ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
DEPARTMENT OF ANESTHESIA

COMPARISON OF THE EFFECTS OF INTRAVENOUS LIDOCAINE AND PROPOFOL ADMINSTRATION ON ATTENUATION OF HEMODYNAMIC RESPONSESDURING EXTUBATION IN ADULT ELECTIVE SURGICAL PATIENT AT ASELLA TEACHING AND REFERRAL HOSPITAL IN 2019/20.(PROSPECTIVE COHORT STUDY DESIGN)

RESEARCHER: EPHREM NIGUSSIE (MSCSTUDENT)

ADVISORS: MRS. ADUGNA AREGAWI (BSC, MSC, ASS. PROFESSOR OF ANESTHESIA)
MS. MERON ABRAR(BSC, MSC IN ANESTHESIA)

AARESEARCH THESIS SUBMITTED TO THE DEPARTMENT OF ANESTHESIA, COLLEGE OF HEALTH SCIENCES, ADDIS ABABA UNIVERSITY IN PARTIAL FULFILLMENT FOR THE REQUIREMENT OF THE MASTER DEGREE IN ANESTHESIA.

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Name of Researcher	EphremNigussie (MscAnesthesia student)
Name of advisors	Mrs.AdugnaAregawi (Bsc,Msc, ass. Professor of Anesthesia) Ms.MeronAbrar (Bsc,Msc in Anesthesia)
Full tittle of the research	Comparison of the effects of intravenous lidocaine and propofol administration on attenuation of hemodynamic response during extubation in adult elective surgical patient at Asella teaching and referral hospital in 2019/20.(Prospective cohort study design)
Duration of project	November1,2019 to June30, 2020.
Study area	Asella Teaching and Referral Hospital
Address of Researcher (s)	ephremnigussie730@gmail.com Cell phone:-+251933986927

Abstract

Background: Tracheal extubation is the process of removing a tube from the trachea which is associated with an increased in heart rate, blood pressure, intracranial and intraocular pressure, coughing, bronchospasm and increased bleeding. Many techniques as well as drugs have been proposed for attenuation of airway and cardiovascular responses. Propofol and lidocaine are widely available drugs in resource limited setting though their relative effectiveness for smooth extubation is not well established.

Objectives: To compare the effectiveness of intravenous lidocaine and propofolon attenuation of extubation induced hemodynamic responses in adult elective surgical patient from Nov 1,2019 – Feb 2020 at Asella teaching and referral hospital, Ethiopia.

Methods: A prospective cohort study design was conducted on 72 eligible patients at Asella teaching and referral hospital from Nov 1/2019-Feb 30/2020. The study participant were allocated into three group; Group P(n=24) received 0.5 mg/kg propofol, group L(n=24) received 1.5 mg/kg lidocaine two minute prior to extubation and group C(n=24) were control groups. Data was collected using adopted and prepared questionnaires byobservation and chart review methods. Data was entered in to SPSS version 20 computer software and analyzed using one way ANOVA. Normality of the data was checked by Shapiro wilktest andTukeypost hoc test was used to compare difference between groups.p-value of <0.05 was considered as statistically significant.

Results: After extubationheart rate, systolic, diastolic and mean arterial pressure decreased significantly in propofol and lidocaine groups than control group up to 10 minute. Heart rate, diastolic and mean arterial pressure was lower in group of propofol up to 5 minute and systolic blood pressure up to 3 minutes post extubation.Heart rate, diastolic and mean arterial pressure was lower in group of lidocaine after 5 minute and systolic blood pressure after 3 minutes post extubation.(p=0.001)

Conclusions and recommendations: The administration of 0.5 mg/kg propofol or 1.5mg/kg lidocaine might help for attenuating extubation induced hemodynamic responses. We recommend anesthetist to use 0.5 mg/kg propofol or 1.5mg/kglidocaine for attenuating extubation induced hemodynamic response.

Keywords: Propofol, Lidocaine, Extubation, hemodynamic responses

Declaration

The under signed certify that the research entitled comparison of the effects of intravenous lidocaine and propofol administration on attenuation of hemodynamic responses during extubationin adult elective surgical patientsat Asella Teaching and Referral hospital, Ethiopia An institutional based observational prospective cohort study is my original work and any literature and/or data cited in this article were listed in the reference section and any assist done during this period has been given an acknowledgement.

Investigators

Name _____ Signature _____ Date _____

Approval of the Board of Examiners

1. Advisor

Name _____ Signature _____ Date _____

2. Internal Examiner

Name _____ Signature _____ Date _____

3. External Examiner

Name _____ Signature _____ Date _____

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ACRONYMS

AAU…… Addis Ababa University

ASA……American Society Of Anesthesiologist

AU……..Arsi University

DBP……Diastolic Blood Pressure

HR……..Heart Rate

IAP …….Intra Abdominal Pressure

IARS……. …….International Anesthesia Research Society

ICP ……. Intracranial Pressure

MAP……Mean Arterial Pressure

NIBP……Non-invasive Blood Pressure

OR……Operation Room

PACU……..Post Anesthesia Care Unit

SBP……..Systolic Blood Pressure

CHAPTER ONE : INTRODUCTION

Back ground

Tracheal extubation is the discontinuation of an artificial airway when the indications for its placement are no longer required. Extubating at light plane of anesthesia can stimulate rapidly acting receptors which are found throughout the larynx, trachea and bronchi. There is an increase of the concentrations of noradrenalines and adrenalines in the plasma due to the stimulations which result in various cardiovascular and airway responses leading to an increase in heart rate , blood pressure, arrhythmias, coughing, bronchospasm, increased bleeding from surgical site, raised intracranial and intraocular pressure(1, 2).

Many techniques (extubation in a deeper plane of anesthesia, substitution of the endotracheal tube with a laryngeal mask airway) and Drugs (fentanyl, verapamil, esmolol, nicardipine, low dose propofol, landiolol, clonidine, dexmedetomidine, lidocaine spray and intravenous etc) have been proposed to attenuate airway and cardiovascular responses, but none have been completely successful(3, 4).

Propofol is a potent intravenous hypnotic anesthetic agent that is used widely in clinical anesthesia which is known by its airway reflex inhibitor(5).It can decreases systemic vascular resistance and cardiac contractility which leads to decreased in heart rate and blood pressure(6).Lidocaine an amide local anesthetics agent administered either intravenously or topically can decreases heart rate ,blood pressure and cough reflex induced during endotracheal extubation by its mechanisms of direct myocardial depressant effect, central stimulant effect, peripheral vasodilatory effect, interruption of Synaptic transmission, and suppressing the cough reflex(7).

1.2. Statement of the problem

Endotracheal extubation might leads to significant hemodynamic disturbances but,there is no adequate literature that addresses the problems concerning endotracheal extubation. According to American Society of Anesthesiology(ASA) Closed Claims Study reports tracheal extubation has received little emphasis and the problems occurring after tracheal extubation are more of involving the respiratory system injury(8).

A guideline of international airway management addresses extubation of a patient with difficult air way rather than nondifficult airway. Anatomical and physiological changes, compounded by time pressures and other constraints are the main reason of transition of the patient from controlled to uncontrolled situation during extubation and become challenging for the anesthetist(9).

Hodgkinson and his colleagues suggests that, in severe pre-eclamptic mothers, the mean systemic arterial pressure increased by 45 mm Hg, mean pulmonary arterial pressure increased by 20 mm Hg and pulmonary arterial occlusion pressure increased by 20 mm Hg for at least 10 min after extubation(10).

Even if, there is a condition which allows to extubate the patient in awake state studies done on children's shows that there is greater incidence of upper airway complications with awake extubation due to an increase in airway reactivity(11).

The airway irritation appearing during tracheal extubation may cause cough or difficulties in breathing and may contribute to an increase in blood pressure. Tracheal extubation is associated with a 10–30% transient increases in blood pressure and heart rate lasting 5–15 min after extubationPatients with coronaryartery diseaseextubated under light plane of anesthesia experience 40–50% decrease in ejection fraction from the initial(12).

During extubation irritant or stretch stimuli found in the trachea can induce coughing38 to 96% which is caused by the tube and its cuff which leads to an increase in blood pressure, heart rates, intraocular pressure and intracranial pressures. There is bleeding from surgical site and disruption of surgical wounds from excessive movement and the occurrences of myocardial ischemia and bronchospasm(13, 14).

Regardless of the type of operation extubation under deep plane of anesthesia decreases cardiovascular stimulation, incidence of coughing and straining on the tube. However, there is a greater incidence of respiratory complications.(15).

Even if several pharmacological strategies and extubation techniques, extubating in deeper planes of anesthesia have been studied to blunt hemodynamic and cough responses to extubation(16)unavailability of drugs at every set up, lack of attention toward significance of hemodynamic stabilization, inadequate literatures on hemodynamics response secondaryto suctioning and extubation are the main problems.

1.3. Significanceof the study

Stimulation of the airway during endotracheal extubation is one of the stressing moments during emergence. Elevation inblood pressure and heart ratesdue to endotracheal extubtionare transient but may havesignificant effects on the patients.

Among many cardiovascular drugs which have been evaluated by different literatures withrespects to their ability of attenuatingextubation induced hemodynamic responses,lidocaine and propofol are widely available in our set up.

There were a literatures which shows there is no difference in heart rates and mean arterial pressure after administration of propofol during emergence,[17] and there is also other litratures which shows an increase in heart rate and mean arterial pressure up to five minutes after extubation in patients received lidocaine(7).

As far as my knowledge no published data exist on comparison of the effectivenessof intravenous lidocaine and propofolon attenuation ofextubation induced hemodynamic responses in my study area.

Since the main objectivesof this study was to assess the effectiveness of propofol and lidocaineon attenuation of extubation induced hemodynamic responses, the result will be

- ✓ Motivate the anesthetists to use uniformly in their patient management protocols
- ✓ Improves the outcomes of the patients and reduce the consequence of emmergence.

This study might be used as a baseline for further studywhich will be conducted on the same topic as well as related topics.

CHAPTER TWO: LITERATURE REVIEW

2.1. Hemodynamic Responses DuringExtubation

During tracheal extubation there are the occurrence of sympathetic discharge due to larygopharengeal and epipharengealstimulation which result in heamodynamic change. This increase in sympathoadrenal activity result in an increased in blood pressure, heart rate and arrhythmias(2, 18).

The mechanism by which heart rate and blood pressure increased at the time of tracheal extubation is associated with the release of catecholamine while the endotracheal tube in touch with the tracheal wall(19).

In order to attenuate hemodynamic responses during tracheal extubation different techniques are used. such as extubating the patient in deep plane of anesthesia, using laryngeal mask airway rather than endotracheal tube ,using Ca^{2+} channel blockers, IV or spray lidocaine, low dose of opoid(fentanyl, remifentanil), and propofol, β1 blockers (esmolol, landiolol), central sympatholytics (clonidine, dexmedetomidine) and vasodilators (nitrates) use before extubation have been studied as preferable agent when compared with each other as well as placebo with variable success rate(20).

2.2. Propofol For Attenuation Of Hemodynamic Response DuringExtubation.

A research done in the Third Hospital of Chinese People's Liberation Army and Xijing Hospital of Fourth Military Medical University from January 2005 to December 2009 on total of 82 patients aged 24-65 were randomly divided into 2 equal groups; propofol group (1.5mg/kg) and urapidil (2.5mg/kg). Propofol group shows significantly lower BP and HR after exubation up to ten minutes when compared with pre treatment hemodynamic parameters (<0.05) but there is no significant difference with urapidil group(21).

A randomized control trial (RCT) study in Iran (2013) on 80 patients receives propofol2 minutes before extubation shows that the Heart rate and blood pressure are less than those of control group($P < 0.05$) at the time of propofol administration. but, at the time of extubation there is no difference between the two groups(22).

A randomized control trial (RCT) study in Busan, Korea (2013) on 60 patients were chosen and randomly divided into 2 groups, those who receives 0.3mg/kg of propofol and control group those receives 0.03ml/kg. The HR change according to time during emergence there is no significantly different between the two groups (P = 0.23). There was also no significant difference between the groups for change in MAP according to time during emergence(P = 0.22)(17).

A prospective randomized study done in India (2016) on 90 patients scheduled for major surgeries was assigned into three equal groups, those who receive 0.5mg/kg Propofol, 1mg/kg intravenous lidocaine and 1.5mg/kg esmolol. In a group of lidocaine heart rate, systolic blood pressure, diastolic blood pressure, and mean arterial pressure increase before extubation until three minutes after extubation while in group of Propofol and esmolol decreased up to 10 minutes after study drug is given ($p<0.05$)(23).

The study conducted in Telangana State, India (2018) on 80 elective surgical patients was randomly assigned into two groups of 40 patients while group of P received 0.5 mg kg-1 propofol and group "E" received 1.5 mg kg-1 esmolol IV 2 min before extubation. From the comparisons the mean systolic blood pressure (SBP), diastolic blood pressure (DBP) and mean arterial pressure (MAP) decreased in groups of esmololwhen compared to that of propofol.($P<0.05$)(20).

2.3. Lidocaine for attenuation of hemodynamic response during extubation.

A one year randomized study done in India (2010) on 74 elective patients of cleft palate surgery age three months to six years randomly divided into two groups 37 patients receive intravenous lidocaine (1.5mg/kg) and 37 patients receive placebo. Patient those receive lidocaine shows a significant difference in reducing heart rate, systolic, diastolic blood pressure at one, two, three, five and ten minutes following extubation $p<0.05$(24).

A prospective, randomized double blind study done in Imadol(2013) on 60 patient aged 20 to 60 years scheduled for elective surgery requiring general anesthesia with endotracheal intubation. The Patients were divided into 2 equalgroups,Group I received esmolol 1.5 mg/kg and Group II received lidocaine 1 mg/kg three minute before extubation. The heart rate and SBP increased in group of lidocaine 1mg/kg during extubation and three minute after extubation, but

it attenuate the DBP and MAP during extubation and three minute after extubationp<0.0001)(25).

A clinical prospective descriptive double blind study done in Karnatka, India. (2014) on 90 patients scheduled for elective surgeries under general Anesthesia were randomly divided into three equal groups lignocaine 1mg/kg was effective in suppressing hemodynamic response to extubation when compared to lignocaine 0.5mg/kg and control group p < 0.001(26).

A double blinded randomized clinical trial done in Banaras Hindu University, Uttar Pradesh from August 2013 to July 2016 in Department of Anaesthesiology, Institute of medical sciences, On 100 aged between 16 to 60 years patients undergoing surgery under general anaesthesia were assigned into Group D received Dexmedetomidine 0.75 mcg/kg diluted to 10ml and Group L received Lidocaine 1.5 mg/kg diluted to 10ml.Lidocaine groups shows increase in HR and MAP after extubation up to five minute and gradually decreased after five minutes(7).

A clinical prospective cohort study done in Tikuranbesa specialized hospital,Addis Ababa, Ethiopia(2018) on 114 patients scheduled for elective surgeries under general anesthesia were randaomly divided into two equal groups, lidocaine 1.5mg/kg was effective in abolishing a rise in hemodynamic response to extubation when compared to lidocaine 1mg/kg after one minute of extubation p<0.001(27).

Research Hypothesis:

HA: There is a significant difference between the mean of three groups on attenuation of extubation induced hemodynamic responses.

CHAPTER THREE: OBJECTIVES

3.1 General objective

To compare the effectivenessof intravenouslidocaine and propofolon attenuation of extubation induced hemodynamic responses in adult elective surgical patients from Nov 1,2019 – Feb 2020 at Asella Teaching and Referral Hospital, Oromia Ethiopia.

3.2 Specific objectives

- ✓ To compare effectiveness of intravenous lidocaine and propofol on attenuation of extubationinduced heart rate responses.
- ✓ To compare effectiveness of intravenous lidocaine and propofol on attenuation of extubation induced systolic blood pressure responses.
- ✓ To compare effectiveness of intravenous lidocaine and propofol on attenuation of extubation induced diastolic blood pressure responses.
- ✓ To compare effectiveness of intravenouslidocaine and propofol on attenuation of extubation induced mean arterial pressure responses.

CHAPTER FOUR: METHODOLOGY

4.1 Study Area and period

The study was conducted in Asella Teaching and Referral Hospital which is located in the Arsi zone of Oromia region about 159 kilometers from Addis Ababa to the Southern of Ethiopia in Asella town. The Hospital was serving around 3.5 million peoples in Arsi and the nearby zones by having Internal Medicine(45 beds), General Surgery(58 beds), Obstetrics and Gynecology(24 beds) ,Pediatrics(48 beds) and Ophthalmologic unit(5 beds) with a total of 180 beds. The Hospital has 6 operation room (1 in ophthalmologic unit and 5 in major operation room).

4.2 Study design

An institutional based prospective cohort study was conducted. The comparison group was group P(received propofol 0.5mg/kg), group L (received lidocaine 1.5mg/kg) and group C(who did not received any medication).

4.3 Population

4.3.1 Source population

All adultpatients who were admitted and underwent surgery under general anesthesia with endotracheal intubation from Nov 1/2019-Feb30/2020at Asella Teaching and Referral Hospital.

4.3.2 Study population

All adult patients scheduled for elective surgery and fulfill inclusion criteria during study period.

4.3.3.Sample population

All adult patients who were included in the study

4. 4 Eligibility Criteria

4.4.1 Inclusion criteria

- ✓ ASA class I
- ✓ Airway assessment of Mallampatti grade I and II
- ✓ Age group of 18-65 years
- ✓ Patient induced with ketamine and thiopental

- ✓ Patient scheduled for elective surgeries under general anesthesia who underwent General Surgery, Orthopedic and Gynecological procedures with Endotracheal intubation.

4.4.2 Exclusion criteria

- ✓ Patients Allergic to study drug
- ✓ Patients unwilling to participate
- ✓ Patients on beta blockers
- ✓ Patients on Calcium channel blockers
- ✓ Patients with difficult intubation,
- ✓ Patient received <1.5mg/kg of lidocaine and <0.5mg/kg of propofol were excluded
- ✓ Patient recievedlidocaine and propofol at 1 or 3 minute prior to extubation were excluded

4.5 Variables

4.5.1 Dependent variable

- ✓ Hemodynamics changes (HR,SBP,DBP,MAP)

4.5.2 Independent variable

- ✓ Age
- ✓ ASA physical status
- ✓ Diagnosis
- ✓ Duration of anesthesia
- ✓ Duration of surgery
- ✓ Total Opoid used
- ✓ Induction agent (ketamine, thiopental)
- ✓ Exposure variable; IV Lidocaine, propofol
- ✓ Mallampatti classification
- ✓ Procedure performed
- ✓ Sex

4.6 Sample size and sampling technique

4.6.1 Sample size determination

There is no comparative study done between propofol (0.5mg/kg), lidocaine (1.5mg/kg) and control groups during extubation in our country. We did pilot study at St. Peters Specialized Hospital on 15 elective adult patients from October1-21/2019. Sample size calculated from pilot study using variables and means of propofol ,lidocaine and control groups. According to the pilot study we choose mean diastolic blood pressure for large sample size $\mu 1=72.20 \pm 3.35$, $\mu_2 =73.85 \pm 6.18$, $\mu_3 = 76.43 \pm 3.36$, and SD pooled=4.50. A priori power analysis for one way ANOVA with 3 groups was conducted in G×power 3.1.9.2 to determine sample size using an alpha =0.05 and power of 0.80. In order to ensure a minimum of 69 patients needed, an additional 3 patients (≈5 %) were enrolled to account non respondents. The total sample size of 72 was included in the study with 24 samples in each group.

4.6.2.Data collection technique and procedure

The demographic characteristics reviewed from patient chart ,HR, SBP, DBP and MAP recorded just before residual effect of muscle relaxant was reversed as base line value and 1min, 3min, 5min and 10min from the monitoring after extubationwas collected by 3Bsc anesthetists using pretested check lists prepared in English.

The data collectors record what anesthetist incharge administered prior to extubation either lidocaine, propofol or nothing using prepared data collection tool.

4.7. Data Quality Assurance

To ensure quality of data, orientation about the objectives and relevance of the study were provided for data collectors and supervisors. During data collection follow up was done and cross check for completeness and consistency of data on daily basis and rejecting incomplete data.

4.8. Data Analyzing and processing

Data was checked manually for completeness and then coded and entered in to SPSS version 20-computer program**.** The data was tested for normality using Shapiro-Wilk test and Homogeneity of variance by Levene's test. Then one way analysis of variance (ANOVA) was used for normally distributed data and Tukeypost hoc test was used to compare difference between groups. Data was expressed as a mean and standard deviation for normally distributed data. P value <0.05 is considered statistically significant for all analysis.

Anesthetic techniques at Asella teaching and referral hospital:

The routine practice of general anesthesia is the patients were premedicated with Atropine 0.02mg/kg and Preoxygenatedwith 100% oxygen for 3–5 minutes. Then, patients were intravenously induced with Thiopentone sodium (5mg/kg) or Ketamine (2mg/kg) or propofol (2.5mg/kg), 1mg/kg pethidines.After manual ventilation with oxygenfor 1 minute, Tracheal intubation was facilitated withsuxamethonium2 mg/kg using the appropriate size Macintosh laryngoscope blade. The endotracheal tube balloon was filled with air and the endotracheal tube position was checked.

Anesthesia was maintained with 100% oxygen, 0.75 % Halothane, and intermittent bolus of Vecuronium (0.025mg/kg), for analgesia every hourly 1mg/kg pethidine was given and the patients were mechanically ventilated. Peripheral arterial oxygen saturation was monitored throughout the period of anesthesia. Blood pressure and heart rate was recorded before induction of anesthesia and throughout the procedure every five minutes from standard ASA Monitoring machine (pulse oximetry, non-invasive blood pressure, and echocardiography).

When the surgeons began closing the wounds, the patientswere allowed to breathe spontaneously with 100% oxygen and inspired Halothane was increased. Halothane was discontinued at the time of the last surgical suture and reversal of neuromuscular blockade with Neostigmine 0.05mg/kg and Atropine 0.02 mg/kg administered intravenously.

After confirmation of patient the ability of breathingspontaneously and the recovery from neuromuscular blockage was assessed. The trachea was extubatedeither after 1 minute, 2 minutes or 3 minutes of administration of either lidocaine or propofol.Extubation also performed without administration of any drugs. The oral cavity of the patient was suctioned gently with

suction catheter immediately before extubation. Immediately after extubation 100% oxygen was given via face mask for 5 minutes and the patient were shifted to recovery room.

4.9.Operational Definition

ASA status:-is the surgical risk stratification validated by American Society of Anaesthesiologist.

ASA I :- A normal healthy patients those have only surgical indication

Hemodynamic attenuation:-A reduction in hemodynamic responses which is induced during endotracheal extubation

Base linevital signs:- Vital signs recorded just before the administration of reversal agent
Elective surgery:- is surgery done before on set (appearance) of any complication that might constitute urgent indication
Endotracheal extubation:-removal of an endotracheal tube from the tracheawhich is performed in operating room.
Hemodynamic parameters:- heart rate , systolic blood pressure ,diastolic blood pressure and mean arterial pressure which are measured before study drug adminstration (base line), 1 minute,3 minute,5 minute and 10 minute after extubation.
Mallampatti- a technique used to predict ease of endotracheal intubation
Mallampatti class I -when there iscomplete visualization of the soft palate
Mallampatti class II – when there iscomplete visualization of the uvula
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4.10. Ethical consideration

The study was conducted after obtaining ethical approval from Addis Ababa University,Official support letter was written to Asella teaching and referral Hospitals and permission for data collection was sought from the hospital authorities. The purposes and the importance of the study were explained & verbal informed consent was obtained from each participants before the administration of Anesthesia. Confidentiality was maintained at all levels of the study by using anonymous questionnaire.

4.11. Dissemination plan

The copies of final results will be disseminated to AAU, Ethiopian Association of Anesthetists, AU and Asella Zonal Health office. Possible efforts will be made to publish the results of the study to international Journal.

CHAPTER FIVE: RESULT

A total of 72 two ASA I respondents were participated with 100 % response rate. The data of the patient was normally distributed with homogenous variance.

A demographic status and clinical characteristics of patient were comparable between groups with p value >0.05. (Table 1)

5.1.Demographics and clinical characteristics

Table 1. Comparison of demographics status among groupsat Asella teaching and referral hospital, from November1/2019 to Feb 30/2020

Variables		Group P (n=24)	Group L (n=24)	Group C (n=24)	P-value
		Fre (%)	Freq(%)	Freq (%)	
Sex	M	7 (29.2)	5(20.8)	6 (25)	.808
	F	17 (70.8)	19 (79.2)	18 (75)	
Intubation trial	I	20 (83.3)	22 (91.7)	24 (100)	.613
	II	4 (16.7)	2 (8.3)	-	
Mallampati classification	I	14 (58.3)	19(79.2)	18(75)	.252
	II	10(41.7)	5(20.8)	6(25)	
Induction agent	Ketamine	10(41.7)	9(37.5)	13(54.2)	.493
	Theopental	14(58.3)	15(62.5)	11 (45.8)	
Procedure performed	General surgery	18(0.75)	22(91.6)	19 (79.2)	.481
	Gyneacology	5(20.8)	1(4.2)	5(20.8)	
	Orthopedics	1(4.2)	1(4.2)	-	

Group P= propofolgroup,group L = group of lidocaine ,group C = control group , freq= frequency.% = percent, n= number of patients, F= female, M= male, p>0.05

A clinical characteristics of patient were comparable between groups with p value >0.05. (Table 2).

Table 2 .Clinical characteristics of patients who underwent elective surgeryatAsella teaching and referral hospital from November 1/2019 to February30/2020

Variables	Group P (n=24)	Group L (n=24)	Group C (n=24)	P-value
	(mean ± SD)	(mean ± SD)	(mean ± SD)	
Age (years)	40.46 ± 12.61	36.13 ± 10.05	43.33 ± 9.64	.075
Weight (kg)	62.71 ± 7.69	67.54 ± 11.25	67.88 ± 11.80	.165
Height (m)	1.61 ± .081	1.63 ± .07	1.65 ± .08	.232
Total opoid used (mg)	104.58±12.50	110.00±14.14	109.17±19.76	.445
Duration of surgery (hrs)	1.68 ± .64	1.63 ± .54	1.70 ± .69	.684
Duration of anesthesia(hrs)	1.97 ± .67	1.82 ± .57	1.94 ± .67	.912

P= propofol group, L = group of lidocaine C = control group ,

n= number of patients, SD= standard deviations, p>0.05 no significant deference

5.2. Comparison of heart rates among groups

There is significant difference in HR at 1st, 3rd, 5th and 10th minutes after administration of study drugs. Heart rate was significantly lower in propofol and lidocaine group when compared to control group at 1st, 3rd,5th, 10th minutes after extubation p<0.001).(Table 3)

Table 3. Mean heart rates among groupswho underwent elective surgeryat Asella teaching and referral hospital from November 1/2019 to February30/2020

HR	GroupP(n=24) Mean ± SD	GroupL(n=24) Mean ± SD	GroupC(n=24) Mean ± SD	P value	Pair wise significance		
					Group P Vs Group L	Group P Vs Group C	Group L Vs Group C
Base line	109.46± 3.13	107.88 ± 4.68	110.46 ± 3.90	.082	.511	1.000	.081
1 minute	102.67 ± 4.86	106.71 ± 3.38	121.67 ± 3.78	.001	.003	.001	.001
3 minute	99.29 ± 7.98	105.00 ± 3.76	118. 58 ± 3.06	.001	.001	.001	.001
5 minute	95.08 ± 9.10	102.08 ± 8.96	116. 46 ± 4.91	.001	.009	.001	.001
10 minute	95.13 ± 5.92	89.29 ± 5.71	108.21± 4.53	.001	.001	.001	.001

HR=Heart rate , SD=Standard deviation, P= Propofol group, L =Lidocaine group , C= Control group,

n= Number of patient,vs= Versus, P<0.05 is statistically significant.

5.3 Comparison of systolic blood pressure among groups

There is significant difference in systolic blood pressure at 1st, 3rd, 5th and 10th minutes after administration of study drugs. Systolic blood pressure was lower in groups of propofol at 1st and 3rd minutes after extubation when compared with lidocaine and control groupsafter extubation p<0.001. (Table 4)

Table 4: Mean systolic blood pressure among groups who underwent elective surgery at Asella teaching and referral hospital from November 1/2019 to February30/2020

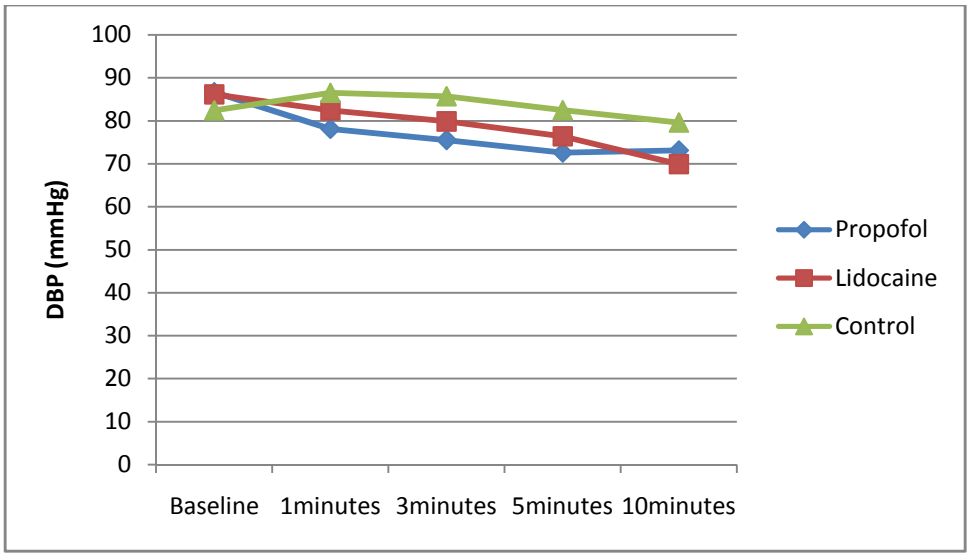
SBP	GroupP(n=24) Mean ± SD	Group L(n=24) Mean ± SD	Group C(n=24) Mean ± SD	P value	Pair wise significance		
					Group P Vs Group L	Group P Vs Group C	Group L Vs Group C
Base line	135.50 ± 7.39	137.17 ± 7.34	132.46± 8.22	.105	1.00	.291	.059
1 minute	124.88 ± 5.69	130.83 ± 8.61	139.63 ± 6.19	.001	.012	.001	.001
3 minute	120.54 ± 5.77	125.92 ± 8.41	139.88 ± 4.88	.001	.017	.001	.001
5 minute	117.41 ± 5.44	113.29 ± 5.63	135.54 ± 4.81	.001	.027	.001	.001
10 minute	116.13 ± 6.64	111.38± 5.28	128.88 ± 4.92	.001	.015	.001	.001

SBP= Systolic blood pressure ,SD=Standard deviation, P= Propofol group, L =Lidocaine group,

C= Control group,n= Number of patients**,** vs=Versus, P<0.05 is statistically significant

5.4. Comparison of diastolic blood pressure among groups

There is significant difference in diastolic blood pressure at 1st, 3rd, 5th and 10th minutes after administration of study drugs. Mean diastolic blood pressure was lower in groups of propofol at 1st, 3rdand 5th minutes after extubation when compared with lidocaine and control groups. (Figure 1)

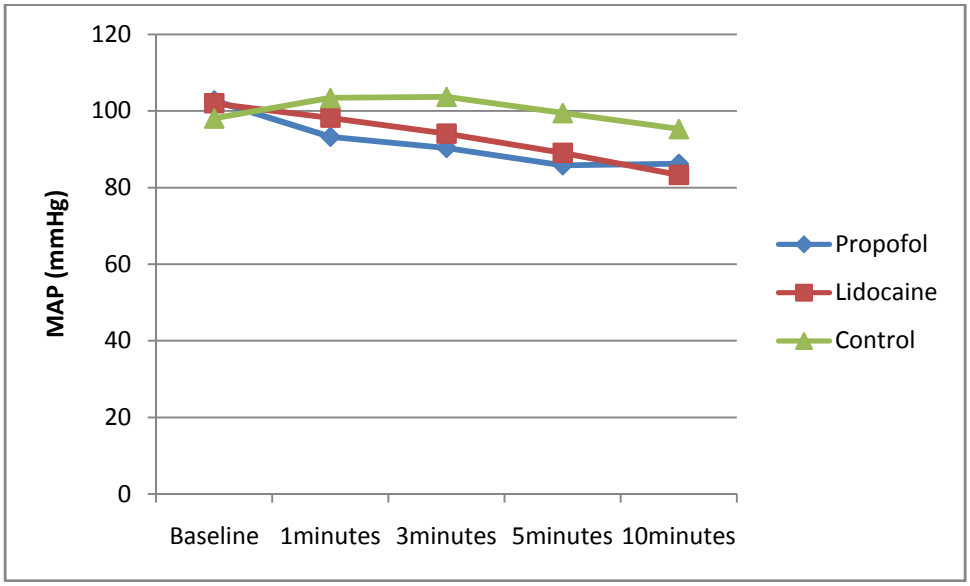


DBP= diastolic blood pressure, mmHg=millimeter of mercury

Figure 1: Graphs depicting mean diastolic blood pressure changes among groups at different time intervals

5.5. Comparison of Mean Arterial Pressure among groups

There is significant difference inmean arterial pressure at 1st, 3rd, 5th and 10th minutes after administration of study drugs. Mean arterial pressure was lower in groups of propofol at 1st, 3rd and 5th minutes after extubation when compared with lidocaine and control groups.(Figure 2)



MAP= mean arterial pressure, mmHg=millimeter of mercury

Figure 2: Graphs depicting mean arterial pressure changes among groups at different time intervals.

CHAPTER SIX: DISCUSSION

This prospective cohort study was conducted to determine attenuation of extubation induced hemodynamic responseon 72 ASA I patients allocated into group of propofol 0.5mg/kg, lidocaine 1.5mg and control groups who underwent elective surgery.

In our study the demographic and clinical characteristic's(age, sex, weight ,height, mallampati, induction agent, procedure performed , duration of surgery and anesthesia) are comparable between the groups, While there are statistically significant differences in hemodynamics (HR, SBP, DBP, MAP) between the groups.

Our study confirmed that heart rate between groups was significantly different. The heart rate was lower in propofol groups (102.67bpm ± 4.86bpm) when compared to lidocaine (106.71 bpm ± 3.38 bpm) and control groups (121.67 ± 3.78) at first minutes after extubation with p value of 0.001.At three minutes after extubation heart rate was lower in propofol groups (99.29 bpm ± 7.98bpm) when compared to lidocaine (105.00 bpm± 3.76 bpm) and control groups (118.58 bpm± 3.06bpm) with p value of 0.001.At five minutes after extubation heart rate was lower in propofol groups (95.08 bpm ± 9.10bpm) when compared to lidocaine (102.08 bpm ± 8.96bpm) and control groups (116.46 bpm ±4.91bpm) with p value of 0.001. (p=0.001). At ten minutes after extubation heart rate was lower in lidocaine groups (89.29bpm ± 5.71bpm) when compared to propofol(95.13 bpm ± 5.92bpm) and control groups (108.21 bpm±4.53bpm)with p value of 0.001.

In line with our study Yong Chong Cheng and et al(2011) found that there is significantly decreased in heart rate up to 10 min post extubation in group of propofol(1.5mg/kg) and uripadil (2.5 mg/kg)(21). There is high dose administered in this study and consistent with our study, the high dose might be due to the procedure was ophthalmic procedure which needs immobility until the patient fully awakes.Soon Y. J. (2014) and his colleague conclude that in patient receivedpropofol 0.3mg/kg and placebo (0.03ml/kg) there is no sign of difference of HR between the groups post extubation up to ten minutes (P = 0.23)(17),which is in contrary with our study ,it might be due to lower dose of study drugs.

Inline with our study CS Sanikop SB (2010) demonstrate that a reduction in heart rates post extubation up to 10 minutes in patients received intravenous lidocaine (1.5mg/kg) when compared with patients received placebo($p<0.05$)(24). Savitha K.S (2014) demonstrated that an

increase in heart rate in groups of lidocaine 1mg/kg up to 5 minute but, starts to decrease at ten minute of extubating with p <0.001(26),which is in contrary to our findings in the first five minute .This might be due to lower dose of study drugs

According to our study there was a significant difference in SBP between the groups. SBP was lower in propofol group (124.88 mmHg ± 5.69 mmHg) when compared to lidocaine(130.83 mmHg ±8.61 mmHg) and control groups(139.63 mmHg ± 6.19mmHg) at first minute after extubation with p value of 0.001. At three minute after extubation SBP was lower in propofolgroups(120.54 mmHg ± 5.77 mmHg) when compared to lidocaine(125.92 mmHg ±8.41 mmHg) and control groups (mmHg 139.88±4.88 mmHg) with p value of 0.001. At five minutes after extubation SBP was lower in lidocaine groups (113.29 mmHg ±5.63 mmHg) when compared to propofol (117.41 mmHg ±5.44 mmHg) and control groups (135.54 mmHg ± 4.81 mmHg) with p value of 0.001. At ten minute after extubation SBP was lower in lidocaine groups(111.38 bpm ± 5.28 bpm) when compared to propofol (116.13 mmHg ± 6.64mmHg) and control groups (128.88 mmHg ± 4.92 mmHg) with p value of 0.001.

In line with our study Laxminarsaiah(2018) and his collegues demonstrate that patient received 0.5 mg/kg of propofol and 1.5mg/kg of esmolol shows asignificant decrease in systolic blood pressure post extubation up to 10 minutes in both groups (p<0.05)(20).Nagrale M.H (2016) and his colleaguesconclude that patient received 0.5 mg/kg of propofol demonstrated a decrease in systolic blood pressure up to three minutes and starts to increase up to 10 minute after extubation p < 0.05(23),which is in contrary with our study after three minute of extubation.

Similar with our study ,Tefera (2018) found that patient received 1.5mg/kg of lidocaine shows a decreased in systolic blood pressure up to 10 minute after one minute of extubation with p < 0.002(27).This might be similar study design with ours.. Shrestha S (2013) concluded that the systolic blood pressure significantly increase in groups of lidocaine 1mg/kg starting at the time of extubation up to 3 minute after extubation with p<0.001(25). This might be due to the use of lower dose of study drug and inclusion of procedure which is more prone to air way stimulation ((ENT and Neurosurgical) when compare with our study

The present study confirmed, there was a significant difference in DBP between the groups.DBP was lower in propofol groups (78.08 mmHg ± 6.47 mmHg) when compared to lidocaine (82.38 mmHg ± 5.98 mmHg) and control groups (86.50 mmHg ±3.91 mmHg) at first minute after extubation with p value of 0.001. At three minute after extubation DBP was lower in propofol groups (75.50 mmHg ± 6.05 mmHg) when compared to lidocaine (79.83 mmHg ±5.86 mmHg) and control groups (85.71 mmHg ± 4.39 mmHg) with p value of 0.001. At five minutes after extubation DBP was lower in propofol groups (72.58 mmHg ± 4.73 mmHg) when compared to lidocaine (76.38 mmHg ±5.31 mmHg) and control groups (82.46 mmHg ±4.49 mmHg) with p value of 0.001. At ten minute after extubation DBP was lower in lidocaine groups (69.92 mmHg ±3.44 mmHg) when compared to propofol (73.8 mmHg ± 5.09 mmHg) and control groups (79.58 mmHg ±3.45 mmHg) with p value of 0.001.

Inline with our study ,Mohammad Taghy (2013) and his colleagues found that there is significant decrease in diastolic blood pressure post extubation up to 5 minutes in groups of propofol (0.5mg/kg) when compared with placebo(22). But, this study did not includes the changes after 5 minutes of extubation.A contrary results was obtained in Nagrale M.H (2016) his colleagues studies on patients received 0.5 mg/kg of propofol, the diastolic blood pressure significantly decreased only up to three minutes after extubation when compared with 1.5mg/kg esmolol and 1mg/kg of lidocainewith $p < 0.05$(23).

Inline with our study CS Sanikop SB (2010) demonstrate that a reduction in diastolic blood pressure post extubation up to 10 minutes of patients receive intravenous lidocaine (1.5mg/kg) when compared with patients received placebo($p<0.05$)(24). Savitha K.S (2014) and his collegue found that there is an increase in diastolic blood pressure up to three minute post extubation in patients recived 1 mg/kg of lidocaine $p<0.05$(26).This might be due to the use of smaller dose of study drugs they used

Our result demonstrated that there was a significant difference in MAP between the groups. MAP was lower in propofolgroups(93.21 mmHg±5.88 mmHg) when compared to lidocaine (98.21 mmHg ±7.07 mmHg) and control groups (103.38 mmHg ±4.35 mmHg) at first minute ofextubation with p value of 0.001. At three minute after extubationMAP was lower in propofol groups (90.33mmHg ± 5.39mmHg) when compared to lidocaine (94.08mmHg ±5.59mmHg) and control groups (103.67 mmHg ± 4.27 mmHg) with p value of 0.001. At five minutes after

extubation MAP was lower in propofol groups (85.79mmHg ± 4.87mmHg) when compared to lidocaine (89.08mmHg ±4.84mmHg) and control groups (99.46 mmHg ± 3.72 mmHg)with p value of 0.001. At ten minute after extubation MAP was lower in lidocaine groups (83.33 mmHg ±3.27 mmHg) when compared to propofol (86.17 mmHg ± 4.67 mmHg) and control groups (95.29 mmHg ± 3.49 mmHg) with p value of 0.001.

In line with our study, Laxminarsaiah(2018) and his collegues demonstrate that patient received 0.5 mg/kg of propofol shows a significant decrease in mean arterial pressure post extubation up to 10 minutes($p<0.05$)(20). In contrary with our study Soon Y. J. (2014) and his colleague conclude that in patient receivedpropofol 0.3mg/kg and placebo(0.03ml/kg) there is no sign of difference of MAP between the groups post extubation up to ten minutes ($P = 0.22$)(17).This might be due to low doses of study drug they used.

Inline with our study,Amrita Rath AJ(2018) conclude that patient received 1.5mg/kg of lidocaine demonstrates, a significant decrease in MAP post extubation up to 10 minutes.($P<0.05$)(7). A contrary results with our study was obtained in Nagrale M.H (2016) his colleagues studies on patients received 1mg/kg of lidocaine demonstrates the MAP increased up three minutes post extubation with $p < 0.05$(23).

CHAPTER SEVEN:CONCLUSIONS AND RECOMMENDATIONS

7.1.Conclusions

The administration of Propofol 0.5mg/kg is superior than lidocaine 1.5mg/kg to attenuate Heart rate, diastolic blood pressure and mean arterial pressure up to five minute, systolic blood pressure up to three minute after extubating($P < .001$).

The administration of Lidocaine 1.5mg/kg is superior than propofol 0.5mg/kg to attenuate Heart rate ,diastolic blood pressure and mean arterial pressure after five minute and systolic blood pressure after three minute of extubating($P < .001$).

7.2.Recommendations

We recommend anesthetist to use 0.5 mg/kg propofol or 1.5mg/kglidocainefor attenuating extubation induced hemodynamic response

We recommend to do further research using RCT by increasing sample size

7.3.Strength of the study

As far as our search this is the first study in my study area. Therefore, it will be helpful as a base line for other researchers.

7.4.Limitation of the study

Discussion is limited due to inadequate literature

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Annex

Oral consent:

Addis Ababa University Collegeof health Sciences, School of graduate studies, Department of anesthesia. Questionnaire prepared to assess the effectiveness of intravenous lidocaine and propofol administration on attenuation of hemodynamic responses during extubation in adult elective surgical patients.

This questionnaire is to be used as a guide to collect information for the data collectors.

Greeting:

Hello, My name is_____. I am one of the members of the research team.I have identified you as a study participant hoping that you would be willing to help me by providing with some information**.**Iwant to ask your permission to observe and record your vital sign while the anesthetist inchargegives you either Lidocaine or propofol at the end of surgery to blunt extubation induced hemodynamic responses. I did't intervene the way your anesthetist treat you rather than observing in the periextubation period.

Your name will not be written in this form and will never be used in connection with any information you tell us. Your responses will be kept confidentially. Your participation will be based on your interest and you are not obligated to answer any question if you do not wish to answer. If you feel discomfort with the participation, it is your right to leave it.

Are you willing to participate in this study?

A. yes
B. No

MRN……

Gucniiarmaangadii kun nama raga kana akkawalittiqabuuframadameefakkagargaartuuta’eetajaajila.

Duraandursagalanniikookanonneerramaddeisinhaagahu.

Harkafuunee ,maqaankooEefireemNugusseenjedhama ,barataadiigriilammaffaaUniivarsiitiiFinfinneedameeAnisteezyaati. Dhukkubsattootajirankeessaaisiin raga barbaachisaanaaflaachudandeessujedheekaniinisiinfiladheyoota’uisiiniisragaa kana fedhiikeessanirrattiihundooftaniinaafqooddujedheenabdadha. Wayitabaqaqsaniiyaaluundhumee, ujummoonqiilleensaa fi anisteezyaasiniifdabarsaatureqaamahargansuukessaabahuufjedhuudaqiiqaa lama duradawwaaleekeennamanirrattiibu’aaisaaniisirrittiiaddabaasuuf , battalumaanisteetistiindawwaasiiniiflachuudhajedhuirraaeegalehangadaqiiqaa 10 ttiergaujummoonqaamahargansuukeessabaheettiikanjirudha. Ragaanisinirraafunaanu kun tajaajiladhukkubsatootaadarandabaluufakkasumastajaajilaanistetistooniilaatanakkacimuuwaantaa sisuuf, Isinis kana hubachuudhaanragaaleebarbaachisoo kana akkanwalittiiqabadhuakkanaafeeyyamtankabajaanisiingaafadha.Haalii kun akkumajiruunta’etajaajilaanisteetistiinsiiniiframadamehaalabeekumsaisaairrattiihundaa’eeisiniifl aatu/ttukamiiyyuuilaalurraankanhafegidduugaleewaatokkoyyuugochuuhindanda’u/hinfedhus.

Ragaanisiinirraawalittiiqabameekamiyyuuicciitiiisaaeegateekanqabamuyoota’u,akkasumasqaama sadafffatiifdabarfameekanhinlaatamneta’uisiiniifmirkaneessa.Akkasumas,maqaankeessaniskanhi ncaqafamneta’uwaadaaisiniifseena. Ragaaleeisinirraafudhannukun fedhiikeessanqofairrattiikanhundaa’ewaanta’eef,ragaa kana nuufkennuffedhiiqabduu?

A) Eeyyee B)Lakkii

Lakk.galmeehospiitaalaa…….

1.Questions on socio-demographic characteristics of the patient

Code	Socio-demographic characteristics	
101	Age in years	
102	Sex	A] Male B] Female
103	Weight in(Kg)	
104	Height in (m)	

2.Questions about anesthetic and surgical characteristics of the patient

Code	Anesthetic and surgical characteristics	
201	ASA physical status	A. ASA I
202	Mallampatti	A. Class I B. Class II
203	Diagnosis	
204	Planned procedure	
205	Induction agent	A. Ketamine B. Thiopental
206	Number of trail to intubate the patient	A. First trail B. Second trail C. Third trials
207	Maintenance anesthetic agent	A. Halothane B. ketamine
208	Opoid administered (mg/kg)	
209	Duration of surgery (hrs)	

210	Duration of Anesthesia (hrs)	
211	Study agent administered before extubation	A. Propofol 0.5mg/kg B. Lidocaine 1.5mg/kg C. None
212	Time of study agent administration before extubation	A. 1 -minute before extubation B. 2-minute before extubation C. 3-minute before extubation

3. Patients hemodynamics parameter

Code	Duration	Hemodynamic parameter			
		HR	SBP	DBP	MAP
301	Base line				
302	1-Minute after extubation				
303	3-Minute after extubation				
304	5-Minute after extubation				
305	10-Minute after extubation				