

# Changes in Serum Blood Sugar Levels before and After Induction of General Anaesthesia with Propofol and Thiopentone: An Observational Comparative Study Done In a Teaching Hospital

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## ABSTRACT

**Aim:** The main aim of the study was to evaluate the propofol and thiopentone used before and after induction of general anaesthesia and as a result its effect of its in serum blood sugar levels.

**Material and Method:** In this observational prospective study was conducted on 120 patients who had admitted under surgery department and were categorised as ASA I & II. The entire population were again equally divided in two groups named Group A and Group B and each group were having 60 patients. Group A patients were received Thiopentone 5mg/kg body weight IV as initial loading dose and Group B patients were received Propofol 5mg/kg body weight IV as initial loading dose. As a primary outcome measurement a random blood glucose test was performed in both the groups after 5 minutes of initial IV.

**Result:** Both the group were almost identical in demographic parameters and it has been observed that Group B with Propofol were more effective than Group A with Thiopentone towards reduction in vital parameters like blood pressure (both SBP & DBP), PR and RPP in both cases that is after induction and 1,3,5,10 min after endotracheal intubation and along with that it has also observed that near the baseline or even below from that was the SBP, DBP and MAP in Group B where as it was above in case of Group A.

**Conclusion:** The study has concluded that before and after induction of general anaesthesia as compare to thiopentone, Propofol provides stable hemodynamic condition. Blood Sugar level which was measured as RBS was found to be significantly reduced in propofol group as compared to other thiopentone group of patients.

**Keyword:** Propofol, Thiopentone, Serum Blood Sugar levels, General Anaesthesia.

## INTRODUCTION

Minimal respiratory side effects, hemodynamic stability and rapid clearance are the property that Ideal inducing Agent for general Anaesthesia should have. Attenuation of stress response, hemodynamic stability and maintenance of balance between myocardial oxygen demand and supply are the concerns for

induction of anaesthesia in patients undergoing cardiac surgery.

Resistance to insulin & hyperglycaemia is one of the most important metabolic reactions during surgery. As a graded response related to magnitude of the operation Insulin resistance develops. [1] Resistance to insulin due to surgical stress and increasing secretion of adrenaline, nor

adrenaline, causes hyperglycaemia. Specific cellular functions such as phagocytosis, the production of reactive oxygen species, to promote the adherence and sequestration of neutrophils and monocytes into peripheral tissue and also impair the micro vasculature's ability to relax in the presence of vasodilating stimuli such as nitric oxide inhibits acute hyperglycaemia. [2, 3] Even in the patients who had normal glucose tolerance test, acute hyperglycaemia during surgery worsens prognosis. [4,5]

Lattermann et al [5] inferred that, in the patients undergoing any surgery, combined spinal epidural technique can prevent hyperglycemia compared to GA, but surgeries which mandates the use of General anaesthesia including Cardio-thoracic surgeries, Head and neck surgeries etc. Several intravenous anaesthetic agents are used during induction including Etomidate, Midazolam, Thiopentone, Propofol and Ketamine which is associated with change in blood glucose levels and hemodynamics. Propofol anaesthesia has rapid elimination from the blood circulation, short half-life, satisfactory recovery, causing less sedative effect and vomiting are the reasons for using this drug more commonly. [6, 7]

The main objective of the study to evaluate the changes in serum blood sugar levels before and after induction of general anaesthesia with propofol and thiopentone.

## MATERIAL AND METHOD

120 patients undergoing elective surgery under general anaesthesia and were of ASA I & II was included in this study and also divided equally in two groups comprising 60 patients each group. Approval from divisional Ethics committee was taken prior to initiation of the trial. All patients who had participated in this study has submitted the inform consent before enrolment.

All patients were premedicated with I.M glycopyrrolate 0.2 mg half an hour before induction. After receiving the patient in Operation Theater (OT), an intravenous line (IV) was secured with IV cannula and

Normal Saline drip was started. Thereafter random blood sugar (RBS) recorded 5 min before induction (5 min BI). Before induction base line vital parameters were recorded; including blood pressure and pulse rate.

Inj. Thiopentone 5mg/kg body weight IV were induced in all patients of group A and Inj. Propofol 5mg/kg body weight IV were induced in all patients of group B. There after 5 min before induction random blood sugar (RBS) was recorded. Vital parameters like blood pressure and heart rate before induction.

Proper pre anaesthetic check-up and all relevant investigations were done for all patients. Monitors ECG, NIBP, Pulse oximeter connected. All patients were pre medicated with Inj. Midazolam 1 mg I.V. blood sugar and heart rate, systolic blood pressure, diastolic blood pressure, mean arterial pressure were recorded. Group P was induced with propofol 2 mg/kg and group T with thiopentone 5 mg/Kg. After administration of succinylcholine 1.5 mg/Kg, laryngoscopy and tracheal intubation was performed. Then blood sugar levels & heart rate, systolic blood pressure, diastolic blood pressure, mean arterial pressure were measured 5 & 15 mins after giving study drugs. Blood glucose checked by glucometer optimum exceed. Blood glucose level compared between 2 groups using t- test & repeated measure.

Student t test for parameters on continuous scale. Chi-square test for parameters on categorical scale. p Value <0.05 was considered significant.

## RESULT

Demographic details are mentioned in table 1. Demographic Data Was Comparable & Difference Was Not Statistically Significant Among the Groups.

Table 1: Demographic details

Variable	Group P Mean	Group T Mean	P value
Age (Years)	39.76	39.51	0.274
Sex (Male/Female)	32/28	38/22	0.821
Weight (Kgs.)	58.49	57.71	0.981
ASA I/ II	47/13	38/22	0.462

There was statistically significant difference regarding blood pressure between two groups, the bellow table shows the mean of the systolic blood pressure of the two

groups. SBP after induction (T2), there was fall and increase in blood pressure (T3) in propofol group.

**Table 2: Systolic blood pressure [SBP] & Diastolic Blood Pressure [DBP]**

SBP & DBP at different time interval	SBP T(mm of Hg)	SBP P(mm of Hg)	DBP T(mm of Hg)	DBP P(mm of Hg)
T1	111.7±8.4	111.3±7.5	66.7±6.9	69.1±6.3
T2	108.6±12.6	95.1±7.8	62.7±6.7	59.9±5.6
T3	127.9±13.2	110.8±10.2	78.4±10.9	68.9±7.5
T4	116.5±10.9	105.1±11.2	71.5±11.2	64.3±6.8
T5	108.8±11.9	100.7±10.3	66.7±10.3	60.8±7.0
T6	108.7±10.9	97.5±11.3	63.5±9.1	58.3±7.1

In both the two groups, demographic data was comparable as compared to Thiopentone, Propofol was found to be significantly reduced SBP, DBP, PR and RPP after induction and 1,3,5,10 min after endotracheal intubation. diastolic arterial blood pressure, Systolic blood pressure and mean arterial pressure were near the baseline or below the baseline in propofol group after intubation and induction while in thiopentone group, all the values were above the baseline after induction.

**Table 3: RBS Monitoring in Propofol Group & Paired ~ t Test Results**

Group	Rbs 5 Mins. Before Induction	Rbs 5 Mins. After Induction
T	96.88±10.48	95.32±11.05
P	98.98±9.92	93.04±7.72

## DISCUSSION

In this study we evaluated the effect of Propofol and thiopentone on blood glucose during surgeries done under general anaesthesia in non-diabetic patients. This study was conducted to compare the effects of anaesthetic induction with single dose propofol versus thiopentone on blood glucose and haemodynamics. In fact the reason of hyperglycaemia during surgery may be surgical pain and metabolic response to surgical stress that even deep anaesthesia cannot block these responses. But with enough analgesia we can maintain blood glucose in normal limits and prevent hyperglycaemia and its complications during perioperative period.

Bandschappo et al concluded that propofol showed short lasting analgesic properties during its administration. [8]

Propofol has been proposed to have several mechanisms of action, both through potentiation of GABA receptor activity, thereby slowing the channel-closing time, and also acting as a sodium channel bl. [9, 10]

The deleterious effects of anesthetic agents in patients suffering from coronary artery disease are well-known. Induction of general anesthesia may be a critical period during CABG and valve replacement surgery, especially in presence of LV dysfunction. There is a paucity of literature regarding the choice of suitable agent to avoid deleterious effects in such patients. Anesthetic induction techniques for cardiovascular surgery are based on considering hemodynamic stability and effects on myocardial oxygen supply and demand.

Etomidate is one of the intravenous anesthetics used in anesthesia induction, either alone or in combination with other anesthetic drugs. [11] In a study by Hosseinzadeh et al. [12] comparing hemodynamic changes during placement of laryngeal mask airway (LMA) using propofol, etomidate and etomidate-propofol combination, after the administration of inj. fentanyl 2 mg/kg, group one was given inj. propofol 2.5 mg/kg, group two received inj etomidate 0.3 mg/kg and group three 1 mg/kg propofol+0.2 mg/kg etomidate. LMA placement was done after loss of eyelash reflex and no response to verbal command. The main finding of the study was that more stable hemodynamics was provided by combination of propofol and etomidate compared to propofol and etomidate and

alone. Although the dose of both drugs are reduced in the combination of propofol and etomidate, it was reported that more stable hemodynamic state and better condition for LMA placement was provided.

General anaesthetic induction agents may decrease arterial blood pressure via myocardial depression, vasodilatation and attenuation of autonomic nervous activity. [6] Sudden hypotension, arrhythmias and cardiovascular collapse are life threatening complications following injection of induction agent. It is desirable to use a safe agent with fewer cardiovascular effects. [7] In the present study, we observed that there was a statistically significant reduction in SBP, DBP and MAP at induction with propofol as compared to etomidate.

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