PROTOCOL

FOR THE SUBMISSION OF THESIS TO

H.N.B.UTTARAKHAND MEDICAL EDUCATION UNIVERSITY, DEHRADUN

FOR

THE AWARD OF

MD DEGREE IN ANAESTHESIOLOGY AND CRITICAL CARE

FOR THE SESSION OF 2017-2020

TITLE OF THESIS

COMPARATIVE STUDY OF IV ESMOLOL , IV DILTIAZEM AND IV LIGNOCAINE HYDROCHLORIDE IN ATTENUATING PRESSOR RESPONSE TO LARYNGOSCOPY AND INTUBATION

BY:

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PROTOCOL

COMPARATIVE STUDY OF IV ESMOLOL , IV DILTIAZEM AND IV LIGNOCAINE HYDROCHLORIDE IN ATTENUATING PRESSOR RESPONSE TO LARYNGOSCOPY AND INTUBATION

SUBMITTED TO

H.N.B. UTTARAKHAND MEDICAL EDUCATION UNIVERSITY, DEHRADUN

FOR DEGREE OF DOCTORATE OF MEDICINE

IN

ANAESTHESIOLOGY AND CRITICAL CARE

BY

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UNDER SUPERVISION OF

GUIDE:

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APPLICATION FORM FOR APPROVAL OF SUBJECT OF THESIS FOR MD (ANAESTHESIOLOGY AND CRITICAL CARE)
SESSION (2017-2020)

1	**NAME OF THE CANDIDATE**	DR. SATHYA NARAYANAN,K
2	**MONTH AND YEAR OF PASSING MBBS EXAMINATION**	MARCH 2014
3	**NAME OF THE UNIVERSITY FROM WHICH GRADUATED**	THE TAMIL NADU DR.MGR MEDICAL UNIVERSITY, CHENNAI,TAMIL NADU.
4	**DATE OF JOINING MD COURSE**	01 MAY 2017
5	**LIKELY DATE OF APPEARING IN MD EXAM**	MAY/JUNE 2020
6	**PROPOSED SUBJECT OF THESIS**	COMPARATIVE STUDY OF IV ESMOLOL , IV DILTIAZEM AND IV LIGNOCAINE HYDROCHLORIDE IN ATTENUATING PRESSOR RESPONSE TO LARYNGOSCOPY AND INTUBATION
7	**FACILITIES FOR WORK ON THE SUBJECT OF THE THESIS**	Adequate facilities are available in department of anaesthesiology, govt medical college and associated dr.sushila tiwari government hospital, haldwani (u.k)
8	**DETAILED SCHEME ACCORDING TO WHICH THE CANDIDATE PROPOSE TO WORK**	Proposal Attached
9	**NAME OF THE GUIDE**	**DR. GEETA BHANDARI** PROFESSOR & HEAD OF DEPARTMENT DEPARTMENT OF ANAESTHESIOLOGY & CRITICALCARE GMC HALDWANI, NAINITAL UTTARAKHAND

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1.	NAME OF CANDIDATE	DR. SATHYA NARAYANAN,K		06/09/2017.
2.	NAME OF THE GUIDE	**DR.GEETA BHANDARI** PROFESSOR & HEAD OF DEPARTMENT. DEPARTMENT OF ANAESTHESIOLOGY & CRITICALCARE GMC HALDWANI, NAINITAL UTTARAKHAND		7/09/2017
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INTRODUCTION

Endotracheal intubation has indeed become an integral part of anaesthetic management and critical care since its description in 1921 by **Rowbotham** and **Magill**.

Laryngoscopy and tracheal intubation induces an increase in **nor-epinephrine**, **epinephrine** and **dopamine** levels , but the increase in nor-epinephrine levels is consistently associated with elevation of blood pressure and heart rate.

King et al .(1951) described the pressor responses to laryngeal and tracheal stimulation following laryngoscopy and tracheal intubation as reflex sympatho-adrenal stimulation.

Even though this **sympathoadrenal** response to laryngoscopy and intubation results are brief , they may have detrimental effects in high risk patients including myocardial infarction ,cardiac failure ,intracranial hemorrhage and increases in intracranial pressure and hence this response is undesirable in any patient undergoing surgery, irrespective of the nature of surgery.

Therefore it is important to find an effective means of attenuating sympathetic response to laryngoscopy and endotracheal intubation.

Many strategies have been implemented to minimize these hemodynamic adverse responses and are aimed at different levels of the reflex arc:

These include :

1. Block of the peripheral sensory receptors and afferent input by topical application and infiltration of local anaesthetic to superior laryngeal nerve.

2. Block of central mechanism of integration and sensory input by administration of fentanyl, morphine etc.

3.Block of efferent pathway and effector sites with i.v. lignocaine, β blockers, calcium channel blockers, hydralazine etc.

Since no single drug or technique is 100% efficient, recommendations for attenuating the reflex hypertension and tachycardia are manifold. The technique besides minimizing the cardiovascular responses to anaesthesia for patients at risk must also satisfy the following requirements.

1. It must be applicable regardless of patient's co-operation.

2. It should prevent the impairment of cerebral blood flow and avoid arousal of the
patient.

3. It should neither be time consuming nor alter the duration or modality of ensuing
anaesthesia.

Esmolol is a cardio selective water soluble ultrashort acting beta 1 adrenergic receptor antagonist that can be administered only by intravenous route.
The IV formulation of esmolol is available as preservative free esmolol hydrochloride 10mg/ml. Esmolol is rapidly hydrolysed by cytoplasmic esterases in red blood cells. Its metabolism is not influenced by renal or hepatic function and less than 1% excreted in urine as unchanged drug.

Diltiazem is a drug of benzothiazepine class of calcium channel blockers. Injectable diltiazem is a clear, colourless, sterile, non pyrogenic solution with a pH range of 3.7 – 4.1. The IV formulation of diltiazem is available as preservative free diltiazem hydrochloride 5 mg/ml. 70%-80% of the drug binds to the plasma proteins and albumin appears to bind 30% of the drug. The drug should be used with caution in patients with impaired renal or hepatic function.

Lidocaine/Lignocaine, an amide group of local anaesthetic agent .The IV formulation of lignocaine is available as preservative free lignocaine hydrochloride 21.3mg/ml. It is metabolized by oxidases and amidases from microsomes of liver and the metabolites are excreted in the urine, hastened when the urine is acidic.

The aim of this study is to do a comparative study of various drugs in attenuating the haemodynamic changes during laryngoscopy and intubation

REVIEW OF LITERATURE

In a **Randomised, double blind placebo controlled** study conducted by ***Thomson IR et al*** [1], they concluded that Esmolol 100 mg given as bolus, was effective as well as safe in blunting the haemodynamic responses to laryngoscopy and tracheal intubation in treated hypertensive patients.

In a **Prospective, double-blind, randomized study** conducted by ***Fox EJ et al*** [2], it was concluded that esmolol and lidocaine have similiar efficacies in attenuating moderate hemodynamic response to intubation of patients with isolated head trauma.

In a **Randomized controlled double blind study** conducted by ***Karuppiah S et al*** [3] for attenuation of hemodynamic response to laryngoscopy and intubation using intravenous fentanyl and esmolol,they concluded that in patients with no measures/drugs to attenuate hemodynamic response to laryngoscopy and intubation, there was a maximum rise in heart rate, SBP, DBP, and MAP when compared with pre-induction value. Fentanyl 2 µg/kg bolus or esmolol 0.2 mg/kg bolus 3 minutes before induction significantly attenuated the hemodynamic response to laryngoscopy and intubation better than control group.

In a **Multicentric trial** conducted by ***Miller et al*** [4] **,**dose-response and side-effects of esmolol when administered as a single iv bolus prior to induction of anaesthesia for controlling the haemodynamic response to tracheal intubation was assessed and they concluded that 100 mg bolus of esmolol was safe and effective for controlling the haemodynamic response to tracheal intubation. This dose of esmolol combined with a low dose of narcotic (fentanyl 2-3 micrograms.kg-1 or equivalent) resulted in effective control of both heart rate and blood pressure, while avoiding important side-effects.

In a **Comparative study** done by ***Martin DE et al*** [5]**,** they concluded that increases in systolic blood pressure, diastolic blood pressure, and pulmonary capillary wedge pressure with intubation were also significantly greater following administration of thiopental than following fentanyl-thiopental. Doses of fentanyl that are low enough to cause little postoperative respiratory depression significantly but blunts post intubation hypertension when used as an adjunct to thiopental.

In a **Randomised, double-blind, placebo-controlled** , ***Helfman SM et al*** [6] concluded that

only esmolol provided consistent and reliable protection against increases in both heart rate and systolic blood pressure accompanying laryngoscopy and intubation when compared with Lignocaine and fentanyl.

Gupta S et al[7] in his comparative study of efficacy of esmolol and fentanyl for pressure attenuation during laryngoscopy, and endotracheal intubationconcluded that the combination of intravenous fentanyl 2mcg/kg and intravenous esmolol 2 mg/kg is more effective in the attenuation of hemodynamic responses to laryngoscopy and endotracheal intubation than intravenous fentanyl 2mcg/kg or intravenous esmolol 2mg/kg alone.

Abou madi MN et al[8] studied the cardiovascular reactions to laryngoscopy and tracheal intubation following small and large intravenous doses of lidocaine and concluded that larger dose caused borderline protection against hypertension and tachycardia while the smaller dose prevented only the rise in systolic blood pressure. Possible mechanisms to account for these observations were discussed. These include a direct myocardial depressant effect, a central stimulant effect, a peripheral vasodilating effect and finally an effect on synaptic transmission.

Begum M et al[9]***,*** who did a comparative study between efficacy of esmolol and lignocaine for attenuating haemodynamic response due to laryngoscopy and endotracheal intubation concluded that esmolol 1.5 mg/kg was superior to lignocaine (1.5mg/kg) for attenuation ofhaemodynamic response tolaryngoscopy and endotracheal intubation.

Santosh Kumar et al [10] compared the efficacy of I.V esmolol, diltiazem and magnesium sulphate in attenuating the haemodynamic response to laryngoscopy and tracheal intubation and concluded that only esmolol prevented rise in heart rate after intubation while $MgSO_4$ itself causes tachycardia and diltiazem was ineffective in attenuating rise in heart rate .

P Agarawal et al[11] who studied the efficacy of intravenous esmolol ,lidocaine and diltiazem in attenuating haemodynamic response to laryngoscopy and intubation conluded that esmolol in dose of 1 mg/kg intravenously 3 min prior to laryngoscopy and intubation prevented the rise in heart rate effectively. Esmolol was also effective in attenuating systolic blood pressure increase, diastolic blood pressure increase and increase in mean blood pressure except at 1 min after intubation whereas in comparison lidocaine and diltiazem were not that effective. Esmolol may be used in ischemic heart disease patients and in hypertensive patients where increase in blood pressure and heart rate can be detrimental to the patient or surgical procedure itself,

like ophthalmic surgeries and neurosurgical procedures.

M Mahesh et al[12] who did a comparative study between iv esmolol hydrochloride and Lignocaine Hydrochloride concluded that in patients with no drugs to attenuate the sympathetic responses to laryngoscopy and intubation the rise in heart rate, systolic, diastolic and mean arterial blood pressures was maximum and statistically and clinically very highly significant and was be detrimental in high-risk patients. Lignocaine significantly attenuates the sympathetic responses to laryngoscopy and tracheal intubation. Esmolol also very significantly attenuates the sympathetic responses.

Gurudatta KN et al[13] who studied the attenuation of hemodynamic responses to laryngoscopy and endotracheal intubation by intravenous esmolol concluded that intravenous administration of 100 mg esmolol 2 minutes before induction of general anesthesia is very effective in attenuating the hemodynamic response to laryngoscopy and tracheal intubation.

Parth Shah et al[14] who did acomparison of fentanyl, esmolol and their combination for attenuation of hemodynamic response to laryngoscopy and tracheal intubation concluded that the combination of intravenous fentanyl 2mcg/kg and intravenous esmolol 2 mg/kg is more effective in the attenuation of hemodynamic responses to laryngoscopy and endotracheal intubation than intravenous fentanyl 2mcg/kg or intravenous esmolol 2mg/kg alone.

Millar forbes et al[15] who did a study consisting of twenty-two normotensive patients, in which anaesthesia was induced with thiopentone, nitrous oxide and oxygen, suxamethonium, and endotracheal intubation. Laryngoscopy and insertion of an endotracheal tube were immediately followed by an average rise in mean arterial pressure of 25 mm Hg (SE 22, range 2-45). He concluded that there was no significant difference in this response between groups premedicated with morphine and with amylobarbitone. There was no evidence that this effect caused lasting damage in normotensive patients. The possible cardiac or cerebral complications which might result in hypertensive patients werediscussed.

AIM

The aim of this study is to do a comparative study of various drugs in attenuating the haemodynamic changes during laryngoscopy and intubation.

OBJECTIVES

1. To study the efficacy of intravenous esmolol, lidocaine, and diltiazem in attenuating haemodynamic response to laryngoscopy and intubation.

2 To observe the variations in sympathetic response after administration of intravenous esmolol, lidocaine, and diltiazem to laryngoscopy and intubation.

3.To ascertain the superiority of one drug over the other in suppressing sympathetic

response to laryngoscopy and tracheal intubation .

MATERIAL AND METHODS

Study design: Prospective , Randomized ,Double blind , Controlled clinical study.

Place of study: Dr. Sushila Tiwari Government Hospital, Haldwani.

Sample size : 220 ASA grade I/II patients of age 18-60 years , randomly divided into 4 groups of 55 each by closed envelope technique.

The sample size is calculated by taking mean of the pulse rate after the drug administration from the following studies using **WIN PEPI** software .

1. The mean of pulse rate in the diltiazem group was taken as 94 after drug administration[10].

2.The mean of pulse rate in the lignocaine group was taken as 81.76 and that of esmolol as 82.96 after drug administration [12].

Sample size has been calculated by using power analysis & alpha error of 0.05 and the power of the study as 80%.

Sampling technique: Simple Randomization by Closed Envelope Technique.

The name of 4 groups of drugs are equally written in 220 opaque envelopes and sealed. The sealed envelopes are placed in a container and shuffled. After shuffling , the sealed envelopes are numbered from 1 to 220 in sequence. Sealed envelope will be opened in sequence corresponding to the number of the patient . Double blinding will be done to avoid any bias.

Study period: From the date of acceptance of thesis protocol to 15 months or completion of study whichever is earlier .

Inclusion criteria:

1.Patients >18 and < 60 years of age.

2.Patients weighing > 40kg and <90 kgs of either sex and BMI > 18.5 and < 24.9 of either sex.

3.Patients posted for elective Surgical Procedure belonging to ASA physical status – Grade I and II.

4.Patients requiring general Anesthesia and Endotracheal Intubation.

Exclusion criteria:

1. Patient / guardian refusal for consent

2. ASA grade III and IV.

3. Emergency surgeries.

4. Patients between age > 60 years and Age <18 years.

5. Patients weighing > 90kg and < 40kg and BMI < 18.5 and > 24.9 .

6. Patients suspected to have difficult tracheal intubation.

7. Patients on beta-blockers or calcium channel blockers.

8. Patients with significant renal (serum creatinine > 1.5mg/dl) ,hepatic (serum total bilirubin > 1.2 mg/dl, serum total protein <6g/dl & >8.5g/dl ,serum albumin <3.5g/dl & >5g/dl , serum SGPT >40u/l , serum SGOT >56u/l) disease.

9. Hypertensive patients systolic blood pressure ≥ 160 mmHg and or diastolic blood pressure ≥ 95 mmHg.

10. Patients with chronic obstructive lung diseases especially bronchial asthma.

11. Diabetic patients on treatment.

12. Patients with significant heart disease like past history of angina or myocardial infarction , heart blocks , and congestive cardiac failure.

13. Laryngoscopy and intubation exceeding 20 seconds .

METHODOLOGY

After the approval of Institutional ethical committee, a detailed history, complete physical examination and routine & appropriate investigations will be done for all patients, for PAC clearancefor surgery under anaesthesia. Informed written consent will be taken from patients after PAC clearance.

A total of 220 normotensive patients will be randomly divided into 4 groups of 55 each by closed envelope technique.

Group C is Control group. In this group 3 ml normal saline will be administered intravenously 2 minutes before layngoscopy and intubation.

Group E is Esmolol group .Injection esmolol 2mg/kg I.V. bolus will be administered intravenously 2 minutes before layngoscopy and intubation.

Group D is Diltiazem group . Injection diltiazem 0.2 mg/kgI.V. bolus will be administered

2 minute before laryngoscopy and intubation.

Group L is Lignocaine group. Injection lignocaine 1.5mg/kg I.V.will be administered 2 minutes before laryngoscopy and intubation.

Upon arrival in operation theatre, NIBP ,pulse oximeter, ECG monitoring will be established and vitals monitored . Appropriate intravenous line will be started with Ringer Lactate.

All the patients will be premedicated with injection glycopyrrolate 0.2 mg IV and injection midazolam 0.5 – 1 mg IV prior to induction of anaesthesia. Heart rate, systolic and diastolic blood pressure will be recorded as baseline value.

All the patients will be preoxygenated for 3min with 100% oxygen via Bain'scircuit. After administration of the study drug,anesthesia will be induced with intravenous propofol (1%) dose being 2.5 mg/kg and followed by succinylcholine 1.5 mg/kg.

Laryngoscopy will be performed with a Macintosh laryngoscope and Intubation will be done with an appropriate sized, disposable, high volume low-pressure cuffed endotracheal tube. Laryngoscopy and intubation will be done within 15 to 20 seconds with a strict and vigil monitoring of the following hemodynamic parameters –The heart rate , arterial blood pressure , and electrocardiography (ECG) changes which will be observed at the following time intervals.

1.Baseline .

2.After the drug administration.

3.Immediately after intubation.

3.At 1, 3,5min after intubation .

Any Surgical stimulus will be avoided during the study period.

Anesthesia will be maintained with balanced technique of nitrous oxide 66%, oxygen 33%, , isoflurane 1% or halothane 0.5 %, Non-depolarizing muscle relaxant, vecuronium 0.06–0.12mg/kg given at appropriate time and IPPV. Adequacy of ventilation will be monitored clinically with $ETCO_2$ and SPO2 will be maintained at 99-100%.

At the end of surgery, neuromuscular blockade will be reversed with inj. neostigmine 0.05 mg/kg and inj. Glycopyrrolate 0.008 - 0.01 mg/kg. Extubation will be done after the return of airway protective reflex and patients will be shifted to recovery room for further observation.

An observation will be made related to adverse effects of drugs and anesthesia related problems and will be attended to appropriately.

STATISTICAL ANALYSIS:

Data will be analyzed using appropriate statistical techniques.

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laryngoscopy and endotracheal intubation by intravenous esmolol.

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INFORMATION FORM FOR PATIENTS

Title of the project	COMPARATIVE STUDY OF IV ESMOLOL IV DILTIAZEM AND IV LIGNOCAINE HYDROCHLORIDE IN ATTENUATING PRESSOR RESPONSE TO LARYNGOSCOPY AND INTUBATION
Name of the candidate	DR SATHYA NARAYANAN,K
Purpose of the study	This study is to evaluate and study the efficiency and safety of intravenous esmolol , lidocaine,and diltiazem in the attenuation of hemodynamic response to laryngoscopy and intubation in normotensive individuals.
Procedure/method of study	Prospective Randomized controlled clinical study
Expected duration of subject participation	<4 hours .
Benefits to be expected from research to the participant	Attenuation of cardiovascular responses to laryngoscopy and intubation.

Any risk expected from study to the participant	NO
Maintenance of confidentiality of result	YES
Provision for free treatment for research related injury	NO
Compensation to the participant for research related injury	NO
Freedom to withdraw from study at any time during research	YES
Possible current or future use of biological material & data to be generated from research & if material is likely to be used for some other purpose or to be shared with other – should be mentioned	NO
Patient information sheet must be signed by Investigator	YES

PARTICIPANT CONSENT FORM

PARTICIPANT's NAME –

ADDRESS –

TITLE OF PROJECT –"COMPARATIVE STUDY OF IV ESMOLOL , IV DILTIAZEM AND IV LIGNOCAINE HYDROCHLORIDE IN ATTENUATING PRESSOR RESPONSE TO LARYNGOSCOPY AND INTUBATION"

The detail of study has been provided to me in writing and explained to me in my own language. I confirm that I understood the above study and opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. I agree not to restrict any use of the data or result that arises from the study provided such use is only for scientific purpose(s). I have been given information sheet giving detail of the study. I fully consent to participant in this study.

Signature / Left Thumb Impression of patient Date:
Place:

Name of the Participant: _____
Son/Daughter/Spouse of: _____
Complete postal address: _____

प्रतिभागी सहमति–पत्र

प्रतिभागी का नामः

पताः

प्रोजेक्ट का शीर्षकः "COMPARATIVE STUDY OF IV ESMOLOL , IV DILTIAZEM AND IV LIGNOCAINE HYDROCHLORIDE IN ATTENUATING PRESSOR RESPONSE TO LARYNGOSCOPY AND INTUBATION

इस शोध की विस्तृत जानकारी मुझे लिखित रूप से उपलब्ध करा दी गई है तथा मुझे मेरी भाषा में समझा दी गई है। उक्त शोध की जानकारी से मैं आस्वस्त हूँ तथा मेरे सभी सन्देह दूर हो गये हैं। इस सोध में मेरी प्रतिभागिता स्वैच्छिक है तथा मैं किसी भी समय इससे अलग होने के लिये स्वतन्त्र हूँ। उक्त शोध से प्राप्त प्रदतों एवं परिणामों का वैज्ञानिक उद्देश्य के हेतु इस्तेमाल करने पर मैं सहमति प्रदान करता/करती हूँ। उक्त शोध के सम्बन्ध में विस्तृत जानकारी–पत्र मुझे प्राप्त करा दिया गया है। मैं उक्त शोध हेतु पूर्ण रूप से अपनी सहमति प्रदान करता/करती हूँ।

हस्ताक्षर प्रतिभागी

Declaration Form

I, DR. SATHYA NARAYANAN,K hereby declare that I will not disclose identity of the research participants at time during or after the study period or during publication.

Signature of Candidate

PERSONAL DETAILS

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I hereby declare that all the information given is correct and complete to the best of my knowledge.

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EXPERIENCE : 18 YEARS 4 MONTHS

ACADEMIC ACHEIVEMENTS:

a) Qualifications: MBBS,MD,FCCS
b) Publications:40

ACKNOWLEDGEMENT LETTER

IEC has received research proposal entitled " COMPARATIVE STUDY OF IV ESMOLOL , IV DILTIAZEM AND IV LIGNOCAINE HYDROCHLORIDE IN ATTENUATING PRESSOR RESPONSE TO LARYNGOSCOPY AND INTUBATION"

Registration Number of the above research proposal is _____.

_____

Member Secretary

MEMBERS OF THE THESIS / RESEARCH COMMITTEE	SIGNATURE WITH STAMP
HEAD OF THE INSTITUTE / COLLEGE	
CHAIRMAN OF THE ETHICAL COMMITTEE	
MEMBER ETHICAL COMMITTEE	
MEMBER ETHICAL COMMITTEE	
MEMBER ETHICAL COMMITTEE	
MEMBER ETHICAL COMMITTEE	
MEMBER ETHICAL COMMITTEE	
MEMBER ETHICAL COMMITTEE	

OBSERVATION BY ETHICAL COMMITTEE-

DATE-

SIGNATURE OF SECRETARY ETHICAL COMMITTEE-

HUMAN ETHICS COMMITTEE APPROVAL

The members of IEC met on_____ at GMC Haldwani and reviewed the Project entitled "COMPARATIVE STUDY OF IV ESMOLOL , IV DILTIAZEM AND IV LIGNOCAINE HYDROCHLORIDE IN ATTENUATING PRESSOR RESPONSE TO LARYNGOSCOPY AND INTUBATION"

The IEC after careful deliberation has granted approval to the subject.

This approval is valid for three years or the duration of project whichever is earlier.

Member Secretary

IEC, GMC, Haldwani

DATA COLLECTION PROFORMA

DATE

PUKA NO(OPD)

PANA(IPD)

NAME

WEIGHT

BMI

AGE

GROUP
CONTROL / ESMOLOL / DILTIAZEM / LIGNOCAINE

SEX

PROPOSED SURGERY:

CHIEF COMPLAINTS

Table 1 : Pulse rate comparison with basal value

		DURATION				
Group	Basal	After drug administration	Immediately after intubation	After 1 min	After 3 min	After 5 min
Control						
Esmolol						
Diltiazem						
Lignocaine						

Table 2: Systolic Blood Pressure comparison with basal values.

		DURATION				
Group	Basal	After drug administration	Immediately after intubation	After 1 min	After 3 min	After 5 min
Control						
Esmolol						
Diltiazem						
Lignocaine						

Table 3: Diastolic Blood Pressure comparison with basal values.

			DURATION				
Group	Basal		After drug administration	Immediately after intubation	After 1 min	After 3 min	After 5 min
Control							
Esmolol							
Diltiazem							
Lignocaine							

Table 4 :Mean Arterial Pressure comparison with basal values.

		DURATION				
Group	Basal	After drug administration	Immediately after intubation	After 1 min	After 3 min	After 5 min
Control						
Esmolol						
Diltiazem						
Lignocaine						