A DISSERTATION ON

BILATERAL SUPERFICIAL CERVICAL PLEXUS BLOCK COMBINED WITH GENERAL ANAESTHESIA FOR THYROID SURGERY – A COMPARATIVE STUDY OF ANALGESIC EFFICACY, SAFETY AND INTRAOPERATIVE HAEMODYNAMIC STATUS

Submitted to

THE TAMIL NADU DR. MGR. MEDICAL UNIVERSITY,

CHENNAI–600032.TAMIL NADU.

In partial fulfillment of the regulations for the award of the degree of

M.D. DEGREE BRANCH-X

ANAESTHESIOLOGY

GOVERNMENT MOHAN KUMARA MANGALAM

MEDICAL COLLEGE, SALEM, TAMILNADU.

APRIL 2016

Government Mohan Kumaramangalam Medical

College&Hospital

DECLARATION BY THE CANDIDATE

I hereby declare that this dissertation titled "**Bilateral superficial cervical plexus block combined with general anaesthesia for thyroid surgery – a comparative study of analgesic efficacy, safety and intraoperative haemodynamic status**" is a bonafide and genuine research work carried out by me under the guidance of ***Dr. K. Murugesan, M.D., DA.,Associate Professor***, Department of Anesthesiology, **Government Mohan Kumaramangalam Medical College Hospital, Salem, Tamil Nadu, India.**

Signature of the Candidate.

DR.V.NEDUMARAN

Date: .09.2015

Place: Salem

Government Mohan Kumaramangalam

Medical College& Hospital

CERTIFICATE BY THE GUIDE

This is to certify that this dissertation on "**Bilateral superficial cervical plexus block combined with general anaesthesia for thyroid surgery – a comparative study of analgesic efficacy, safety and intraoperative haemodynamic status**" is a bonafide work done by **DR. V. NEDUMARAN** in partial fulfillment of the requirement for the degree of **M. D.** in Anesthesiology, examination to be held in **2016**.

Signature of the Guide

Dr. K. MURUGESAN, MD., DA.,
Associate Professor,
Department of Anesthesiology,
Government Mohan Kumaramangalam
Medical College&Hospital, Salem.

Date:.09. 2015
Place: Salem

Government Mohan Kumaramangalam

Medical College& Hospital

ENDORSEMENT BY THE HEAD OF DEPARTMENT

This is to certify that this dissertation "**Bilateral superficial cervical plexus block combined with general anaesthesia for thyroid surgery – a comparative study of analgesic efficacy, safety and intraoperative haemodynamic status**"titled is a bonafide work done by**DR.V. NEDUMARAN** under overall guidance and supervision of***DR. G. SIVAKUMAR M.D.,DA., Professor and Head***, Department of Anesthesiology, **Government Mohan Kumaramangalam Medical College Hospital,** in partial fulfillment of the requirement for the degree of **M.D.** in Anesthesiology, examination to be held in **2016.**

Date:.09.2015

Place : Salem

Signature of the HOD

Dr. G.SIVAKUMAR MD DA,

Professor and HeadDepartment of Anesthesiology

Government Mohan Kumaramangalam Medical College Hospital, Salem, Tamil Nadu, India

Government Mohan Kumaramangalam

Medical College& Hospital

ENDORSEMENT BY THE DEAN OF THE INSTITUTION

This is to certify that this dissertation entitled"**Bilateral superficial cervical plexus block combined with general anaesthesia for thyroid surgery – a comparative study of analgesic efficacy, safety and intraoperative haemodynamicstatus**"is a bonafide work done by **DR.V. NEDUMARAN**, under overall guidance and supervision of**Dr.G.SIVAKUMAR MD DA**, Professor and Head, Department of Anesthesiology, **Government Mohan Kumaramangalam Medical College Hospital,** in partial fulfillment of the requirement for the degree of **M. D**. in Anesthesiology, examination to be held in**2016.**

Signature of the Dean

DEAN

Govt. Mohan Kumaramangalam and Medical College Hospital Salem, Tamil Nadu, India

Government Mohan Kumaramangalam

Medical College &Hospital

COPYRIGHT

I hereby declare that the **Government Mohan Kumaramangalam Medical College Hospital, Salem, Tamil Nadu, India;** shall have the rights to preserve, use and disseminate this dissertation / thesis in print or electronic format for academic / research purpose.

Signature of the Candidate

DR.V. NEDUMARAN.

Date:.09.2015

Place: Salem

ACKNOWLEDGEMENTS

My sincere thanks to,

Dr. K. Murugesan, my guide, for the support, encouragement and guidance throughout the study.

Dr. G. Siva kumar, head of the department, for his help and guidance in conducting the study.

Dr.R. Nagarajan and Dr. C. SanthanaKrishnan for their help and support in performing the study.

Dr. A. Mohanhariraj, my co-guide for all the constant support, encouragement and guidance in preparing this dissertation.

Dr. Radhika, Dr. Vasanthageethan, Dr. Rameshkumar, Dr. Aravindkumar, Dr.Senthilkumar, Dr. Dilish, Dr. Arunachalam, Dr. Prasath, Dr. Jothianand, Dr. Venkatragavan and Dr. Nagarajan for their help and support in performing the study.

Dr. Sureshbabu, Dr. Seethaapathy, Dr. Kumaresan, Dr. Selvakumar, Dr. Sangeetha, Dr. Kayalvizhi, Dr. Rajkumar, Dr. Venkatraman, Dr.Sakthivel, Dr.Rameshkumar and Dr. Mythily and Dr. Srilekha for all their help and guidance in doing this work.

Dr. Selvaraj, Dr. Vijayakumar, Dr. Megala and Dr. Lidiya George for their immense support during my project and for always being good friends of mine.

Dr. Ramesh, Dr. Muthamil Selvan, Dr. Rajarajan, Dr. AfreenNahar, Dr. Jayashree and Dr. Sasirekha for being good friends and for their support and advice.

Department of Surgery, for their help in getting the patients.

The members of Ethical Committee, Govt. Mohan Kumaramangalam Medical College,Salem.

The patients, who gave their consent and cooperation for the study.

My family for their unconditional support.

Last but not the least, God, for all the blessings.

DATE :
PLACE: Salem

Signature of the Candidate

DR.V. NEDUMARAN

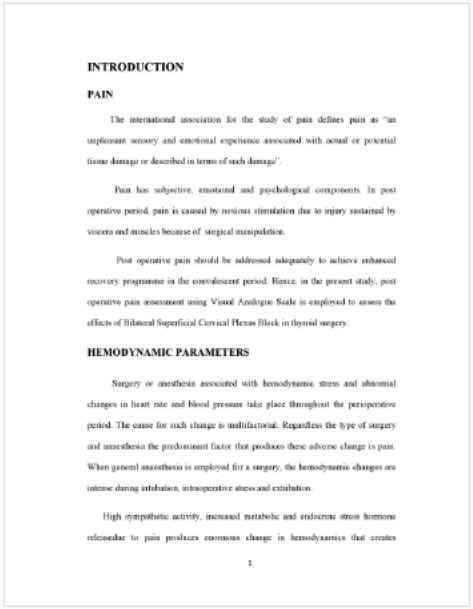
turnitin

Digital Receipt

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

The first page of your submissions is displayed below.

Submission author:	201420701.md Anesthesiology Dr....
Assignment title:	TNMGRMU EXAMINATIONS
Submission title:	Bilateral superficial cervical plexus ...
File name:	Nedumaran_thesis.doc
File size:	1.6M
Page count:	75
Word count:	9,169
Character count:	50,658
Submission date:	20-Sep-2015 12:44AM
Submission ID:	572581176



INTRODUCTION

PAIN

The international association for the study of pain defines pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage".

Pain has subjective, emotional and psychological components. In post operative period, pain is caused by noxious stimulation due to injury sustained by viscera and muscles because of surgical manipulation.

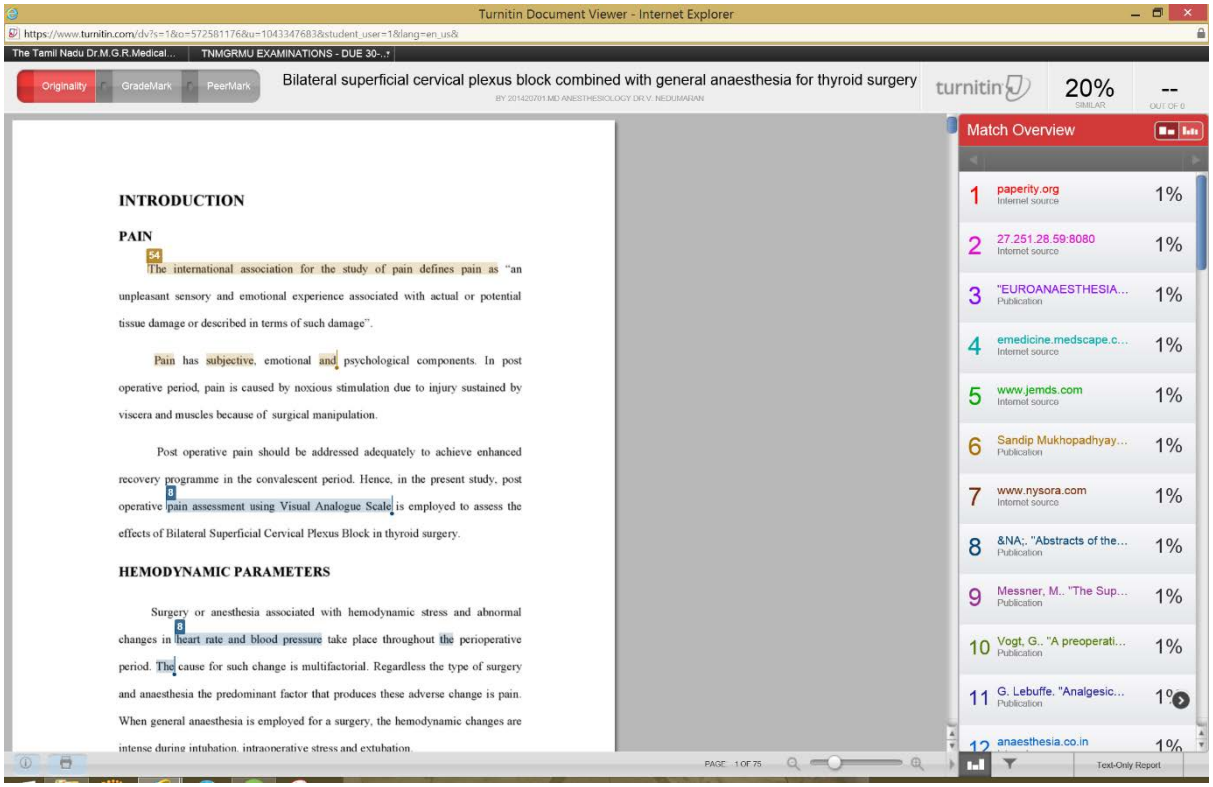
Post operative pain should be addressed adequately to achieve enhanced recovery programme in the convalescent period. Hence, in the present study, post operative pain assessment using Visual Analogue Scale is employed to assess the effects of Bilateral Superficial Cervical Plexus Block in thyroid surgery.

HEMODYNAMIC PARAMETERS

Surgery or anesthesia associated with hemodynamic stress and abnormal changes in heart rate and blood pressure take place throughout the perioperative period. The cause for such change is multifactorial. Regardless the type of surgery and anaesthesia the predominant factor that produces these adverse change is pain. When general anaesthesia is employed for a surgery, the hemodynamic changes are intense during intubation, intraoperative stress and extubation.

High sympathetic activity, increased metabolic and endocrine stress hormone releasedue to pain produces enormous change in hemodynamics that creates

1


Turnitin Document Viewer - Internet Explorer
https://www.turnitin.com/dv?s=1&o=572581176&u=1043347683&student_user=1&lang=en_us&
The Tamil Nadu Dr.M.G.R.Medical...
TNMGRMU EXAMINATIONS - DUE 30-...
Originality
GradeMark
PeerMark
Bilateral superficial cervical plexus block combined with general anaesthesia for thyroid surgery
turnitin
20%
SIMILAR
--
OUT OF 0
INTRODUCTION
PAIN
The international association for the study of pain defines pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage".
Pain has subjective, emotional and psychological components. In post operative period, pain is caused by noxious stimulation due to injury sustained by viscera and muscles because of surgical manipulation.
Post operative pain should be addressed adequately to achieve enhanced recovery programme in the convalescent period. Hence, in the present study, post operative pain assessment using Visual Analogue Scale is employed to assess the effects of Bilateral Superficial Cervical Plexus Block in thyroid surgery.
HEMODYNAMIC PARAMETERS
Surgery or anesthesia associated with hemodynamic stress and abnormal changes in heart rate and blood pressure take place throughout the perioperative period. The cause for such change is multifactorial. Regardless the type of surgery and anaesthesia the predominant factor that produces these adverse change is pain. When general anaesthesia is employed for a surgery, the hemodynamic changes are intense during intubation, intraoperative stress and extubation.
PAGE 1 OF 75
Match Overview
1 paperity.org Internet source 1%
2 27.251.28.59:8080 Internet source 1%
3 "EUROANAESTHESIA... Publication 1%
4 emedicine.medscape.c... Internet source 1%
5 www.jemds.com Internet source 1%
6 Sandip Mukhopadhyay... Publication 1%
7 www.nysora.com Internet source 1%
8 &NA;. "Abstracts of the... Publication 1%
9 Messner, M.. "The Sup... Publication 1%
10 Vogt, G.. "A preoperati... Publication 1%
11 G. Lebuffe. "Analgesic... Publication 1%
12 anaesthesia.co.in 1%
Text-Only Report

Bilateral superficial cervical plexus block combined with general anaesthesia for thyroid surgery – a comparative study of analgesic efficacy, safety and intraoperative haemodynamic status

ORIGINALITY REPORT

20%	10%	18%	5%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	paperity.org Internet Source	1%
2	27.251.28.59:8080 Internet Source	1%
3	"EUROANAESTHESIA 2006: Annual Meeting of the European Society of Anaesthesiology, Madrid, Spain, June 3–6, 2006", European Journal of Anaesthesiology, 06/2006 Publication	1%
4	emedicine.medscape.com Internet Source	1%
5	www.jemds.com Internet Source	1%
6	Sandip Mukhopadhyay. "Bilateral superficial cervical plexus block with or without low-dose intravenous ketamine analgesia: effective, simple, safe, and cheap alternative to	1%

ABSTRACT

ABSTRACT

Bilateral superficial cervical plexus block combined with general anaesthesia for thyroid surgery – a comparative study of analgesic efficacy, safety and intraoperative haemodynamic status

OBJECTIVES

To compare the efficacy of analgesia, incidence of adverse effects and intra operative hemodynamic status ofbilateral superficial cervical plexus block with general anesthesia in thyroid surgeries.

METHODS

Bilateral superficial cervical plexus block was performed in patients undergoing simple thyroid surgery using normal saline in 29 control group patients and 0.5% Bupivacaine in 29 study group patients. Intraoperative hemodynamic status was monitored in both the groups using parameters such as heart rate, systolic blood pressure, diastolic blood pressure and mean blood pressure. Post operative analgesia was assessed using numerical visual analogue scale for first 24 hours after surgery.

RESULTS

Hemodynamic parameters are not altered during the intraoperative period in the study and control group. Post operative pain is significantly reduced in the bupivacaine group when compared to the control group.

CONCLUSION

Bilateral Superficial Cervical Plexus Block with bupivacaine did not alter the intraoperative hemodynamic parameters and was effective in reducing the pain during the postoperative period.

Ref. No.5694/MEI/P.G/2015

Office of the Dean,
Govt. Mohan Kumaramangalam
Medical College, Salem – 30.
Dated: .02.2015.

Ethical Committee Meeting held on 08.01.2015 at 11.00 A.M in the Seminar Hall, IInd Floor, Medicine Block, Govt. Mohan Kumaramangalam Medical College Hospital, Salem 01.

The following Members were attended the Meeting.

MEMBERS:

1. Dr. N. Mohan, MS.,FICS.,FAIS.,FMMC., Dean, Govt. Mohan Kumaramangalam Medical College, Salem.
2. Dr. A. P. Ramasamy, MD., Chairman, ECIRB, External Clinician.
3. Dr. V. Dhandapani, MD., Deputy Chairman, External Social Scientist, ECIRB.
4. Mr. S. Shanmugam, B.Sc., BL, Advocate, External Legal Expert.
5. Mrs. Ruby Thiyagarajan, Secretary, YWCA, Salem - Social worker.
6. Dr. T. Swaminathan, MS., Medical Superintendent, Govt. Mohan Kumaramangalam Medical College Hospital, Salem.
7. Dr. S. Mohamed Musthafa, MD., Vice Principal, Govt. Mohan Kumaramangalam Medical College, Salem.
8. Dr. S. Vijayarangan, MD., Associate Professor of Pharmacology, Govt. Mohan Kumaramangalam Medical College, Salem.
9. Dr. Priya Jeyapal, MD., Professor and HOD of Biochemistry, Govt. Mohan Kumaramangalam Medical College, Salem.

Sl. No.	Name of the Presenter with Address	Title	Name of the Guide and Address	Whether it is Approved or not.
1.	Dr. V. Nedumaran, II Year MD., P. G. Student, GMKMC, Salem – 30.	Bilateral superficial cervical plexus block combined with General Anaesthesia for thyroid surgery – A comparative study on intropeative haemodynamic status and post operative analgesia.	Dr. Kalyanasundaram, MD., D.A, Associate Professor of Anaesthesiology Department, GMKMC, Salem.	Approved

The Ethical Committee examined the studies in detail and is pleased to accord Ethical Committee approval for the above Post Graduate of this College to carry out the studies with the following conditions.

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

DEAN

LIST OF ABBREVIATIONS USED

BSCPB – Bilateral Superficial Cervical Plexus Block

HR – Heart Rate

SBP - Systolic Blood Pressure

DBP – Diastolic Blood Pressure

MAP – Mean Arterial Pressure

ECG – Electrocardiography

VAS- Visual Analog Score

TABLE OF CONTENTS

INTRODUCTION	**1**
REVIEW OF LITERATURE	**4**
AIMS AND OBJECTIVES	**32**
MATERIALS AND METHODS	**33**
RESULTS	**41**
DISCUSSION	**66**
CONCLUSION	**72**
LIMITATION	**73**
FUTURE COURSE	**74**
SUMMARY	**75**
REFERENCES	**77**
ANNEXURES	
Proforma Sheet	**79**
Consent forms	**80**
Master Chart	**81**

INTRODUCTION

PAIN

The international association for the study of pain defines pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage”.

Pain has subjective, emotional and psychological components. In post operative period, pain is caused by noxious stimulation due to injury sustained by viscera and muscles because of surgical manipulation.

Post operative pain should be addressed adequately to achieve enhanced recovery programme in the convalescent period. Hence, in the present study, post operative pain assessment using Visual Analogue Scale is employed to assess the effects of Bilateral Superficial Cervical Plexus Block in thyroid surgery.

HEMODYNAMIC PARAMETERS

Surgery or anesthesia associated with hemodynamic stress and abnormal changes in heart rate and blood pressure take place throughout the perioperative period. The cause for such change is multifactorial. Regardless the type of surgery and anaesthesia the predominant factor that produces these adverse change is pain. When general anaesthesia is employed for a surgery,

the hemodynamic changes are intense during intubation, intraoperative stress and extubation.

High sympathetic activity, increased metabolic and endocrine stress hormone releasedue to pain produces enormous change in hemodynamics that creates increased myocardial oxygen demand and consumption producing extreme stress on the cardiovascular system. These changes are deleterious in patients with reduced myocardial reserve.

To attenuate these unwanted stress responses, various techniques are employed like administration of parentral opiods, intravenous lidocaine, beta blockers, and vasodilators like nitroglycerine and local anaesthetic techniques like field block, nerve block, plexus block and neuraxial block.

In the present study, by employing Bilateral Superficial Cervical Plexus Block using 0.5 % Bupivacaine prior to skin incision, assessment of hemodynamic effects during intraoperative period is done. Intraoperative hemodynamic parameters like heart rate, systolic blood pressure, diastolic blood pressure and mean blood pressure are monitored.

Though Bilateral Superficial Cervical Plexus Block is recognized as a safe procedure without much adverse effects for thyroid surgery, the unwanted effects like hypersensitivity to local anaesthetics, intravascular injection, nerve injury, systemic toxicity of local anaesthetics, rarely neuraxial

spread of local anaesthetics, blockade of brachial plexus and phrenic nerve block can occur.

Hence, vigilant monitoring is required throughout the intraoperative period and early postoperative period for early recognition and effective management. In the present study, ECG, non invasive blood pressure, pulse oximeter, end tidal CO_2 and temperature were monitored.

Previous studies have compared the postoperative analgesic effect of Bilateral Superficial Cervical Plexus Block. But, the effects on hemodynamic features are not compared.

Hence, this study involves evaluation of postoperative analgesia in addition to assessment of intraoperative hemodynamics and occurrence of adverse effects by administering Bilateral Superficial Cervical Plexus Block for thyroid surgeries in addition to general anaesthesia.10 ml of 0.5% Bupivacaine is used as local anaesthetic for the block on each side.

LITERATURE REVIEW

THYROID

Thyroid gland is a highly vascular endocrine organ located in the anterior part of the neck. It is made up of two lateral lobes with superior and inferior poles connected by a median isthmus. Each lobe varies between 50 – 60 mm in length. The weight of the thyroid gland varies 25 – 30 g in adults. It is slightly heavier in women.

The principal innervations of the thyroid gland derives from the autonomic nervous system. Parasympathetic fibres for the thyroid gland comes from the vagus nerve. Sympathetic fibres arise from the superior, middle and inferior cervical ganglia of the sympathetic trunk.

The external branch of superior laryngeal nerve runs with the superior thyroid artery. Superior thyroid artery is the first anterior branch of the external carotid artery.

Recurrent laryngeal nerve is a branch of vagus nerve. It ascends in the tracheo oesophageal groove. It is closely associated with the inferior thyroid artery, which arises from the thyrocervical trunk, a branch of the subclavian artery.

Patients with hyperthyroidism presents with tachycardia, atrial fibrillation, systolic hypertension, high cardiac output, Congestive cardiac failure, hyperthermia, adrenocortical insufficiency, volume depletion and proximal muscle weakness.

Patients with hypothyroidism presents with cold intolerance, psychosis, bradycardia, hypertension, pericardial and pleural effusions and obesity.

Imaging techniques like chest x ray, x ray neck- antero posterior and lateral view, CT neck, MRI are commonly used to evaluate airway difficulties due to thyroid disease like tracheal deviation, tracheomalacia and intrathoracic extension of thyroid enlargement.

Indications for thyroidectomy:

1. Goitre – diffuse, multinodular and solitary nodular
2. Hyperthyoidism, not responding to medical management
3. Thyroid cancer
4. Decreased thyroid function (hypothyroidism) with enlarged thyroid gland

Thyroid surgeries are performed as elective surgical procedure. Hence, the thyroid function should be normalized using antithyroid drugs, beta blockers and anti hypertensive agents in the preoperative period. Patient is positioned with head fully extended and rested on padded ring with sand bag between scapulae.

Prior to extubation, vocal cord movements are visualized using either direct laryngoscope or fiberoptic bronchoscope. When Tracheomalacia is suspected, leak test and direct visualization is recommended using direct laryngoscope or fibreoptic bronchoscope.

Thyroid storm is a life threatening exacerbation of hyperthyroidism if patient’s metabolic, thermoregulatory and cardiovascular compensatory

mechanisms fail. It is precipitated by surgery, trauma, infection and inadequate preoperative preparation. It is treated with anti thyroid drugs, beta blockers, cooling measures and maintaining hydrating status.

Post operative complications include airway obstruction due to post operative bleeding, laryngeal edema, recurrent laryngeal nerve palsy and hypocalcemia.

There are various regional anaesthetic techniques employed for thyroidectomy like superficial cervical plexus block, deep cervical plexus block and midline local anaesthetic infiltration from thyoid cartilage to suprasternal notch. Among all of the techniques, bilateral superficial cervical plexus block is effective without any complications.

CERVICAL PLEXUS BLOCK

HISTORY

Cervical plexus block was first performed by William Stewart Halsted at Bellevue Hospital in NewYork on 1884. (1) He performed surgical anaesthesia by injecting cocaine in the nerve trunks in the neck.

The posterior routewas first published by Kappis in Germany on 1912. Though Heidenhein introduced the lateral approach in 1914, it was Labat who popularized this technique in America.(1)

Murphy and Scott introduced the superficial cervical plexus block, which involves subcutaneous injection of drug at the midpoint, along the posterior border of the sternocleidomastoid muscle.

In intermediate cervical plexus block, the drug is injected deep to the subcutaneous layer but above the deep fascia.

Winnie introduced the deep cervical plexus block. C2-C4 transverse process is identified and the drug is injected into the deep cervical region. This can be done either by three separate injections or by single injection.

ANATOMY OF CERVICAL PLEXUS

The cervical plexus represents nerves from the anterior rami of C1 – C4 (shown in Fig. 1).

SUPERFICIAL (4 PRIMARY BRANCHES)

- Lesser occipital nerve
- Greater auricular nerve
- Supraclavicular nerve
- Transverse cervical nerve

DEEP (PRIMARILY MUSCULAR INNERVATION)

- C1 innervates thyrohyoid and geniohyoid
- Ansa cervicalis (C1 – C3 loop) innervates sternohyoid, omohyoid andsternothyroid

- Segmental branches innervate scalene muscles
- Phrenic nerve (C3 – C5) innervates the diaphragm and pericardium

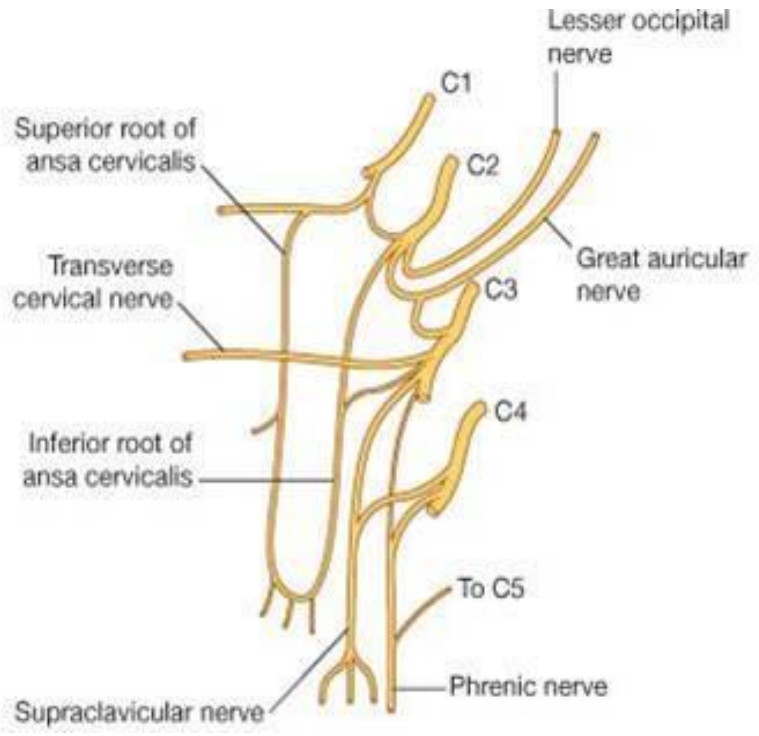


Fig 1. Cervical Plexus

LESSER OCCIPITAL NERVE

The nerve arises primarily from C2 with some C3 branches. It innervates the posterior and lateral aspect of the scalp. Along with the greater auricular nerve, it provides sensation to the posterior aspect of the ear.

GREATER AURICULAR NERVE

The nerve arises from C2 – C3. It has anterior and posterior branch. The anterior branch innervates the skin supplying the anterior surface of the ear, and the skin overlying the parotid gland. The posterior branch innervates the skin overlying the mastoid process and posterior aspect of the ear.

SUPRACLAVICULAR NERVE

The nerve arises from C3 – C4. The medial branch innervates the skin and clavicle from sternoclavicular joint to mid clavicle. The intermediate branch innervates the clavicle and skin from superior aspect of pectoralis major out to the anterior aspect of the deltoid. The lateral branch innervates the distal clavicle and skin supplying the superior and posterior aspect of the deltoid

TRANSVERSE CERVICAL NERVE

It arises from C2 – C3. It provides the cutaneous and deep innervation to the anterior/medial and posterior/lateralaspects of the neck

CERVICAL PLEXUS BLOCK

Procedures which can be done by using cervical plexus block are:

- Carotid endarterectomy,
- Plastic repairs,

- Superficial neck surgeries,
- Lymph node dissection,
- Thyroidectomy,
- Parathyroidectomy,
- Tracheostomy

Non surgical uses of cervical plexus block are:

- Neuralgias,
- Treatment of hiccough,
- Pain relief secondary to pharyngeal cancer,
- Relief of occipital headache,
- Central venous cannulation – internal jugular or subclavian routes,
- Injuries to the neck, ear, clavicular fractures, acromio-clavicular dislocations,
- Postoperative pain,
- Post-herpetic neuralgia,
- Complex regional pain syndrome.

Cervical plexus block can be performed by three different methods:

Superficial, Intermediate and Deep.

SUPERFICIAL CERVICAL PLEXUS BLOCK (SCPB)

Indication: carotid endarterectomy, superficial neck surgery

Position: supine/sitting

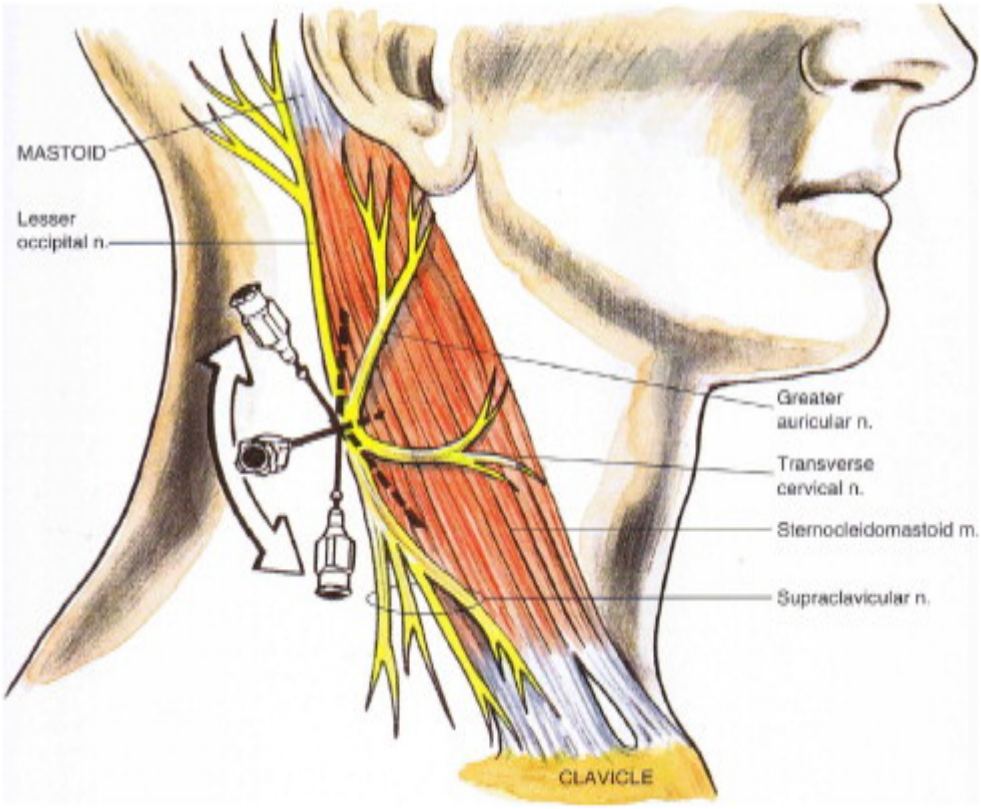
Equipment: 1½-in, 25-gauge needle

Landmarks: mastoid process, sternocleidomastoid muscle, C6 transverse process

Local: 10 ml (15 – 20 ml)

SCPB is the subcutaneous blockade of the distinct nerves of anterolateral neck, anterior auricular, posterior auricular areas and also skin overlying and inferior to the clavicle on the chest wall. This produces only sensory blockade, while deep cervical plexus block produces both motor and sensory blockade.

It is generally performed starting at the midpoint on the posterior/lateral border of the sternocleidomastoid muscle. (Fig. 2)



Brown: Atlas of Regional Anesthesia, 3rd ed., Copyright © 2006 Saunders

Fig 2: Superficial cervical plexus block – Technique. The needle is inserted behind the posterior border of the sternocleidomastoid muscle.

SUPERFICIAL CERVICAL PLEXUS BLOCK TECHNIQUE

Under aseptic precaution, the needle is inserted along the posterior border of sternocleidomastoid muscle. Then, three injections of 5 ml local anaesthetic is injected approximately 1 cm deep to the posterior border of

sternocleidomastoid muscle subcutaneously, perpendicularly, cephalad and caudad in a fan fashion. (fig.1)

The goal of SCPB is to infiltrate the local anaesthetic subcutaneously and behind the sternocleidomastoid muscle. Deep insertion of the needle has to be avoided.

DEEP CERVICAL PLEXUS BLOCK

Position: Supine/sitting

Landmarks: Mastoid process, Chassaignac tubercle

Local: 3-4 ml injected each at C2, C3, and C4

Classically the block is performed using a paresthesia eliciting technique to obtain a paravertebral block of C2 – C4.

INTERMEDIATE CERVICAL PLEXUS BLOCK

This is basically an ultrasound guided superficial cervical plexus block. This ensures the deeper components of the Superficial Cervical Plexus are anesthetized. (Shown in Fig. 3)

ULTRASOUND OF SCP

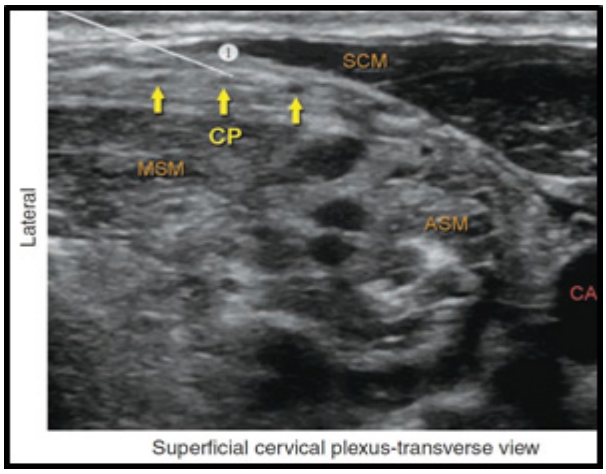


Fig.3. The superficial cervical plexus (CP) is seen posterior to the Sternocleido mastoid Muscle (SCM) and under the prevertebral fascia.

ASM – Anterior Scalene Muscle, MSM – Middle scalene muscle, VA-Vertebral Artery, CA-Carotid Artery.

LOCAL ANAESTHETICS OF CHOICE

Mepivacaine 1.5%, Lidocaine 2 %, Ropivacaine 0.5 %, Bupivacaine 0.25 to 0.75%. Mepivacaine takes 10 to 15 min for its action. Anaesthesia lasts for 2 to 2.5 hr and analgesia for 3 to 6 hr. Lidocaine takes 10 – 15 min for the onset of action. Anaesthesia lasts for 2 to 3 hr, while analgesia for 3 to 6 hr.

Ropivacaine takes 10 to 20 min for the onset of action. Anaesthesia lasts for 3 to 4 hr, while analgesia for 4 to 10 hr. Bupivacaine takes 10 to 20 min

for the onset of action. For Bupivacaine, anaesthesia lasts for 3 to 4 hr and analgesia for 4 to 10 hr.

After injection of local anaesthetic, sensation around the area of nerve distribution will be decreased in 10 – 15 min. Depending on the type of surgery, superficial or deep cervical plexus block is used.

CONTRAINDICATIONS FOR CERVICAL PLEXUS BLOCK

- Respiratory compromise
- Local neural injury
- Hemorrhagic diathesis
- Anatomic distortion due to trauma or previous injury
- Anti-coagulation treatment

COMPLICATIONS OF CERVICAL PLEXUS BLOCK

- **Hematoma**: Multiple insertions to be avoided particularly in patients with anticoagulant therapy
- **Nerve injury**: When the needle is inserted against resistance or when the patient complaints of severe pain on injection. This occurs particularly in deep cervical plexus block.

- **Local anaesthetic toxicity**: The most common complication of cervical plexus block is central nervous system toxicity. This occurs because of the rich vascularity of the neck and proximity to vertebral and carotid artery. This happens due to the inadvertent intravascular injection of

- With deep cervical plexus block, leading to diaphragmatic paralysis.

- **Infection**: Low risk infection. It can be prevented by aseptic precaution.

Deep cervical plexus block is associated with severe complications such as vertebral artery puncture, phrenic nerve blockade, superior laryngeal nerve blockade, nerve root toxicity, systemic toxicity and neuraxial spread of local anaesthetic leading to epidural and subarachnoid blockade.

Sensory distributions for superficial and deep blocks are similar. Since deep cervical plexus block has severe complications, SCPB is preferred than deep cervical plexus block.

BUPIVACAINE

Bupivacaine is a local anaesthetic and is in clinical use since 1963. It was synthesized by Ekenstam. The molecular structure of Bupivacaine is shown in Fig. 4.

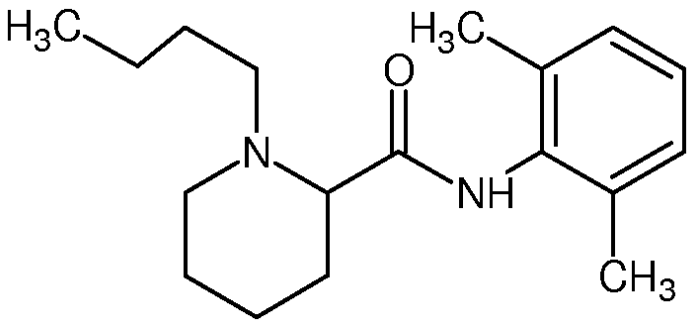


Fig 4. Molecular structure of Bupivacaine

DOSAGE

3 mg/kg body weight.

Infiltration – 0.25 %

Peripheral Nerve block – 0.25%, 0.5%

Epidural – 0.25%, 0.5%,

Spinal – 0.5%,

PROPERTY

Invitro Conduction Blocking Potency – 8

P ka – 8.1

Hydrophobicity – 3420

Plasma protein binding – 2 µg/ml

Percentage of protein binding – 95.6%

Partition coefficient – 27.5

Bupivacaine has more pronounced effect on sensory nerves than motor nerves. Intense anaesthesia is obtained without any motor blockade, which is useful in treatment of pain like post-operative pain, labour pain and post traumatic pain.

MODE OF ACTION

Drug is deposited near the nerve. Removal of free drug by tissue binding, circulation and metabolism. Remaining free drugs, penetrate the nerve sheath and accumulate within the axoplasm. The drug binds the site on voltage gated Na+ channels. Thereby, It acts by increasing the threshold for electrical excitation in the nerve, by slowing the propagation of nerve impulse and by reducing the rate of rise of action potential. Hence, bupivacaine blocks the generation and the conduction of nerve impulses. The order of loss of nerve function are pain, temperature, touch, proprioception and muscle tone.

PHARMACOKINETICS

Systemic absorption of bupivacaine depends on the dose and concentration of the drug, route of administration, vascularity at the site of administration, presence or absence of epinephrine in the anaesthetic solution. Bupivacaine has

rapid onset of action and takes longer duration of anesthesia compared to other local anesthesia. There is a period of analgesia which persists after the return of sensation. Therefore the need for potent analgesics at that time is reduced.

Bupivacaine has a high (95%) protein binding capacity and a low fetal/maternal ratio. It does not enter the fetal blood from maternal circulation. Bupivacaine distributed to some extent to all body tissues and higher concentrations in highly perfused organs such as lungs, liver, heart and brain. The plasma profile of bupivacaine after direct IV injection shows a three compartment open model. Rapid IV distribution of the drug represents the first compartment.Distribution of the drug to highly perfused organs represents the second compartment. Distribution to poorly perfused tissues represents the third compartment.

When bupivacaine is used for caudal, epidural or peripheral nerve block, peak blood level is reached n 30 to 45 min and reaches insignificant level in next 3 to 6 hrs. The pharmacokinetics properties are altered in liver, kidney disease, route of administration and age of the patient. Elderly patients exhibit maximal spread of analgesia and maximal motor blockade and exhibit higher peak plasma concentration. Total plasma clearance was decreased in these patients.

Bupivacaine is metabolized by the liver by enzymatic degradation and is excreted mainly by the kidney. About 5% of bupivacaine is excreted unchanged

by the urine. Toxic dose can cause irritation, tissue damage and methemoglobinemia.

BUPIVACAINE TOXICITY

CARDIOVASCULAR SYSTEM

At normal doses, it produces change in cardiac conduction, excitability, refractoriness, contractility and peripheral vascular resistance. At toxic blood concentration, it leads to atrioventricular block, ventricular arrhythmias and cardiac arrest. By depressing the myocardial contractility and peripheral vasodilation, it decreases cardiac output and arterial pressure. These changes occurs after unintended intravascular injection of bupivacaine.

MECHANISM OF TOXICITY IN CARDIOVASCULAR DEPRESSION:

- Direct action on heart and peripheral blood vessels.
- Indirect action on blockade of sympathetic, parasympathetic efferent activity.
- Ratio of the dosage required for irreversible cardiovascular collapse and dosage that will produce CNS toxicity is lower for bupivacaine (CC/Convulsion ratio)

- Rapid intravenous injection of large dose produce ventricular arrhythmias and fatal ventricular fibrillation.

- Acidosis, Hypoxia markedly potentiate the cardiotoxicity of bupivacaine.

- Resuscitation is more difficult after bupivacaine induced cardiovascular collapse.

CENTRAL NERVOUS SYSTEM

- Blockage of amygdaloid complex occurs initially followed by the blockade of inhibitory pathways in cerebral cortex.

- Suppression of facilitatory pathways leads to CNC depression and respiratory arrest.

- Symptoms are light headedness, dizziness, circumoral numbness, visual and auditory disturbances, twitching of face and distal extremities, shivering, tonic clonic convulsions and coma.

- Selective inhibition of inhibitory neurons of Central Nervous System leads to unopposed excitatory neuron activity produce seizures.

MANAGEMENT OF TOXICITY

CARDIOVASCULAR TOXICITY

- CPR should be started immediately.
- Defibrillation according to ACLS protocol.
- Intralipid 20%, 1.5 ml/kg, rapid bolus injection followed by 0.25ml/kg/min for next 10 minutes.
- Lidocaine and Amiodarone are not recommended for bupivacaine induced ventricular arrhythmias.
- Cardiac arrest due to bupivacaine toxicity is difficult to revive. Large doses of adrenaline and atropine are needed. Phenytoin and Bretylium can also be used

CENTRAL NERVOUS SYSTEM TOXICITY

Management is mainly supportive. Endotracheal intubation and mechanical ventilation prevents aspiration, hypoxemia and hypercarbia. Thiopentone sodium and benzodiazepines are used for seizures.

PREVENTION OF TOXICITY

- Avoid massive intravascular injection.
- Excessive dosing has to be avoided.
- Incremental, fractionated dosing.
- ECG monitoring during local anaesthetic injection.

PAIN

Pain is a subjective experience that is influenced by psychological, cultural and other variables. Pain can be measured using following scales.

PAIN SCORING SCALES

a) Verbal rating scale:

Patient is asked to score their pain

0 - No pain

1 - Mild pain

2 - Moderate pain

3 - Severe pain

b) Numerical rating scale:

Patient is asked to score between 0 and 10

0 – corresponds to no pain

10 – Reflect worst possible pain

C) Wong-Baker FACES pain scale:

- For children 3 yrs and above
- And for patients with whom communication may be difficult
- Patient is asked to point various fascial expressions ranging from a smiling face to an extremely unhappy one that expresses the worst possible pain

d) MPQ (Mc Gill Pain Questionnaire)

It defines pain in three major dimensions.

1. Sensory – Discriminative
2. Motivational – Affective
3. Cognitive – Evaluative components

It contains 20 sets of descriptive words that are divided into four major groups. 10 sensory, 5 affective, 1 evaluative, 4 miscellaneous. Pain rating index is derived based on the words chosen.

e) Visual Analogue Scale: (VAS)

- 10 cm Horizontal line
- Patient is asked to mark on this line that represents the intensity of the pain
- Left end of this line corresponds to “no pain” and the right end corresponds to “worst imaginable pain”.

- VAS is a simple and efficient method that correlates well with other reliable methods. This is most widely accepted measurement technique for pain intensity assessment.

PSYCHOLOGICAL EVALUATION OF PAIN

MMPI:

- Minnesota Multi phasic Personality Inventory
- 566 item true-false questionnaire
- It defines patient's personality on 10 clinical scale.

BDI:

- Beck Depression Inventory
- Identifies patient with major depression

DISABILITY ASSESSMENT

It assess functional limitation, impairment.

1. MPI –Multidimensional Pain Inventory

2. Snort form SF – 36

3. Pain Disability Index (PDI)

4. Oswestry Disability Index (ODI)

REVIEW OF LITERATURE

Andreiu et al, British Journal of Anesthesia, 2007

Eighty seven patients were randomized to receive BSCPB to three groups. About 29 patients received saline, 29 patients received ropivacaine, while 29 patients received ropivacaine plus clonidine.

During the intraoperative period, Sufentanil was given for a 20% rise in arterial pressure and heart rate for the patients with the bispectral score between 40 and 60. All patients were given acetaminophen 4 g during the first 24 hrs after surgery. Nefopam was given when the pain score was more than 4 on a numeric pain scale.

Sufentanil requirement was significantly reduced for the Group which received both ropivacaine plus clonidine, compared to groups which received ropivacaine and saline. Post operative analgesic requirement was significantly reduced in groups who received ropivacaine and ropivacaine plus clonidine, compared to patients who received saline.

These results show that the BSCPB with ropivacaine plus clonidine reduced the need for intra operative analgesia. Use of ropivacaine or ropivacaine plus clonidine reduced the post operative analgesic requirement.

Shih et al, World Journal of Surgery, 2010

This study investigated the analgesic efficacy of BSCPB in patients undergoing thyroidectomy procedure and studied whether it reduced the adverse effects of general anesthesia.

About 162 patients who underwent elective thyroid surgery were divided into three groups. First group with 56 patients received BSCPB with 12ml of isotonic saline (Group A). 52 patients received 0.5% of bupivacaine 12 ml on each side (Group B) and 54 patients received 0.5 % of levobupivacaine (Group C).

Analgesic efficacy of BSCPB was assessed by the use of intraoperative analgesic desflurane, number of patients requiring postoperative analgesic, time required for the first analgesic and pain intensity by Visual Analogue Scale (VAS). They also assessed Post Operative Nausea and Vomiting, duration of hospital stay, operative time and discomfort in swallowing.

Average end tidal desflurane concentration were 5.8, 3.9 and 3.8 % in group A, B and C respectively. Fewer patients in group B and C required analgesics. It took longer for the group B and group C to receive first dose of analgesic postoperatively. Post operative pain was lower in group B and C assessed by the VAS. Duration of hospital stay was less in group B and C. There

was no significant difference between the groups in operative time and pain during swallowing.

BSCPB significantly reduces the general anaesthetic dose requirement during thyroid surgery and also reduces the postoperative pain during the first 24 hr and shortens the hospital stay.

Dieudonne et al, Anesthesia andAnalgesia, 2001

The analgesic efficacy of BSCPB performed at the end of surgery was assessed. This was a double blinded, randomized, placebo controlled study. Ninety patients who underwent thyroid surgery under general anaesthesia under the same surgeon were randomized to two groups. First group received 20 ml isotonic sodium chloride. Second group received 0.25% of 20 ml bupivacaine. Postoperative pain was assessed for the first 24 hr using an 11- point numeric rating scale (NRS – 11). Morphine was administered when the NRS – 11 score was ≥ 4.

The outcome variable was pain score, the proportion of patients given morphine during the first 24 hours and the amount of morphine administered. Among patients who had given bupivacaine, only low proportion needed morphine and had lower median pain scores.

The study concluded that BSCPB reduced pain during the postoperative period, but did not provide optimal pain relief alone.

Suri et al, seminar in cardiothoracic vascular anesthesia, 2010

The study was performed to evaluate whether general anaesthesia or regional anaesthesia is of benefit to the patients undergoing thyroid or parathyroid surgery. In about 95 patients, who underwent thyroid or parathyroid surgery, 64 patients were given general anaesthesia and 31 patients received bilateral superficial cervical plexus block with sedation.

The study has done a postoperative questionnaire regarding the perioperative experience in all patients. Patients who underwent parathyroidectomy under regional anaesthesia experienced statistically significant better energy levels and earlier return to work.

They concluded that 96% of patients who underwent either type of surgery reported satisfaction with either type of anaesthesia.

Egan et al, British Journal of Surgery, 2013

The study was a randomized clinical trial of intraoperative SCPB versus incisional local anaesthesia in thyroid and parathyroid surgeries. Patients were divided into two groups. One group received incisional local anaesthesia, while another group received incisional local anaesthesia plus intra operative SCPB.

Post operative pain was the primary outcome. The study assessed the post operative pain using Visual analogue scale. Use of strong opiates, respiratory

rate and sedation score were secondary outcome measures. Fewer patients who received SCPB group required strong opiates and rescue opiates.

The study concluded that the intraoperative SCPB reduces pain scores following thyroid and parathyroid surgery, and reduces the requirement for strong and rescue opiates.

Messner et al, European Journal of Vascular and Endovascular Surgery, 2007

The study evaluated whether SCPB reduces the postoperative pain after carotid endarterectomy surgery.

Fourty six patients were randomized to two groups. One group received ropivacaine, while other group received placebo. A patient controlled analgesic device (PCA) delivering morphine was provided to the patients. Primary outcome was total morphine consumption from the recovery room. Arterial pCO_2 and patient satisfaction were included as secondary outcomes.

Ropivacaine group had a significant reduction in morphine consumption, lower visual analogue pain scores, lower $paCO_2$ levels at the time of discharge. Patient satisfaction was higher in ropivacaine group.

The study concluded that superficial cervical plexus block provided effective pain relief for patients undergoing carotid endarterectomy surgeries.

Young Jin et al, European Journal of Anaesthesiology, 2009

The study evaluated the analgesic efficacy of BSCPB and combined superficial and deep cervical plexus block for incision pain, headache and posterior neck pain after thyroidectomy.

Patients were divided into three groups. One group (Group S) received BSCPB, while the second group (Group CO) received both superficial and deep cervical plexus block. The third group (Group C) was a control group. 0.25% bupivacaine was given for cervical plexus block. Remifentanil was the opioid used intraoperatively.

The group S required significantly lesser dose of remifentanil, when compared to other two groups. The post operative pain were significantly reduced at 0,2 and 4 hr in group S compared to group C. Posterior neck pain were similar in all the three groups. The time of first rescue analgesic was significantly prolonged in group S.

The study concluded that the BSCPB is superior to combined superficial and deep cervical plexus block in reducing post operative pain in thyroid surgeries.

AIM

To compare the analgesic efficacy, safety and intraoperative hemodynamic status of bilateral superficial cervical plexus block combined with general anaesthesia for thyroid surgery

OBJECTIVES

1. To compare the efficacy of analgesia of bilateral superficial cervical plexus block with general anesthesia in thyroid surgeries.
2. To compare the incidence of adverse effects of bilateral superficial cervical plexus block with general anesthesia in thyroid surgeries.
3. To compare the Intra operative Hemodynamic status of bilateral superficial cervical plexus block with general anesthesia in thyroid surgeries.

MATERIALS AND METHODS

SOURCE

Patients admitted to Government Mohan Kumaramangalam Medical College Hospital (GMKMCH), Salem. Written informed consent were obtained from the patient to include in the study.

METHODS OF COLLECTION OF DATA

Patients undergoing elective Thyroid surgeries are included in the study, after obtaining the ethical committee clearance.

INCLUSION CRITERIA

Patients belonging to age group 18-60 years of both sex with body weight 40 – 80 kg under ASA grade I and grade II undergoing elective operative procedures on Thyroid gland.

EXCLUSION CRITERIA

1. Patients allergic to local anaesthetics
2. History of bleeding disorders
3. Substernal Goitre
4. Patients with stridor
5. Thyroid malignancy requiring block dissection
6. Respiratory compromise
7. ASA grade III and IV patients
8. Patients who are unable to understand Visual Analogue Scale

MODE OF SELECTION OF CASES: Double blinded, Random Sampling technique

SUPERFICIAL CERVICAL PLEXUS BLOCK TECHNIQUE

A line is drawn from the tip of mastoid process to transverse process of C6 vertebra along the posterior border of the clavicular head of sternocleidomastoid muscle (shown in Fig. 5). Using 23 Gauage 1.5 inch needle, 10 ml of 0.5% bupivacaine is injected 15 min prior to induction in a fan shaped manner at the mid point of the above mentioned line in the subcutaneous plane.

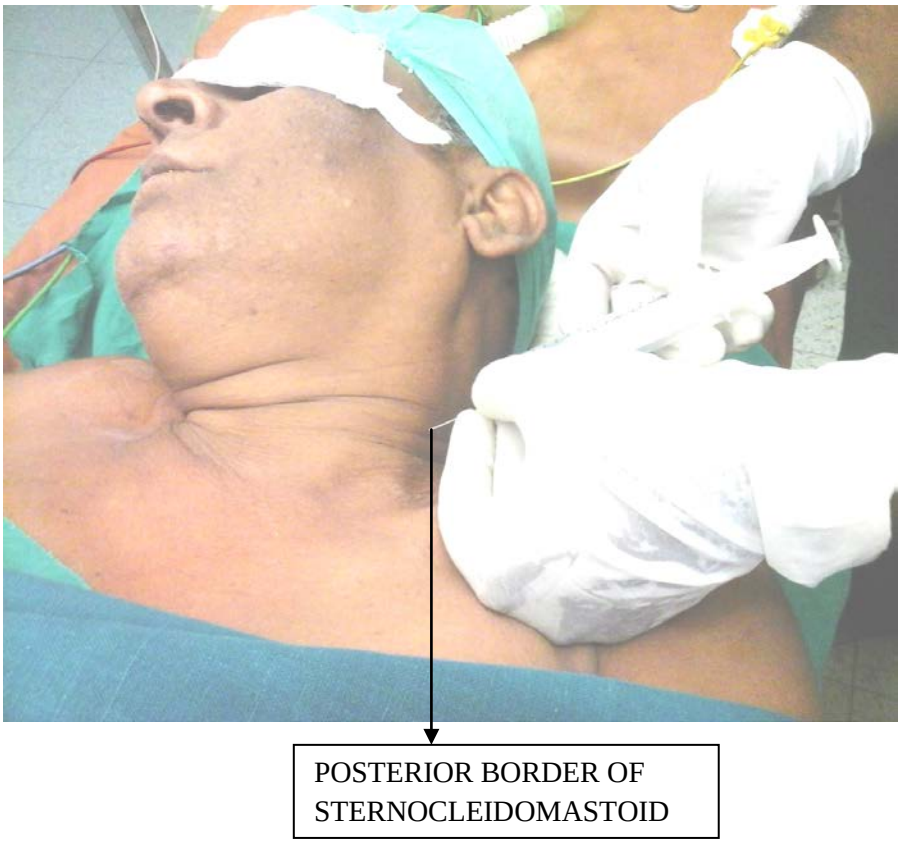


Fig. 5. Superficial cervical plexus block technique

ALLOCATION TO DIFFERENT REGIMENS

Group I: Patients receiving superficial cervical plexus block with 10ml of Normal Saline each side.

Group II: Patients receiving superficial cervical plexus block with 10ml of 0.5 % Bupivacaine on each side.

SAMPLE SIZE

Study parameters

alpha = 0.0500

power = 0.8000

delta = -0.3500 (difference)

p1 = 0.5500

p2 = 0.2000

Estimated sample size

N = 58

N per group = 29

Considering the proportion of subjects who need post operative rescue analgesisa as 55% and 20% in control and intervention group respectively, with 80% power of study and 5% alpha error, the required sample size was 29 subjects in each group.

Statistics software version 13 was used for sample size calculation.

29 patients are taken for study group and 29 patients are taken for control group (total 58 patients).

PARAMETERS OF COMPARISON

a. Analgesic efficacy

b. Adverse events
c. Hemodynamic parameters

STANDARD PROTOCOL FOLLOWED FOR GENERAL ANAESTHESIA IN BOTH GROUPS

Premedication with T. Diazepam 10mg,

T.Ranitidine 150mg,

T.Metoclopramide 10mg 1hr before surgery,

Inj. Tramadol 100mg i.m. 45 min prior to induction,

Inj. Glycopyrrolate 0.2mg i.v.

Inj. Fentanyl 2 µg/kg i.v.

Inj. Midazolam 2 mg i.v. prior to induction

Preoxygenation with 100% oxygen 4 L/min for 3 min.

Induction with Inj. Propofol 2mg/kg i.v.

Inj. Succinyl choline 1.5mg/kg i.v

Direct laryngoscopy and endotracheal intubation using PVC ETT.

Inj. Vecuronium 0.05mg/kg followed by 0.02mg/kg every 15 min for relaxation

Maintanence- N_2O: O_2 – 2:1 with fresh gas flow of 6 L/min

Halothane 1% for first 15 min followed by 0.6%

Neuromuscular reversal with Inj. Neostigmine 50µg/kg with Inj. Glycopyrolate 10µg/kg i.v. bolus.

POSTOPERATIVE RESCUE DRUGS

T. Paracetamol 500mg 6^{th} hourly for all the patients

Inj. Tramadol 50mg/kg i.v. bolus in 6 hrs will be used if pain level > 4/10.

RESCUE DRUGS

Inj. Fentanyl 20µg i.v. bolus if increase in systolic blood pressure/heart rate of more than 20% of the basal value.

Inj. Ephedrine 6mg i.v. bolus if fall in systolic blood pressure more than 20% of the basal value.

OUTCOME MEASURES:

HEMODYNAMIC PARAMETERS

Haemodynamic status were evaluated every 15 min during intraoperative period using the following variables.

1. Heart rate

2. Systolic blood pressure

3. Diastolic blood pressure

4. Mean arterial blood pressure.

The hemodynamic parameters are measured using PHILIPS IntelliVue MP 40, shown in Fig. 6.

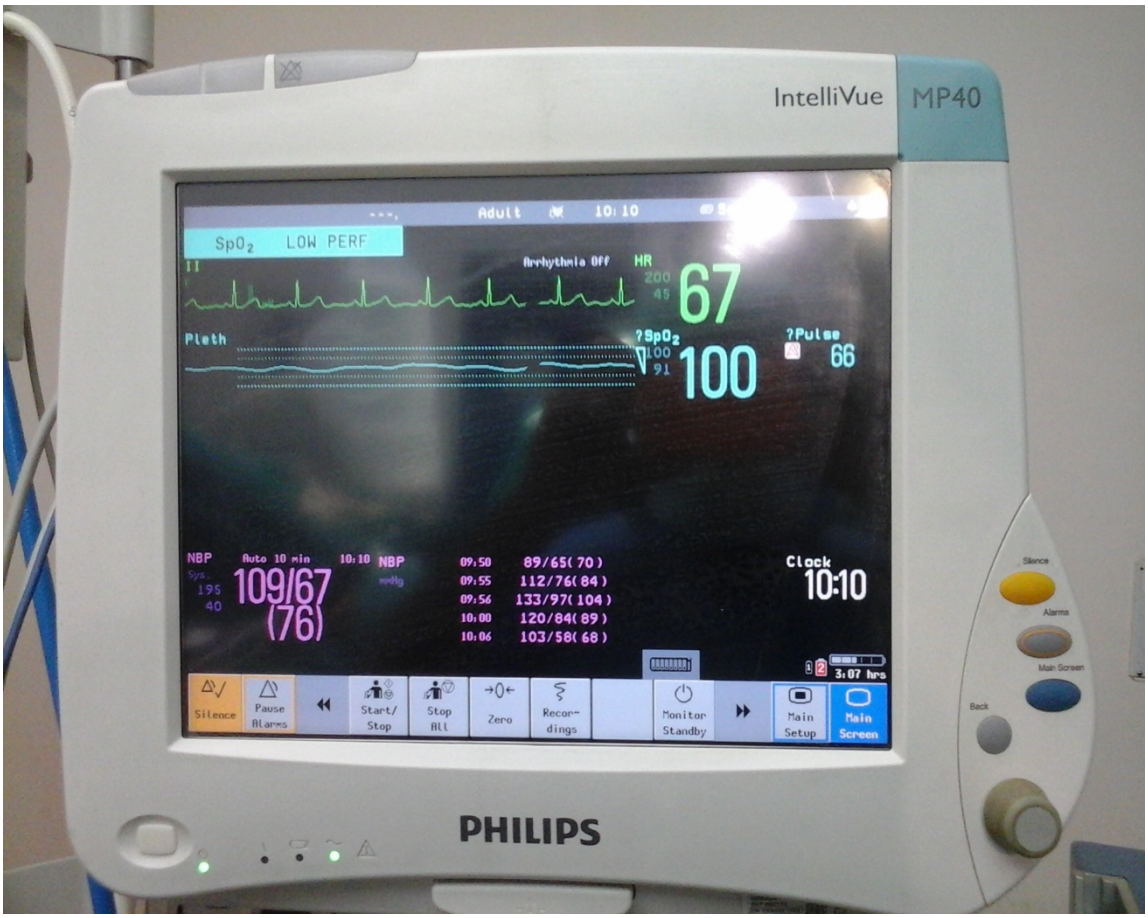


Fig.6. PHILIPS, IntelliVue MP 40

To record arterial oxygen saturation, Pulse oximeter is used.

ET CO_2, capnography are measured using ET CO_2 monitor.

ECG is recorded in lead II, using ECG monitor.

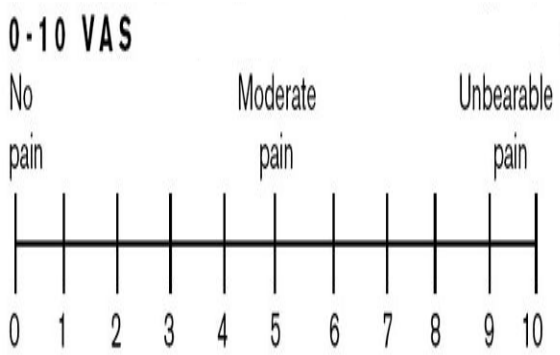
Temperature is monitored using oesophageal probe.

PAIN ASSESSMENT

To evaluate the postoperative analgesia using linear Visual Analogue Scale, pain was measured hourly for first 4 hrs. Then, 4th hourly for 24 hrs following surgery. Effective post operative pain management improves recovery and reduces post operative complications.

Pain should be assessed regularly, at least every 4 hrs.

VISUAL ANALOGUE SCALE



In this study, using visual analogue scale, pain is assessed in the postoperative period every 1 hour interval for the first four hours. Then, 4 hour interval for the first 24 hours, as shown below.

Time	0 hr	1 hr	2 hr	3 hr	4th hr	8th hr	12th hr	16th hr	20th hr	24th hr
Score										

OBSERVATIONS AND RESULTS

STUDY GROUP

Bilateral superficial cervical plexus block with Bupivacaine 0.5% 10ml on each side.

CONTROL GROUP

Bilateral superficial cervical plexus block with normal saline 10ml on each side**.**

RESULTS

There were a total of 58 patients included in the final analysis. Out of them

29 subjects were controls and 29 subjects received the intervention.

The clinical details of the patients such as age, sex, weight, diagnosis are shown below (Table 1 & Table 2).

Table 1. Patient Clinical Details - Bupivacaine group (Study group)

S.No	Age	Sex	Wt(Kg)	Diagnosis
1	60	F	51	SNG
2	23	F	52	MNG
3	46	F	65	MNG
4	42	M	67	MNG
5	47	M	64	MNG
6	21	F	67	MNG
7	31	F	57	MNG
8	42	F	69	MNG
9	47	F	58	MNG
10	38	F	69	MNG
11	45	M	54	SNG
12	37	F	53	MNG
13	55	F	55	MNG
14	58	F	56	MNG
15	55	F	64	MNG
16	43	F	59	MNG
17	29	F	58	MNG
18	56	F	62	MNG
19	21	F	57	MNG
20	45	M	52	MNG
21	35	F	62	MNG
22	32	M	58	MNG
23	32	F	78	MNG
24	34	M	64	MNG
25	55	M	70	MNG
26	30	F	66	MNG
27	23	M	55	SNG
28	37	F	60	SNG
29	34	F	66	MNG

Table 2. Patient clinical details – Control group

S.No	Age	Sex	Wt(Kg)	Diagnosis
1	30	F	64	MNG
2	30	F	67	MNG
3	53	M	66	MNG
4	30	F	54	MNG
5	27	M	58	MNG
6	30	F	60	MNG
7	23	F	72	MNG
8	31	F	56	MNG
9	35	F	62	MNG
10	37	F	63	MNG
11	50	F	57	MNG
12	25	F	68	MNG
13	45	M	48	SNG
14	48	F	56	MNG
15	53	F	57	MNG
16	35	F	57	MNG
17	50	M	46	MNG
18	32	F	73	MNG
19	47	F	68	MNG
20	46	F	69	SNG
21	48	M	64	MNG
22	27	F	53	SNG
23	45	F	67	MNG
24	25	M	59	MNG
25	47	F	59	SNG
26	39	F	66	SNG
27	37	F	53	MNG
28	56	F	54	MNG
29	29	M	68	MNG

STATISTICAL ANALYSIS

Intra operative hemodynamic parameters and post operative pain as assessed by visual analogue scale were considered as primary outcome parameters. Sociodemographic and baseline haemodynamic parameters were compared between the control and study groups. Categorical variables were presented in frequencies and percentages. Quantitative variables were presented as mean and standard deviations. The post operative mean visual analogue scores at different time periods were compared between the study and control groups. Chi square test and student t-test were used appropriately to test the statistical significance of the parameters. The trend of hemodynamic parameters and postop visual analogue scale in the post operative period were compared by plotting trend diagrams.IBM SPSS version 21 and Microsfot Excel 2013, were used for statistical analysis.

BASELINE PARAMETERS

The baseline socio demographic parameters were comparable between the study and control groups, as there was no statistically significant difference between the age and gender composition of the two study groups. (Shown in Table 3). The age and gender distribution is shown in bar chart in Fig. 7 and Fig. 8 respectively.

Table 3: Comparison of Socio demographic Variables in study and control groups

Parameter	Study Group (N=29) N (%)	Control Group (N=29) N (%)	Chi squarevalue	P - value
I. Age Groups				
25 and below	4(13.8%)	3(10.3%)	1.361	0.715
26 to 35 yrs	8(27.6%)	11(37.9%)		
36 to 45 yrs	8(27.6%)	5(17.2%)		
above 45 yrs	9(31.0%)	10(34.5%)		
II. Sex				
Male	8(27.6%)	7(24.1%)	0.090	1.000
Female	21(72.4%)	22(75.9%)		

Fig 7: Bar chart of Age distribution among two study groups (N=58)

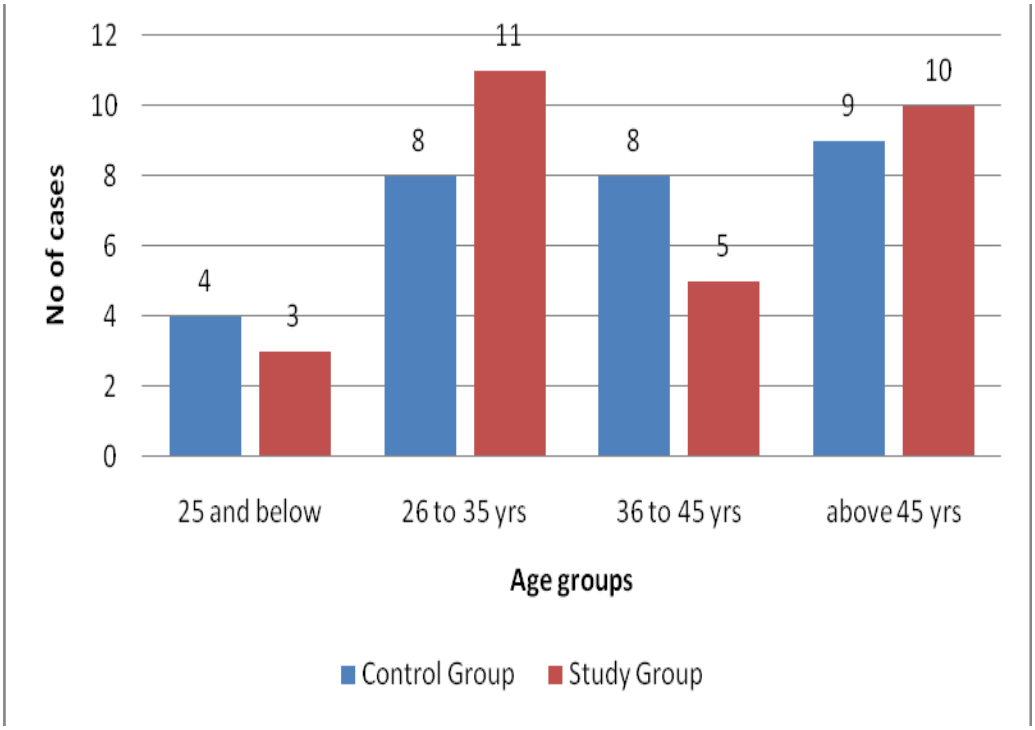
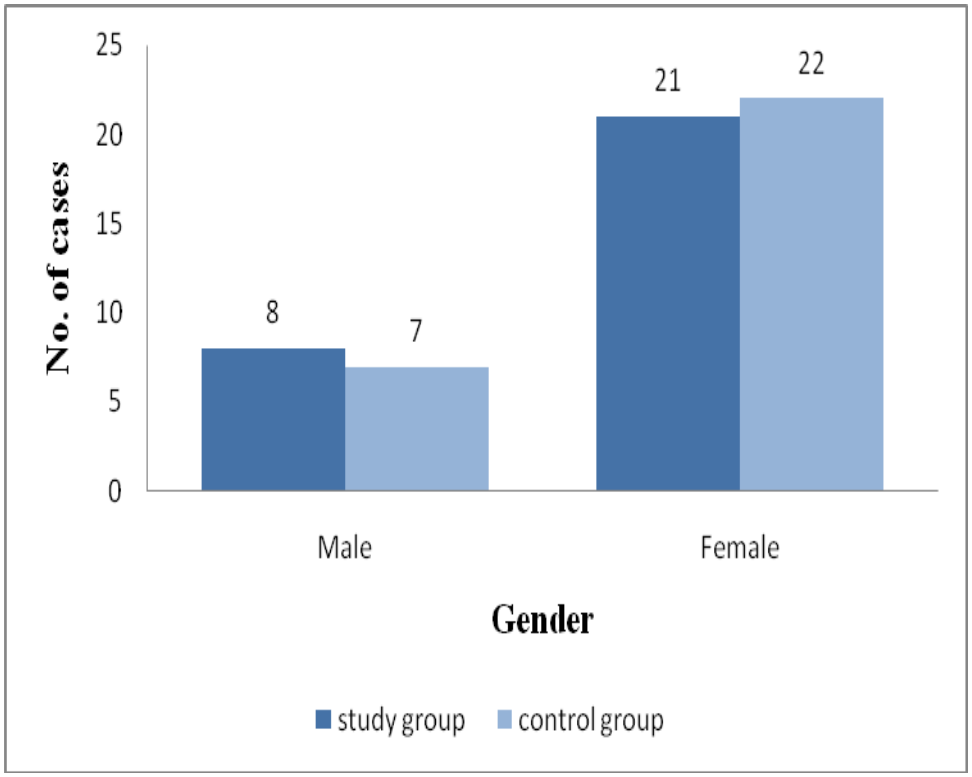


Fig 8: Bar chart of Gender distribution among two groups (N=58)



DIAGNOSIS

The proportion of subjects with Multi Nodular Goitre (MNG) was 86.2% and 82.8% respectively in study and control groups. While, the proportion of subjects with Single Nodular Goitre (SNG) was 13.8% and 17.2% in the study and control groups respectively.(shown in Table 4)

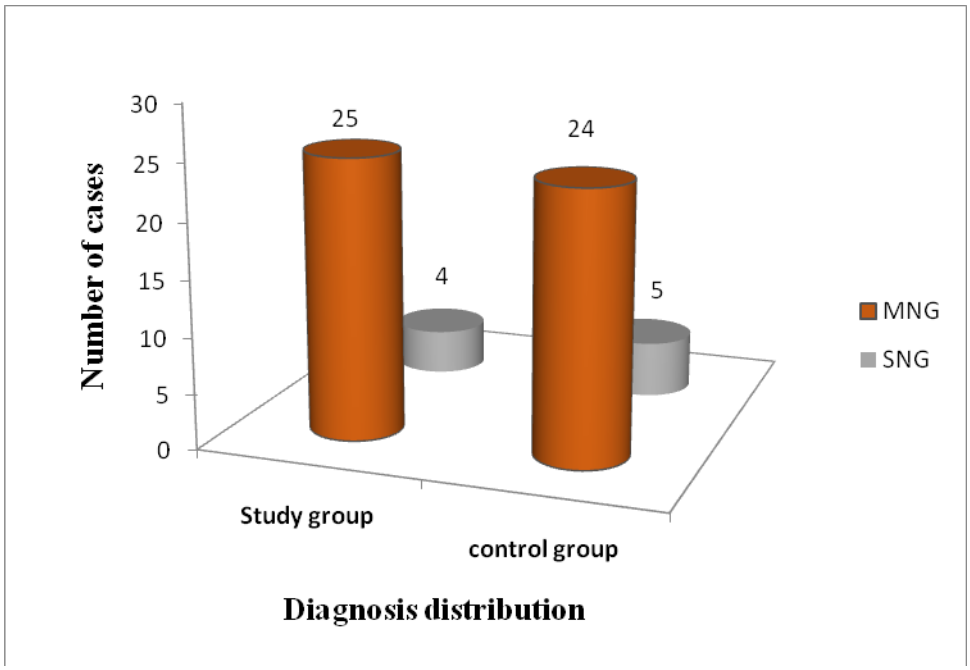
Table 4: Comparison of Clinical Diagnosis in two study groups (N=58)

Diagnosis	Study Group N (%)	Control Group N (%)	Chi square-value	P-value
MNG	25(86.2%)	24(82.8%)	0.132	0.717
SNG	4(13.8%)	5(17.2%)		

But there was no statistically significant difference in clinical diagnosis between the two groups.

The distribution of MNG and SNG is shown in Fig. 9

Fig 9: Diagnosis distribution among two groups (N=58)



WEIGHT:

The mean weight in the study group was 60.8, while the mean weight in the control group was 60.97. The distribution of weight of the patients in both the groups are shown in the Fig. 10. Weight of the subjects was statistically compared between the study and control groups. (Table 3)

.

Fig 10. Comparison of weight among two groups

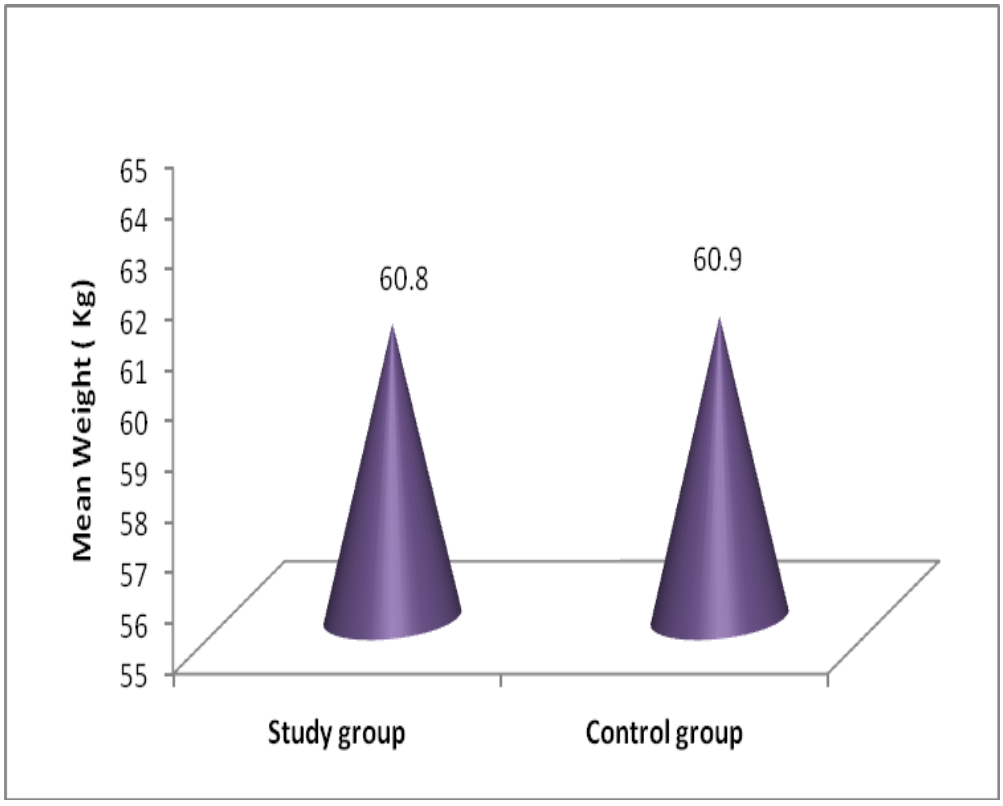


Table 5: Comparison of weight in two groups (N=58)

Parameter	Study Group (Mean ±Std. deviation)	Control Group (Mean ±Std. deviation)	Student t-value	P-Value
Weight	60.97±6.55	60.83±6.96	0.08	0.938

No statistically significant differences were observed in weight between the study and control groups.

HEMODYNAMIC PARAMETERS:

Hemodynamic parameters such as heart rate, systolic blood pressure, diastolic blood pressure, mean arterial pressure were recorded during the intraoperative period every 15 min for 2 hours, both in the bupivacaine group and in the control group.

Hemodynamic parameters recorded in a patient in bupivacaine group is shown below in Table 6.

Table 6. Intraoperative monitoring in a patient in control group (Raw data)

Parameters	0 (min)	15	30	45	60	1 hr 15 min	1 hr 30 min	1hr 45 min	2 hr
HR	106	109	106	103	89	80	84	82	92
SBP	110	108	104	108	118	117	122	117	111
DBP	72	67	70	76	80	69	78	82	75
MAP	85	81	81	86	95	94	93	93	86

Hemodynamic parameters recorded in a patient in control group is shown below (Table 7)

Table 7. Intra operative monitoring in a patient in study group (Raw data)

Parameters	0 (min)	15	30	45	60	1 hr 15 min	1 hr 30 min	1hr 45 min	2 hr
HR	78	74	93	85	86	67	68	86	66
SBP	120	116	95	115	99	105	101	117	102
DBP	70	93	52	75	62	69	60	67	61
MAP	85	77	62	82	70	76	70	79	71

The baseline hemodynamic parameters were compared between the study and control groups. (shown in Table 8)

Table 8: Comparison of Base line physical parameters in two groups (N=58)

Parameter (0 hr value)	**Study Group (Mean ±Std. deviation)**	**Control Group (Mean ±Std. deviation)**	**Student t-value**	**P-Value**
Heart Rate	84.38±13.61	81.38±13.61	0.82	0.414
Systolic BP	116.97±16.49	113.28±14.14	0.92	0.364
Diastolic BP	75.79±13.70	70.93±10.15	1.54	0.130
Mean Arterial Pressure	85.97±13.93	81.17±10.07	1.50	0.139

The baseline mean heart rate in the bupivacaine group is 84.4 and the mean heart rate in the control group is 81.4. The baseline mean systolic blood pressure in the bupivacaine group is 116.97, while in the control group, the mean systolic blood pressure is 113.28. The baseline diastolic blood pressure in the bupivacaine group is 75.79, while in the control group is 70.93. The mean arterial blood pressure in the bupivacaine group is 85.9, while in the control group is 81.2.

No statistically significant differences were observed in the hemodynamic values such as heart rate, systolic BP, diastolic BP and mean arterial

pressure between the study and control groups. Hence, both the groups were comparable.

The mean values of the heart rate, systolic blood pressure, diastolic blood pressure and the mean arterial pressure are obtained from the raw data recorded every 15 min during the intraoperative period for the first 2 hr in the study and control groups were plotted astrend diagrams and is shown respectively in figures 9,10,11 & 12.

Though the heart rate was constantly higher in study group, No statistically significant difference was observed in heart rate between the study and control groups during the intra operative period, except at 30 and 45 minutes. The mean heart rate was 8.10 and 8.14 beats/minute higher at 30 and 45 minutes respectively. With p values ≤ 0.05. (Fig. 9&Table 9)

Fig 9: Trend diagram of mean values HR in two study groups (N=58)

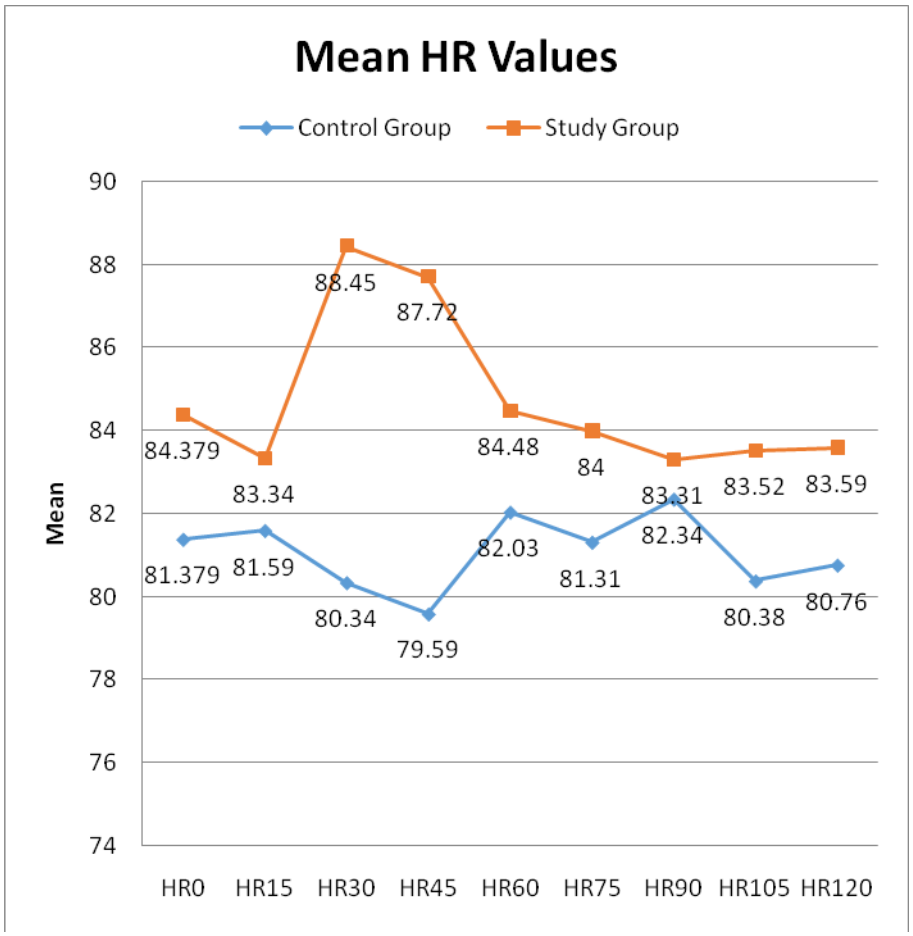


Table 9: Comparison of Heart rate in study and control groups (N=58)

Heart Rate	Study Group (Mean)	Control Group (Mean)	Mean Differ-ence	Student t-value	P-Value	95% CI of the Difference	
						Lower	Upper
HR0	84.38	81.38	3.00	0.82	0.41	-4.30	10.30
HR15	83.34	81.59	1.76	0.51	0.61	-5.08	8.60
HR30	88.45	80.34	8.10	1.96	0.05	-0.18	16.39

HR45	87.72	79.59	8.14	2.12	0.04	0.44	15.83
HR60	84.48	82.03	2.45	0.70	0.48	-4.52	9.41
HR75	84.00	81.31	2.69	0.84	0.40	-3.72	9.10
HR90	83.31	82.34	0.97	0.26	0.79	-6.37	8.30
HR105	83.52	80.38	3.14	0.90	0.37	-3.85	10.13
HR120	83.59	80.76	2.83	0.90	0.37	-3.48	9.14

Even though the systolic blood pressure was slightly higher in study group in the first 45 minutes of intra operative period, it was lower than the control group subsequently. These differences observed between the study and control groups were very minimal, as they were statistically not significant. (fig.10 & table 10)

Fig 10: Trend diagram of mean values SBP in two study groups (N=58)

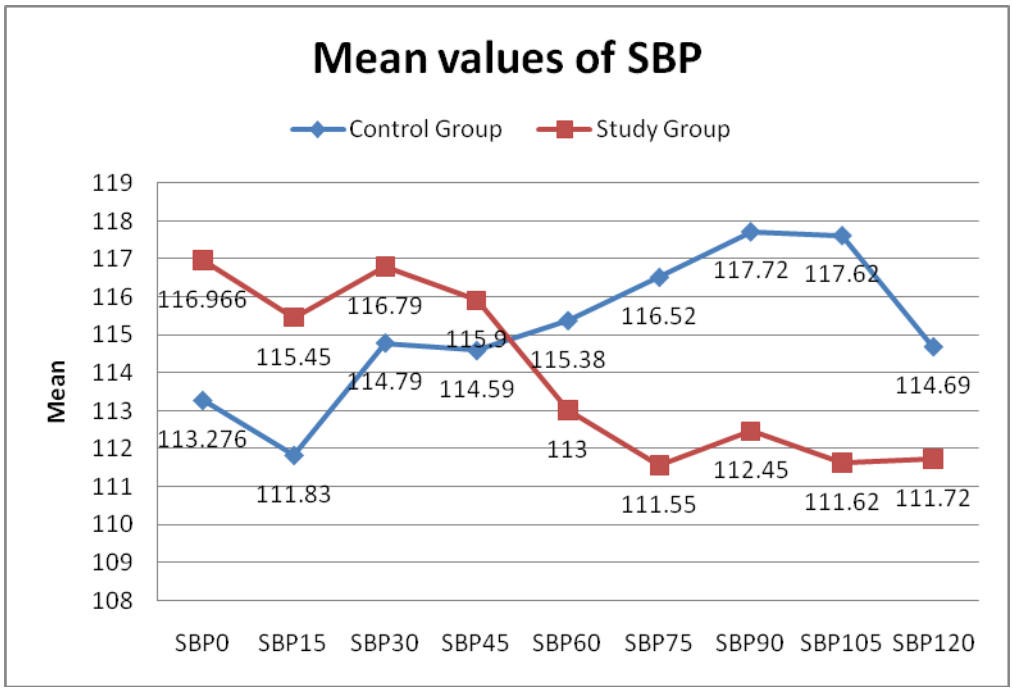


Table 10: Comparison of Systolic Blood Pressure in study and control groups (N=58)

Systolic Blood Pressure	Study Group (Mean)	Control Group (Mean)	Mean Differ-ence	Student t-value	P-Value	95% CI of the Difference	
						Lower	Upper
SBP0	116.97	113.28	3.69	0.91	0.36	-4.39	11.77
SBP15	115.45	111.83	3.62	1.00	0.32	-3.60	10.84
SBP30	116.79	114.79	2.00	0.46	0.65	-6.69	10.69
SBP45	115.90	114.59	1.31	0.29	0.77	-7.61	10.24
SBP60	113.00	115.38	-2.38	-0.62	0.53	-10.01	5.25
SBP75	111.55	116.52	-4.97	-1.24	0.22	-12.98	3.05
SBP90	112.45	117.72	-5.27	-1.39	0.17	-12.88	2.33
SBP105	111.62	117.62	-6.00	-1.50	0.14	-13.10	1.10
SBP120	111.72	114.69	-2.97	-0.66	0.51	-12.01	6.08

Though the diastolic blood pressure was slightly higher in study group in the first 45 minutes of intra operative period, it was lower than the control group subsequently. These differences observed between the study and control groups were very minimal, as they were statistically not significant. (table 6& figure 6)

Fig11: Trend diagram of mean values DBP in study and control groups (N=58)

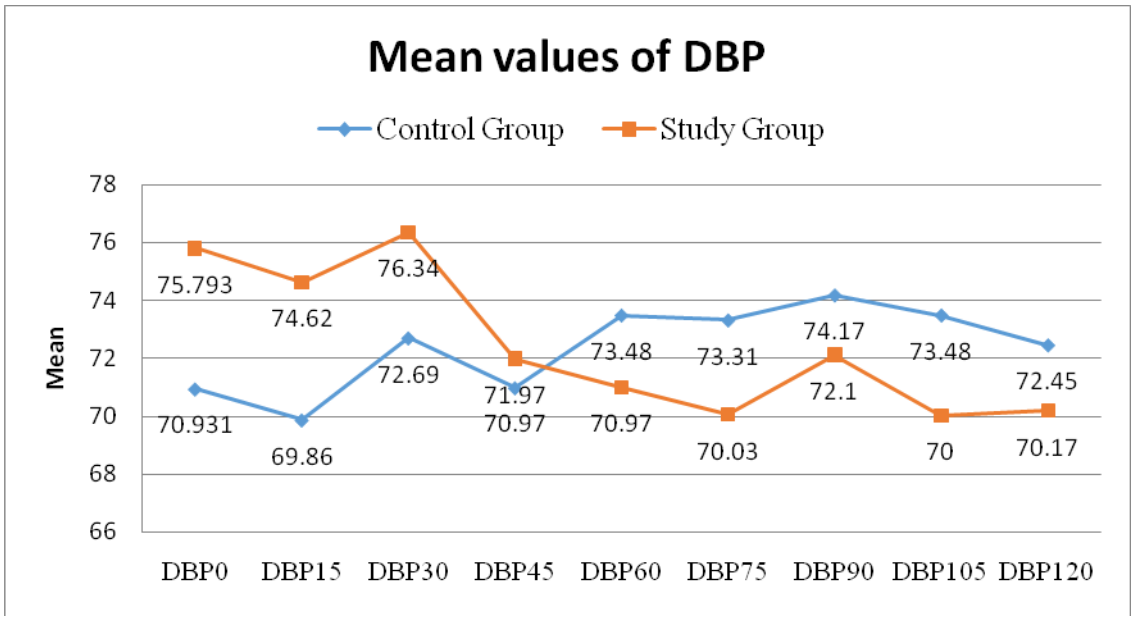


Table 11: Comparison of Diastolic Blood Pressure instudy and control groups (N=58)

Diastolic Blood Pressure	Study Group (Mean)	Control Group (Mean)	Mean Differ-ence	Student t-value	P-Value	95% CI of the Difference	
						Lower	Upper
DBP0	75.79	70.93	4.86	1.54	0.13	-1.48	11.20
DBP15	74.62	69.86	4.76	1.60	0.12	-1.21	10.73
DBP30	76.34	72.69	3.65	1.10	0.28	-3.01	10.32
DBP45	71.97	70.97	1.00	0.33	0.74	-5.07	7.07
DBP60	70.97	73.48	-2.52	-0.72	0.47	-9.54	4.50
DBP75	70.03	73.31	-3.28	-0.92	0.36	-10.43	3.88
DBP90	72.10	74.17	-2.07	-0.67	0.50	-8.24	4.10
DBP105	70.00	73.48	-3.48	-1.15	0.26	-9.57	2.61
DBP120	70.17	72.45	-2.28	-0.70	0.48	-8.77	4.22

Even though the mean arterial pressure (MAP) was slightly higher in study group in the first 45 minutes of intra operative period, it was lower than the control group subsequently. These differences observed between the study and control groups were very minimal, as they were statistically not significant. (table 7& figure 7)

Fig12: Trend diagram of mean values MAP in study and control groups (N=58)

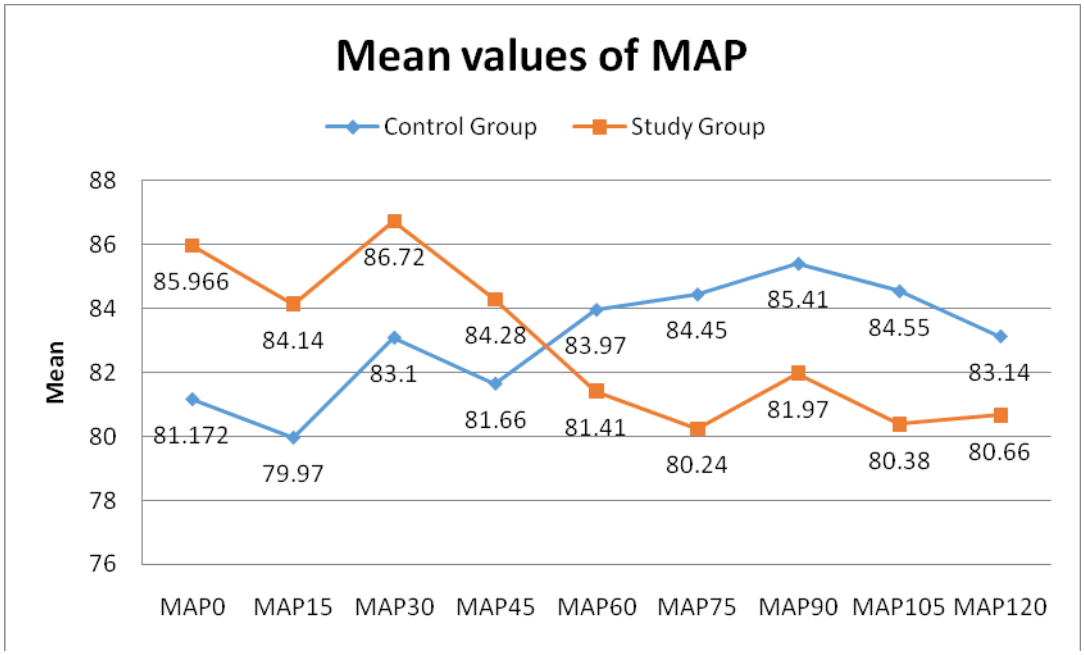


Table 12: Comparison of Mean Arterial Pressure in two study groups (N=58)

Mean Arterial Pressure	Study Group (Mean)	Control Group (Mean)	Mean Difference	Student t-value	P-Value	95% CI of the Difference	
						Lower	Upper
MAP0	85.97	81.17	4.79	1.50	0.14	-1.603	11.189
MAP15	84.14	79.97	4.17	1.34	0.19	-2.07	10.42
MAP30	86.72	83.10	3.62	1.04	0.30	-3.34	10.58
MAP45	84.28	81.66	2.62	0.79	0.43	-4.07	9.29
MAP60	81.41	83.97	-2.55	-0.77	0.45	-9.22	4.12
MAP75	80.24	84.45	-4.21	-1.22	0.23	-11.11	2.69
MAP90	81.97	85.41	-3.45	-1.21	0.23	-9.16	2.26
MAP105	80.38	84.55	-4.17	-1.32	0.19	-10.51	2.17
MAP120	80.66	83.14	-2.48	-0.71	0.48	-9.48	4.52

POST OP VISUAL ANALOGUE SCALE:

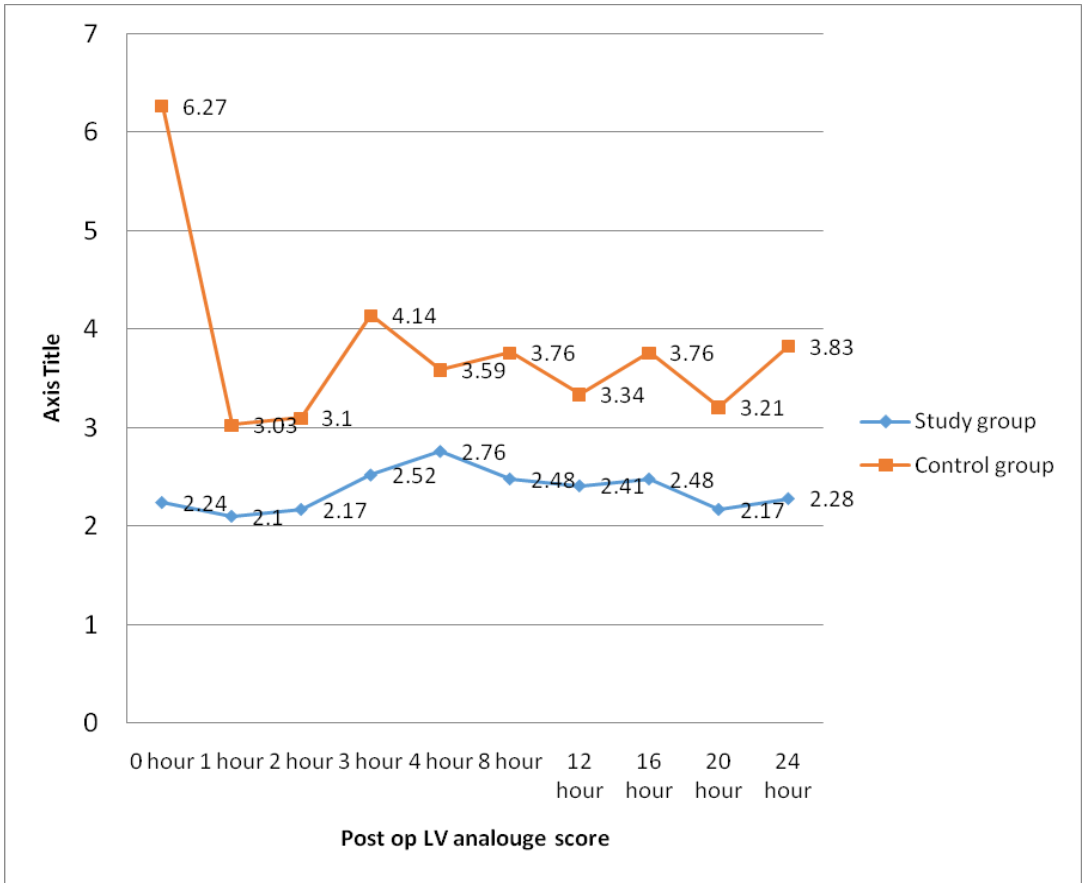
The pain during the postoperative period was assessed for the first 24 hours using the post op visual analogue scale. Raw data of a patient in each group is shown in table 9.

Table 13. Post op visual analogue scale in a patient in both groups (Raw data)

Time	**0 hr**	**1 hr**	**2 hr**	**3 hr**	**4th hr**	**8th hr**	**12th hr**	**16th hr**	**20th hr**	**24th hr**
Bupivacaine group	2	2	1	2	3	3	2	2	3	3
Control group	6	3	3	4	3	3	5	2	2	2

The severity of pain, as assessed by visual analogue scale was compared between the study and control groups, during the post operative period. The mean visual analogue score was higher in the control group, throughout the post operative period, when compared to study group. This indicates better pain control in the study group throughout the post operative period, when compared to controls. The trend diagram of Post op visual analogue score among the study and control groups is shown in Fig. 13

Fig 13: Trend diagram of distribution of Post op LV analogue score among the study and control groups (N=58)



The highest difference in the mean visual analogue score was observed in the immediate post operative period (mean difference 4.03, 95 CI 3.4 to 4.66, p value < 0.001). This difference even though was variable and lower compared to the immediate post operative value, was sustained throughout the post operative period. At 24 hour post operative period the mean difference in visual analogue score was 1.55 (95% CI 0.93 to 2.16, p value < 0.001). All these differences in the

mean visual analogue scores were statistically significant at p value < 0.05.

(shown in table 10)

Table 14: Comparison of Post op Visual analogue score in two groups (N=58)

Post op LV analogue score	Study Group (Mean)	Control Group (Mean)	Mean Difference	Student t-value	P-Value	95% CI of the Difference	
						Lower	Upper
0 hour	2.24	6.27	-4.03	-12.93	<0.001	-4.66	-3.40
1 hour	2.10	3.03	-0.93	-4.57	<0.001	-1.34	-0.52
2 hour	2.17	3.10	-0.93	-4.50	<0.001	-1.35	-0.52
3hour	2.52	4.14	-1.62	-6.13	<0.001	-2.15	-1.09
4 hour	2.76	3.59	-0.83	-2.63	0.011	-1.46	-0.19
8 hour	2.48	3.76	-1.28	-3.74	<0.001	-1.96	-0.59
12 hour	2.41	3.34	-0.93	-3.44	0.001	-1.47	-0.39
16 hour	2.48	3.76	-1.28	-3.95	<0.001	-1.92	-0.62
20 hour	2.17	3.21	-1.03	-3.84	<0.001	-1.57	-0.49
24 hour	2.28	3.83	-1.55	-5.07	<0.001	-2.16	-0.93

DISCUSSION

Acute post operative pain increases the sympathetic activity, increases stress hormones, adverse neuro hormonal responses like hyperglycemia, insulin resistance and increased catabolism. It also causes psychological disturbances like agitation, delirium, lethargy and unresponsiveness to stimulus. It delays gastric emptying, increases the risk of pulmonary aspiration of gastric contents.

Hence, post operative pain should be adequately managed to prevent the adverse effects of pain. No single analgesic technique is sufficient to adequately address the acute postoperative pain.

Post operative pain in thyroid surgery is traditionally managed with parentral opiods. Though it produces better analgesia, it has many undesirable effects like respiratory depression, excessive sedation, paralytic ileus,nausea, vomiting and tolerance.

Difficulty in swallowing, pain in the wound region, burning sensation in the throat occurs in the patients during postoperative period after thyroid surgery. In addition, nausea and vomiting are common complications which further cause discomfort to the patient.

Patients coming for elective thyroid surgery, the thyroid function tests are brought to normal, using various drugs. Though these drugs are taken preoperatively, the chance of excessive release of thyroid hormones occurs during the surgery. This results in unwanted hemodynamic changes like tachycardia,

hypertension, dysarrhythmia and fatal thyroid storm. To address these adverse effects, adequate depth of general anesthesia is necessary.

Use of opiod drugs, NSAIDS (Non Steroidal Anti Inflammatory Drugs) or regional anaesthetics can reduce the dose of general anaesthetic drugs (4). When local anaesthetics are used to perform BSCPB, it reduces the general anaesthetic requirements and blunts the adverse effects of excessive stimulation of thyroid gland during thyroid surgery. Hence, the use of local anaesthetics expected to maintain stable intraoperative hemodynamic parameters.

In a study by Shih et al 2010, bilateral superficial block reduces the general anesthetic requirements during the surgery and also significantly lowers the severity of postoperative pain during the first 24 hours. But in this study, the haemodynamic status during the surgery was not studied(5).

When regional anaesthesia was combined with general anaesthesia for thyroid surgery, the patients were more likely to experience good recovery in postoperative period – better energy levels and early return to work(6). In a study by Dieudonne et al, bilateral superficial cervical plexus block was performed only at the end of the surgery to assess the post operative analgesic effect. The intraoperative haemodynamic status was not studied (7).

To test the analgesic efficacy of BSCPB, in a study by Andrieu et al, three groups of total thyroidectomy patients were randomized to receive saline or ropivacaine or ropivacaine plus clonidine(8). The requirement of sufentanil during

the intraoperative period and pain score in the post operative period were significantly reduced. No major complications of BSCPB occurred during the study. Though regional anaesthesia using ropivacaine and clonidine were used, bupivacaine was not compared in this study.

Wound Infiltration of local anaesthetics(9), bilateral superficial cervical plexus block(7)(10)(11), bilateral combined superficial and deep cervical plexus block (12)can reduce the postoperative pain after thyroid surgery. Superficial cervical plexus block reduces postoperative pain in carotid endarterectomy surgeries.(13)

However, in a study by Eti et al, use of local anaesthetic wound infiltration or use of bilateral superficial cervical plexus block did not decrease the analgesic requirement after thyroid surgery.(14)

Also, in another study by Warschkow et al (15), the efficacy and safety of BSCPB in adjunct to general anaesthesia was evaluated in thyroid surgery patients. Randomised controlled trials were performed to evaluate the efficacy of BSCPB, in which reduction in pain scores were obtained 6 and 24 hrs after the surgery. However, the pain reduction in post operative period was too small to be of clinical relevance. The risk of postoperative nausea and vomiting was also seen in patients who received BSCPB.

Hence, proof of efficacy of combination of the BSCPB with general anaesthesia in thyroid surgery remains weak. There is a gap in the knowledge

about the bilateral superficial cervical plexus block in intraoperative haemodynamics and post operative analgesia in thyroid surgery.

Therefore, there is a need to evaluate the analgesic efficacy of BSCPB performed under general anaesthesia during thyroid surgery.

Therefore, the aim of the present study is to evaluate the analgesic efficacy, safety and hemodynamic status of bilateral superficial cervical plexus block with general anaesthesia in thyroid surgery patients.

The following parameters are observed and compared:

1. Intraoperative hemodynamic parameters such as heart rate, systolic blood pressure, diastolic blood pressure and mean blood pressure.
2. Post operative pain using Visual Analogue Scale.
3. Adverse effects during and after surgery.

INTRA OPERATIVE HEMODYNAMIC PARAMETERS

The baseline hemodynamic parameters such as heart rate, systolic blood pressure, diastolic blood pressure and mean blood pressure in study and control groups were recorded and compared. There is no statistically significant difference were observed in the baseline hemodynamic parameters between the study and control groups. Hence, both groups are comparable.

The heart rate is constantly higher in the bupivacaine group compared to the normal saline group throughout the intraoperative period, which is statistically not

significant except at 30 and 45 minutes. At 30 and 45 minutes, the difference in the mean heart rate was 8.1 and 8.14 beats/min respectively, with the p values ≤ 0.05. But, after 45 min, there is no statistically significant difference in the heart rate between the two groups.

The systolic blood pressure in the bupivacaine group was slightly higher in the first 45 min of intra operative period. After 45 min, it was slightly lower than the control group. There is minimal difference observed between the two groups, which is statistically insignificant.

The diastolic blood pressure in the bupivacaine group is slightly higher in the intra operative period for the first 45 min, compared to the control group. After 45 min, it was slightly lower than the control group. The difference observed between the two groups is not statistically significant.

The mean arterial pressure in the bupivacaine group was slightly higher for the first 45 min during the intra operative period, when compared to the control group. Subsequently, it was slightly lower than the control group. This minimal difference observed between the study and control group is not statistically significant.

Though the heart rate at 30 and 45 min showed statistically significant difference between the bupivacaine and control groups, there is no statistically significant difference in heart rate after 45 min.

Systolic blood pressure, diastolic blood pressure and mean arterial blood pressure did not show any statistically significant difference between the bupivacaine and control group. Hence, we can conclude that the bupivacaine did not alter the hemodynamic parameters in the intraoperative period during thyroid surgeries.

POST OPERATIVE PAIN

The post operative pain was assessed using linear visual analogue scale. The mean visual analogue scale score was higher in the normal saline group, when compared to the bupivacaine group throughout the post operative period.

The mean visual analogue scale score difference between the bupivacaine group and normal saline group was statistically significant throughout the post operative period with the p value < 0.05. The difference was observed highest in the immediate post operative period.

Hence, we can conclude that the use of bupivacaine for bilateral superficial cervical plexus block during thyroid surgeries, significantly reduces the post operative pain.

ADVERSE EFFECTS

Throughout the study, no adverse effects were noted both in the bupivacaine group and normal saline group. Hence, we can conclude that the use of bupivacaine in thyroid surgeries, does not cause any adverse effects, both during intra operative and post operative period.

CONCLUSION

The data and statistical analysis suggest that Bilateral Superficial Cervical Plexus Block with bupivacaine did not alter the intraoperative hemodynamic parameters and was effective in reducing the pain during the postoperative period. No significant adverse effects were noted both during surgery and postoperative period.

LIMITATION

SCPB can only be combined with general anaesthesia and cannot be used as a sole anaesthetic.

FUTURE COURSE

To see the effects of intraoperative analgesia and post operative sedation when opiods are combined with local anaesthetic, for performing SCPB.

SUMMARY

The number of patients undergoing thyroid surgery is increasing for various indications including multi nodular goiter, single nodular goiter and adenoma. General anaesthesia is the standard anaesthetic technique followed throughout the world for thyroid surgeries. Opiod analgesics are commonly used for analgesia for intraoperative and postoperative period. Any head and neck surgery is usually associated with postoperative nausea and vomiting, which is further aggravated by opiod analgesics.

The use of local anaesthetics in thyroid surgeries for bilateral Superficial Cervical Plexus Block (BSCPB), reduces the opiod requirement and also adverse effects associated with the use of opiods. Various studies have shown the effects of BSCPB, using various local anaesthetics and adjuvants have beneficial effect in post operative pain relief. But, few studies showed no beneficial effect of BSCPB in thyroid surgeries. Hence, the use of BSCPB in thyroid surgeries remain controversial.

Though various studies have shown the benefit of BSCPB in reduction of intraoperative general anaesthetics and analgesics requirements, the effects of BSCPB in intraoperative hemodynamic status is not studied. Hence, there is a need to study the effect of BSCPB in simple thyroid surgery, for intraoperative hemodynamic status and post operative pain relief.

In the present study, the intraoperative hemodynamic parameters of both the bupivacaine and the normal saline group were compared. There is no statistically significant difference in the trend of hemodynamic status during the intraoperative period between both the groups.

The post operative pain was assessed using Visual Analogue Scale for the first 24 hours in the post operative period. In the Normal Saline group, the mean visual analogue score was higher, when compared to the Bupivacaine group. This indicates that there is better pain control in the Bupivacaine group when compared to the Normal Saline group. The mean difference in the visual analogue score between the two groups is statistically significant.

The present study shows that the use of Bupivacaine in BSCPB in thyroid surgeries, did not alter the intraoperative hemodynamic status, but effective in post operative pain relief. There is no significant adverse effects noted in this study.

REFERENCES

1. Collins. Principles of Anaesthesiology. In: 2nd ed. Philadelphia; 1978. p. 951

2. Moore DC. Regional Block: A Handbook for use in the Clinical Practice of Medicine and Surgery. In: 4th ed. 1978. p. 112–20.

3. NYSORA: The NewYork School of Regional Anaesthesia.

4. Sonner JM, Hynson JM, Clark O, Katz JA. Nausea and vomiting following thyroid and parathyroid surgery. J Clin Anesth. 1997 Aug;9(5):398–402.

5. Shih M-L, Duh Q-Y, Hsieh C-B, Liu Y-C, Lu C-H, Wong C-S, et al. Bilateral superficial cervical plexus block combined with general anesthesia administered in thyroid operations. World J Surg. 2010 Oct;34(10):2338–43.

6. Suri KB, Hunter CW, Davidov T, Anderson MB, Dombrovskiy V, Trooskin SZ. Postoperative recovery advantages in patients undergoing thyroid and parathyroid surgery under regional anesthesia. Semin Cardiothorac Vasc Anesth. 2010 Mar;14(1):49–50.

7. Dieudonne N, Gomola A, Bonnichon P, Ozier YM. Prevention of postoperative pain after thyroid surgery: a double-blind randomized study of bilateral superficial cervical plexus blocks. Anesth Analg. 2001 Jun;92(6):1538–42.

8. Andrieu G, Amrouni H, Robin E, Carnaille B, Wattier JM, Pattou F, et al. Analgesic efficacy of bilateral superficial cervical plexus block administered before thyroid surgery under general anaesthesia. Br J Anaesth. 2007 Oct 1;99(4):561–6.

9. Gozal Y, Shapira SC, Gozal D, Magora F. Bupivacaine wound infiltration in thyroid surgery reduces postoperative pain and opioid demand. Acta Anaesthesiol Scand. 1994 Nov;38(8):813–5.

10. Steffen T, Warschkow R, Brändle M, Tarantino I, Clerici T. Randomized controlled trial of bilateral superficial cervical plexus block versus placebo in thyroid surgery. Br J Surg. 2010 Jul 1;97(7):1000–6.

11. Young Jin et al, superficial cervical plexus block, european journal of anaesthesia, 2009

12. Aunac S, Carlier M, Singelyn F, De Kock M. The analgesic efficacy of bilateral combined superficial and deep cervical plexus block administered before thyroid surgery under general anesthesia. Anesth Analg. 2002 Sep;95(3):746–50, table of contents.

13. Messner M, Albrecht S, Lang W, Sittl R, Dinkel M. The Superficial Cervical Plexus Block for Postoperative Pain Therapy in Carotid Artery Surgery. A Prospective Randomised Controlled Trial. Eur J Vasc Endovasc Surg. 2007 Jan 1;33(1):50–4.

14. Eti Z, Irmak P, Gulluoglu BM, Manukyan MN, Gogus FY. Does bilateral superficial cervical plexus block decrease analgesic requirement after thyroid surgery? Anesth Analg. 2006 Apr;102(4):1174–6.

15. Warschkow R, Tarantino I, Jensen K, Beutner U, Clerici T, Schmied BM, et al. Bilateral superficial cervical plexus block in combination with general anesthesia has a low efficacy in thyroid surgery: a meta-analysis of randomized controlled trials. Thyroid Off J Am Thyroid Assoc. 2012 Jan;22(1):44–52.

PROFORMA SHEET

Comparison of intra operative haemodynamics, postoperative analgesic effect of bilateral superficial cervical plexus block in thyroid surgery under general anaesthesia

Patient Name:

Age/Sex:

IP No/Surgery unit:

Date of Admission:

Date of Surgery:

Diagnosis:

Procedure:

Weight in kg:

Investigations:

Procedure: Bilateral superficial cervical plexus block using 10ml of 0.5% of Bupivacaine / Normal Saline on each side

Intraoperative monitoring:

Parameters	0	15	30	45	60	1:15	1:30	1:45	2:00
HR									
SBP									
DBP									
MAP									

Post operative linear visual analogue score:

Time	0 hr	1 hr	2 hr	3 hr	4^{th} hr	8^{th} hr	12^{th} hr	16^{th} hr	20^{th} hr	24^{th} hr
Score										

Name of the Investigator:

Signature of the Investigator:

Date:

ஆராய்ச்சி ஒப்புதல் படிவம்

ஆராய்ச்சி தலைப்பு: அறுவைசிகிச்சையின் பொழுது ஏற்படும் இதய துடிப்பு , இரத்த அழுத்த மாற்றத்தினை அறிவதற்கும், அறுவைசிகிச்சைக்குப்பின் வலிநீக்கத்தினை அறியவும் கழுத்து பக்கவாட்டில் கொடுக்கப்படும் வலிநீக்க மருந்தின் ஒப்பீடு.

பெயர் : தேதி :

வயது : உள் நோயாளி எண் :

பால் : ஆராய்ச்சி சேர்க்கை எண் :

இந்த ஆராய்ச்சியின் விபரங்களும் அதன் நோக்கங்களும் முழுமையாக எனக்கு தெளிவாக விளக்கப்பட்டது.

எனக்கு விளக்கப்பட்ட விஷயங்களை நான் புரிந்து கொண்டு எனது சம்மதத்தைத் தெரிவிக்கிறேன்.

இந்த ஆராய்ச்சியில் பிறரின் நிர்ப்பந்தமின்றி என் சொந்த விருப்பத்தின் பேரில் தான் பங்கு பெறுகிறேன். மற்றும் நான் இந்த ஆராய்ச்சியிலிருந்து எந்நேரமும் பின்வாங்கலாம் என்பதையும் அதனால் எந்த பாதிப்பும் ஏற்படாது என்பதையும் நான் புரிந்து கொண்டேன்.

இந்த ஆராய்ச்சியின் விபரங்களைக் கொண்ட தகவல் தாளைப் பெற்றுக்கொண்டேன்.

நான் என்னுடைய சுயநினைவுடன் மற்றும் முழு சுதந்திரத்துடன் இந்த மருத்துவ ஆராய்ச்சியில் என்னை சேர்த்துக் கொள்ள சம்மதிக்கிறேன். இந்த ஆராய்ச்சியால் ஏற்படும் நன்மைகள் பற்றியும், விளைவுகள் பற்றியும் மருத்துவர் தெளிவாக எனக்கு எடுத்து கூறினார். முடிவுகளை அல்லது கருத்துக்களை வெளியுடும் போதோ அல்லது ஆராய்ச்சியின் போதோ என்னுடைய பெயரையோ அல்லது அடையாளங்களையோ வெளியிட மாட்டார்கள் என்பதையும் அறிந்து கொண்டேன்.

இந்த ஆராய்ச்சியில் பங்கேற்பது என்னுடைய விருப்பத்தின் பேரில் தான் இருக்கிறது. மேலும் நான் எந்நேரமும் இந்த ஆராய்ச்சியிலிருந்து பின்வாங்கலாம் என்பதையும் தெரிந்துகொண்டேன்.

எனக்கு விளக்கப்பட்ட விஷயங்களை முழுமையாக புரிந்துகொண்டு இந்த ஆராய்ச்சியில் பங்குகொள்ள என் முழுமனதுடன் ஒப்புக்கொள்கிறேன்.

ஆராய்ச்சியாளர் கையொப்பம் பங்கேற்பாளர் கையொப்பம்.

தேதி :

CONTROL GROUP

	HR per min									SBP in mmHg									DBP in mmHg									MAP in mmHg									Post op Visual Analogue score									
S.No	0 min	15 min	30 min	45 min	60 min	75 min	90 min	105 min	120 min	0 min	15 min	30 min	45 min	60 min	75 min	90 min	105 min	120 min	0 min	15 min	30 min	45 min	60 min	75 min	90 min	105 min	120 min	0 min	15 min	30 min	45 min	60 min	75 min	90 min	105 min	120 min	0 Hr	1 Hr	2 Hr	3 Hr	4 Hr	8 Hr	12 Hr	16 Hr	20 Hr	24 Hr
1	106	109	106	103	89	80	84	82	92	110	108	104	108	118	117	122	117	111	72	67	70	76	80	69	78	82	75	85	81	81	86	95	94	93	93	86	6	3	3	4	3	3	5	2	2	2
2	108	105	106	103	88	78	82	80	91	129	108	106	103	106	116	115	111	110	81	70	72	67	70	76	80	69	79	92	60	80	76	80	85	87	79	85	6	3	3	4	5	3	3	6	6	4
3	89	94	104	88	92	89	110	104	98	116	124	128	116	128	130	124	130	126	76	80	85	78	82	82	80	84	78	91	95	100	91	97	97	95	99	93	6	3	3	5	3	3	4	3	2	2
4	86	80	74	70	62	62	70	56	60	110	90	108	96	98	100	120	82	82	70	60	65	64	60	55	70	52	52	83	70	80	74	75	70	85	59	59	6	5	3	3	4	3	3	5	3	3
5	92	86	78	84	86	82	92	88	92	110	90	130	140	130	135	138	142	145	60	50	70	65	68	65	70	75	75	75	65	90	90	88	86	95	94	100	7	3	3	3	3	8	3	6	4	5
6	92	91	84	85	88	84	86	84	78	115	121	97	101	90	96	97	88	89	80	89	68	63	71	69	69	68	71	88	97	74	71	74	76	75	73	75	4	1	1	3	3	6	2	2	2	3
7	86	92	91	88	86	84	86	78	84	85	129	124	108	147	152	131	105	116	64	73	76	84	96	90	86	59	74	69	87	86	89	109	107	97	69	84	3	4	2	3	3	6	2	2	3	4
8	86	84	86	84	95	94	96	95	84	119	111	117	116	100	93	71	80	99	74	68	76	62	66	59	57	53	62	84	79	85	76	74	66	60	58	71	8	3	3	4	2	2	3	6	2	2
9	109	107	105	107	104	109	123	104	103	104	102	101	108	107	106	109	109	108	58	58	59	63	67	66	68	82	78	67	67	69	73	76	75	78	89	86	7	1	3	3	4	2	2	6	3	3
10	104	98	96	78	84	92	94	95	94	106	102	103	106	112	115	108	108	98	68	63	78	75	52	84	78	78	78	77	72	84	83	64	87	85	85	85	6	3	3	4	2	3	3	5	2	2
11	92	96	94	84	82	84	84	78	84	98	99	99	104	105	109	115	127	107	76	74	70	74	80	71	79	90	73	80	80	77	80	85	81	88	100	81	7	3	3	5	2	3	3	4	2	2
12	60	58	58	59	61	61	67	72	65	112	114	113	108	110	109	108	115	108	70	73	73	67	73	71	76	72	69	80	82	81	77	81	79	83	83	78	6	3	3	5	2	2	3	3	4	3
13	74	85	86	86	88	94	94	95	87	103	106	103	111	111	107	119	121	130	65	69	67	65	68	70	67	81	84	73	77	75	75	78	79	79	91	95	7	3	3	3	5	2	3	5	3	3
14	65	66	79	76	96	93	90	88	88	96	106	100	123	132	118	122	112	114	45	70	70	67	78	75	57	62	74	52	78	78	80	85	86	73	74	84	6	3	5	3	3	6	3	2	2	5
15	84	78	84	75	79	77	68	76	78	113	109	121	71	85	89	92	109	89	62	71	77	57	57	77	70	78	64	74	79	84	61	64	83	80	92	75	8	3	3	5	2	3	4	2	3	3
16	75	76	66	64	65	60	62	62	64	87	102	88	140	99	145	114	111	122	59	68	71	81	62	100	72	70	77	72	83	75	93	69	110	82	79	88	4	4	3	6	4	2	2	3	3	6
17	77	81	81	84	96	109	77	78	78	120	115	100	112	107	82	103	113	128	86	79	78	81	77	63	83	85	80	93	86	83	88	85	67	88	91	91	5	3	3	6	2	3	4	2	2	5
18	70	69	65	76	84	87	71	73	79	137	128	122	131	131	142	140	127	146	74	72	74	75	96	83	80	77	79	89	86	86	89	104	98	96	91	98	4	3	6	4	4	7	3	3	5	4
19	84	75	76	84	96	82	78	86	76	117	139	133	144	131	138	127	140	135	70	85	78	88	80	85	82	84	86	81	99	92	103	93	98	92	98	98	8	3	3	5	4	3	3	2	4	6
20	70	66	65	68	69	73	71	68	77	131	133	139	117	146	127	140	142	95	80	78	85	70	79	77	80	83	48	93	92	99	81	98	91	96	98	58	6	4	3	3	5	2	4	4	3	5
21	78	78	60	68	64	68	68	64	71	113	117	148	136	114	115	112	159	136	65	62	79	70	73	69	67	79	79	76	75	97	87	83	81	79	99	94	8	3	3	5	4	3	2	5	4	6
22	59	62	62	62	96	84	96	82	86	119	90	90	103	100	104	100	96	98	73	63	64	66	67	67	67	65	62	82	69	70	74	75	76	75	72	72	7	3	3	5	5	4	3	4	5	6
23	74	82	86	71	74	71	84	84	82	101	94	130	136	135	127	140	138	96	69	56	79	79	86	82	84	85	65	76	65	90	94	98	92	98	98	72	6	3	3	4	2	5	4	4	6	3
24	75	76	78	77	83	78	74	82	75	139	135	134	127	134	132	140	141	137	67	69	67	65	53	92	82	86	89	82	86	83	76	74	102	96	99	101	7	3	3	5	4	3	3	6	4	5
25	68	74	72	80	66	74	76	78	80	139	133	132	126	113	109	114	113	113	86	82	81	73	97	68	82	59	69	98	94	93	86	100	75	89	72	77	6	3	3	5	7	4	4	3	2	6
26	78	75	68	72	75	72	74	78	85	118	113	119	111	118	132	141	133	131	87	82	94	89	88	68	72	69	60	94	89	98	92	95	83	88	83	76	7	3	3	2	5	4	6	4	3	3
27	72	73	75	78	84	87	82	68	64	125	120	123	119	126	114	124	120	136	56	56	50	55	61	58	61	57	64	72	72	69	70	77	71	74	70	79	6	3	3	5	4	4	5	3	3	5
28	71	72	73	80	71	72	73	75	72	119	103	108	102	105	111	118	113	119	86	81	77	80	80	82	87	82	94	94	86	83	85	85	87	94	89	98	7	3	4	2	5	6	3	4	3	3
29	76	78	72	74	76	78	76	78	75	94	102	109	100	108	109	110	109	102	78	58	55	59	64	53	67	65	63	82	68	68	68	74	67	77	75	72	8	3	3	6	3	4	5	3	3	2

BUPIVACAINE GROUP

	HR per min									SBP in mmHg									DBP in mmHg									MAP in mmHg									Post op Visual Analogue score									
S.No	0 min	15 min	30 min	45 min	60 min	75 min	90 min	105 min	120 min	0 min	15 min	30 min	45 min	60 min	75 min	90 min	105 min	120 min	0 min	15 min	30 min	45 min	60 min	75 min	90 min	105 min	120 min	0 min	15 min	30 min	45 min	60 min	75 min	90 min	105 min	120 min	0 Hr	1 Hr	2 Hr	3 Hr	4 Hr	8 Hr	12 Hr	16 Hr	20 Hr	24 Hr
1	65	71	138	141	126	97	77	73	85	117	123	159	154	128	96	108	108	130	58	64	95	89	80	63	71	68	84	69	75	114	110	94	75	86	85	102	3	2	2	3	1	2	4	3	2	2
2	78	74	93	85	86	67	68	86	66	120	116	95	115	99	105	101	117	102	70	93	52	75	62	69	60	67	61	85	77	62	82	70	76	70	79	71	2	2	1	2	3	3	2	2	3	3
3	78	80	102	94	90	92	88	92	84	124	120	90	100	110	115	105	100	105	75	70	60	60	65	75	80	70	70	90	85	73	75	81	85	88	80	82	2	1	1	2	2	3	2	2	3	3
4	74	70	137	140	125	96	76	72	84	128	122	158	153	127	95	107	107	129	78	63	94	88	79	62	70	67	83	93	74	113	109	93	74	85	84	101	3	2	2	3	4	3	3	4	3	3
5	116	120	110	88	76	70	68	75	75	140	143	133	153	134	126	120	117	111	85	89	92	93	88	85	85	74	74	103	114	110	121	106	100	97	90	90	3	2	2	3	3	3	2	2	2	2
6	77	80	79	86	90	96	96	85	83	131	132	138	136	125	126	140	118	111	91	94	102	58	84	83	89	66	55	100	103	110	107	94	93	100	79	61	1	2	2	3	3	3	4	3	3	3
7	79	83	84	86	87	90	92	92	92	99	100	102	106	97	103	109	116	93	59	64	63	62	61	64	63	63	58	69	72	72	71	70	74	75	71	67	2	2	2	3	3	2	2	1	1	1
8	74	82	78	80	80	74	76	78	85	106	110	121	119	133	108	114	123	125	76	75	89	81	94	72	82	86	88	84	83	96	90	103	80	89	94	96	1	3	3	2	2	2	3	3	1	1
9	86	88	88	88	99	103	114	114	112	126	115	114	123	109	115	108	97	81	90	79	78	84	75	79	73	63	50	98	87	87	93	81	88	80	71	57	1	1	2	2	3	3	3	4	1	1
10	111	119	104	102	94	93	99	114	112	80	86	103	95	92	127	109	108	81	49	50	59	61	64	99	75	73	50	56	59	69	68	70	104	81	80	57	2	2	3	3	3	1	1	2	2	2
11	94	84	78	84	74	84	82	86	78	127	118	115	129	115	113	127	111	115	95	87	78	89	89	83	91	86	81	99	94	86	96	95	91	98	93	89	3	1	1	1	1	2	2	2	3	3
12	82	82	84	86	84	82	78	82	84	96	93	100	107	115	108	105	110	101	74	74	75	78	84	77	77	77	75	80	78	78	85	91	84	83	83	81	1	2	2	2	3	3	3	4	1	1
13	92	84	86	92	82	78	76	78	82	99	104	128	113	122	104	111	115	96	76	72	85	79	87	82	80	81	74	81	80	95	86	94	87	87	89	80	2	2	3	3	3	4	1	1	2	2
14	89	86	82	85	78	74	72	74	76	110	133	132	97	132	131	131	128	136	80	94	98	70	94	91	95	98	101	87	104	107	76	103	100	104	105	108	1	1	2	2	2	3	3	3	4	1
15	63	71	71	67	66	68	68	65	64	124	110	137	113	115	115	117	117	111	100	68	97	86	73	79	80	80	72	106	77	107	92	84	87	87	87	81	2	2	2	3	3	3	4	1	1	2
16	66	68	66	65	65	65	66	79	76	108	107	104	107	99	96	106	100	123	74	76	70	72	62	43	70	53	67	82	84	77	81	69	52	78	65	80	3	3	3	4	1	1	1	2	2	2
17	82	87	92	94	78	86	84	86	92	115	111	111	103	103	109	106	105	105	76	78	50	47	45	41	47	43	49	90	86	65	60	59	56	61	58	62	1	1	2	2	3	3	4	1	1	2
18	86	88	86	84	82	86	87	92	77	114	112	108	101	107	109	113	110	111	52	51	55	44	49	55	55	60	51	67	66	68	58	63	67	69	69	65	2	2	3	3	4	1	1	2	2	3
19	101	83	83	84	81	76	74	68	69	153	122	134	87	97	100	101	140	141	97	99	93	44	41	38	37	78	77	114	110	109	61	61	60	60	100	100	1	1	2	2	3	4	1	1	2	2
20	83	68	69	78	77	70	65	61	70	137	113	112	135	128	155	131	127	152	93	76	73	91	88	97	82	88	95	102	85	83	100	95	112	94	94	108	3	4	1	1	2	2	2	3	3	3
21	68	66	70	72	78	77	82	86	78	145	115	106	110	97	111	107	109	113	91	78	77	79	66	51	60	55	55	102	86	84	85	74	65	71	67	69	2	2	3	2	5	2	1	3	3	2
22	84	75	76	76	70	113	122	128	122	110	133	101	122	104	96	97	93	99	67	86	68	69	61	54	51	50	52	78	98	75	83	72	65	62	60	64	3	3	2	3	5	3	2	4	3	4
23	80	86	94	97	102	105	102	98	99	132	143	115	110	127	126	145	128	129	87	86	73	75	73	80	72	79	77	98	100	85	82	85	90	84	91	88	6	3	3	2	4	3	2	2	3	2
24	97	94	99	102	98	94	106	82	86	123	121	123	137	122	103	117	113	114	71	71	83	76	75	73	85	76	81	83	83	92	90	86	79	91	84	89	3	2	2	1	3	3	4	3	2	3
25	85	92	90	78	79	82	90	78	79	108	107	116	99	104	104	116	99	104	70	66	96	70	69	68	96	70	68	79	76	100	77	76	76	100	77	76	2	2	1	3	4	2	3	2	1	3
26	78	84	82	78	74	76	78	74	76	101	97	97	100	96	101	94	97	94	60	63	60	63	58	58	57	58	78	69	71	68	71	67	67	66	67	82	3	3	2	4	3	2	1	2	3	3
27	78	72	74	76	78	76	78	75	76	102	109	100	108	109	110	109	102	108	58	55	59	64	53	67	65	63	62	68	68	68	74	67	77	75	72	71	2	2	4	3	2	1	3	3	2	3
28	121	98	92	82	75	84	74	75	82	97	119	119	111	121	117	102	115	112	76	73	70	73	73	72	71	65	76	80	85	81	83	81	83	76	76	84	3	4	2	2	1	3	3	4	2	2
29	80	82	78	74	76	82	78	74	80	120	114	116	118	110	111	105	107	108	70	70	70	67	66	71	72	73	71	81	80	81	78	77	80	80	81	78	2	2	3	4	1	2	3	3	2	2