Addis Ababa University College of Health Sciences Department of Anesthesia

INCIDENCE AND ASSOCIATED FACTORS FOR POST PROPOFOL INDUCTION HYPOTENSION DURING ELECTIVE GENERAL SURGERY AT ADAMA HOSPITAL MEDICAL COLLEGE, OROMIA, ETHIOPIA, 2020.

A CROSS SECTIONAL STUDY.

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A THESIS SUBMITTED TO DEPARTMENT OF ANESTHESIA, SCHOOL OF MEDICINE, COLLEGE OF HEALTH SCIENCE, ADDIS ABABA UNIVERSITY IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR MASTER OF SCIENCE IN ANESTHESIA

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ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCE, SCHOOL OF MEDICINE, DEPARTMENT OF ANESTHESIA,

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Examiner

Declaration

I, the undersigned, declare that this thesis is my original work in partial fulfillment of the requirements for the Master of Science degree in Anesthesia. I understand that plagiarism will not be tolerated and all directly quoted material has been appropriately referenced.

Name: _____

Signature: _____

Submitted to MSc Tutor, Department of Anesthesia Addis Ababa University.

Date of Submission: _____

This thesis work has been submitted for examination with my/our approval as Advisors and Tutors on the Master of Science degree in Anesthesia

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Abstract

Background: Induction agents are drugs that, when given IV in an appropriate dose, cause a rapid loss of consciousness. Propofol is a common anesthetic agent for the induction of general anesthesia. During anesthesia, maintenance of adequate tissue perfusion is mandatory. However, rapid infusion of propofol often causes hypotension.

Objectives: To determine the incidence and associated factors for hypotension after propofol induction in patients undergoing general surgery from January to May 30, 2020 at Adama Hospital Medical College.

Method: Institutional based cross sectional study was conducted on 286 on patients undergoing general surgery from January, to May, 30, 2020 at Adama Hospital Medical College, Oromia, Ethiopia using structured questionnaire. Systematic random sampling technique was used to select the sample. Both binary and multiple variabe logistic regression analysis were done for associated factors. Level of statistical significance was declared at p-value less than 0.05.

Results: The incidence of hypotension among clients undergoing general surgery after propofol induction was 60.4%. Age >=60year AOR=3.01; 95%CI: (1.41- 6.41), baseline MAP 60-100mmHg AOR=3.78; 95%CI: (1.91-7.47), dose of propofol AOR= 2.40; 95%CI: (1.26-4.55), dose of pethidine AOR=2.00; 95%CI: (1.09-3.69) were identified as associated factors of hypotension among clients undergone general surgery after propofol induction.

Conclusion: Hypotension after propofol induction was a common problem in patients undergoing general surgery. Age, baseline MAP, dose of propofol and pethidine are the clinical factors associated with post-propofol induction hypotension. The use of these factors to estimate risk of this hypotension might allow the avoidance and early treatments of hypotension during general surgery.

Key Words: incidence, General surgery, Hypotension, Propofol, Oromia, Ethiopia

Contents

Acknowledgment

I would like to express my gratitude to AAU department of anesthesia for giving me this chance. My gratitude will go to my advisors Betelihem Girma and Fisseha Fentie for giving me guidance, valuable comment throughout the development of this thesis.

I extend my great appreciation to my data collectors as well as the working staff anesthetist of Adama Hospital for their unreserved cooperation during data collection.

Finally, I would like thank my friends for their continues encouragement and support during this thesis work

List of abbreviations

AAU –Addis Ababa University.

AHMC- Adama Hospital Medical College

AOR- Adjusted Odds Ratio

ASA- American Society of Anesthesiologist

COR- Crude Odd Ratio

DBP-Diastolic Blood Pressure

ETT- Endotracheal Tube

HR- Heart Rate

HTN- Hypertension

MAP-Mean Arterial Pressure

OR- Operation Room

PACU- Post Anesthesia Care Unit

SBP- Systolic Blood Pressure

SPSS- Statistical Packages for Social Science

1. Introduction

1.1. Background

Induction agents are drugs that, when given IV in an appropriate dose, cause a rapid loss of consciousness. Induction agents are used to induce anesthesia prior to other drugs being given to maintain anesthesia, as the sole drug for short procedures, to maintain for longer procedure by IV infusion, to provide conscious sedation during procedures undergoing under local anesthesia and intensive care unit.(1)

Propofol is a common anesthetic agent for the induction of general anesthesia. Propofol was originally developed in the United Kingdom by imperial chemical industries following research into the sedative effect of phenol derivatives in animal models. Its anesthetic properties were first reported in January 1973. The mechanisms of action on the central nervous system involve interactions at various neurotransmitter receptors, especially gamma-aminobutyric acid A receptor.(2),(3) and it has many pharmacological advantage over other anesthetic agents such as rapid effect, short action and fewer side effects like postoperative nausea.(1)(2)(3)(4)

During anesthesia, maintenance of adequate tissue perfusion is mandatory. Unfortunately, tissue perfusion cannot be assessed easily. Cardiac output measurement and pulmonary artery occlusion pressure are useful guides to anesthesia, but in current practice, blood pressure and heart rate are used as main hemodynamics targets. Perioperative blood pressure management is a key factor for anesthetists, as its instability is associated with adverse events.(5)

Induction with propofol is smoother, almost equally rapid awakening and orientation times, better intubating conditions and upper airway integrity compared to thiopentone sodium. However, the major disadvantage of rapid induction with propofol are impaired cardiovascular and respiratory function which may put patients at greater risk of hypotension, bradycardia, and apnea. .

Intraoperative hypotension is a common and frequent side effect of anesthesia. Intraoperative hypotension may lead to negative outcomes of such as myocardial injury, stroke, acute kidney injury, and death. Intraoperative blood pressure variations outside of accepted physiology ranges are common during non-cardiac surgery. Incidence of hypotension (systolic blood pressure <80 for 5 min) were 26%. (6)(7)(8)

An arterial blood pressure decline below the lower limit of the vascular autoregulation curve might lead to ischemia of vital organ such as heart and kidney.(9)(7)

1.2 Statement of the problem

In all methods used for anesthesia induction, it is aimed to preserve the hemodynamic balance and to provide optimal conditions for the patient by reducing side effects. However, when IV induction drugs are used as a single hypnotic agent, hemodynamic side effect are frequently observed, like intraoperative hypotension which has the potential to cause an ischemia reperfusion injury which manifest as dysfunction of any vital organ.

Intraoperative hemodynamic changes have been reported as important prognostic factors of morbidity and mortality. Evidence shows that hypotension under general anesthesia is associated with adverse outcomes in patients undergoing cardiac and non-cardiac surgery. It is reported that mortality risk is increased by more than 1% per minute of systolic blood pressure below 80 mmHg. (10)

Enhanced hemodynamic fluctuation after induction of general anesthesia were observed in 482(23%) patients. Of these 482 patients, 287(13.7%) developed hypotension, and 195(9.3%) developed hypertension in patients older than 18 years.(6)

In other study, the incidence of post induction hypotension was reported to be 60%in adult patients scheduled for vascular surgery. According to this study the patients who developed post induction hypotension had increased mortality 8.8% versus 5.2% no-hypotension , extended ICU stay(7.9% post induction hypotension versus 2.0% no-hypotension), and postoperative mechanical requirement(20.7% post induction hypotension versus 3.8%no-hypotension).(11)

Propofol induction at dose of 2 – 2.5mg/kg causes a 25 – 40% decrease in arterial pressure which is due to reduction of myocardial contractility, peripheral vascular resistance, and sympathetic tone. Vagotonic effects of propofol also reduce the HR that may cause severe bradycardia, complete atrio ventricular block and cardiac arrest. (8)

One study showed that independent of the presence of cardiovascular disease, the incidence of post propofol induction mediated hypotension ranges from 25% to 67.5%.(12)

1.3 Significance of the study

Induction of anesthesia is associated with hemodynamics variations of mild to severe degree depending upon many factors. This study will help to identify those predictors like induction dose of propofol which impair cardiovascular and respiratory function and put patients at greater risk of hypotension. Induction of general anesthesia is a time of hemodynamics fluctuation. A variety of interventions was used to prevent it, but none of them resulted in stable induction. So this study will contribute great help to predict the factors and solve the problems. So, predicting those factors affecting hemodynamic fluctuation used to improve the outcomes in post-operative periods.(13)

Most of the time, the emphasis is to treat hypotension rather than to preventing it by knowing associated factors. Hence this study will focus on determining associated factors of hypotension after propofol induction of anesthesia. As far as my knowledge no single published study in our country on this area. So this study will be used as baseline for further studies.

2. Literature Review

During surgery, the manipulation of blood pressure is crucial for the conduct of the surgery as well as to prevent complications of surgery. Hemodynamics fluctuation is regarded as an additional risk in anesthesia.(14)

A double blind, randomized control trial study done at Austria in 2018 on hemodynamics stability during anesthesia induction with propofol – impact of phenylephrine showed that, after induction of anesthesia before intubation mean arterial pressure and stroke volume index decreased significantly compared to baseline in both group, while the systemic vascular resistance index increased slightly. (15)

A comparative study done at Indian in 2018 on the hemodynamics effects of thiopentone or propofol and combined use of low dose thiopentone and propofol on induction and intubation showed that the mean value of SBP, DBP and HR were assessed there are significant change from the base line seen in both alone group.(8)

A comparative study done at India in on propofol auto coinduction and standard propofol induction in patients undergoing general anesthesia showed that the MAP was significantly lower in the group which took standard propofol induction. (16)

But, a comparative study done at India in 2017 *on* a comparative study between propofol and thiopentone for hemodynamic parameters during induction of general anesthesia in surgical patients shows after induction, there was fall in both SBP and DBP after an increase during intubation (17)

Comparative Study at India in 2016 on Effects of Sevoflurane versus Propofol-based Anesthesia on Intraoperative Maintenance of Hemodynamics and Recovery Characteristics in Patients Undergoing Modified Radical Mastectomy showed that in propofol group, MAP, DBP, and SBP were significantly higher intraoperatively.(18)

A randomized clinical study at India in 2016 to compare the haemodynamic effects of etomidate with propofol during induction of general anaesthesia showed that patients in propofol group showed significant fall of SBP, DBP, MAP compared to etomidate ($P<0.05$). (19)

A comparative study done at Turkey in 2015 on the hemodynamics response to tracheal intubation using propofol, etomidate and etomidate-propofol combination in anesthesia induction showed that, a significant decrement seen on MAP after induction and before intubation from the baseline which more significant in propofol group if compared with other group.(4)

A comparative study done at India in 2014 by on propofol and etomidate in patients under general anesthesia showed that a decrease in MAP from baseline in propofol group than etomidate group at induction ($p >.05$).(1)

A randomized study done at India in 2012 on Effect of sevoflurane versus propofol-based anesthesia on the hemodynamic response and recovery characteristics in patients undergoing microlaryngeal surgery reported that, the mean arterial pressure was significantly lower after induction and higher at insertion of operating laryngoscope in propofol group as compared

to sevoflurane group. More patients in propofol group had episodes of hypotension and hypertension than sevoflurane group.(20)

An observational study done in Germany in 2010 Propofol as an induction agent for endotracheal intubation can cause significant arterial hypotension in preterm neonates showed that Propofol generally offered good intubating conditions, but they encountered severe problems with arterial hypotension. A low propofol bolus of 1 mg/kg caused a distinctive decline of mean arterial blood pressure from 38 mmHg (range 29-42 mmHg) prior premedication to 24 mmHg (22-40mmHg) 10 minute after application of propofol(21)

A prospective, randomized, double-blinded study done at Japan in 2008 by on Comparative effects of propofol, landiolol, and nicardipine on hemodynamic and bispectral index reported that in the propofol group, cardiac output and stroke volume index decreased after administration of additional propofol, lasting for 30 seconds after intubation.(22)

An observational prospective cohort study at Ethiopia in 2019 on effect of ketofol versus propofol as an induction agent on ease of laryngeal mask airway insertion conditions and hemodynamic stability in pediatrics showed that a significant drop in mean arterial blood pressure was observed in propofol group from baseline while in the ketofol group, there was a rise in mean arterial pressure at all measurement times ($P < 0.001$).)(23)

Conceptual framework

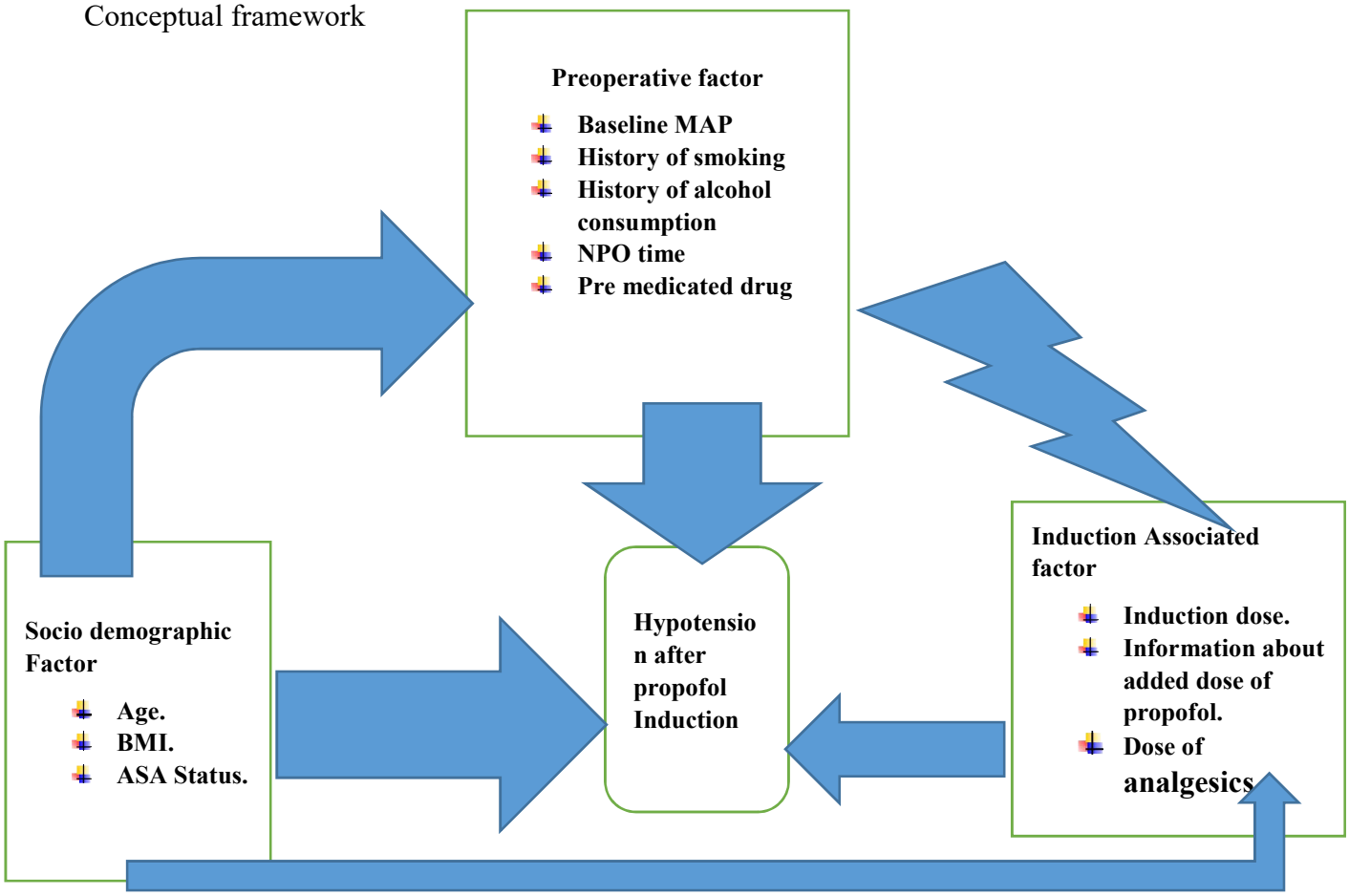

figure 1 conceptual framework for assessing associated factors of hypotension among patient undergoing general surgery after propofol induction.

3. Objective

3.1. General Objective

To determine the incidence and associated factors for post propofol induction hypotension in patients undergoing general surgery at Adama Hospital Medical College from January to May 30, 2020.

3.2. Specific Objective

To determine the incidence of post propofol hypotension in patients undergoing general surgery at Adama Hospital Medical College from January to May 30, 2020.

To assess associated factors for post propofol hypotension in patients undergoing general surgery at Adama Hospital Medical College from January to May 30, 2020.

4. Methods and Materials

4.1. Study Area

The study was conducted in Adama Hospital Medical College from January to May 30. Adama town is located 99 km southeast of Addis Ababa in the great rift valley of east Africa with total population of 33,8940, and covers an immense of area of 13,666.5 hectares(133.6 square km).

The city have five hospital (one governmental hospital and four private hospital). Adama Hospital Medical College was founded in 1938. Nowadays on giving service like general surgery, gynecologic surgery, neuro surgery, as well as medical service having 8 OR table and regarding human resource, AHMC have 20 Anesthetist, 10 Gynecologist, 10 general surgeon, 2 Orthopedic surgeon, and 4 sub special surgeons.

4.1. Study design and period

Cross sectional study was conducted from January 2019 to May 2020.

4.3. Population

4.3.1. Source of Population

All patients scheduled for the general surgery at Adama Hospital Medical College.

4.3.2. Study population: All elective patients scheduled for general surgery and fulfilled inclusion criteria with in the study period.

4.4. Inclusion and Exclusive criteria

4.4.1. Inclusion criteria

Patients undergoing general surgery under general anesthesia with ETT and induced with propofol.

Normotensive patients.

ASA grade I & II

4.4.2 Exclusion criteria

Unanticipated as well as anticipated difficulty intubation

Severely anemic patients.

Hypotensive patients.

Patients having cardiac disease.

Patients who had any history suggestive of allergy to propofol.

4.5 Sample size and sampling technique

4.5.1 Sample size

The sample size was determined using the single population proportion method for the first objective which is incidence of hypotension after propofol induction.

P=0.5 was used for calculation to get maximum sample size, 95% level of significance, 5% margin of error and 10% for incomplete or as contingency data was used as parameters.

Formula $n = \frac{(Z\ \alpha/2)^2\ p(1-p)}{d^2}$

With assumptions; Z=1.96, at 95% confidence level.
Margin of error =5%

n=384

Where nf =n/1+n/N= of which N =800(estimated target population in the study period)

384/1+384/800= 260, by adding 10% of nf for contingency

Total sample size is 286

4.5.2 Sampling technique

A study participant were selected using systematic random sampling technique using skip interval from the daily operation list of patients scheduled for general surgery. According to the situational analysis, an average of 200 general surgery were done within a month at Adama Hospital Medical College. Thus, 800 general surgery was expected to be done per the study period (4 months) the sampling interval; K was determined using the formula: K=N/n; where, n = total sample size, N = population per 4 months. K= 800/286 ≈3 Therefore, the sampling interval was three and the first study participant was selected using lottery method from the daily general surgery. Then, every third cases from the daily general surgery was included in the study during the study period.

4.6 Study variables

4.6.1 Dependent variable

- Hypotension

4.6.2 Independent variable

- Sociodemographic characteristics of the patients(age, weight , height, sex, BMI)
- Induction dose of propofol.
- Types of surgery.
- Amount of maintenance fluid given pre operatively.
- NPO time.
- Analgesics dose.
- ASA physical status.
- History of alcohol intake
- History of smoking

4.7 Data collection technique

Data was collected from selected study participants using pretested questionnaire. Data was collected from January to May 30, 2020. The data collection was done by two anesthetists after understanding the questionnaire and providing appropriate training

A vital sign recorded one day before surgery was used as baseline vital sign and vital sign taken on table was used as pre induction vital sign by using noninvasive blood pressure measurement. After premediating with calculated dose of pethidine, induction dose of propofol was administered and then smooth intubation procedure followed. Anesthesia management for general surgery under general Anesthesia in the study hospital is carried out by anesthetists. To determine the extent of hemodynamic changes post propofol induction blood pressure were measured at fifth minute after injection of the drugs filled on the questionnaires. The completeness of data was checked every day by principal investigator.

4.8 Data quality control

The questionnaires were prepared in English and one day training was given on the objectives and relevance of the study and brief Orientations on the assessment tools were provided for data collectors and supervisors by principal investigator before data collection. The questionnaire was pretested on 5% of the study population in the same Hospital. Based on the pretest, questions were

revised; edited and necessary modifications were made before actual data collection. Close checkup of data for completeness and consistency was done. Regarding missed measurement electronic data store of the monitoring equipment were recalled and back traced and data was filled.

4.9. **Data analysis and interpretation**

Data was checked for completeness, coded and then entered into SPSS version 20 for analysis. Descriptive statistics was used to calculate frequencies and percentages of different variables and incidence of hypotension. Chi square, binary logistic regression and multiple logistic regression analysis were done to determine presence of associations between dependent and independent variables, and odds ratio with 95% confidence intervals was used to determine the degree of association between dependent and independent variables. Variables with a p-value less than 0.25 in the binary logistic regression analysis were considered for multiple variable analysis. Multiple variable analysis was performed to adjust for possible confounders and to come up with significant predictors. Level of statistical significance was declared at p-value less than 0.05. Both crude and adjusted odds ratio with 95% confidence interval were reported. The result will be presented by using text, table's, charts and graph

4.10 Dissemination plan

The research will be presented for the entire department of anesthesia staff. It will also be presented at the annual research conference. The research will be submitted to journals for publication.

4.11. Operational definition

Hypotension: Decrement of blood pressure from the baseline by 20% after propofol induction.

Post propofol hypotension: Decrement of blood pressure from the baseline by 20% on fifth minute after induction of propofol.

General surgery: surgical specialty which focus on abdominal contents plus procedure on thyroid gland.

Baseline vital sign- vital sign before induction of Anesthesia.

Head and neck surgery- general surgery performed around head and neck.

4.12 Ethical consideration

The study was conducted after approval by Addis Ababa University, Ethical review board to conduct the study. A legal letter was also submitted to Adama Hospital, where the study was took place. Verbal informed consent was obtained from all patients after full explanations of the goals and procedures of the study. After taking permission from the hospital the data collection was conducted.

5. Results

5.1 Socio-demographic characteristics

During the study 280 out of 286 clients were included with a response rate of 98%. Six clients were excluded due to incomplete data. Age, sex, body mass index were assessed in this character. Fifty eight percent were female, majority of clients were in the age group of 30-59(42.9%). Body mass index of 248(88.6%) patients were in the 18.5-24.5 interval and 61.4% were categorized in ASA class one.(table 1)

Table 1 The frequency and cross-tabulation of socio-demographic characteristics with hypotension after propofol induction, at Adama hospital medical college, Oromia, Ethiopia, 2020 GC (n=280**)**

variable	Category	N (%)	Hypotension at 5th min after propofol induction (%)	
			No (%)	Yes (%)
Sex	Male	117(41.8)	41	59
	Female	163(58.2)	38.7	61.3
Age	15-29	62(22.1)	46.8	53.2
	30-59	120(42.9)	50	50
	>=60	98(35)	22.4	77.6
BMI	<18.5	18(6.4)	38.9	61.1
	18.5-24	248(88.6)	41.1	58.9

	24.5-30	14(5)	14.3	85.7
ASA	ASA I	172(61.4)	36.6	63.4
	ASA II	108(38.6)	44.4	55.6

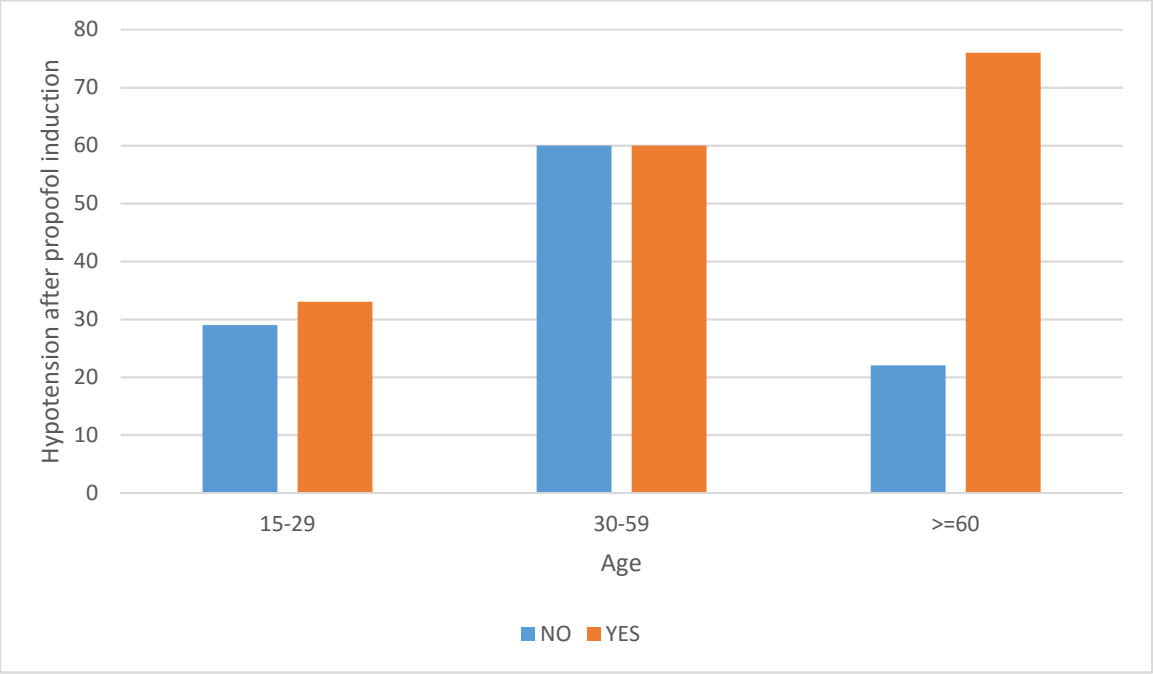

Figure 2Age and frequency of hypotension of the patients undergone general surgery after propofol induction at Adama Hospital Medical College, 2020 GC

5.2 Pre-operative characteristics

Based on the results of pre-operative factors 96.4% of respondents were kept greater than eight hour NPO and majority of the clients took maintenance fluid before surgery (90.7%). 215(76.8%) of the respondents were selected among scheduled for abdominal surgery. 10.7% of the clients had history of anti-thyroid drug and 3.6 had history of receiving anti-hypertensive. (table 2)

Table 2 The frequency and cross-tabulation of preoperative characteristics of patients who underwent elective general Surgery with Hypotension after propofol induction, at Adama Hospital Medical College, Oromia, Ethiopia, 2020 (n=280)

Variables	**Category**	**N (%)**	**Hypotension at 5th min after propofol induction(N)**	
			No	Yes
NPO time	<8 hr.	10(3.6)	50	50
	>=8 hr.	270(96.4)	39.3	60.7
MF	NO	26(9.3)	38.5	61.5
	YES	254(90.7)	39.8	60.2
Types of surgery	Abdominal surgery	215(76.8)	40.5	59.5
	Head and neck surgery	65(23.2)	36.9	63.1
History of antithyroid	NO	250(89.3)	40.4	59.6
	YES	30(10.7)	33.3	66.7
History of HTN	NO	270(96.4)	40.4	59.6
	YES	10(3.6)	20	80
History of alcohol intake	NO	265(94.6)	39.2	60.8
	YES	15(5.4)	46.7	53.3
History of smoking	NO	274(97.9)	40.1	59.9
	YES	6(2.1)	16.7	83.3

Majority of patients baseline MAP were categorized in 60-100 which is 215(76.8%), 140 of them developed hypotension, whereas, among clients categorized in 101-103, 29 patients developed hypotension.

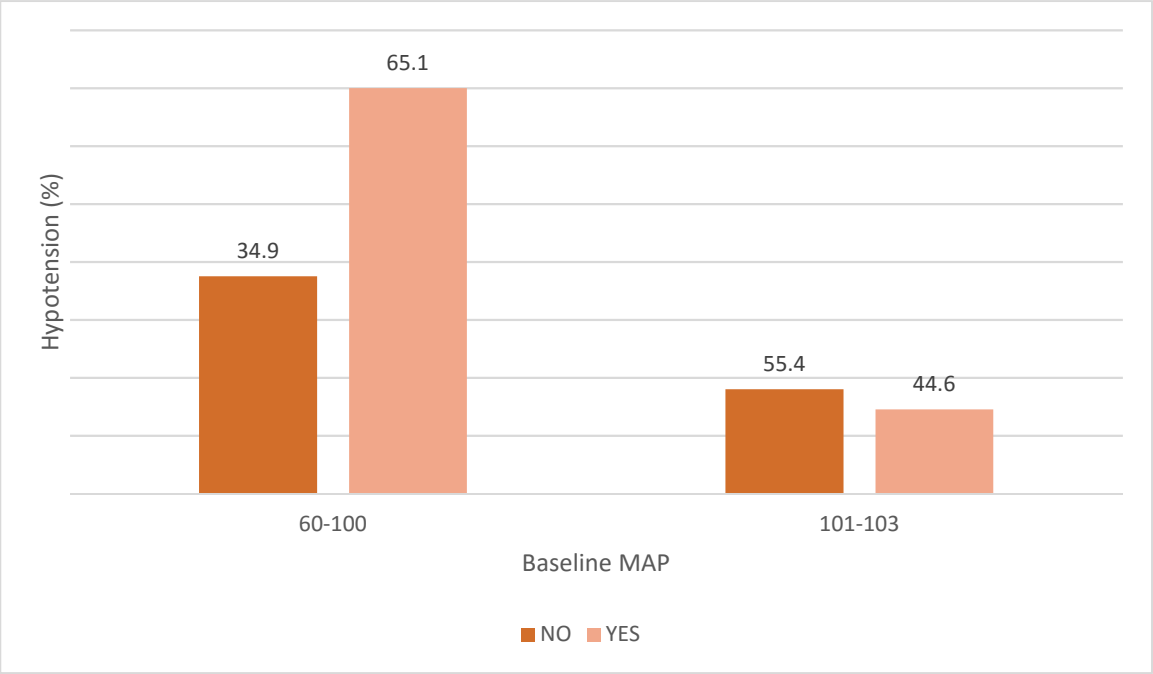

Figure 3Baseline MAP and frequency of hypotension of the patients undergone general surgery after propofol induction at Adama Hospital Medical College, 2020

5.3 Induction agents characteristics

According to the results of Induction agent characteristics 77.1% 0f 280 patients took >= 75mg of propofol dose, whereas 64(22.9%) of the clients induced < 75mg of propofol, 41.8% of the selected clients took additional dose of propofol. Among 117 patients who recieved additional dose of propofol, 76 of them developed hypotension on the 5th minute.71.8% of the respondents were provided >= 50 mg pethidine as analgesics to avoid pain of intubation, 41.8% of the clients were

intubated with non-depolarizing muscle relaxant and the rest 58.2 with depolarizing muscle relaxant.(table 3)

Table 3 The frequency and cross-tabulation of Induction agent characteristics of patients who underwent elective general Surgery with hypotension after propofol induction, at Adama Hospital Medical College, Oromia, Ethiopia, 2020 (n=280)

Variables	Category	N (%)	Hypotension at 5th min after propofol induction()	
			No (%)	Yes (%)
Induction dose of propofol	<75mg	64(22.9)	51.6	48.4
	>= 75mg	216(77.1)	36.1	63.9
Was propofol added	NO	163(58.2)	42.9	57.1
	YES	117(41.8)	35	65
Dose of pethidine	<50mg	79(28.2)	51.9	48.1
	>= 50mg	201(71.8)	34.8	65.2
Muscle relaxant used	Non depolarizing	117(41.8)	40.2	59.8
	Depolarizing	163(58.2)	39.3	60.7

From the total clients who underwent general surgery under general anesthesia using propofol induction the incidence of hypotension was 169 (60.4%).

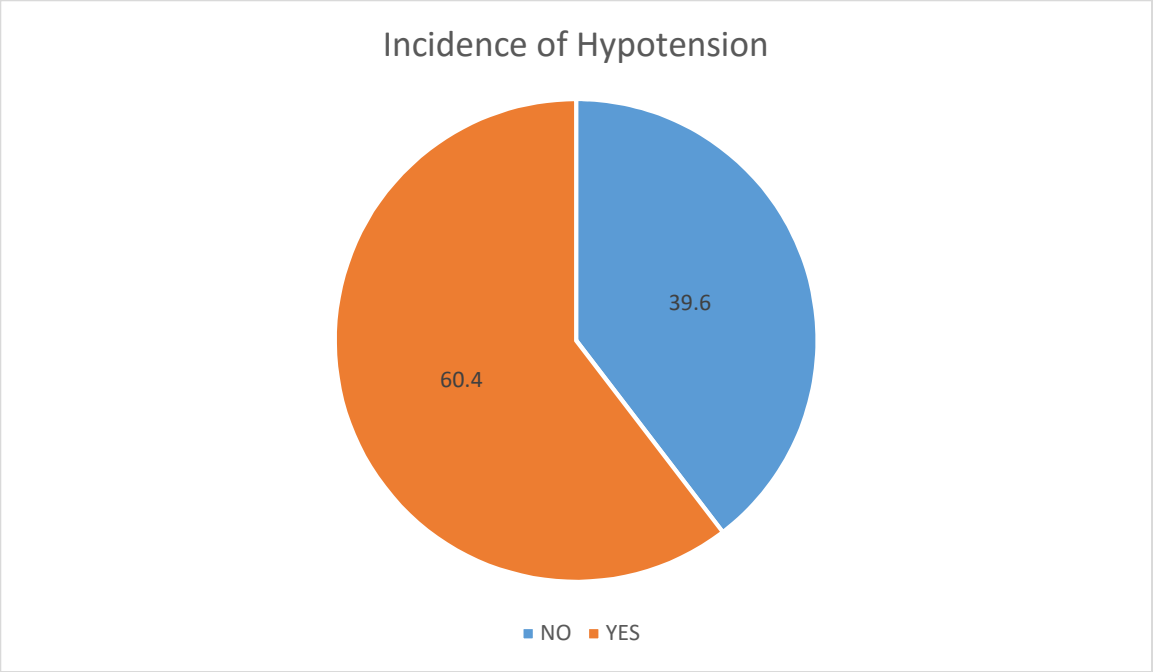

Figure 4Incidence of hypotension among patient undergone general surgery after propofol induction, at Adama Hospital Medical College

5.4 Factor associated with incidence of post propofol induction hypotension.

We were found a variable which have association with post propofol induction hypotension age (AOR: 3.01, 95%CI(1.41-6.41)P- Value 0.004), baseline MAP(AOR:3.78, 95%CI(1.91-7.47)P-Value< 0.001), propofol dose(AOR:2.40, 95%CI(1.26-4.55)P-Value 0.007), and dose of pethidine(AOR:2.00,95%CI(1.09-3.69)P-Value 0.024)).(table 4)

Table 4Factors associated with Hypotension after propofol induction analyzed in both bi-variable and multi-variable logistic regression in Adama Hospital Medical College, Oromia, Ethiopia, 2020.

Variables		Hypotension at 5th min after propofol induction(N)	Odds ratio (95% CI)	
			Crude (95% CI)	Adjusted (95%CI)
Age	15-29	33	1.00	1.00
	30-59	60	0.87(0.47-1.62)	0.73(0.37-1.44)
	>= 60	76	3.03(1.52-6.04)*	3.01(1.41-6.41)**
BMI	<18.5	11	1.00	1.00
	18.5-24.5	146	0.91(0.34-2.4)	1.27(0.39-4.05)
	24.5-30	12	3.81(0.64-22.45)*	6.89(0.92-51.27)
ASA	I	109	1.00	1.00
	II	60	0.72(0.44-1.18)*	0.67(0.39-1.17)
History of anti HTN	NO	161	1.00	1.00
	YES	8	2.70(0.56-12.99)*	3.14(0.57-17.05)
Baseline MAP	101-103	29	1.00	1.00
	60-100	140	2.31(1.31-4.07)*	3.78(1.91-7.47)**
Induction dose of propofol	<75 mg	31	1.00	1.00
	>=75 mg	138	1.88(1.07-3.30)*	2.40(1.26-4.55)**
Was propofol added	NO	93	1.00	1.00
	YES	76	1.39(0.85-2.27)*	1.41(0.81-2.44)

Dose of pethidine	<50 mg	38	1.00	1.00
	>=50 mg	131	2.01(1.19-3.42)*	2.00(1.09-3.69)**

** Variables significant in the multi-variable logistic regression analysis (P<0.05)

* Variables significant in the bi-variable logistic regression analysis (p<0.25).

1.00 Reference/indicator.

6. Discussion

The intention of this study was to find out the incidence of post propofol induction hypotension and to confirm whether there is an association between the Socio-demographic characteristics, Pre-operative characteristics, and induction agents characteristics as relevant explanatory power of post propofol induction hypotension.

We analyzed the variables in both bi-variable and multi-variables methods so as control potential confounding factors and to determine the independent association between post propofol induction hypotension and its factors. On the bi-variable analysis method age, BMI, ASA status, history of anti-HTN, baseline MAP, propofol dose, additional propofol, and dose of pethidine were with (P value of < 0.25). But only the following variables were found to have association with post propofol induction hypotension age (AOR: 3.01, 95%CI(1.41-6.41)P- Value 0.004), baseline MAP(AOR:3.78, 95%CI(1.91-7.47)P- Value< 0.001), propofol dose(AOR:2.40, 95%CI(1.26-4.55)P-Value 0.007), and dose of pethidine(AOR:2.00,95%CI(1.09-3.69)P-Value 0.024)).

In this study the overall incidence of hypotension among patient undergone general surgery under general surgery after propofol induction was 169 (60.4%). Almost similar result was found in Pakistan with rate of hypotension was significantly higher in group of propofol saline (60%) and overall incidence of hypotension was 38.5% (12) The study done in Canada also showed that incidence of hypotension after propofol induction were 60% in which most of the patients who developed hypotension were induced with propofol.(11). But, the study done in Japan showed that incidence of hypotension after induction of propofol was 13.7%(6), the difference might be due to analgesics used for induction, they have used fentanyl as analgesics for induction but in our case

pethidine was analgesics used for induction and set up in which the study done might be the possible reasons.

The Factors which had an association with hypotension was assessed by multivariate logistic regression. Age, baseline MAP, dose of propofol, and dose of pethidine were identified as a factor associated with hypotension.

The age of the patients have significant association with hypotension in our study. Clients who were in age group of greater or equal to sixty has more risk of developing hypotension. Our study is in line with study done in Taiwan in which age was the strongest predictor of hypotension and they recommended propofol based deep sedation should be conducted with caution in the elderly.(24) Another study done in Germany also found age as independently predictors of post induction hypotension.(25) study done in Japan also support our finding and showed that age older than 65 year were highly significant predictive factors for hypotension after propofol induction and also recommended the favorable induction dose of propofol for age greater than 60 year (1.5-1.75mg/kg).(6) study done in Canada concluded that older age are at risk of hypotension after propofol induction because of both aging and propofol synergetic effects on depressing cardiovascular component of autonomic nervous system and in older age group compensatory increase in sympathetic outflow was not observed.(26)

From our finding, baseline MAP had a significant association with hypotension after propofol induction. This study is in line with study done Germany in which MAP were significantly related to post induction hypotension.(25) Baseline MAP in category of 60-100mmHg had 3.78 times more chance to become hypotension after propofol induction when compared with patients induced with propofol having base line MAP in of 101-103 category.

The dose of propofol have significant association with hypotension after propofol induction was found in our study, propofol dose >=75mg has two folds of risk of developing hypotension than induced with less than 75mg. This study is in line with study done in India in which the MAP was significantly lower in the group who took higher dose at time(2mg/kg) comparative to the group that took auto co induction(0.4mg/kg as priming dose and the remaining in the titrated dose.(16) In our case the possible reason will be in case of propofol <75mg, they might be administered total dose of individuals by dividing into two, in which they gave less 75mg of propofol as priming dose and added the left of the dose.

The risk of hypotension has strong association with dose of analgesics used. In our study the dose of pethidine >=50mg with (AOR: 2.00, 95%CI (1.09-3.69) P-Value 0.024) was statistically significant with risk of developing hypotension. This result is consistent with study done in Japan, the result of this study also show that increasing induction dose of fentanyl was predictive factors for hypotension.(6) The possible reason might be, as analgesia dose increase we can suppress stress response of laryngoscopy.

7. Conclusion and recommendation

7.1 Conclusion

Hypotension after propofol induction was a common problem in patients undergoing general surgery. Age, baseline MAP, dose of propofol and pethidine are the clinical factors associated with post-propofol induction hypotension. The use of these factors to estimate risk of this hypotension might allow the avoidance and early treatments of hypotension during general surgery.

7.2. Recommendation

For anesthetists

- The incidence of hypotension shows the size of the problem, so we will recommend to use the low dose of propofol to reduce this incidence.
- For patients whose age is greater or equal to 60 year and also for patients whose baseline MAP is less than 100mmHg better to use other induction agent or to decrease the dose of propofol.

For researchers

We recommend researchers to carry out additional strong studies on to investigate better optional induction agents for clients older than 60 years.

7.3 Strength and limitations of the study

Limitation: it was single center study.

Since speed of injection of induction agent is one factor, but difficult to measure in our set up.

Strength: As far as my knowledge this is the first study in my study area so, it will be helpful a baseline information for other researchers.

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Annexes

Annex one: Information sheet to get permission for the research

Introduction

This information sheet is prepared to explain the research project that you are asked to join by a group research investigators. The research team includes MSc students, two senior advisor from AAU and two anesthetist for data collection from Adama Hospital Medical College.

Principal investigator: - Wedajo Tsegaye

Advisor's : - Ms. Betehlihem Girma

Mr. Fisseha Fentie

Name of sponsor: - AAU

Name of organization: - AAU, Health science college, school of anesthesia

This information sheet is prepared by the above mentioned investigator

Risk

There is no any risk or harm that you will face by participating in this research. Any personal information recorded will not be copied and transferred to other bodies. No need of writing participants' name but by a code. Every piece of information will be kept confidentially.

Benefits

There is no incentive or payment to be gained by taking part in this project. The information collected from this research project will be kept confidential and only accessed by the researcher and research assistant only. This research project will be reviewed and approved by ethical committee of the department. If you want to know more information, you can contact the committee through the address below.

Tel: - +251911597629, E-mail-wedajotsegaye53@gmail.com

Annex two: Consent form

Dear participant:

This is a research designed on determine the incidence and associated factors for hypotension after propofol induction in patients undergone general surgery at Adama Hospital Medical College .You are selected to participate in this study by chance. Your data completely confidential and you have full right either to refuse or leave the study. So, we are requesting you to keep participation.

Would you willing to participate in the study please? YES/NO

Thanks for taking part in the study!!!!

For further question ask investigator

Tel: - +251911597629

E-mail- wedajotsegaye53@gmail.com

Questioner developed for collection of data for the study on determine the incidence and associated factors for hypotension after propofol induction in patients undergone general surgery at Adama Hospital Medical College Oromia, Ethiopia.

Section: 1 Socio demographic factors

S.no	Question	Response	Code
101	Patient card NO		
102	Patient age(yr)		
103	Body Weight (k/g)		
104	Height		
105	BMI		
106	ASA status	ASA I	1
		ASA II	2

Section: 2 Baseline information

S.no	Question	Response	Code
200	Baseline blood pressure	……./…….(……)	
201	Baseline HR	……bpm	
202	NPO time	……	
203	Was the patient on the maintenance fluid?	1.Yes 2.No	
	If yes ,	Specify types of fluid….……and amount in liters……..	
204	Types of diagnosis to be operated.		
205	Preoperative drug history If yes, specify	Antithyroid.(specify) ……. Dose and frequency……... For how long he/she took……..	1

		Hypoglycemic agent (specify)……. Dose and frequency……... For how long he/she took	2
		Antihypertensive drug (specify)…….…….. Dose and frequency……... For how long he/she took…… Route of drug administration……..	3
		Anxiolytics (specify)…… Dose and frequency……... For how long he/she took …….. Route of drug administration……..	4
		Antiemetic (specify)…….. Dose……. Route of administration……..	5
		Others (specify)…….	

206	Does the patient has the history of alcohol intake?	1.Yes 2.No	
	If yes	For how long……	
207	Does the patient has the history of smoking cigarettes	1.Yes 2.No	
	If yes,	Dose per day……. Duration ……	

Section: 3 Information about Induction Agent

S.no	Question	Response	Code
300	Induction dose of propofol	…….mg	
301	Is there additional dose given?	…….mg	
302	Analgesics given and its dose	.Diclofenac……mg	1
		Tramadol ……..mg	2
		.Morphine……mg	3
		Pethidine ……mg	4
		Fentanyl……mcg	5
		Ketamine……mg	6
		Others (specify …	7

303	Muscle relaxant used for intubation	Suxamethonium	1
		Vecronium	2
		Atracurium	3
		Cisatracurium	4
		Pancronium	5
		Others (specify …	6

Section: 5 Observation immediately After Intubation

s.no	V/s	5^{th} min
1	BP	……/……. (……)

Data collector

Name signature

_____ _____