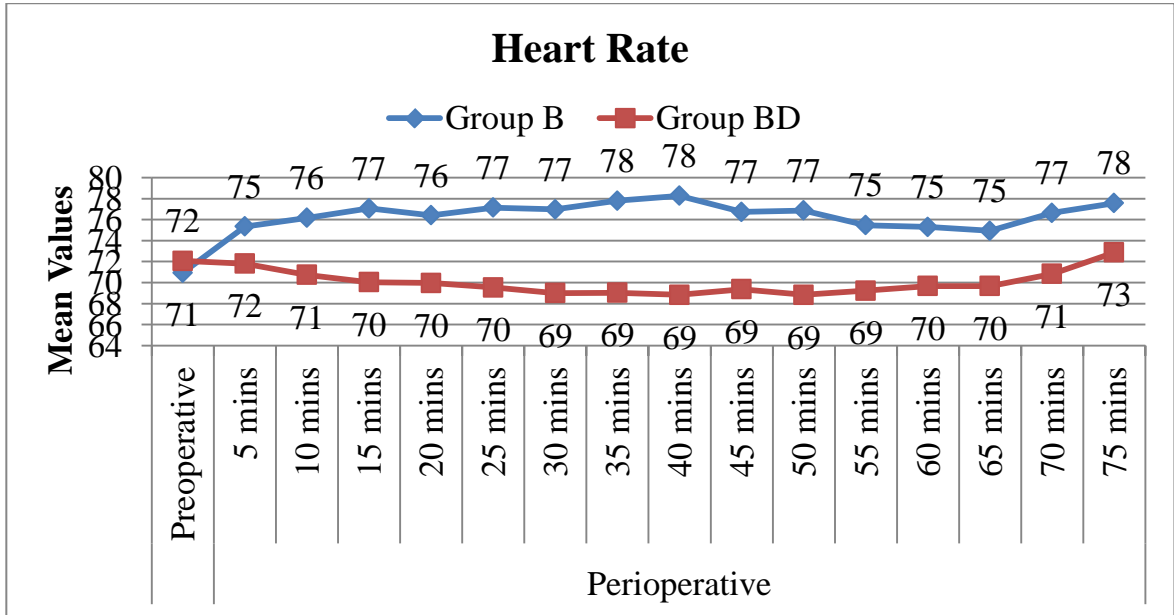


Weight - Groups	Group B	%	Group BD	%
21-30 years	0	0.00	0	0.00
≤ 40 kgs	1	3.33	0	0.00
41-50 kgs	13	43.33	11	36.67
51-60 kgs	11	36.67	14	46.67
61-70 kgs	5	16.67	5	16.67
Total	30	100	30	100

Weight Distribution	Group B	Group BD
Mean	52.23	54.03
SD	7.35	6.57
P value Unpaired t Test	0.3214	

Among the patients undergoing parascalene brachial plexus block for upper limb surgeries there was no statistically significant difference in relation to weight distribution between group B (mean=52.33, SD=7.35) and group BD (mean=54.03, SD=6.57) with a p value of >0.05 as per unpaired t test. Therefore we fail to reject the null hypothesis that there is no difference in weight distribution between the intervention groups.

Heart Rate



Heart Rate (bpm)		Group B		Group BD		P value unpaired t Test
		Mean	SD	Mean	SD	
Preoperative		70.93	6.01	72.07	6.13	0.4724
Perioperative	5 mins	75.33	9.37	71.80	6.03	0.0877
	10 mins	76.17	8.88	70.73	6.10	0.0077
	15 mins	77.07	9.97	70.03	5.77	0.0015
	20 mins	76.40	11.15	69.97	5.99	0.0072
	25 mins	77.13	9.98	69.53	5.91	0.0007
	30 mins	76.97	9.83	69.00	6.05	0.0004
	35 mins	77.80	10.30	69.03	6.66	0.0002
	40 mins	78.27	9.52	68.83	6.98	0.0001
	45 mins	76.73	8.28	69.37	7.12	0.0005
	50 mins	76.87	7.67	68.83	7.44	0.0001
	55 mins	75.47	7.88	69.23	7.19	0.0022
	60 mins	75.30	9.13	69.67	7.45	0.0113
	65 mins	74.93	8.81	69.67	6.77	0.0119
	70 mins	76.63	9.72	70.83	6.50	0.0087
75 mins	77.57	10.12	72.87	5.78	0.0311	
Postoperative	0.5 hrs	69.63	5.63	73.80	17.95	0.2299
	1 hrs	71.40	5.72	77.53	4.80	<0.0001
	1.5 hrs	73.07	6.32	77.30	5.10	<0.0001
	2 hrs	74.90	6.96	76.70	5.62	0.2752
	2.5 hrs	75.37	6.99	76.73	5.89	0.4162
	3 hrs	77.13	6.42	76.27	5.56	0.5785
	3.5 hrs	77.43	6.19	76.63	5.37	0.5950
	4 hrs	78.63	5.34	77.90	5.79	0.6121
	8 hrs	79.37	5.44	77.20	5.99	0.1478
	12 hrs	80.43	7.70	77.07	6.59	0.0739
24 hrs	77.57	5.25	77.20	6.59	0.8125	

Heart Rate - Overall	Group B	Group BD
Mean	76.09	72.81
SD	4.92	4.43
P value Unpaired t Test		0.0086

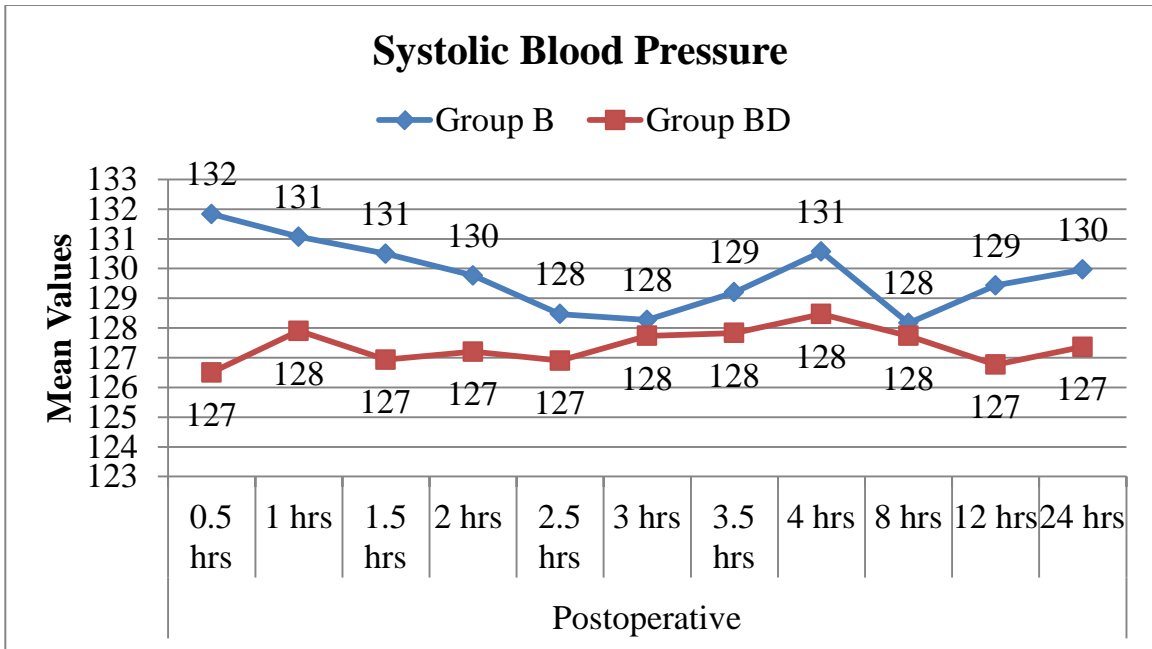
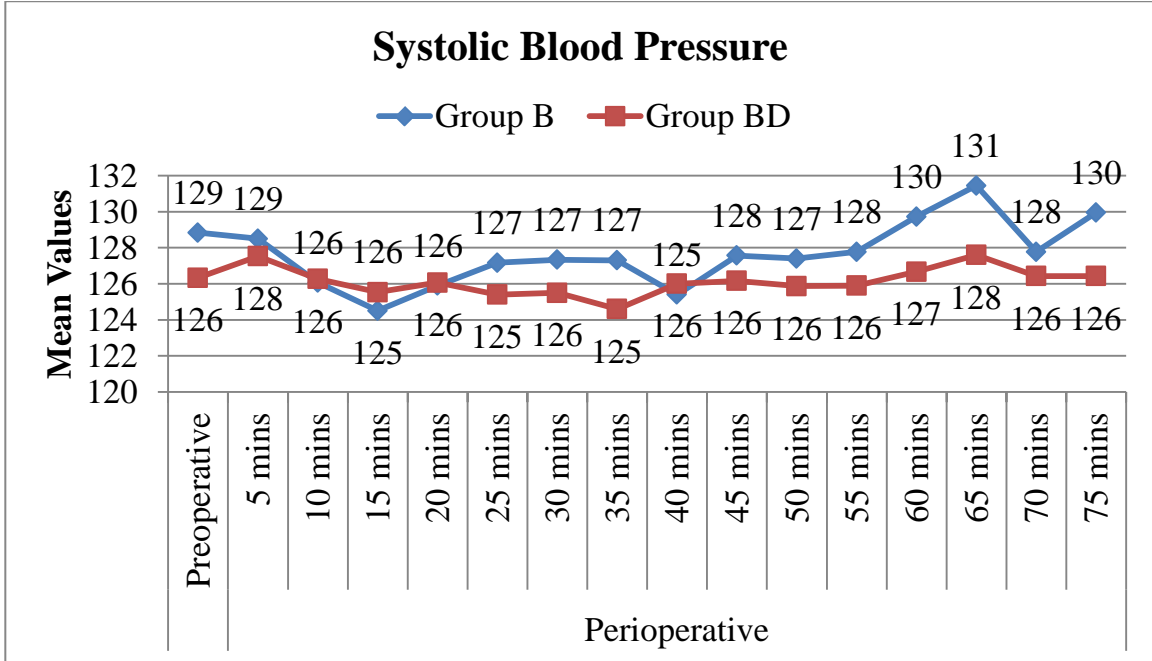
Among the patients undergoing parascalene brachial plexus block for upper limb surgeries there was a statistically significant difference in relation to heart rate between group B (mean=76.09, SD=4.92) and group BD (mean=72.81, SD=4.43) with a p value of <0.05 as per unpaired t test. Therefore we reject the null hypothesis that there is no difference in heart rate distribution between the intervention groups.

Discussion

The mean heart rate in group B was significantly higher in group B compared to group BD by a mean difference of 3.29 bpm (4% higher). This difference is significant with a p-value of 0.0086 as per unpaired t-test.

Conclusion

In this study we can safely conclude that bupivacaine 0.25% with dexamethasone produces sustained lowered heart rate compared to bupivacaine 0.25% alone when used in patients undergoing parascalene brachial plexus block for upper limb surgeries

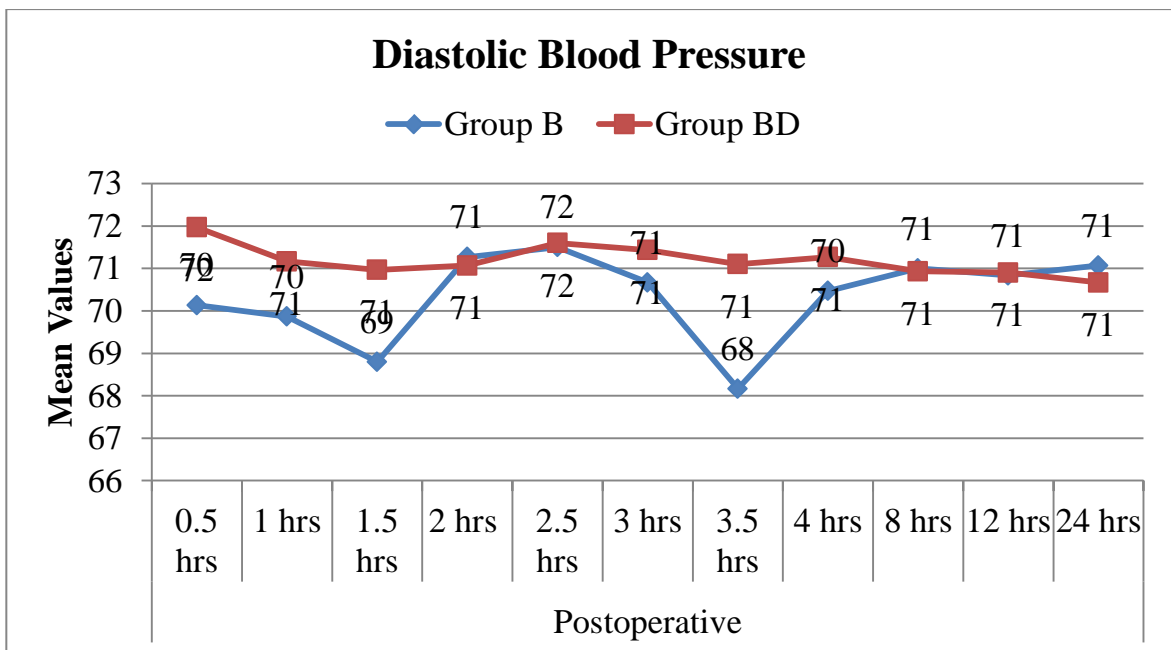
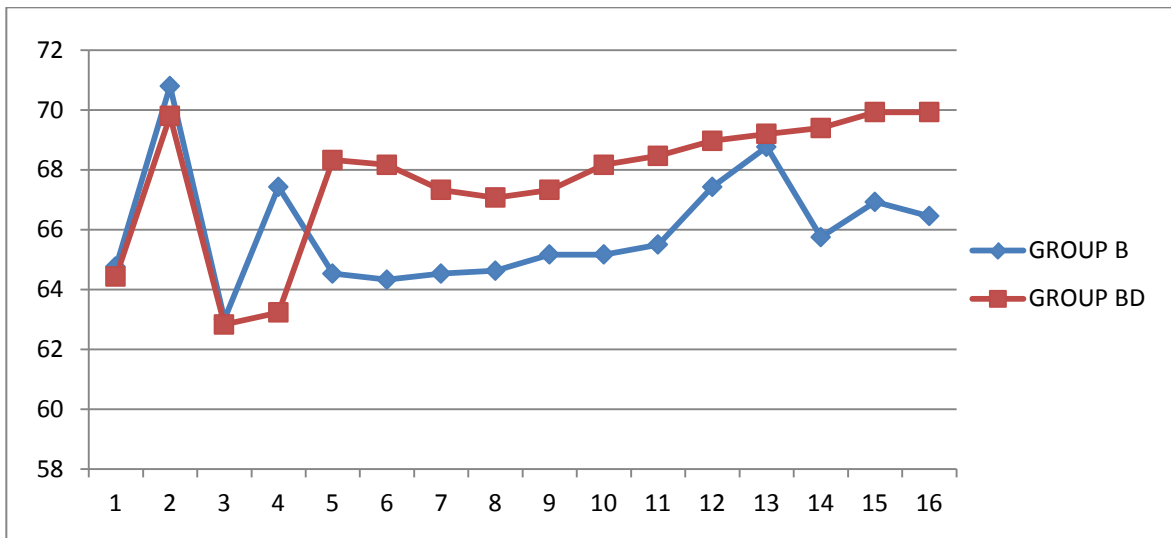


Systolic Blood Pressure (mm Hg)		Group B		Group BD		P value unpaired t Test
		Mean	SD	Mean	SD	
Preoperative		128.83	6.71	126.33	12.64	0.4032
Perioperative	5 mins	128.50	6.89	127.53	9.43	0.6520
	10 mins	126.07	7.86	126.27	9.80	0.9308
	15 mins	124.50	7.06	125.53	9.22	0.6279
	20 mins	125.90	7.78	126.07	8.37	0.9366
	25 mins	127.17	7.26	125.40	9.02	0.4068
	30 mins	127.33	6.63	125.50	10.46	0.4208
	35 mins	127.30	8.91	124.60	8.97	0.2467
	40 mins	125.40	8.54	126.00	8.37	0.7845
	45 mins	127.57	6.66	126.17	8.78	0.4892
	50 mins	127.40	8.11	125.87	9.34	0.4996
	55 mins	127.77	8.57	125.90	9.91	0.4384
	60 mins	129.72	6.68	126.67	9.99	0.1739
	65 mins	131.44	6.15	127.60	10.05	0.0914
	70 mins	127.77	8.34	126.43	9.84	0.5891
75 mins	129.95	7.64	126.43	9.35	0.1684	
Postoperative	0.5 hrs	131.83	5.85	126.50	12.74	0.0416
	1 hrs	131.07	6.27	127.90	7.55	0.0825
	1.5 hrs	130.50	6.33	126.93	7.57	0.0525
	2 hrs	129.77	6.16	127.20	7.28	0.1459
	2.5 hrs	128.47	6.40	126.90	8.10	0.4091
	3 hrs	128.27	5.60	127.73	8.35	0.7725
	3.5 hrs	129.20	5.71	127.83	7.83	0.4428
	4 hrs	130.57	5.92	128.47	7.19	0.2217
	8 hrs	128.17	7.51	127.73	7.30	0.8215
	12 hrs	129.43	7.37	126.77	7.12	0.1594
24 hrs	129.97	7.36	127.37	7.27	0.1738	

SBP - Overall		Group B	Group BD
Mean		125.63	126.65
SD		6.31	7.61
P value Unpaired t Test			0.5465

Among the patients undergoing parascalene brachial plexus block for upper limb surgeries there was no statistically significant difference in relation to systolic blood pressure between group B (mean=125.03, SD=6.31) and group BD (mean=126.65, SD=7.61) with a p value of >0.05 as per unpaired t test. Therefore we fail to reject the null hypothesis that there is no difference in heart rate distribution between the intervention groups.

**DIASTOLIC BLOOD PRESSURE
PERIOPERATIVE**

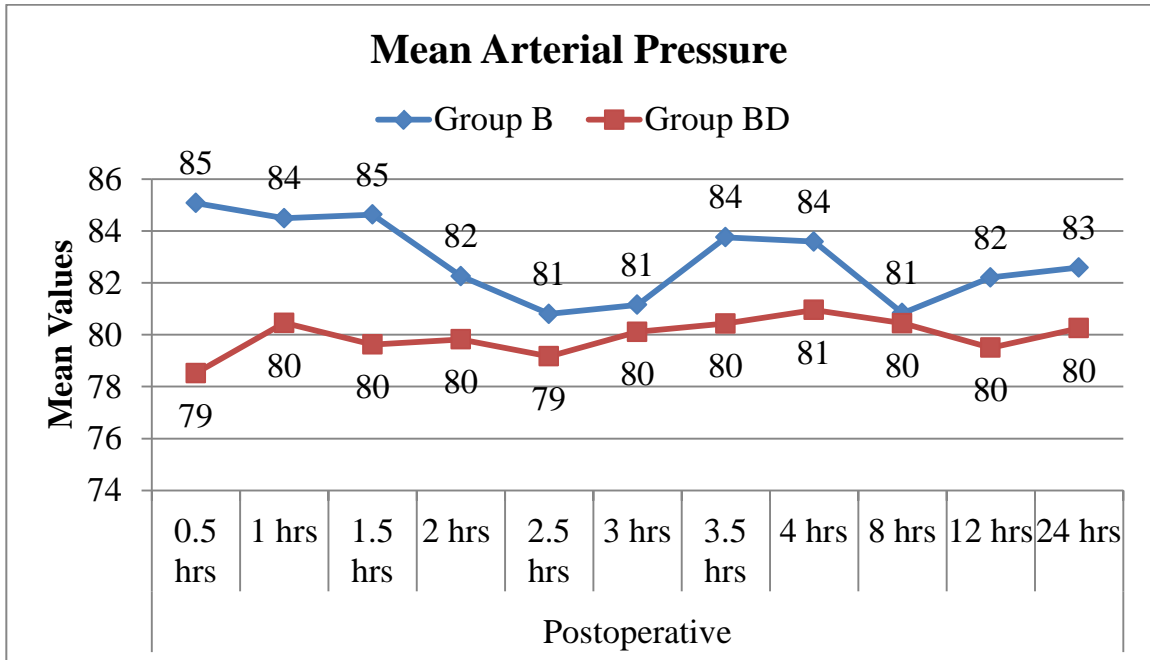
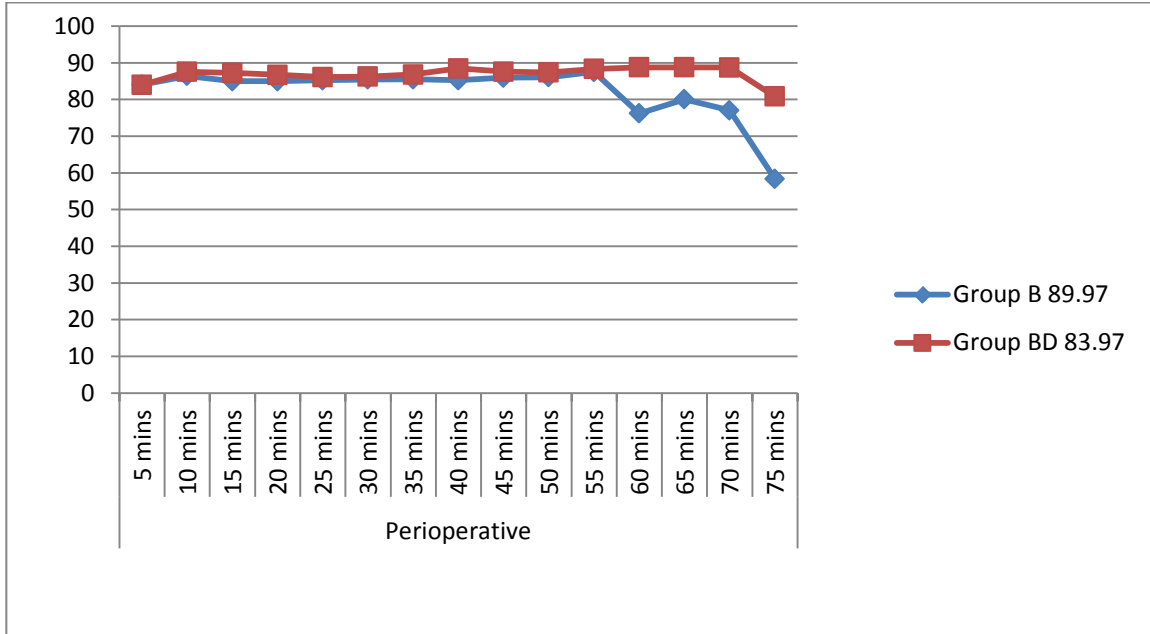


		Group B		Group BD		P value unpaired t Test
		Mean	SD	Mean	SD	
Preoperative		64.76	5.15	64.43	1.12	0.1354
Perioperative	5 mins	70.8	2.35	69.8	1.73	0.1954
	10 mins	63	2.21	62.83	1.80	0.2350
	15 mins	67.43	1.85	63.23	2.06	0.1970
	20 mins	64.53	7.14	68.33	9.55	0.0861
	25 mins	64.33	6.63	68.17	9.31	0.0714
	30 mins	64.53	7.42	67.33	8.75	0.1865
	35 mins	64.63	7.58	67.07	9.13	0.2662
	40 mins	65.17	7.83	67.33	9.17	0.3291
	45 mins	65.17	7.83	68.17	9.71	0.1931
	50 mins	65.50	6.91	68.47	9.84	0.1818
	55 mins	67.43	6.05	68.97	9.18	0.4481
	60 mins	68.77	5.33	69.20	8.95	0.8206
	65 mins	65.75	8.21	69.40	9.56	0.1257
	70 mins	66.93	7.66	69.93	9.33	0.1918
	75 mins	66.45	7.43	69.93	8.88	0.1542
Postoperative	0.5 hrs	70.13	7.53	71.97	14.36	0.5381
	1 hrs	69.87	8.46	71.17	9.47	0.5773
	1.5 hrs	68.80	6.91	70.97	9.10	0.3033
	2 hrs	71.27	6.52	71.07	8.48	0.9188
	2.5 hrs	71.50	6.88	71.60	8.13	0.9592
	3 hrs	70.67	7.09	71.43	8.45	0.7048
	3.5 hrs	68.17	7.20	71.10	9.55	0.1844
	4 hrs	70.47	7.92	71.27	9.39	0.7225
	8 hrs	71.00	6.49	70.93	9.97	0.9756
	12 hrs	70.83	6.98	70.90	9.65	0.9756
24 hrs	71.07	8.01	70.67	8.83	0.8548	

DBP - Overall		Group B	Group BD
Mean		67.73	69.09
SD		6.57	8.27
P value Unpaired t Test			0.4835

Among the patients undergoing parascalene brachial plexus block for upper limb surgeries there was no statistically significant difference in relation to diastolic blood pressure between group B (mean=67.73, SD=6.57) and group BD (mean=69.09, SD=8.27) with a p value of <0.05 as per unpaired t test. Therefore we cannot reject the null hypothesis that there is no difference in diastolic blood pressure distribution between the intervention groups.

MEAN ARTERIAL PRESSURE



Mean Arterial Pressure (mm Hg)		Group B		Group BD		P value unpaired t Test
		Mean	SD	Mean	SD	
Preoperative		89.97	2.97	83.97	3.82	0.0255
Perioperative	5 mins	84.02	2.8	84	3.73	0.7362
	10 mins	86.45	2.37	87.57	8	0.2743
	15 mins	84.98	4.55	87.24	7.94	0.057
	20 mins	84.98	4	86.72	7.94	0.0553
	25 mins	85.27	4	86.12	7.62	0.2091
	30 mins	85.46	4.74	86.24	7.8	0.2817
	35 mins	85.52	5.04	86.8	7.7	0.4254
	40 mins	85.24	5.68	88.5	8.13	0.0419
	45 mins	85.96	5.35	87.6	8.45	0.1345
	50 mins	86.1	4.9	87.4	8.03	0.1114
	55 mins	87.54	4.55	88.35	7.84	0.0328
	60 mins	76.24	8.62	88.8	7.09	0.0725
	65 mins	80.06	2.94	88.77	8.36	0.0694
	70 mins	77.06	3.94	88.76	7.94	0.0087
75 mins	58.41	8.25	80.84	2.6	0.0001	
Postoperative	0.5 hrs	85.08	8.55	78.52	19.23	0.0933
	1 hrs	84.49	6.91	80.46	7.5	0.0344
	1.5 hrs	84.63	5.64	79.62	6.81	0.003
	2 hrs	82.26	6.6	79.82	7.03	0.1723
	2.5 hrs	80.8	7.03	79.17	8.1	0.4075
	3 hrs	81.16	6.44	80.11	8.48	0.5932
	3.5 hrs	83.76	5.7	80.43	7.37	0.0556
	4 hrs	83.59	6.21	80.96	6.82	0.1233
	8 hrs	80.83	7	80.44	8	0.8419
	12 hrs	82.21	6.39	79.5	8.25	0.1599
24 hrs	82.59	7.11	80.26	8.31	0.2474	

MAP - Overall	Group B	Group BD
Mean	80.78	84.58
SD	6.12	5.35
P value Unpaired t Test		0.0130

Among the patients undergoing parascalene brachial plexus block for upper limb surgeries there was a statistically significant difference in relation to mean arterial pressure between group B (mean=80.78, SD=6.12) and group BD (mean=84.58, SD=5.35) with a p value of <0.05 as per unpaired t test. Therefore we reject the null hypothesis that there is no difference in mean arterial pressure distribution between the intervention groups.

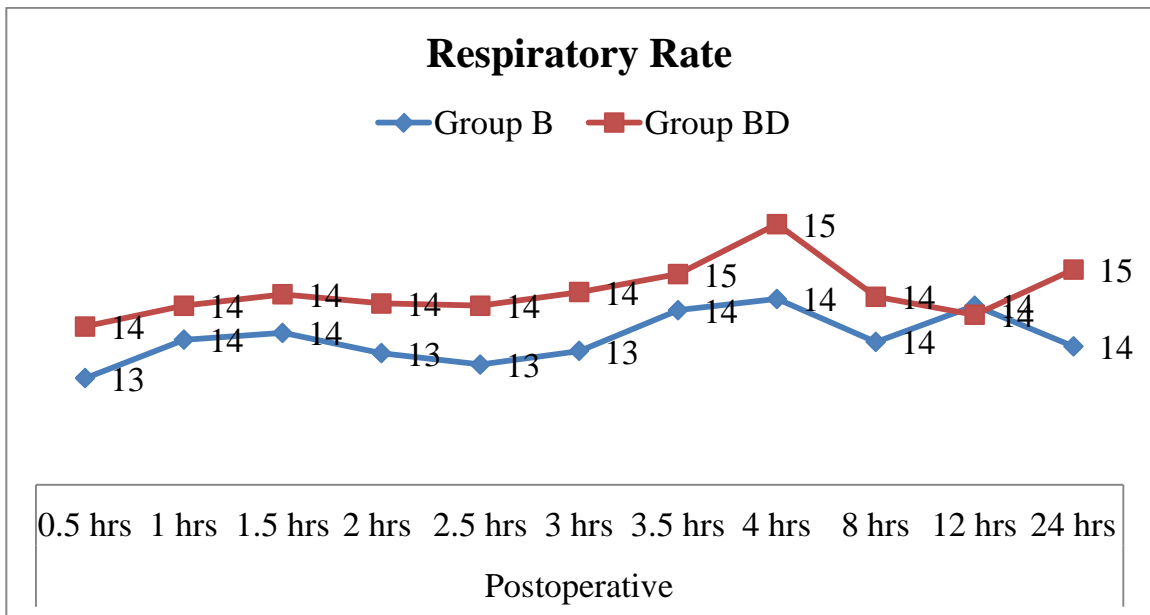
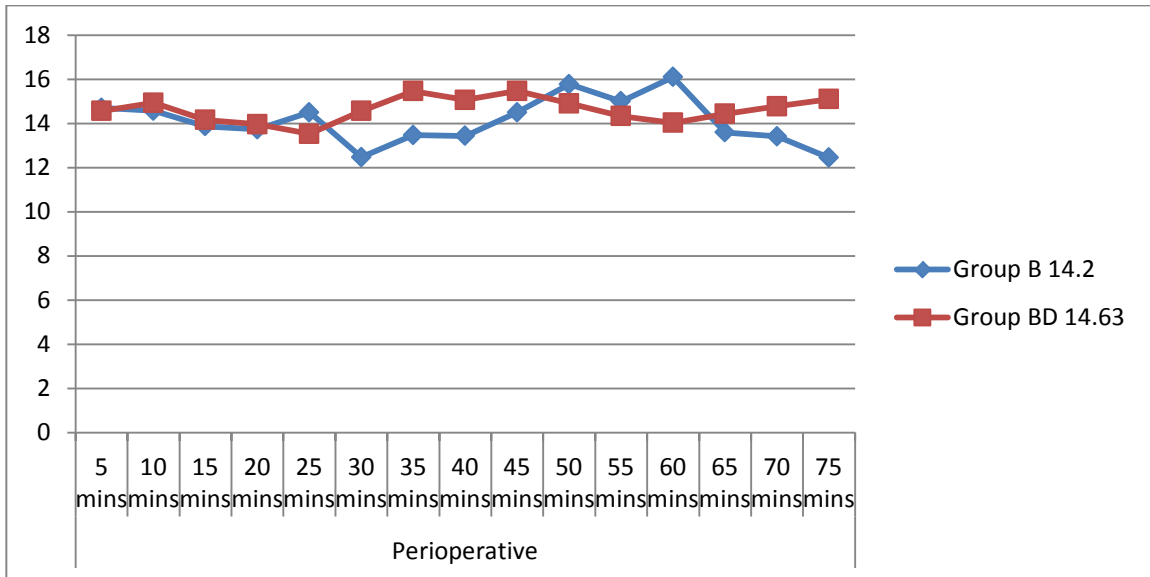
Discussion

The mean MAP in group B was significantly lower in group B compared to group BD by a mean difference of 3.80 mm Hg (4% lower). This difference is significant with a p-value of 0.0130 as per unpaired t-test.

Conclusion

In this study we can safely conclude that bupivacaine 0.25% with dexamethasone produces sustained higher mean arterial pressure compared to bupivacaine 0.25% alone when used in patients undergoing parascalene brachial plexus block for upper limb surgeries.

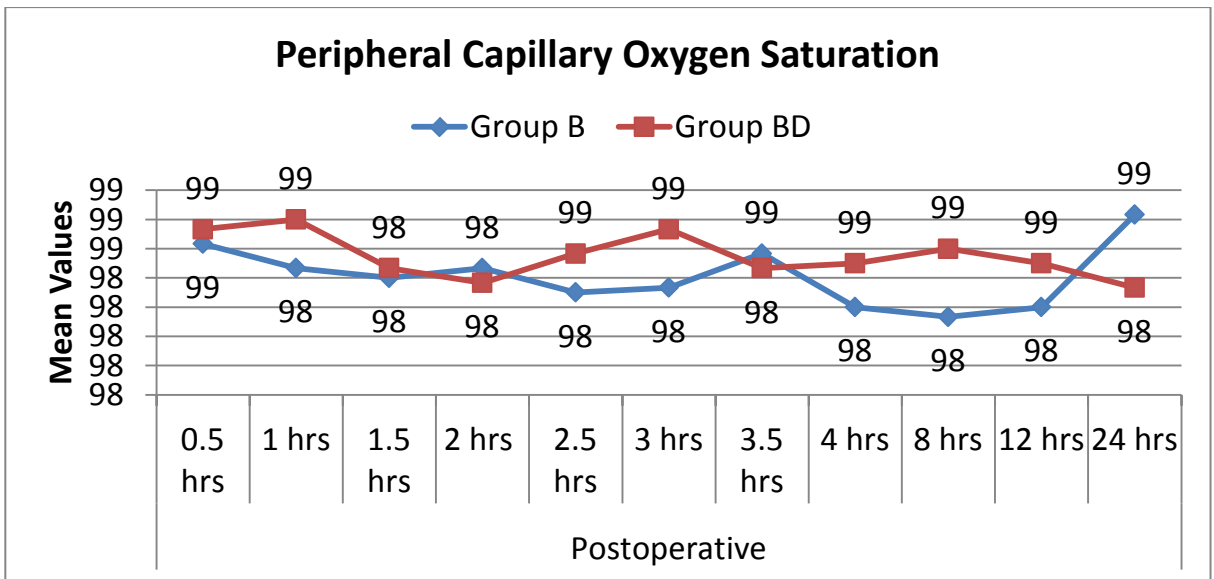
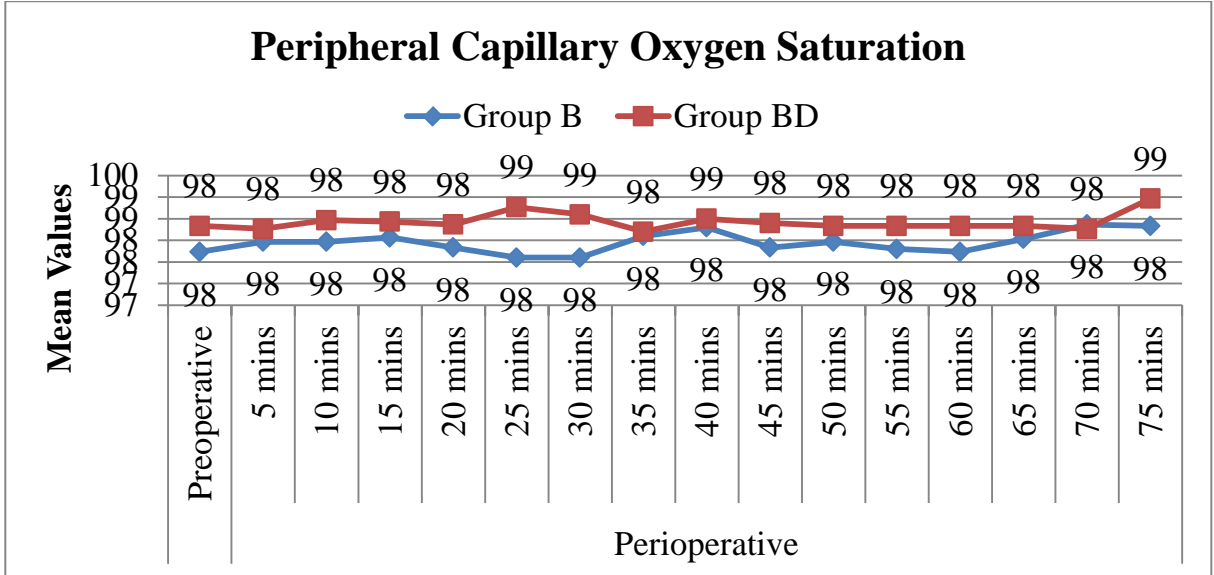
RESPIRATORY RATE



RESPIRATORY RATE		Group B		Group BD		P value unpaired t Test
		Mean	SD	Mean	SD	
Preoperative		14.20	2.14	14.63	0.99	0.5856
Perioperative	5 mins	14.70	2.37	14.56	1.04	0.1810
	10 mins	14.57	2.08	14.93	0.82	0.1930
	15 mins	13.87	1.76	14.16	1.31	0.2530
	20 mins	13.73	1.78	13.96	1.42	0.3278
	25 mins	14.50	2.45	13.53	1.43	0.4814
	30 mins	12.47	2.39	14.56	1.22	0.1890
	35 mins	13.47	2.18	15.46	1.16	0.1020
	40 mins	13.43	2.51	15.06	1.94	0.1000
	45 mins	14.50	2.24	15.47	2.61	0.1291
	50 mins	15.77	2.84	14.90	2.70	0.2300
	55 mins	15.00	2.59	14.33	2.59	0.3227
	60 mins	16.10	2.90	14.03	2.66	0.0056
	65 mins	13.59	2.88	14.43	2.46	0.2293
	70 mins	13.41	2.57	14.77	3.35	0.0880
75 mins	12.45	3.53	15.10	3.19	0.0037	
Postoperative	0.5 hrs	13.07	2.20	13.83	2.54	0.2226
	1 hrs	13.63	2.33	14.13	2.56	0.4314
	1.5 hrs	13.73	2.12	14.30	2.93	0.3936
	2 hrs	13.43	2.47	14.17	2.42	0.2507
	2.5 hrs	13.27	2.39	14.13	2.11	0.1423
	3 hrs	13.47	1.91	14.33	2.31	0.1184
	3.5 hrs	14.07	2.36	14.60	2.53	0.4019
	4 hrs	14.23	2.42	15.33	2.83	0.1111
	8 hrs	13.60	2.49	14.27	2.77	0.3302
	12 hrs	14.13	2.47	14.00	1.98	0.8186
24 hrs	13.53	2.54	14.67	2.15	0.0676	

RR - Overall	Group B	Group BD
Mean	13.92	14.50
SD	2.40	2.14
P value Unpaired t Test		0.3273

Among the patients undergoing parascalene brachial plexus block for upper limb surgeries there was no statistically significant difference in relation to respiratory rate between group B (mean=13.92, SD=2.40) and group BD (mean=14.50, SD=2.14) with a p value of not <0.05 as per unpaired t test. Therefore we cannot reject the null hypothesis that there is no difference in respiratory rate distribution between the intervention groups.

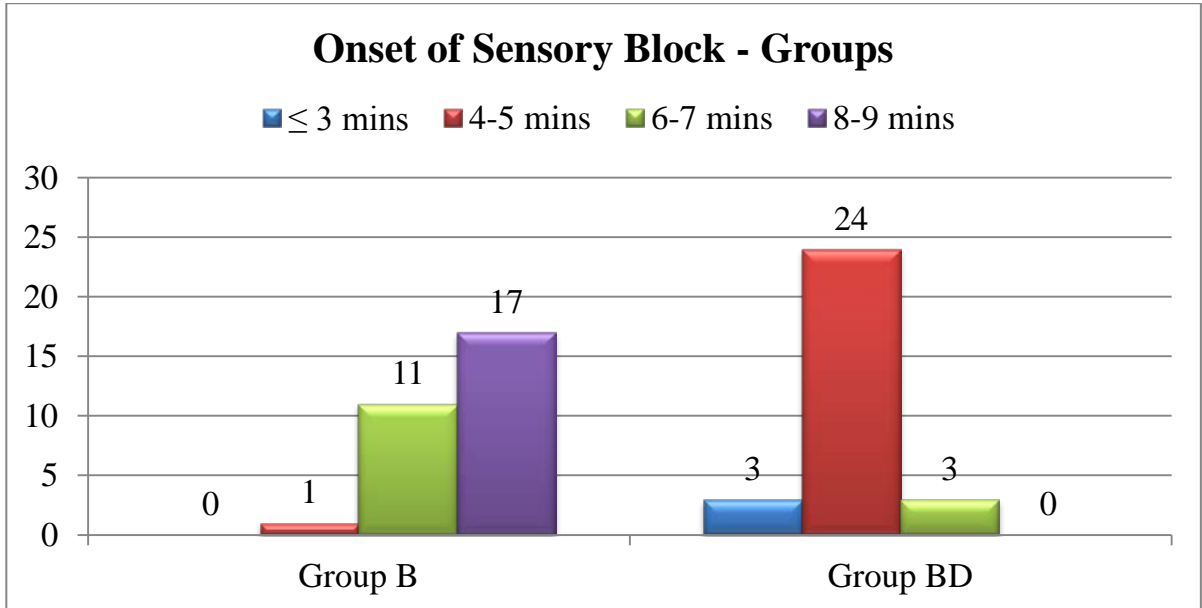


Peripheral Capillary Oxygen Saturation (%)		Group B		Group BD		P value unpaired t Test
		Mean	SD	Mean	SD	
Preoperative		97.73	1.26	98.33	1.09	0.0534
Perioperative	5 mins	97.97	1.19	98.27	0.87	0.3925
	10 mins	97.97	1.03	98.47	0.63	0.8505
	15 mins	98.07	1.28	98.43	0.82	0.8690
	20 mins	97.83	1.05	98.37	0.81	0.8887
	25 mins	97.60	0.93	98.77	0.63	0.8991
	30 mins	97.60	1.07	98.60	0.62	0.5130
	35 mins	98.10	0.92	98.20	0.66	0.8950
	40 mins	98.30	0.88	98.50	0.63	0.7851
	45 mins	97.83	1.29	98.40	0.50	0.3046
	50 mins	97.97	0.89	98.33	0.80	0.0991
	55 mins	97.80	1.06	98.33	0.80	0.0566
	60 mins	97.73	0.94	98.33	0.71	0.0508
	65 mins	98.03	1.30	98.33	0.66	0.2643
	70 mins	98.37	1.03	98.27	0.87	0.6864
	75 mins	98.33	0.99	98.97	0.67	0.0053
Postoperative	0.5 hrs	98.63	0.89	98.73	0.64	0.6191
	1 hrs	98.47	0.94	98.80	0.66	0.1174
	1.5 hrs	98.40	0.81	98.47	0.82	0.7530
	2 hrs	98.47	0.86	98.37	0.76	0.6360
	2.5 hrs	98.30	0.70	98.57	0.68	0.1402
	3 hrs	98.33	0.84	98.73	0.69	0.0493
	3.5 hrs	98.57	0.68	98.47	0.78	0.5973
	4 hrs	98.20	0.66	98.50	0.78	0.1134
	8 hrs	98.13	0.94	98.60	0.67	0.0308
	12 hrs	98.20	0.81	98.50	0.78	0.1473
24 hrs	98.83	0.70	98.33	0.80	0.0126	

SPO2 - Overall	Group B	Group BD
Mean	98.14	98.48
SD	0.33	0.14
P value Unpaired t Test		0.1033

Among the patients undergoing parascalene brachial plexus block for upper limb surgeries there was no statistically significant difference in relation to peripheral capillary oxygen saturation between group B (mean=98.14, SD=0.33) and group BD (mean=98.48, SD=0.14) with a p value of >0.05 as per unpaired t test. Therefore we fail to reject the null hypothesis that there is no difference in peripheral capillary oxygen saturation distribution between the intervention groups.

Onset of Sensory Block



Onset of Sensory Block - Groups	Group B	%	Group BD	%
≤ 3 mins	0	0.00	3	10.00
4-5 mins	1	3.33	24	80.00
6-7 mins	11	36.67	3	10.00
8-9 mins	17	56.67	0	0.00
> 9 mins	1	3.33	0	0.00
Total	30	100	30	100

Onset of Sensory Block	Group B	Group BD
Mean	7.67	4.60
SD	1.09	0.89
P value Unpaired t Test		<0.0001

Among the patients undergoing parascalene brachial plexus block for upper limb surgeries there was a statistically significant difference in relation to onset of sensory block time between group B (mean=7.67, SD=1.09) and group BD (mean=4.60, SD=0.89) with a p value of <0.05 as per unpaired t test. Therefore we reject the null hypothesis that there is no difference in onset of sensory block time distribution between the intervention groups.

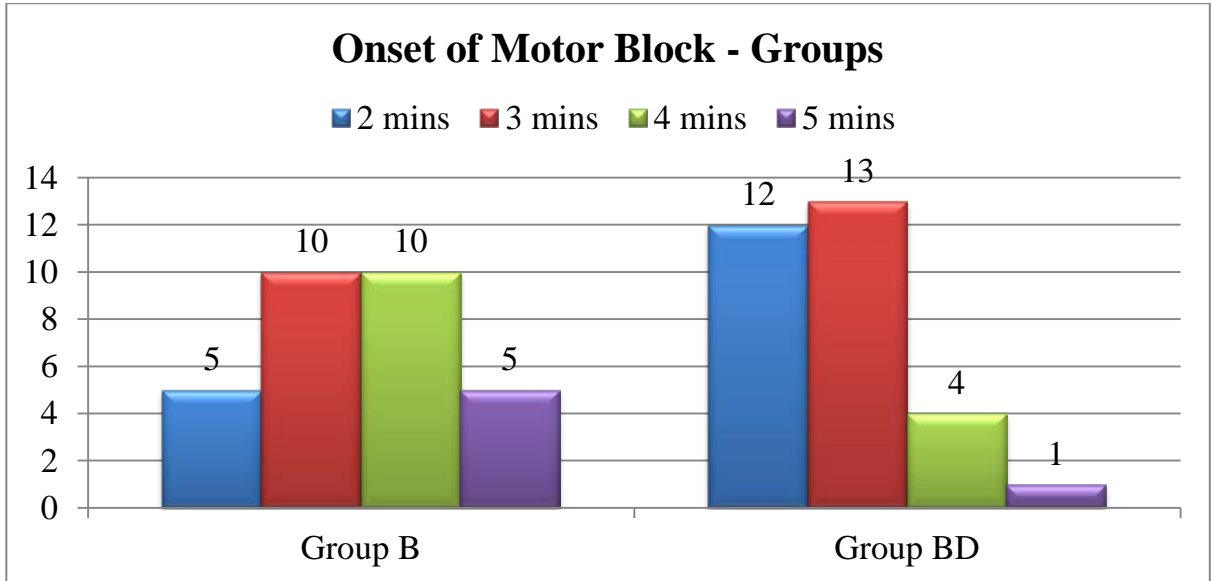
Discussion

The mean onset of sensory block time in group B was significantly delayed in group B compared to group BD by a mean difference of 3.07 minutes (40% more delay). This difference is significant with a p-value of <0.0001 as per unpaired t-test.

Conclusion

In this study we can safely conclude that bupivacaine 0.25% with dexamethasone produces sustained earlier onset of sensory block compared to bupivacaine 0.25% alone when used in patients undergoing parascalene brachial plexus block for upper limb surgeries.

Onset of Motor Block



Onset of Motor Block - Groups	Group B	%	Group BD	%
2 mins	5	16.67	12	40.00
3 mins	10	33.33	13	43.33
4 mins	10	33.33	4	13.33
5 mins	5	16.67	1	3.33
Total	30	100	30	100

Onset of Motor Block	Group B	Group BD
Mean	3.50	2.80
SD	0.97	0.81
P value Unpaired t Test		0.0036

Among the patients undergoing parascalene brachial plexus block for upper limb surgeries there was a statistically significant difference in relation to onset of motor block time between group B (mean=3.50, SD=0.97) and group BD (mean=2.80, SD=0.81) with a p value of <0.05 as per unpaired t test. Therefore we reject the null hypothesis that there is no difference in onset of motor block time distribution between the intervention groups.

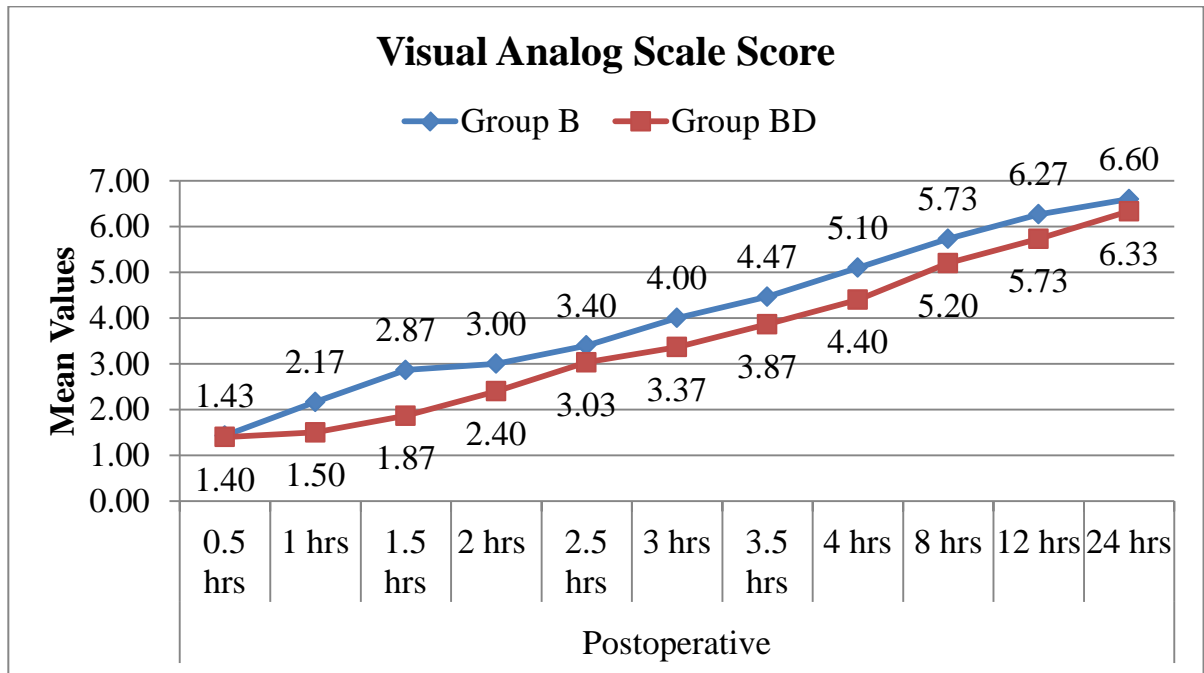
Discussion

The mean onset of motor block time in group B was significantly delayed in group B compared to group BD by a mean difference of 42 seconds (20% more delay). This difference is significant with a p-value of 0.0036 as per unpaired t-test.

Conclusion

In this study we can safely conclude that bupivacaine 0.25% with dexamethasone produces sustained earlier onset of motor block compared to bupivacaine 0.25% alone when used in patients undergoing parascalene brachial plexus block for upper limb surgeries.

VAS



Visual Analog Scale Score		Group B		Group BD		P value unpaired t Test
		Mean	SD	Mean	SD	
Postoperative	0.5 hrs	1.43	0.63	1.40	0.50	0.8203
	1 hrs	2.17	0.59	1.50	0.57	<0.0001
	1.5 hrs	2.87	0.78	1.87	0.78	<0.0001
	2 hrs	3.00	0.69	2.40	0.81	0.0032
	2.5 hrs	3.40	0.67	3.03	0.76	0.0437
	3 hrs	4.00	0.91	3.37	0.85	0.0072
	3.5 hrs	4.47	0.94	3.87	0.90	0.0141
	4 hrs	5.10	0.96	4.40	1.25	0.0180
	8 hrs	5.73	0.94	5.20	1.27	0.0701
	12 hrs	6.27	0.94	5.73	1.28	0.0721
	24 hrs	6.60	1.04	6.33	1.18	0.3573

VAS - Overall	Group B	Group BD
Mean	4.09	3.55
SD	0.63	0.75
P value Unpaired t Test		0.0037

Among the patients undergoing parascalene brachial plexus block for upper limb surgeries there was a statistically significant difference in relation to VAS scores between group B (mean=4.09, SD=0.63) and group BD (mean=3.55, SD=0.75) with a p value of <0.05 as per unpaired t test. Therefore we reject the null hypothesis that there is no difference in respiratory rate distribution between the intervention groups.

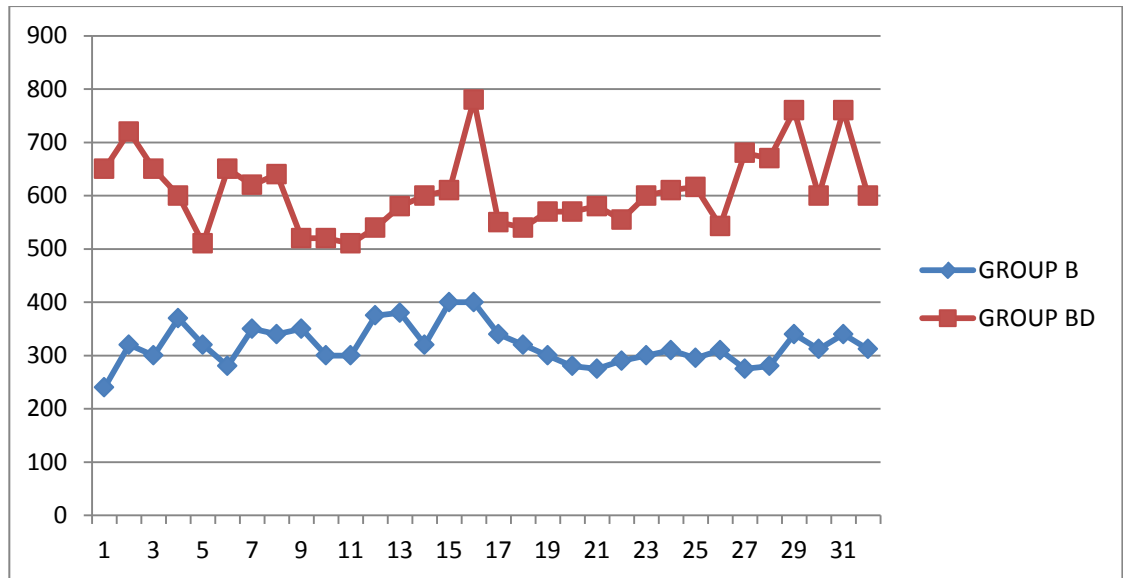
Discussion

The mean VAS scores in group B was significantly higher in group B compared to group BD by a mean difference of 0.54 scoring points (13% higher). This difference is significant with a p-value of 0.0032 as per unpaired t-test.

Conclusion

In this study we can safely conclude that bupivacaine 0.25% with dexamethasone produces sustained lower VAS scores compared to bupivacaine 0.25% alone when used in patients undergoing parascalene brachial plexus block for upper limb surgeries.

TIME OF FIRST RESCUE ANALGESIA



Time of first rescue analgesia	Group B	%	Group BD	%
201-300	14	46.66	0	0
301-400	16	53.33	0	0
401-500	0	0	0	0
501-600	0	0	18	60
601-700	0	0	9	30
>700	0	0	3	23.08

Time of first rescue analgesia	Group B	Group BD
Mean	319.06	600.13
SD	38.92	71.59

P value by unpaired T test	<0.0001
----------------------------	---------

Among the patients undergoing parascalene brachial plexus block for upper limb surgeries there was a statistically significant difference in relation to time for first rescue analgesia between group B (mean=319.06, SD=38.92) and group BD (mean=600.13, SD=71.59) with a p value of <0.05 as per unpaired t test. Therefore we reject the null hypothesis that there is no difference in time for first rescue analgesia distribution between the intervention groups.

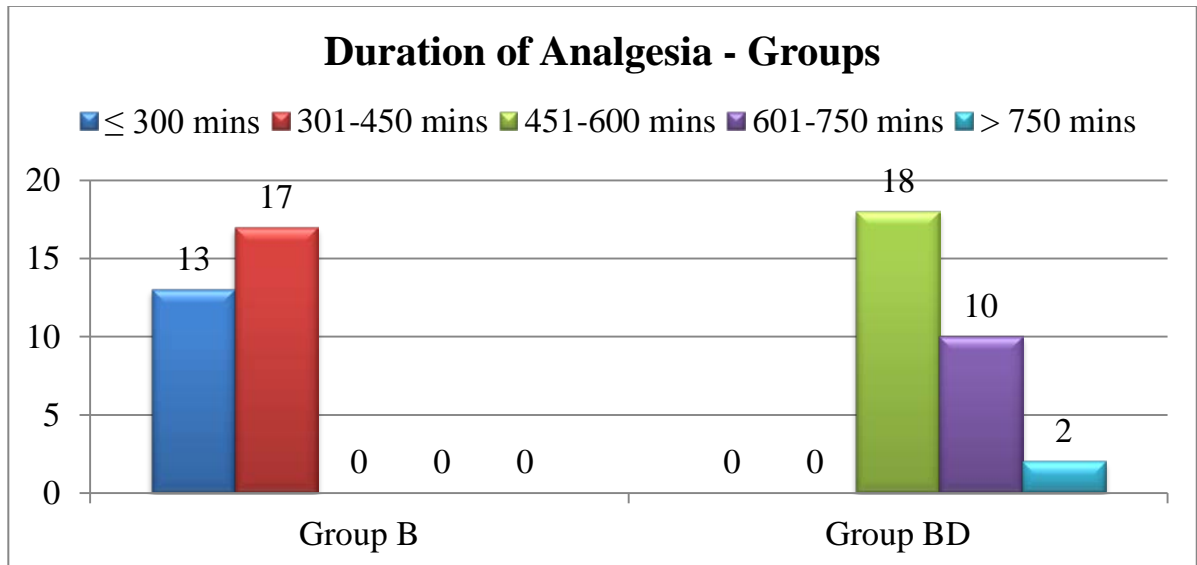
Discussion

The mean time for first rescue analgesia in group B was significantly earlier in group B compared to group BD by a mean difference of 281.07 min. This difference is significant with a p-value of <0.0001 as per unpaired t-test.

Conclusion

In this study we can safely conclude that bupivacaine 0.25% with dexamethasone produces sustained delayed need for first rescue analgesia compared to bupivacaine 0.25% alone when used in patients undergoing parascalene brachial plexus block for upper limb surgeries.

Duration of Analgesia



Duration of Analgesia - Groups	Group B	%	Group BD	%
≤ 300 mins	13	43.33	0	0.00
301-450 mins	17	56.67	0	0.00
451-600 mins	0	0.00	18	60.00
601-750 mins	0	0.00	10	33.33
> 750 mins	0	0.00	2	6.67
Total	30	100	30	100

Duration of Analgesia	Group B	Group BD
Mean	311.40	595.53
SD	38.71	71.62
P value unpaired t Test		<0.0001

Among the patients undergoing parascalene brachial plexus block for upper limb surgeries there was a statistically significant difference in relation to duration of analgesia between group B (mean=311.40, SD=38.71) and group BD (mean=595.53, SD=71.62) with a p value of <0.05 as per unpaired t test. Therefore we reject the null hypothesis that there is no difference in duration of analgesia distribution between the intervention groups.

Discussion

The mean duration of analgesia in group B was significantly shorter in group B compared to group BD by a mean difference of 284.13 minutes (48% more shorter). This difference is significant with a p-value of <0.0001 as per unpaired t-test.

Conclusion

In this study we can safely conclude that bupivacaine 0.25% with dexamethasone produces sustained prolonged duration of analgesia compared to bupivacaine 0.25% alone when used in patients undergoing parascalene brachial plexus block for upper limb surgeries.

COMPLICATIONS

5 patients in group B reported post operative nausea and vomiting, while none in Group BD complained of post operative nausea and vomiting.

No patients in both groups reported any other complications like

- 1) Pneumothorax
- 2) Convulsions
- 3) Arrhythmias
- 4) CSF puncture.

DISCUSSION

Brachial plexus blockade offers very good advantage for surgeries on upper limb by avoiding general anesthesia which has its set of complications like delayed recovery, poly pharmacy, loss of consciousness of the patient etc.

Various techniques have been developed to perform brachial plexus block for increasing success rate and avoiding complications.

The technique chosen in this study was NERVE LOCATOR ASSISTED PARASCALENE BLOCK. Parascalene block was developed by Vongvises and Panijayamond in 1979. A vertical line is drawn from the chassignac's tubercle to the midpoint of the clavicle. The junction of upper two thirds and lower one third of this line is taken as the point of insertion. This technique avoids the complication like pneumothorax associated with supraclavicular block and nerve injuries associated with interscalene block.

Block by eliciting paresthesia is associated with nerve injuries and high failure rates. To avoid these complications, we chose nerve locator to achieve successful block.

Bupivacaine was the first local anesthetic that combined the properties of acceptable onset, significant duration of analgesia, profound blockade.

Various agents like epinephrine, opioids, Ketamine, potassium chloride, verapamil, neostigmine, hyaluronidase and Sodium bicarbonate have been used as *adjuvants* to local anaesthetics in brachial plexus block to quicken the onset, increase the duration and enhance the quality of block and also to reduce the post operative analgesic requirements. The results have been mixed and at times associated with side effects.

Dexamethasone was chosen as an adjuvant in this study as it has been used in intrathecal, extradural and peripheral nerve blocks. CUMMINGS ET AL in 2011 used dexamethasone 8 mg as an adjuvant to bupivacaine and ropivacaine in USG guided interscalene block and found that addition of dexamethasone significantly prolongs duration of analgesia and post operative comfort without affecting hemodynamics.

SHRESTHA ET AL in 2003 found that addition of dexamethasone to local anesthetic in supraclavicular block hastens the onset of action.

We conducted a prospective randomized controlled study on 30 patients satisfying selection criteria undergoing parascalene brachial plexus block with or without addition of dexamethasone. Various parameters like onset of sensory and motor blockade, hemodynamic values, duration of analgesia, postoperative VAS scores, complications are studied and analyzed.

ONSET OF SENSORY BLOCKADE :

Onset of sensory blockade was quicker in patients with dexamethasone added as an adjuvant to bupivacaine. The mean onset of sensory blockade was 4.67 minutes in Group BD compared to Group B where it was about 7.67 minutes and significant difference <0.0001 . This is in accordance with SHRESTHA ET AL IN 2003 where he reported addition of dexamethasone hastens onset of blockade. This is due to synergistic action of dexamethasone to local anesthetic.

ONSET OF MOTOR BLOCKADE :

Onset of motor blockade was quicker in patients with dexamethasone added as an adjuvant to bupivacaine. The mean onset of motor blockade was 2.80 min in Group BD compared to Group B where it was 3.50 min with significant difference 0.0036. So dexamethasone hastens onset of motor blockade.

The fact that onset of motor blockade occurs prior to onset of sensory blockade satisfies theory proposed by WINNIE and RAMAMOORTHY that local anesthetic first blocks peripheral motor fibres followed by block of central sensory fibres.

TIME OF FIRST RESCUE ANALGESIA :

Time of first rescue analgesia is significantly delayed in patients where dexamethasone was added as an adjuvant. The mean time of first rescue analgesia was 600.13 minutes in Group BD compared to Group B where it was about 319.06 min with a significant difference <0.0001 . This is in accordance with CUMMINGS et al in 2011 where he reported addition of dexamethasone significantly delays time for first rescue analgesia.

DURATION OF ANALGESIA :

Duration of analgesia is significantly prolonged in patient where dexamethasone is added as an adjuvant. The mean duration of analgesia was about 595.43 min in Group BD compared to Group B where it was about 311.40 min with significant difference <0.0001 . This is in accordance with VIERA et al in 2010 where he proved duration of analgesia is significantly prolonged in patients where dexamethasone was used as an adjuvant to local anesthetic in interscalene plexus blockade.

Dexamethasone acts as a vasoconstrictor thus reducing absorption of local anesthetic and significantly prolonging duration of analgesia.

Dexamethasone acts by reducing the pain transmission in nociceptive C fibres by enhancing action of inhibitory potassium channels thereby prolonging sensory blockade.

POSTOPERATIVE VAS SCORES :

Postoperative VAS scores was significantly lower in patients where dexamethasone was added as an adjuvant. The mean VAS score was about 3.55 in Group BD compared to Group B where it was about 4.09 with a significant difference of 0.0037. This is in accordance with SHRESTHA et al in 2003 who reported post operative analgesia was better with patients where dexamethasone was added as an adjuvant to local anesthetic in supraclavicular blockade.

Dexamethasone acts by inhibiting production of inflammatory cytokines there by reducing inflammation and thus prolonging post operative analgesia.

HEMODYNAMIC PARAMETERS :

Heart rate was significantly reduced in patients with dexamethasone added as an adjuvant. The mean heart rate was 72.81 beats per minutes in Group BD compared to Group B where it was 76.09 in Group B with a significant difference <0.05 .

The mean arterial pressure shows sustained increase in patients where dexamethasone was added as an adjuvant. The mean MAP was 84.58 mm Hg in Group BD compared to Group B where it was 80.78 mm Hg with a significant difference of 0.0130.

All other hemodynamic parameters like Systolic blood pressure, Diastolic blood pressure, respiratory rate, peripheral capillary saturation of oxygen (SPO2) showed similar trends throughout perioperative and postoperative periods and does not show any significant difference.

No hemodynamic stability was reported in patients in both groups.

COMPLICATIONS :

5 patients in Group B complained of postoperative nausea and vomiting compared to patients in Group BD where none reported.

Patients in both groups did not report any other complications like

- 1) Pneumothorax
- 2) Convulsions
- 3) Arrhythmias
- 4) CSF puncture.

SUMMARY

- 1) The mean duration of analgesia was significantly prolonged in Bupivacaine with Dexamethasone Group.
- 2) The onset of both sensory and motor blockade is quicker in Bupivacaine with Dexamethasone group.
- 3) Time of first rescue analgesia was significantly delayed in Bupivacaine with Dexamethasone group.
- 4) Post operative VAS score for pain is significantly lower in Bupivacaine with Dexamethasone group.
- 5) Heart rate was significantly reduced in Bupivacaine with Dexamethasone Group. Mean arterial pressure showed sustained increase in Bupivacaine with Dexamethasone group.
- 6) No hemodynamic instability was reported in both groups.
- 7) No complication arose as a result of addition of dexamethasone to parascalene block.

CONCLUSION

In Parascalene block, addition of 8 mg of Dexamethasone to 28 ml of 0.25% Bupivacaine quickens the onset of Sensory and motor blockade and prolongs the duration of analgesia. It also improves the quality of post operative analgesia, postoperative nausea and vomiting. It decreases heart rate with increase in mean arterial pressure without causing hemodynamic instability. Hence Dexamethasone can be considered a safe additive to local anesthetic in brachial plexus block

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ANNEXURES

**INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE, CHENNAI 600 003**

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

CERTIFICATE OF APPROVAL

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

Dear Dr.A.J.Saikarthik,

The Institutional Ethics Committee has considered your request and approved your study titled **"A COMPARATIVE EVALUATION OF EFFICACY OF BUPIVACAINE 0.25% AND BUPIVACAINE 0.25% WITH DEXAMETHASONE IN PARASCALENE BRACHIAL PLEXUS BLOCK FOR UPPER LIMB SURGERIES "- NO. (II) 26032016.**

The following members of Ethics Committee were present in the meeting hold on **22.03.2016** conducted at Madras Medical College, Chennai 3

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

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

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



Member Secretary Ethics Committee

MEMBER SECRETARY
INSTITUTIONAL ETHICS COMMITTEE
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39 Dissertation submitted to


THE TAMILNADU DR M.G.R MEDICAL UNIVERSITY
 in partial fulfillment for the award of the degree of

DOCTOR OF MEDICINE

IN

ANESTHESIOLOGY

BRANCH X



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A COMPARATIVE EVALUATION OF EFFICACY OF
ROPIVACAINE 0.2% AND BUPIVACAINE 0.2% WITH
DECAINE BRASONE IN PARAGUALLINE BLOCK FOR UPPER
LIMB PREGNERIES.

Submitted to
THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY
in partial fulfillment for the award of the Degree of

DOCTOR OF MEDICINE
IN
ANESTHESIOLOGY

BRANCH X



INSTITUTE OF ANESTHESIOLOGY AND CRITICAL CARE
RAJIV GANDEI MEDICAL COLLEGE HOSPITAL
THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY
CHENNAI - 600 009

19th. 2017

PROFORMA

Title:

“A COMPARATIVE EVALUATION OF EFFICACY OF BUPIVACAINE 0.25% AND BUPIVACAINE 0.25% WITH DEXAMETHASONE IN PARASCALENE BLOCK FOR UPPER LIMB SURGERIES”.

DATE: IP NO:

NAME:

AGE: SEX:

DIAGNOSIS:

SURGICAL PROCEDURE:

Ht: CVS: HR:

Wt: RS: BT : CT :

PRE OP ASSESSMENT: ASSESSMENT NO:

HISTORY:

Any Co-morbid illness

H/O Documented Difficult Airway

H/O previous surgeries

INFORMED CONSENT IN TAMIL:

RANDOMIZATION: Tick the following

1)GROUP B : INJ BUPIVACAINE 0.25% 30 ml

2)Group BD : INJ BUPIVACAINE 0.25% 28 ml + 2 ml of Dexamethasone

IV line

PREMEDICATION

MONITORS

BASELINE VITAL PARAMETERS

Heart rate	
NIBP	
SpO2	

ONSET OF SENSORY BLOCK :

	GROUP B	GROUP BD
TIME OF ONSET (MIN)		

ONSET OF MOTOR BLOCK :

	GROUP B	GROUP BD
TIME OF ONSET(MIN)		

DURATION OF ANALGESIA:

	GROUP B	GROUP BD
DURATION(MIN)		

INTRAOP HEMODYNAMICS :

VITALS(MIN)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
HR																	
BP																	
SYSTOLIC																	
DIASTOLIC																	
MEAN																	
RR																	
SPO2																	

POST OPERATIVE :

TIME(HRS)	0.5	1	1.5	2	2.5	3	3.5	4	8	12	16	20	24
VAS													
HR													
BP													
SYS													
DIA													
RR													

	GROUP B	GROUP BD
RESCUE ANALGESIC		
TIME(MIN)		

COMPLICATIONS	GROUP B	GROUP BD
PONV		
PNEUMOTHORAX		
CONVULSIONS		
ARRYTHMIAS		
CSF PUNCTURE		

INFORMATION TO PARTICIPENTS

Investigator : **Dr. A.J.SAIKARTHIK**

Name of the Participant :

Title :

“ A Comparative evaluation of efficacy of 0.25% Bupivacaine and 0.25% Bupivacaine with dexamethasone in parascalene block for upper limb surgeries”

You are invited to take part in this research study. We have got approval from the IEC. You are asked to participate because you satisfy the eligibility criteria. We want to evaluate the efficacy of Dexamethasone added as an aduvant to local anesthetic in parascalene block.

What is the Purpose of the Research:

The two groups which received nerve locator assisted parascalene block with 0.25% Bupivacaine and 0.25% Bupivacaine with Dexamethasone are compared to

1. To evaluate the duration of analgesia
2. Time of onset of sensory and motor blockade
3. To assess Intraoperative and post operative haemodynamics
4. Post operative visual analogue scale pain score.
5. Complications
6. Time for rescue analgesia.

The Study Design:

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

Group B – 30 ml of 0.25% Bupivacaine

Group B – 28 ml of 0.25% Bupivacaine with 8 mg of Dexamethasone.

Benefits :

Parascalene block avoids complications like pneumothorax,nerve injuries etc..Dexamethasone added as an adjuvant to local anesthetic has been shown to improve duration of analgesia,hastens onset of sensory and motor blockade,improve quality of post operative analgesia.

Discomforts and risks

- ❖ Intravascular local anaesthetic injection
- ❖ Epidural blockade has been rarely reported among parascalene block.

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

Time :

Date :

Place :

Signature / Thumb Impression of Patient

Patient Name:

Signature of the Investigator : _____

Name of the Investigator : _____

ஆராய்ச்சி தகவல் தாள்

ஆராய்ச்சி தலைப்பு

கை அறுவை சிகிச்சைக்கு கழுத்தில் உள்ள நரம்பு பின்னல் (Parascalene) பகுதியில் புபிவெகெய்ன் அல்லது புபிவெகெய்ன் மற்றும் டெக்ஸாமெதஸோன் கலவை மருந்தினை செலுத்தி மறத்துப்போகும் தன்மையினை ஒப்பிடுதல்.

ஆராய்ச்சியாளர் பெயர் : மருத்துவர்.அ.ஜெ.சாய் கார்த்திக்

பங்கேற்பாளர் பெயர் :

ஆராய்ச்சியின் நோக்கம்

1. அறுவை சிகிச்சைக்குப்பின் வலி நிவாரண நேரம்.
2. அறுவை சிகிச்சையின்போதும், அதன் பின்பும், நாடித்துடிப்பு, இரத்த அழுத்தம் போன்றவைகளை கண்காணித்தல்.
3. அறுவை சிகிச்சைக்கு பின்னான விசுவல் அனலாக் அளவுகோலின் படி வலியின் அளவு.
4. அறுவை சிகிச்சையின்போது இதர வலி நிவாரணிகளின் தேவை

ஆய்வு முறை

ஆய்வில் பங்குபெறும் கை அறுவை சிகிச்சைக்கு வரும் நோயாளிகள் இரண்டு குழுக்களாகப் பிரிக்கப்படுவர்.

குழு-1 கழுத்தில் உள்ள நரம்பு பின்னல் (Parascalene) பகுதியில் புபிவெகெய்ன் (0.25%) 30 மி.லி. செலுத்துதல்.

குழு-2 கழுத்தில் உள்ள நரம்பு பின்னல் (Parascalene) பகுதியில் புபிவெகெய்ன் (0.25%) 28 மி.லி. மற்றும் டெக்ஸ்மெதஸோன் 2மி.லி கலவையை செலுத்துதல்.

நன்மைகள்

- 1) அறுவை சிகிச்சையின்போது நாடித்துடிப்பு மற்றும் இரத்த அழுத்தம் சீராக செயல்பட உதவுகின்றன.
- 2) இதர வலி நிவாரணிகளின் தேவை வெகுவாக குறைக்கப்படுகின்றன.
- 3) அறுவை சிகிச்சைக்குப் பின்னர் வலி நிவாரணத்தின் தன்மை நீட்டிக்கப்படுகின்றது.

பக்கவிளைவுகள்

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

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

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

ஆய்வாளரின் பெயர்

பங்குபெறுபவரின் பெயர்

ஆய்வாளரின் கையொப்பம்

பங்குபெறுபவரின் கையொப்பம்

ஆராய்ச்சி ஒப்புதல் படிவம்

ஆராய்ச்சியின் தலைப்பு

கை எலும்பு அறுவை சிகிச்சைக்கு கழுத்தில் உள்ள நரம்பு
பின்னல் பகுதியில் புபிவேகெய்ன் (அ) புபிவேகெய்ன் மற்றும்
டெக்சமெதசோன் கலவை செலுத்தி மரத்துப்போகும் தன்மை
அடிப்படையில் ஒப்பிடுதல்

ஆய்வு நிலையம் : மயக்கவியல் துறை,

சென்னை மருத்துவக் கல்லூரி,

சென்னை - 3

பங்கு பெறுபவரின் பெயர் :

பங்கு பெறுபவரின் எண் :

பங்குபெறுவர் இதனை (✓) குறிக்கவும்:

மேலே குறிப்பிட்டுள்ள மருத்துவ ஆய்வின்
விவரங்கள் எனக்கு விளக்கப்பட்டு என்னுடைய சந்தேகங்களை
கேட்கவும் அதற்கான தகுந்த விளக்கங்களை பெறவும்
வாய்ப்பளிக்கப்பட்டது.

நான் இவ்வாய்வில் தன்னிச்சையாகதான்
பங்கேற்கிறேன் எந்த காரணத்தினாலோ எந்த கட்டத்திலும் எந்த
சட்டசிக்கலுக்கும் உட்படாமல் நான் இவ்வாய்வில் இருந்து விலகி
கொள்ளலாம் என்று அறிந்து கொண்டேன்.

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

இந்த ஆய்வின் மூலம் கிடைக்கும்
தகவல்களையும்,பரிசோதனை முடிவுகளையும் மற்றும் சிகிச்சை
தொடர்பான தகவல்களையும் மருத்துவர் மேற்கொள்ளும் ஆய்வில்
பயன்பத்திக் கொள்ளவும் அதை பிரசுரிக்கவும் என் முழுமனதுடன்
சம்மதிக்கிறேன்.

இந்த ஆய்வில் பங்கு கொள்ள
ஒப்புக்கொள்கிறேன்.எனக்குகொடுக்கப்பட்டுள்ள அறிவுரைகளின்படி

நடந்து கொள்வதுடன் இந்த ஆய்வை மேற்கொள்ளும் மருத்துவ
அணிக்கு உண்மையுடன் இருப்பேன் என்று உறுதியளிக்கிறேன்.

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

கட்டைவிரல் ரேகை

பங்கேற்பவரின் பெயர் மற்றும் விலாசம்.....

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

ஆய்வாளரின் பெயர்.....

PATIENT CONSENT FORM

Study title :

“A comparative evaluation of efficacy of Inj bupivacaine 0.25% and bupivacaine 0.25% with dexamethasone in parascalene block for upper limb surgeries”

Study centre :

INSTITUTE OF ANESTHESIOLOGY AND CRITICAL CARE,
RAJIV GANDHI GOVT.GENERAL HOSPITAL
MADRAS MEDICAL COLLEGE
CHENNAI.

Participant name:

I.P. No:

Age:

Sex:

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

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

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

I understand that my identity will not be revealed in any information released to third parties or published, unless as required under the law . I agree not to restrict the use of any data or results that arise from the study. I hereby give permission to undergo complete clinical examination and diagnostic tests including haematological, biochemical, radiological tests.

I hereby agree to participate in this study.

Time:

Date:

Signature / thumb

impression

of patient's parent/guardian

Place:

Patient name:

Signature of the investigator:

Name of the investigator:

MASTER CHART

S.NO	AGE	ip no	WT	PROCEDURE	GROUP B																				OSTOP HR											
					PREOP HR PER OP HR (MIN)																															
					5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	0.5HR	1HR	1.5HR	2HR	2.5HR	3HR	3.5HR	4HR	8HR	12HR	24HR						
1	53/M	13248	60	ORIF LT HUMERUS	88	94	90	86	88	74	76	92	93	84	86	88	82	74	80	96	90	94	99	102	98	97	95	90	86	110	78					
2	55/F	24534	45	RT RADIAL PLATING	76	98	88	100	94	92	90	92	86	88	88	90	92	87	80	79	80	82	86	90	94	88	82	84	88	86	76					
3	50/M	56745	55	ORIF RT FOREARM	68	88	86	84	72	70	66	62	74	72	78	82	86	84	77	80	64	66	67	64	63	62	62	64	66	68	65					
4	45/M	56321	55	ORIF DISTAL LT HUMERUS	70	74	76	80	62	60	62	64	67	62	66	70	62	66	63	66	66	68	70	74	72	73	74	70	64	62	64					
5	35/F	78787	40	LT RADIUS PLATING	72	76	78	80	86	88	92	96	88	72	70	66	68	70	64	62	70	72	73	74	76	77	76	72	74	76	77					
6	50/M	88334	54	LT ULNA PLATING	75	74	80	82	84	86	88	76	78	84	80	76	78	73	79	82	74	76	72	74	75	77	76	77	78	78	78					
7	45/F	43567	43	ORIF RT FOREARM	80	96	92	94	96	84	86	93	94	87	85	84	82	104	100	96	66	68	69	68	68	76	74	76	78	79	80					
8	60/M	67775	52	LT FOREARM PLATING	57	60	55	52	55	62	64	66	68	70	63	66	68	70	60	64	68	69	70	71	71	75	79	80	81	84	82					
9	43/F	88076	45	RT RADIAL PLATING	64	66	62	68	60	66	64	62	70	78	82	90	96	86	94	98	67	68	69	72	73	74	80	82	83	83	82					
10	22/F	78654	43	ORIF LT HUMERUS	70	72	78	82	86	84	88	90	94	90	84	76	74	86	80	90	65	67	70	72	72	73	72	76	77	76	77					
11	45/F	76234	55	ORIF RT DISTAL HUMERUS	74	76	78	82	86	88	86	79	82	72	70	76	78	80	75	74	62	66	68	73	73	74	76	77	78	78	77					
12	35/M	32132	60	RT RADIAL PLATING	68	66	70	64	65	68	74	78	82	86	88	74	76	78	80	84	60	64	66	67	68	68	69	76	78	79	74					
13	50/M	43244	65	LT RADIUS PLATING	70	74	78	80	82	88	84	86	80	78	76	74	90	72	94	90	68	69	68	69	70	72	74	77	78	76	72					
14	60/M	56542	56	ORIF LT FOREARM	72	78	80	86	84	78	88	90	96	78	80	84	74	72	76	70	67	70	71	73	71	73	75	78	79	80	81					
15	42/F	67834	55	ORIF LT HUMERUS	64	66	64	70	65	62	66	67	64	70	71	80	76	74	76	72	64	68	69	70	70	74	77	78	80	81	83					
16	50/M	67653	55	RT FIRST METACARPAL W 71	78	80	64	82	86	74	78	80	68	73	74	72	71	75	74	68	69	71	72	73	75	76	78	81	82	82						
17	22/M	45632	43	RT RADIAL PLATING	64	66	68	70	62	66	65	70	74	72	78	64	62	60	68	66	69	70	72	75	76	77	78	80	82	83	80					
18	45/F	67856	50	LT HUMERUS PLATING	80	88	94	92	90	94	87	86	91	93	86	84	88	76	84	82	70	72	74	75	74	75	74	76	77	78	79					
19	35/F	78966	52	LT FIRST METACARPAL W 76	78	79	82	86	84	88	90	74	72	76	72	76	78	80	82	72	74	72	76	71	70	69	74	76	77	76						
20	32/F	78919	43	ORIF RT FOREARM	66	68	70	74	76	70	72	74	68	70	72	66	64	66	68	70	74	77	76	78	79	81	82	86	85	84	75					
21	46/F	89765	45	ORIF LT FOREARM	70	74	76	72	80	82	84	80	78	76	74	72	76	66	70	72	72	71	71	80	82	83	84	84	85	83	80					
22	47/F	78654	46	LT RADIUS PLATING	64	66	64	68	62	70	74	77	80	72	66	64	68	70	62	66	74	75	76	77	78	82	84	83	84	85	72					
23	22/F	56789	50	RT FOREARM PLATING	68	70	72	70	74	66	62	69	73	77	74	72	66	68	64	62	68	69	78	79	80	86	88	89	90	91	90					
24	32/M	88937	66	WRIST K WIRE FIXATION RT 72	74	78	80	82	86	78	76	74	78	86	84	82	80	78	74	66	66	71	73	75	77	78	80	78	77	76						
25	30/M	23456	62	ORIF LT HUMERUS	74	78	80	84	82	88	86	76	72	76	74	80	72	82	86	84	69	70	72	74	75	78	80	80	79	79	78					
26	25/F	67676	50	LT ULNA PLATING	76	78	79	74	72	80	82	86	90	96	94	74	72	70	87	84	69	71	74	76	77	79	80	79	80	80	76					
27	42/F	67898	47	ORIF RT HUMERUS	68	70	74	76	64	74	65	62	66	70	72	62	60	66	78	82	70	71	71	71	73	80	75	76	77	78	77					
28	35/M	78919	50	LT FOREARM PLATING	70	72	74	75	74	73	75	73	72	70	69	75	76	77	78	80	71	72	73	72	74	76	72	74	75	76	74					
29	32/M	93675	64	ORIF RT DISTAL HUMERUS	74	76	75	75	77	78	75	74	74	73	74	77	76	76	75	76	72	73	78	78	80	82	83	83	82	81	80					
30	45/M	67930	62	ORIF LT DISTAL HUMERUS	67	66	67	66	64	67	68	70	66	68	71	68	67	66	68	70	74	75	76	78	80	80	79	80	82	83	86					

		GROUP B																													
S.NO	AGE	ip no	WT	PROCEDURE	PREOP SYS BP (MM)										POSTOP SYS BP (MM)																
					5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	0.5HR	1HR	1.5HR	2HR	2.5HR	3HR	3.5HR	4HR	8HR	12HR	24HR	
1	50/M	13248	60	ORIF-IT HUMERUS																											
2	55/F	24534	45	RT RADIAL PLATING	134	135	135	132	128	125	127	130	135	138	133	132	134	135	137	142	131	143	138	139	135	130	132	134	137	140	140
3	50/M	56745	55	ORIF-RT FOREARM	134	130	132	135	133	128	127	128	130	134	135	139	142				133	138	137	136	132	134	135	133	135	128	127
4	45/M	56321	55	ORIF-DISTAL LT HUMERUS	126	128	122	124	126	130	129	132	121	125	127	128	132	133	135	137	140	130	131	132	127	130	124	128	135	138	139
5	35/F	78787	40	LT RADIAL PLATING	138	136	132	130	131	134	136	122	133	132	135	134					132	133	132	131	127	128	125	133	121	125	134
6	50/M	89334	54	LT ULNA PLATING	140	142	139	137	138	138	141	145	141	134	141	145	150	144	137		146	141	140	139	140	141	143	144	121	142	144
7	45/F	43567	43	ORIF-RT FOREARM	122	125	118	122	121	124	125	116	123	128	123	127	120	123	121		138	136	137	133	135	137	122	125	127	128	122
8	60/M	67775	52	LT FOREARM PLATING	116	126	118	109	110	112	109	108	112	115	111	113	132	117	113	125	122	128	130	132	133	134	135	136	137	131	130
9	43/F	89876	45	RT RADIAL PLATING	118	119	120	112	116	119	117	117	121	116	121	123	131	125	112	115	126	129	129	126	124	122	124	125	124	121	122
10	22/F	78654	43	ORIF-IT HUMERUS	121	120	116	120	111	121	123	120	112	121	117	119	128	133	121		135	124	126	128	122	124	125	127	125	124	122
11	45/F	76324	55	ORIF-RT DISTAL HUMERUS	122	121	115	120	115	123	125	120	111	125	124	125	125				126	127	129	127	128	129	131	132	133	131	134
12	35/M	32132	60	RT RADIAL PLATING	123	128	110	119	118	125	124	130	132	133	122	125	127	128			127	128	130	131	127	126	129	133	131	132	126
13	50/M	43244	66	LT RADIAL PLATING	125	141	142	115	118	111	122	125	126	128	113	115	130	132	121	140	130	131	133	132	131	131	133	125	121	122	122
14	60/M	56542	56	ORIF-IT FOREARM	130	132	129	126	128	121	127	122	132	127	131	131	134	135	128		131	123	125	127	122	122	124	125	126	127	129
15	42/F	67854	55	ORIF-IT HUMERUS	132	116	118	122	131	133	138	130	114	131	127	117	125	136	133	132	140	141	140	143	144	129	132	134	131	133	133
16	50/M	67653	55	RT FIRST METACARPAL K WIRE FIXATION	128	122	119	129	129	127	124	124	124	121	124	125	128	134	125	121	143	142	140	138	133	132	133	141	143	141	144
17	22/M	45632	43	RT RADIAL PLATING	129	121	120	119	117	128	131	122	116	125	131	133	131	132	124	127	134	133	135	137	131	132	134	136	121	133	132
18	45/M	67856	50	LT HUMERUS PLATING	135	130	134	127	133	133	130	130	134	133	136	132	121	138	133	132	132	131	133	132	133	134	135	128	123	135	124
19	35/F	78866	52	LT FIRST METACARPAL K WIRE FIXATION	140	131	132	134	137	142	136	142	140	141	141	143	124	141	142	144	133	123	125	122	122	126	128	111	112	114	124
20	32/F	78909	43	ORIF-RT FOREARM	138	140	137	136	137	137	134	136	132	139	133	132	140	139	139	133	123	134	117	119	111	113	114	131	121	122	125
21	46/F	89765	45	ORIF-IT FOREARM	137	134	133	132	134	132	135	135	135	132	138	122	132	132	138	134	126	125	119	121	123	125	127	128	124	124	116
22	47/F	78654	46	LT RADIAL PLATING	133	132	127	122	128	124	132	131	132	130	124	134	122	135	134	131	136	120	121	122	125	127	128	131	124	117	124
23	22/F	56789	50	RT FOREARM PLATING	126	129	125	124	124	126	122	122	124	124	128	125	123	124	122		127	123	124	126	127	128	129	130	125	124	125
24	32/M	89897	66	WRIST K WIRE FIXATION RT	128	130	128	125	128	127	124	124	122	125	129	126	125	125	121	124	125	124	125	126	128	122	124	129	126	127	128
25	30/M	23456	62	ORIF-IT HUMERUS	127	128	122	124	130	131	125	125	121	122	111	112	128	131	123	122	128	126	128	127	124	123	122	125	123	124	129
26	25/F	67676	50	LT ULNA PLATING	122	122	124	121	124	125	122	120	114	119	125	117	123	125	121		136	137	136	134	133	131	130	132	131	132	133
27	42/F	67888	47	ORIF-RT HUMERUS	121	123	125	120	122	122	120	116	117	120	122	124	125	124	120	124	135	132	131	128	131	130	133	134	134	135	134
28	35/M	78909	50	LT FOREARM PLATING	125	128	130	117	120	118	126	148	121	122	124	140	131	128	126	128	134	135	132	121	123	122	136	128	122	124	126
29	32/M	90675	64	ORIF-RT DISTAL HUMERUS	128	125	127	124	124	129	129	132	126	124	126	125	129	131	124	121	128	133	135	121	122	123	125	136	147	144	146
30	45/M	67590	62	ORIF-IT DISTAL HUMERUS	131	122	120	124	130	133	128	135	128	129	135	134	133	133	135	133	127	128	122	132	133	134	133	132	133	134	133
					132	134	133	134	136	137	132	132	133	134	135	136	137	136	137	134	131	134	135	131	128	129	131	131	132	131	132

S.NO	AGE	ip.no	WT	PROCEDURE	GROUP B																										
					PREOP RR		PENOP RR(MIN)												POSTOP RR												
					5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	0.5HR	1HR	1.5HR	2HR	2.5HR	3HR	3.5HR	4HR	8HR	12HR	24HR	
1	52/M	13248	60	ORIF LT HUMERUS	18	22	20	16	15	13	11	14	16	15	18	20	22	20	21	29	18	20	18	18	17	16	18	17	20	19	18
2	55/F	24534	45	RT RADIAL PLATING	16	19	18	18	18	20	16	14	18	17	12	14	15				15	16	17	18	12	13	12	14	15	16	12
3	50/M	56745	55	ORIF RT FOREARM	12	14	12	12	10	13	13	14	12	14	16	12	13	12	14	12	12	10	13	14	14	15	16	18	20	17	16
4	45/M	56321	55	ORIF DISTAL HUMERUS	14	15	14	12	13	14	15	16	13	15	11	13	16	15	11	10	14	12	11	12	13	12	14	16	11	12	11
5	35/F	78787	40	LT RADIUS PLATING	16	16	13	14	15	16	17	13	12	14	11	12	18	17	11	9	16	14	9	10	11	11	13	14	13	14	11
6	50/M	89134	54	LT ULNA PLATING	18	18	14	16	12	11	12	14	11	13	13	14	19	14	12	11	9	15	12	14	15	12	12	12	12	11	14
7	45/F	43567	43	ORIF RT FOREARM	14	14	16	15	16	18	10	15	14	12	15	15	20	17	18	12	11	11	12	15	14	13	15	14	14	12	12
8	60/M	67775	52	LT FOREARM PLATING	12	12	14	14	14	15	11	17	15	16	20	16	21	18	16	13	13	13	14	13	20	12	16	17	15	14	15
9	43/F	89876	45	RT RADIAL PLATING	13	13	14	15	13	12	12	16	20	17	18	17	20	19	15	15	15	12	15	14	11	14	13	14	16	14	16
10	22/F	78654	43	ORIF LT HUMERUS	10	12	12	14	16	15	13	14	12	11	19	20	19	14	14	13	13	15	16	13	15	15	16	12	11	15	13
11	45/F	76234	55	ORIF RT DISTAL HUMERUS	12	14	15	14	14	18	15	13	19	16	19	18	18	12	13	12	12	14	17	11	10	17	14	11	13	11	16
12	35/M	32132	60	RT RADIAL PLATING	12	12	13	13	12	13	12	12	12	20	18	16	18	11	14	14	10	11	14	15	12	14	13	12	12	12	20
13	50/M	43244	65	LT RADIUS PLATING	15	15	15	16	12	14	11	12	13	19	17	14	18	13	12	11	14	12	12	13	14	15	12	13	14	15	17
14	60/M	56542	56	ORIF LT FOREARM	16	18	16	18	14	16	14	15	9	17	18	10	19	14	14	10	11	13	13	14	16	15	16	14	14	16	12
15	42/F	67854	55	ORIF LT HUMERUS	18	16	18	12	14	17	12	11	11	11	19	12	17	15	12	12	13	15	14	12	12	13	14	15	15	17	11
16	50/M	67653	55	RT FIRST METACARPAL WIRE FIXATION	18	14	16	12	16	12	11	13	13	13	20	16	16	14	13	11	12	13	14	14	11	11	11	13	17	19	11
17	22/M	45632	43	RT RADIAL PLATING	16	12	12	13	16	13	18	17	11	14	17	13	14	16	14	14	15	12	11	13	15	15	16	16	12	12	12
18	45/M	67856	50	LT HUMERUS PLATING	14	14	16	14	12	14	12	16	16	15	18	14	13	13	9	13	16	18	15	12	14	15	12	16	13	11	11
19	35/F	78966	52	LT FIRST METACARPAL WIRE FIXATION	12	15	15	12	14	15	11	15	14	16	18	18	15	13	10	12	11	12	14	19	16	17	18	19	14	14	10
20	32/F	78919	43	ORIF RT FOREARM	13	15	12	14	15	16	9	12	11	13	14	14	13	12	11	11	10	14	13	9	11	14	15	12	16	17	11
21	46/F	89785	45	ORIF LT FOREARM	14	16	14	15	12	18	10	14	13	12	15	16	12	11	13	10	12	13	15	8	10	10	8	14	11	18	12
22	47/F	78654	46	LT RADIUS PLATING	14	15	12	13	13	13	10	11	14	11	16	12	12	10	12	10	16	17	18	11	13	12	12	9	10	12	14
23	22/F	56789	50	RT FOREARM PLATING	13	12	14	12	15	16	8	14	15	15	18	16	14	9	12	9	11	12	13	12	13	14	15	11	13	11	11
24	32/M	89197	65	WRIST WIRE FIXATION RT	12	13	16	11	12	18	11	15	12	16	11	13	15	8	14	12	13	12	13	14	12	12	16	13	11	11	12
25	30/M	23456	62	ORIF LT HUMERUS	14	16	14	13	14	11	12	16	13	13	13	14	14	11	16	13	15	16	14	16	17	16	18	15	12	12	13
26	25/F	67676	50	LT ULNA PLATING	16	14	18	14	15	10	13	10	14	15	12	15	12	16	18	14	12	11	12	13	11	12	12	13	13	13	13
27	42/F	67898	47	ORIF RT HUMERUS	15	12	12	15	13	12	11	9	15	12	14	16	17	14	12	11	14	14	15	14	13	13	15	14	14	14	14
28	35/M	78919	50	LT FOREARM PLATING	14	16	14	12	12	14	15	11	11	14	15	14	15	13	14	13	16	17	14	16	14	14	16	17	15	15	15
29	32/M	91675	64	ORIF RT DISTAL HUMERUS	13	15	13	14	11	15	13	10	13	14	15	21	16	12	13	13	12	12	13	14	12	12	13	19	11	14	16
30	45/M	67930	62	ORIF LT DISTAL HUMERUS	12	12	15	13	14	13	16	11	11	15	13	15	12	11	11	12	11	13	11	12	10	10	11	13	11	16	17

S.NO	AGE	ip.no	WT	PROCEDURE	GROUP B														POSTOP COMPLICATIONS								
					ONSET OF MOTOR BLOCKADE(MN)		ONSET OF SENSORY BLOCKADE(MN)		Time of first rescue analgesia(mi)	VAS PAIN SCORE														PNEUMOTHORAX	CONVULSIONS	ARRHYTHMAS	CSF
										0.5HR	1HR	1.5HR	2HR	2.5HR	3HR	3.5HR	4HR	8HR	12HR	24HR	PONV						
1	50/M	13248	60	ORIF L HUMERUS	3	6	240	1	1	1	3	3	3	4	5	6	6	6					PUNCTURE				
2	55/F	24534	45	RT RADIAL PLATING	2	8	320	1	2	2	2	4	4	5	6	6	6	6y	N	N	N	N					
3	50/M	56745	55	ORIF RT FOREARM	3	8	300	1	2	3	3	3	4	6	6	7	7	7N	N	N	N	N					
4	45/M	56321	55	ORIF DISTAL HUMERUS	2	7	370	2	3	3	3	3	5	5	6	6	6	7N	N	N	N	N					
5	35/F	70707	40	LT RADUS PLATING	3	9	300	2	2	2	2	2	4	4	5	5	5	5N	N	N	N	N					
6	50/M	89394	54	LT ULNA PLATING	5	6	280	2	2	4	4	4	4	6	6	7	7	7N	N	N	N	N					
7	45/F	45567	43	ORIF RT FOREARM	3	7	350	1	2	4	4	4	4	4	4	6	7	7N	N	N	N	N					
8	60/M	67775	52	LT FOREARM PLATING	4	8	340	2	2	2	2	3	3	3	4	6	6	7N	N	N	N	N					
9	43/F	89076	45	RT RADIAL PLATING	4	9	350	2	2	3	3	3	3	4	4	5	5	6N	N	N	N	N					
10	22/F	78654	43	ORIF L HUMERUS	3	9	300	0	3	3	3	3	3	4	4	5	5	6N	N	N	N	N					
11	45/F	76234	55	ORIF RT DISTAL HUMERUS	4	9	300	2	3	4	4	4	6	6	6	6	7	7N	N	N	N	N					
12	35/M	32132	60	RT RADIAL PLATING	6	8	375	1	3	3	3	4	4	5	7	7	8	8y	N	N	N	N					
13	50/M	43244	65	LT RADUS PLATING	5	8	380	1	1	2	2	3	3	3	4	4	5	5N	N	N	N	N					
14	60/M	55642	56	ORIF L FOREARM	5	10	300	0	2	2	2	2	3	3	4	4	6	6N	N	N	N	N					
15	42/F	67854	55	ORIF L HUMERUS	4	8	400	2	3	4	4	4	5	5	5	6	6	7N	N	N	N	N					
16	50/M	67853	55	RT FIRST METACARPAL WIRE FIXATION	3	8	400	2	3	3	3	4	4	5	6	6	7	8N	N	N	N	N					
17	22/M	45632	43	RT RADIAL PLATING	4	5	340	1	2	2	3	3	3	4	5	5	6	6N	N	N	N	N					
18	45/M	67856	50	L HUMERUS PLATING	4	7	320	2	2	3	3	3	4	4	5	5	6	6N	N	N	N	N					
19	35/F	78966	52	LT FIRST METACARPAL WIRE FIXATION	5	8	300	2	2	4	4	4	5	5	5	6	6	7Y	N	N	N	N					
20	32/F	78909	43	ORIF RT FOREARM	2	7	280	1	1	2	2	3	3	3	4	4	6	6N	N	N	N	N					
21	46/F	89765	45	ORIF L FOREARM	4	8	275	2	2	3	3	3	5	5	7	7	8	9N	N	N	N	N					
22	47/F	78654	46	LT RADUS PLATING	3	9	290	1	3	3	3	4	4	4	6	6	8	7N	N	N	N	N					
23	22/F	56789	50	RT FOREARM PLATING	4	7	300	2	2	2	2	2	2	3	3	4	4	4N	N	N	N	N					
24	32/M	89037	65	WRIST WIRE FIXATION RT	2	7	310	2	2	4	4	4	5	6	6	7	7	7N	N	N	N	N					
25	30/M	24566	62	ORIF L HUMERUS	4	8	295	1	2	3	3	3	4	4	5	5	7	8N	N	N	N	N					
26	25/F	67676	50	LT ULNA PLATING	3	7	310	2	2	3	3	4	4	4	5	6	6	7N	N	N	N	N					
27	42/F	67898	47	ORIF RT HUMERUS	3	6	275	2	2	3	4	4	4	5	5	7	7	8N	N	N	N	N					
28	35/M	78909	50	LT FOREARM PLATING	2	7	280	1	2	3	3	4	5	5	5	6	6	6y	N	N	N	N					
29	32/M	90675	64	ORIF RT DISTAL HUMERUS	4	8	340	1	2	3	3	4	5	5	5	6	6	6N	N	N	N	N					
30	45/M	67930	62	ORIF LT DISTAL HUMERUS	3	8	312	1	3	3	3	4	5	5	5	6	6	6N	N	N	N	N					

S.NO	AGE	SEX	WT	PROCEDURE	IP NO	GROUP D																										
						PREOP HR						PEROP HR						POSTOP HR														
						5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	0.5HR	1HR	1.5HR	2HR	2.5HR	3HR	3.5HR	4HR	8HR	12HR	24HR	
1	26	M	55	ORIF LT FOREARM	73125	65	64	60	60	58	57	58	59	55	60	63	66	64	68	66	68	66	68	66	67	68	66	67	68	66		
2	35	F	50	ORIF RT HUMERUS	77124	70	73	74	68	66	66	65	64	67	68	69	68	67	66	70	75	70	72	67	68	66	70	67	70	68	67	66
3	65	F	65	LT RADIUS PLATING	65124	80	80	80	76	75	74	74	75	73	72	72	74	72	72	72	72	16	78	77	75	74	73	71	70	69	68	70
4	60	M	60	RT HUMERUS PLATING	61123	82	80	80	79	76	77	76	76	78	80	78	79	80	76	76	75	80	80	82	81	78	77	76	79	74	78	77
5	45	F	55	ORIF LT FOREARM	16253	85	83	82	80	83	80	80	78	79	81	81	76	76	75	75	74	84	83	85	82	88	87	84	87	83	86	85
6	55	F	45	ORIF RT HUMERUS	41235	88	87	85	85	84	84	85	86	84	87	86	87	86	84	84	86	88	86	87	85	85	84	86	85	84	83	88
7	42	M	55	K WIRE FIXATION LT FIRST METACARPAL	44135	75	75	73	73	70	70	68	67	66	69	68	66	68	68	70	76	73	72	74	76	75	74	76	78	76	74	75
8	30	M	65	RT HUMERUS PLATING	45128	74	74	72	72	73	73	70	71	68	68	69	70	71	72	73	76	75	74	73	72	71	73	75	74	72	75	76
9	23	M	60	ORIF LT FOREARM	33215	76	74	70	70	70	68	68	66	70	74	74	76	78	78	80	84	70	75	74	67	68	66	75	78	77	79	76
10	40	F	45	LT RADIUS PLATING	42134	72	72	71	70	76	76	70	71	68	66	68	69	73	72	75	73	78	77	80	82	84	83	81	78	77	80	76
11	55	F	42	RT DISTAL HUMERUS PLATING	55676	70	64	66	68	67	64	66	60	58	59	57	56	58	58	60	62	88	87	85	85	84	85	83	84	85	85	87
12	22	M	55	ORIF RT FOREARM	32345	66	64	63	62	66	68	62	60	62	64	64	66	60	68	69	70	76	66	78	78	75	78	77	76	77	74	75
13	43	F	50	K WIRE FIXATION RT FIRST METACARPAL	22345	68	66	64	65	66	66	68	67	66	66	64	66	65	65	64	68	80	82	83	81	84	85	86	83	78	77	85
14	32	M	56	ORIF RT HUMERUS	55943	67	70	69	66	68	66	66	65	65	66	68	66	68	71	73	74	78	77	74	73	77	76	78	77	79	81	82
15	42	F	45	RT FOREARM PLATING	52345	68	66	67	69	70	66	64	66	66	67	68	70	72	72	72	72	86	84	85	85	84	83	82	87	86	85	84
16	35	F	46	K WIRE FIXATION LT THUMB	67843	70	70	66	65	64	66	71	72	68	69	70	72	76	80	80	84	78	77	78	79	75	74	73	76	77	78	80
17	25	M	52	ORIF RT PROXIMAL HUMERUS	22478	62	64	66	64	62	64	62	60	58	57	56	58	59	55	57	66	85	84	83	82	81	80	78	77	79	75	74
18	43	F	55	ORIF LT DISTAL HUMERUS	54321	64	66	64	66	67	65	66	68	70	65	60	58	55	57	60	66	78	77	74	72	71	70	67	68	69	64	63
19	34	M	60	ORIF LT FOREARM	78965	64	64	66	64	63	61	62	66	64	62	62	64	65	66	68	70	78	76	75	74	73	72	77	76	78	74	75
20	50	F	65	ORIF RT FOREARM	32451	72	70	70	72	71	66	65	68	64	66	64	66	68	68	66	69	77	74	73	72	75	77	78	80	81	79	74
21	46	F	50	RT RADIUS PLATING	24389	73	74	74	72	72	72	74	72	76	74	71	70	74	72	73	80	5	73	72	66	67	68	70	70	65	64	68
22	32	F	48	ORIF LT DISTAL RADIUS	44321	75	75	74	76	78	78	80	81	83	85	88	86	82	78	79	80	75	77	76	77	74	72	73	76	77	79	80
23	22	M	60	RT RADIUS PLATING	45324	75	74	73	73	74	75	72	70	70	71	73	72	68	66	69	69	76	77	77	78	80	82	83	85	87	86	80
24	30	M	50	ORIF LT DISTAL HUMERUS	78652	76	77	74	73	73	74	76	78	76	74	74	75	76	77	78	74	80	80	77	78	78	79	75	75	74	76	77
25	32	M	52	LT RADIUS PLATING	54632	70	68	65	64	63	66	66	66	65	67	64	63	62	62	66	70	78	76	74	76	78	75	78	79	75	74	73
26	40	M	55	RT RADIUS PLATING	12389	68	69	66	67	68	70	66	64	65	63	63	64	63	63	65	67	80	80	82	82	83	78	85	84	83	88	87
27	30	F	47	ORIF LT DISTAL HUMERUS	22678	67	67	64	63	63	65	64	62	65	66	64	63	63	65	64	65	78	77	76	78	75	74	73	78	80	78	76
28	35	M	62	ORIF RT PROXIMAL HUMERUS	43677	72	73	74	72	70	70	68	66	68	69	70	73	75	72	74	74	80	80	78	76	75	74	73	89	88	87	86
29	65	F	62	LT RADIUS PLATING	13452	73	74	75	73	70	67	68	70	72	74	67	70	72	71	70	73	78	77	76	80	80	76	76	77	78	78	80
30	35	F	54	ORIF RT DISTAL HUMERUS	22345	75	77	75	74	73	72	70	77	76	72	70	68	74	73	77	74	80	80	78	77	78	76	75	75	73	72	75

S.NO	AGE	SEX	WT	PROCEDURE	IP NO	GROUP 3D																									
						PERIOP SYSBP														POST OP SYSBP											
						5	10	15	20	25	30	35	40	45	50	55	60	65	70	75 0.5 HR	1HR	1.5 HR	2 HR	2.5 HR	3 HR	3.5 HR	4 HR	8 HR	12 HR	24 HR	
1	26	M	55	ORIF LT FOREARM	73025	134	130	130	127	128	126	128	127	136	134	133	137	138	132	133	134	135	132	131	128	133	130	132	135	133	130
2	35	F	50	ORIF RT HUMERUS	7724	138	137	135	133	134	137	138	133	140	132	133	136	139	140	141	142	139	138	137	140	141	140	138	142	140	137
3	65	F	65	LT RADIUS PLATING	6524	124	123	124	118	116	114	117	120	121	122	121	118	119	117	121	73	128	129	131	133	135	134	136	138	133	137
4	60	M	60	RT HUMERUS PLATING	6123	121	125	119	119	121	120	123	122	125	121	117	119	118	124	122	121	123	124	125	122	125	127	128	122	119	117
5	45	F	55	ORIF LT FOREARM	16253	114	108	109	110	111	113	112	112	114	109	110	113	116	108	120	132	134	133	135	131	135	130	128	127	125	130
6	55	F	45	ORIF RT HUMERUS	4125	128	126	126	128	130	131	125	124	123	126	126	126	127	128	130	127	125	124	126	128	124	125	126	128	130	124
7	42	M	55	K WIRE FIXATION LT FIRST METACARPAL	44135	132	133	130	128	129	132	131	130	128	129	130	131	132	130	128	132	133	134	132	135	136	131	132	130	131	128
8	30	M	65	RT HUMERUS PLATING	45128	135	134	136	132	132	131	132	134	126	127	135	137	139	132	128	135	131	129	131	130	130	127	128	129	126	131
9	23	M	60	ORIF LT FOREARM	33215	109	108	110	123	113	112	114	115	116	117	120	121	113	108	107	128	117	112	115	118	117	119	123	124	125	123
10	40	F	45	LT RADIUS PLATING	42134	105	104	108	110	112	107	105	107	110	111	112	108	110	109	113	113	111	110	107	106	105	107	108	109	110	112
11	55	F	42	RT DISTAL HUMERUS PLATING	55676	138	120	121	120	119	118	117	128	129	131	118	125	124	122	123	128	127	125	128	129	131	125	124	122	121	119
12	22	M	55	ORIF RT FOREARM	3245	132	131	129	126	124	128	130	131	130	127	128	129	131	123	132	127	129	125	129	131	127	126	128	130	131	132
13	43	F	50	K WIRE FIXATION RT FIRST METACARPAL	23245	117	115	113	123	120	118	118	116	115	123	124	120	121	122	121	115	117	118	121	115	114	113	119	123	117	118
14	32	M	56	ORIF RT HUMERUS	55543	122	123	120	117	116	118	121	125	130	121	126	132	130	121	120	121	122	123	125	120	121	123	125	121	119	124
15	42	F	45	RT FOREARM PLATING	5245	134	135	133	131	132	133	135	133	128	127	125	127	132	131	130	132	131	128	127	124	125	131	133	134	134	131
16	35	F	46	K WIRE FIXATION LT THUMB	67043	122	125	126	128	122	118	116	114	120	121	123	124	125	123	121	124	126	127	125	121	123	127	130	128	124	122
17	25	M	52	ORIF RT PROXIMAL HUMERUS	23478	139	141	142	138	136	138	135	135	137	137	135	134	133	139	140	142	141	143	139	144	142	145	140	139	137	140
18	43	F	55	ORIF LT DISTAL HUMERUS	54321	114	113	115	116	113	114	113	123	113	112	114	112	113	123	115	117	119	121	116	118	119	122	124	123	116	119
19	34	M	60	ORIF LT FOREARM	78965	124	123	122	124	125	121	120	120	117	116	115	114	113	112	114	124	126	122	123	125	127	127	129	127	125	124
20	50	F	65	ORIF RT FOREARM	32451	128	127	125	124	121	126	127	128	127	129	130	132	131	121	125	128	122	124	125	121	124	125	127	120	121	122
21	46	F	50	RT RADIUS PLATING	24989	131	127	126	128	128	121	120	119	117	116	115	114	121	120	119	123	132	131	128	131	130	131	123	128	129	133
22	32	F	48	ORIF LT DISTAL RADIUS	44321	124	122	124	125	124	122	121	126	124	121	122	121	126	125	130	127	126	125	128	122	128	127	128	122	125	127
23	22	M	60	RT RADIUS PLATING	4524	131	128	127	133	134	132	133	135	130	132	123	137	130	131	128	133	132	131	134	135	131	130	129	132	131	128
24	30	M	50	ORIF LT DISTAL HUMERUS	78652	127	126	124	125	127	128	122	124	125	126	125	124	122	121	123	127	128	126	124	121	122	125	126	127	124	122
25	32	M	52	LT RADIUS PLATING	56432	124	126	127	128	124	123	122	124	123	122	124	125	126	127	131	125	124	122	123	125	127	129	122	121	123	124
26	40	M	55	RT RADIUS PLATING	12389	130	133	123	125	128	131	123	132	131	130	127	126	131	130	128	128	122	124	126	127	123	121	125	123	124	127
27	30	F	47	ORIF LT DISTAL HUMERUS	23678	128	125	124	122	121	123	124	125	127	128	129	131	132	130	122	124	125	123	121	124	126	127	124	122	126	130
28	35	M	62	ORIF RT PROXIMAL HUMERUS	4367	144	145	146	151	153	160	142	140	143	152	155	154	153	152	147	127	128	125	127	129	131	133	135	128	129	133
29	65	F	62	LT RADIUS PLATING	13452	142	141	140	139	137	136	138	141	142	145	150	142	143	144	145	148	145	144	143	141	144	146	147	142	141	145
30	35	F	54	ORIF RT DISTAL HUMERUS	2245	135	134	132	131	132	134	136	137	138	132	132	131	140	138	136	138	139	136	134	133	136	132	137	136	134	132

S.NO	AGE	SEX	WT	PROCEDURE	IP NO	PERIOD DUA BP														POSTOP DUA BP											
						5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	0.5HR	1HR	1.5HR	2HR	2.5HR	3HR	3.5HR	4HR	8HR	12HR	24HR
1	26	M	55	ORIF LT FOREARM	73125	70	65	65	65	64	67	63	64	67	66	68	67	64	63	71	70	72	74	75	77	73	74	72	70	74	73
2	35	F	50	ORIF RT HUMERUS	77124	72	64	66	76	74	72	74	76	77	74	72	70	71	72	71	84	86	83	80	79	76	77	74	73	72	76
3	65	F	65	LT RADIUS PLATING	65124	73	65	63	84	85	80	79	78	82	84	84	80	78	79	81	132	88	84	86	85	84	85	86	88	84	83
4	60	M	60	RT HUMERUS PLATING	61123	69	66	64	76	77	78	75	73	76	78	77	74	73	76	78	76	78	77	74	75	75	77	79	80	76	75
5	45	F	55	ORIF LT FOREARM	16253	68	61	62	67	65	66	64	62	63	63	64	66	70	72	71	65	67	68	66	64	63	64	66	68	70	68
6	55	F	45	ORIF RT HUMERUS	41235	71	62	64	67	69	63	64	60	60	66	68	68	70	71	73	68	70	72	74	75	72	74	75	77	74	73
7	42	M	55	K WIRE FIXATION LT FIRST METACARPAL	44135	70	64	63	53	52	51	55	58	59	57	60	63	64	64	66	57	56	58	60	62	57	54	58	55	56	58
8	30	M	65	RT HUMERUS PLATING	45128	70	62	64	60	58	60	62	60	58	62	64	64	58	62	60	64	66	67	68	66	68	70	74	62	63	66
9	23	M	60	ORIF LT FOREARM	33215	66	60	60	54	56	58	57	60	62	57	55	56	58	60	54	58	56	54	54	55	57	56	54	53	56	58
10	40	F	45	LT RADIUS PLATING	42134	68	61	62	60	60	60	58	56	60	64	65	62	60	62	64	68	66	64	66	68	70	64	62	66	67	64
11	55	F	42	RT DISTAL HUMERUS PLATING	55676	68	65	63	68	66	67	64	63	64	65	63	68	70	71	72	76	75	74	73	72	77	80	74	73	75	77
12	22	M	55	ORIF RT FOREARM	33245	69	64	66	64	63	64	67	69	70	66	64	64	65	67	68	68	66	64	65	65	66	63	66	67	64	63
13	43	F	50	K WIRE FIXATION RT FIRST METACARPAL	33245	71	60	60	60	59	57	54	55	54	54	56	54	53	53	60	56	58	59	62	64	66	54	52	55	54	58
14	32	M	56	ORIF RT HUMERUS	55543	70	62	63	51	52	53	50	47	48	48	50	52	51	50	50	46	48	49	50	51	47	48	49	46	44	48
15	42	F	45	RT FOREARM PLATING	53245	68	64	62	66	67	66	68	70	72	66	68	69	70	68	66	72	70	68	66	72	68	69	71	73	74	70
16	35	F	46	K WIRE FIXATION LT THUMB	67843	69	66	68	76	74	74	76	78	72	72	70	73	74	75	76	74	77	76	79	80	74	75	76	77	78	79
17	25	M	52	ORIF RT PROXIMAL HUMERUS	23478	68	63	63	77	78	77	81	75	74	72	76	77	75	74	73	78	82	84	81	80	78	76	74	77	76	73
18	43	F	55	ORIF LT DISTAL HUMERUS	54321	68	62	67	75	74	74	75	76	77	78	76	75	78	80	82	76	77	75	74	76	78	75	77	74	78	80
19	34	M	60	ORIF LT FOREARM	78965	69	60	62	63	61	60	64	66	63	64	66	67	64	63	62	66	69	70	72	74	76	78	75	77	76	78
20	50	F	65	ORIF RT FOREARM	32451	71	64	65	66	67	70	65	66	68	66	67	69	70	67	66	68	69	71	74	76	77	78	80	82	84	76
21	46	F	50	RT RADIUS PLATING	24389	71	64	64	68	67	66	66	64	67	64	63	65	65	67	66	65	66	68	70	64	62	64	66	67	68	64
22	32	F	48	ORIF LT DISTAL RADIUS	44321	70	65	63	67	69	63	62	66	64	66	70	68	66	65	67	74	73	72	70	76	77	74	72	72	76	77
23	22	M	60	RT RADIUS PLATING	45324	71	62	62	76	77	74	73	72	76	77	74	76	75	80	73	76	77	78	74	75	77	79	80	76	74	73
24	30	M	50	ORIF LT DISTAL HUMERUS	7852	72	63	60	76	78	73	68	70	70	76	82	82	80	78	76	78	80	82	80	76	74	77	76	74	77	76
25	32	M	52	LT RADIUS PLATING	56452	74	62	62	76	74	78	72	74	75	76	77	74	80	77	72	64	66	68	68	70	72	71	68	66	66	70
26	40	M	55	RT RADIUS PLATING	12389	70	63	59	64	65	66	64	66	64	67	68	66	65	64	63	66	67	64	63	64	66	67	68	63	62	60
27	30	F	47	ORIF LT DISTAL HUMERUS	2678	69	60	63	55	57	54	56	57	58	61	63	62	64	66	68	76	74	73	72	74	76	77	78	80	76	74
28	35	M	62	ORIF RT PROXIMAL HUMERUS	4367	68	62	64	86	84	80	88	90	92	94	90	92	94	92	90	84	83	80	78	79	84	84	83	80	84	85
29	65	F	62	LT RADIUS PLATING	13452	70	63	63	88	86	85	84	83	88	87	86	88	90	90	89	86	86	87	88	86	84	85	87	89	83	82
30	35	F	54	ORIF RT DISTAL HUMERUS	22345	71	61	65	66	67	64	64	66	65	64	63	65	67	70	70	68	67	66	70	68	69	64	66	68	66	63

S.NO	AGE	SEX	WT	PROCEDURE	IP NO	GROUP BD																										
						PRE OP MAP												POSTOP MAP														
						5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	0.5 HR	1 HR	1.5 HR	2 HR	2.5 HR	3 HR	3.5 HR	4 HR	8 HR	12 HR	24 HR	
1	26	M	55	ORIF LT FOREARM	73125	86.6667	86.6667	86.6667	85.3333	86.6667	84.6667	85	90	80.6667	89.6667	90.3333	88.6667	86	91.6667	83.5556	91.3333	93	93.3333	93.6667	94	93	92.6667	92	91.6667	93.6667	92	
2	35	F	50	ORIF RT HUMERUS	77124	88.3333	89	95	94	93.6667	95.3333	95	90	89.3333	92.3333	92	93.6667	94.6667	94.3333	84.6667	103.3333	103.6667	101.3333	99	99.3333	97.6667	98	95.3333	96	94.6667	96.3333	
3	65	F	65	LT RADIUS PLATING	65124	84.3333	83.3333	95.3333	95.3333	91.3333	91.6667	92	95	96.6667	96.3333	92.6667	91.6667	91.6667	94.3333	81.6667	112.3333	101.3333	99	101	101	101	101.3333	102.6667	104.6667	100.3333	101	
4	60	M	60	RT HUMERUS PLATING	61123	85.6667	82.3333	90.3333	91.6667	92	91	89.3333	92.3333	92.3333	91.3333	89	88	92	92.6667	78.0000	91	93	92.6667	91	91	90.6667	91.6667	93.6667	95.3333	94	90.3333	89
5	45	F	55	ORIF LT FOREARM	16253	76.6667	77.6667	81.3333	80.3333	81.6667	80	78	78.6667	80	78.3333	79.3333	81.6667	85.3333	87.3333	87.3333	77.2222	87.3333	89.3333	89.6667	89	86.3333	87	86	86.6667	87.6667	88.3333	88.6667
6	55	F	45	ORIF RT HUMERUS	41235	83.3333	84.6667	87.3333	89.3333	85.6667	84.3333	81.3333	81	86	87.3333	87.3333	89	90	92	82.3333	87.6667	88.3333	89.3333	91.3333	92.6667	89.3333	91	92	94	92.6667	90	
7	42	M	55	K WIRE FIXATION LT FIRST METACARPAL	44125	87	85.3333	78	77.6667	78	80.3333	82	82	81	83.3333	85.6667	86.6667	86	86.6667	84.4444	82	81.6667	83.3333	84	86.3333	83.3333	79.6667	82.6667	80	81	81.3333	
8	30	M	65	RT HUMERUS PLATING	45128	86	88	84	82.6667	83.6667	85.3333	84.6667	80.6667	83.6667	87.6667	88.3333	85	85.3333	82.6667	83.7778	87.6667	87.6667	87.6667	89	87.3333	88.6667	89	92	84.3333	84	87.6667	
9	23	M	60	ORIF LT FOREARM	33215	76	76.6667	77	75	76	76	78.3333	80	77	76.6667	77.6667	76.3333	76	71.6667	76.2222	81.3333	76.3333	73.3333	74.3333	76	77	77	77	76.6667	79	79.6667	
10	40	F	45	LT RADIUS PLATING	42124	75.3333	77.3333	76.6667	77.3333	75.6667	73.6667	73	75.6667	79.6667	80.6667	77.3333	76.6667	77.6667	80.3333	75.5556	83	81	79.3333	79.6667	80.6667	81.6667	78.3333	77.3333	80.3333	81.3333	80	
11	55	F	42	RT DISTAL HUMERUS PLATING	55676	83.3333	82.3333	85.3333	83.6667	84	81.6667	84.6667	85.6667	87	81.3333	87	88	88	89	83.5556	93.3333	92.3333	91	91.3333	91	95	95	90.6667	93.3333	91.3333	91	
12	22	M	55	ORIF RT FOREARM	32945	86.3333	87	84.6667	83.3333	85.3333	88	89.6667	90	86.3333	85.3333	85.6667	87	85.6667	89.3333	82.6667	87.6667	87	84.3333	86.3333	87	86.3333	84	86.6667	88	86.3333	86	
13	43	F	50	K WIRE FIXATION RT FIRST METACARPAL	23245	78.3333	77.6667	81	79.3333	77.3333	75.3333	75.3333	74.3333	77	78.6667	76	75.6667	76	80.3333	76.0000	75.6667	77.6667	76.6667	81.6667	81	82	73.6667	74.3333	77.6667	75	78	
14	32	M	56	ORIF RT HUMERUS	55343	82.3333	82	73	73.3333	74.6667	73.6667	73	75.3333	72.3333	75.3333	78.6667	77.3333	73.6667	73.3333	78.0000	71	72.6667	73.6667	75	74	71.6667	73	74.3333	71	69	73.3333	
15	42	F	45	RT FOREARM PLATING	52945	87.6667	85.6667	87.6667	88.6667	88.3333	90.3333	91	90.6667	86.3333	87	88.3333	90.6667	89	87.3333	81.3333	92	90.3333	88	86.3333	89.3333	87	89.6667	91.6667	93.3333	94	90.3333	
16	35	F	46	K WIRE FIXATION LT THUMB	67043	85.6667	87.3333	93.3333	90	88.6667	89.3333	90	88	88.3333	87.6667	90	91	91	91	79.1111	90.6667	93.3333	93	94.3333	93.6667	91.3333	92.3333	94	94	93.3333	93.3333	
17	25	M	52	ORIF RT PROXIMAL HUMERUS	23478	89	89.3333	97.3333	97.3333	97.3333	99	95	95	95.6667	95.6667	96	94.3333	95.6667	95.3333	82.7778	99.3333	101.6667	103.6667	100.3333	101.3333	99.3333	99	96	97.6667	96.3333	95.3333	
18	43	F	55	ORIF LT DISTAL HUMERUS	54321	79	83	88.6667	87	87.3333	87.6667	91.6667	89	89.3333	88.6667	87.3333	89.6667	94.3333	93	76.0000	89.6667	91	91.3333	88	90	91.6667	90.6667	92.6667	91.3333	91.6667	93	
19	34	M	60	ORIF LT FOREARM	78965	81	82	83.3333	82.3333	80.3333	82.6667	84	81	81.3333	82.3333	82.6667	80.3333	79.3333	79.3333	80.2222	85.3333	88	87.3333	89	91	93	94.3333	93	93.6667	92.3333	93.3333	
20	50	F	65	ORIF RT FOREARM	32451	85	85	85.3333	85	88.6667	85.6667	86.6667	87.6667	87	88	90	90.3333	85	85.6667	81	88	86.6667	88.6667	91	91	92.6667	93.6667	95.6667	94.6667	95.3333	91.3333	
21	46	F	50	RT RADIUS PLATING	24389	85	84.6667	88	87.3333	84.3333	84	82.3333	83.6667	81.3333	80.3333	81.3333	83.6667	84.6667	83.6667	80.6667	84.3333	88	89	89.3333	86.3333	84.6667	86.3333	85	87.3333	88.3333	87	
22	32	F	48	ORIF LT DISTAL RADIUS	44321	84	83.3333	86.3333	87.3333	82.6667	81.6667	86	84	84.3333	87.3333	85.6667	86	85	88	78.3333	91.6667	90.6667	89.6667	89.3333	91.3333	94	91.6667	90.6667	88.6667	92.3333	93.6667	
23	22	M	60	RT RADIUS PLATING	45324	84	83.6667	95	96	93.3333	93	93	94	95.3333	90.3333	96.3333	93.3333	97	91.3333	91.3333	95	95.3333	95.6667	94	95	95	96	96.3333	94.6667	93	91.3333	
24	30	M	50	ORIF LT DISTAL HUMERUS	78652	84	81.3333	92.3333	94.3333	91.3333	86	88	88.3333	92.6667	96.3333	96	94	92.3333	91.6667	80.0000	94.3333	96	96.6667	94.6667	91	90	93	92.6667	91.6667	92.6667	91.3333	
25	32	M	52	LT RADIUS PLATING	56432	83.3333	83.6667	93.3333	90.6667	93	88.6667	90.6667	91	91.3333	92.6667	91	95.3333	93.6667	81.4444	84.3333	85.3333	86	86.3333	88.3333	90.3333	90.3333	86	84.3333	85	88		
26	40	M	55	RT RADIUS PLATING	12389	86.3333	80.3333	84.3333	86	87.6667	83.6667	88	86.3333	88	87.6667	86	87	86	84.6667	79.6667	86.6667	85.3333	84	84	85	85	85	87	83	82.6667	82.3333	
27	30	F	47	ORIF LT DISTAL HUMERUS	23678	81.6667	83.3333	77.3333	78.3333	77	78.6667	79.6667	81	83.3333	85	85	86.6667	87.3333	86	80.4444	92	91	89.6667	88.3333	90.6667	92.6667	93.6667	93.3333	94	92.6667	92.6667	
28	35	M	62	ORIF RT PROXIMAL HUMERUS	43267	89.6667	91.3333	107.6667	107	106.6667	106	106.6667	109	113.3333	111.6667	112.6667	113.6667	112	109	83.2222	98.3333	98	95	94.3333	95.6667	99.6667	100.3333	100.3333	96	99	101	
29	65	F	62	LT RADIUS PLATING	13452	89	88.6667	105	103	102	102	102.3333	106	106.3333	107.3333	106	107.6667	108	107.6667	84	106.6667	105.6667	106	106.3333	104.3333	104	105.3333	107	106.6667	102.3333	103	
30	35	F	54	ORIF RT DISTAL HUMERUS	22945	85.3333	87.3333	87.6667	88.6667	87.3333	88	89.6667	89.3333	86.6667	86	87	91.3333	92.6667	92	83.5556	91.3333	91	89.3333	91.3333	89.6667	91.3333	86.6667	89.6667	90.6667	88.6667	86	

SNO	AGE	SEX	WT	PROCEDURE	PNO	GROUPD																										
						PREOPR							PEROPR							POSTOPR												
						5	10	15	20	25	30	35	40	45	50	55	60	65	70	75HR	1HR	15HR	2HR	25HR	3HR	35HR	4HR	4HR	12HR	24HR		
1	26	M	55	ORHETROGRAM	7525	13	14	15	13	12	14	13	13	15	16	17	18	9	12	14	16	12	13	14	12	15	15	12	13	12	14	15
2	35	F	50	ORHETROGRAMS	7724	14	16	16	14	11	10	14	14	14	15	14	13	12	12	14	14	16	16	16	17	18	16	17	18	16	14	
3	65	F	65	ITRADIOPLATING	6524	15	16	14	16	14	15	14	15	16	17	18	14	17	19	20	20	13	12	13	14	15	14	15	12	13	14	
4	60	M	60	ITRADIOPLATING	6123	16	14	16	13	14	13	16	16	15	15	16	18	20	14	16	18	20	19	18	18	17	20	19	18	17	16	15
5	45	F	55	ORHETROGRAM	1623	14	16	15	15	16	14	17	14	16	16	19	12	15	17	18	17	15	17	18	17	16	16	18	20	21	14	18
6	55	F	45	ORHETROGRAMS	4125	15	15	15	13	13	15	15	15	15	18	11	8	9	14	16	18	18	17	18	16	15	14	15	18	12	14	16
7	42	M	55	ITRADIOPLATINGMETACAPAL	4435	16	16	14	15	14	14	14	16	14	15	17	18	16	14	13	12	20	18	19	12	14	16	18	21	14	16	18
8	30	M	65	ITRADIOPLATING	4528	14	14	14	15	14	13	15	17	15	13	14	13	15	13	12	11	14	16	17	18	16	16	17	18	16	18	15
9	23	M	60	ORHETROGRAM	3225	15	14	16	16	13	15	16	15	15	16	17	15	14	14	18	15	15	16	16	17	14	15	16	18	15	18	17
10	40	F	45	ITRADIOPLATING	4224	13	14	15	15	13	15	16	17	16	9	11	12	13	14	15	14	17	16	18	17	16	18	20	15	14	12	16
11	55	F	42	ITRADIOPLATINGMETACAPAL	5576	15	15	14	14	12	16	14	17	15	18	16	14	13	12	11	13	14	16	13	15	16	18	13	12	11	15	17
12	22	M	55	ORHETROGRAM	3235	14	13	16	13	15	13	14	14	14	17	18	19	13	18	20	17	15	17	18	16	17	14	17	18	16	15	16
13	43	F	50	ITRADIOPLATINGMETACAPAL	3245	16	13	15	17	16	13	13	15	16	18	18	15	16	16	18	14	13	12	13	14	16	14	15	12	12	13	14
14	32	M	56	ORHETROGRAMS	5533	15	16	15	16	15	12	15	15	14	20	18	17	16	15	9	10	15	16	14	13	12	11	14	15	16	14	18

S.NO	AGE	SEX	WT	PROCEDURE	PNO	GROUP D		TIME OF RECOVERY (MIN)	DURATION OF ANALGESIA	VAS PAIN SCORE												COMPLICATIONS			
						ONSET OF MOTOR BLOCK (MIN)	ONSET OF SENSORY BLOCK (MIN)			0.5HR	1HR	1.5HR	2HR	2.5HR	3HR	3.5HR	4HR	8HR	12HR	24HR	POW	PNEUMOTHORAX	CONVULSIONS	ARRHYTHMIA	ESPUNCTURE
1	26	M	55	ORIF LT FOREARM	7925	2	4	650	646	1	1	2	2	3	3	4	4	3	3	5N	N	N	N	N	
2	35	F	50	ORIF RT HUMERUS	7724	2	4	720	716	2	2	2	2	3	3	3	4	4	4	5N	N	N	N	N	
3	65	F	65	LT RADIOUS PLATING	6524	2	3	650	647	1	1	1	2	3	3	4	5	5	5	6N	N	N	N	N	
4	60	M	60	RT HUMERUS PLATING	6123	2	5	600	595	1	1	1	1	2	3	4	4	5	5	5N	N	N	N	N	
5	45	F	55	ORIF LT FOREARM	5623	3	5	510	505	2	2	3	3	4	6	6	7	8	8	8N	N	N	N	N	
6	55	F	45	ORIF RT HUMERUS	4125	2	4	650	646	2	3	2	3	3	3	4	6	6	7	7N	N	N	N	N	
7	42	M	55	X WIRE FIXATION LT PROX METACARPAL	4425	3	5	600	605	1	1	1	1	2	4	4	4	6	6	6N	N	N	N	N	
8	30	M	65	RT HUMERUS PLATING	4528	4	5	500	495	1	1	2	2	3	3	3	4	5	5	6N	N	N	N	N	
9	23	M	60	ORIF LT FOREARM	3325	2	4	500	516	1	2	2	3	3	3	4	4	6	6	6N	N	N	N	N	
10	40	F	45	LT RADIOUS PLATING	4234	3	3	500	517	1	1	1	2	2	2	3	3	3	4	4N	N	N	N	N	
11	55	F	42	RT DISTAL HUMERUS PLATING	5576	2	4	510	506	2	2	2	3	3	3	4	4	5	7	7N	N	N	N	N	
12	22	M	55	ORIF RT FOREARM	3345	3	5	540	555	1	1	1	2	2	3	3	3	5	5	6N	N	N	N	N	
13	43	F	50	X WIRE FIXATION RT FIRST METACARPAL	2345	3	5	580	575	1	2	2	2	3	3	3	4	4	4	6N	N	N	N	N	
14	32	M	56	ORIF RT HUMERUS	5543	4	6	600	594	1	1	1	1	3	4	4	5	6	7	9N	N	N	N	N	
15	42	F	45	RT FOREARM PLATING	5345	3	5	610	605	2	2	3	3	4	4	4	6	7	7	8N	N	N	N	N	
16	35	F	46	X WIRE FIXATION LT THUMB	6743	5	5	700	775	2	2	3	4	4	4	6	6	7	8	8N	N	N	N	N	
17	25	M	52	ORIF RT PROXIMAL HUMERUS	2478	3	5	550	545	1	1	1	2	2	3	3	3	5	6	6N	N	N	N	N	
18	43	F	55	ORIF LT DISTAL HUMERUS	5421	4	7	540	533	1	1	1	2	3	3	4	4	5	6	7N	N	N	N	N	
19	34	M	60	ORIF LT FOREARM	7035	2	4	570	566	2	2	3	3	3	4	4	5	7	7	8N	N	N	N	N	
20	50	F	66	ORIF RT FOREARM	3451	2	4	570	566	1	1	1	2	2	2	3	5	5	6	6N	N	N	N	N	
21	46	F	50	RT RADIOUS PLATING	4489	3	3	580	577	2	2	2	3	3	3	3	3	4	5	5N	N	N	N	N	
22	32	F	48	ORIF LT DISTAL RADIOUS	4421	2	4	555	551	1	1	3	4	4	4	4	5	6	6	6N	N	N	N	N	
23	22	M	60	RT RADIOUS PLATING	4524	4	5	600	595	2	2	3	2	3	4	4	4	5	6	7N	N	N	N	N	
24	30	M	50	ORIF LT DISTAL HUMERUS	7052	3	5	610	605	1	1	1	2	2	2	3	3	3	4	6N	N	N	N	N	
25	32	M	52	LT RADIOUS PLATING	5432	2	4	616	612	2	2	2	3	4	4	5	5	5	6	6N	N	N	N	N	
26	40	M	55	RT RADIOUS PLATING	1289	3	5	543	538	1	1	2	2	3	3	3	4	4	5	5N	N	N	N	N	
27	30	F	47	ORIF LT DISTAL HUMERUS	2378	3	6	600	674	2	2	2	4	5	5	6	7	7	8	8N	N	N	N	N	
28	35	M	62	ORIF RT PROXIMAL HUMERUS	4357	2	5	670	665	1	1	2	2	3	3	3	3	5	5	6N	N	N	N	N	
29	65	F	62	LT RADIOUS PLATING	1342	2	4	760	756	2	2	3	3	4	4	4	6	6	6	7N	N	N	N	N	
30	35	F	54	ORIF RT DISTAL HUMERUS	2245	3	5	600	595	1	1	1	2	3	3	4	2	4	5	5N	N	N	N	N	