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Randomised control trial comparing hemodynamic response of propofol induction 2 mg/kg versus 1.5 mg/kg during endotracheal intubation in general anaesthesia

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Abstract
Optimal induction dose administration of intravenous Propofol while maintaining appropriate depth of anaesthesia, stable haemodynamics gives smooth induction and extubation. Bispectral index (BIS) values correlates well with the sedative component in depth of anesthesia by analysing processed EEG signals. A Randomised, double blinded study was conducted on 120 adult patient undergoing elective surgeries under general anaesthesia. Sampling done by Simple Random Sampling using computer generated table with the duration of study of 15 months i.e. from May 2023, to July 2024. Induction dose titration of Propofol while keeping the target depth of anaesthesia is possible with BIS monitoring. In our study, group A patients achieved appropriate depth of anaesthesia with lesser induction dose of intravenous Propofol administration while achieving stable hemodynamics and early recovery.

Keywords: Hemodynamic response, propofol induction, general anaesthesia

Introduction
Intravenous Propofol is a common induction agent in general anaesthesia; dose dependent reduction in arterial blood pressure after drug administration has been demonstrated since its clinical introduction [1, 2].
Optimal induction dose administration of intravenous Propofol while maintaining appropriate depth of anaesthesia, stable haemodynamics gives smooth induction and extubation [3, 4].
Bispectral index (BIS) values correlates well with the sedative component in depth of anesthesia by analysing processed EEG signals [5].
BIS guided administration of drug results in reduced induction dose & early recovery [6].
The main purpose of our study was comparison of two induction dose regimens (2 mg/Kg versus 1.5 mg/Kg) of Propofol with respect to depth of anaesthesia during induction and intubation phases of general anaesthesia using BIS monitoring.
Individualised dose titration with BIS helps in achieving desired hypnosis level at the same time avoiding adverse effects like hemodynamic instability, delayed recovery and other complications.

Methodology
A Randomised, double blinded study was conducted on 120 adult patient undergoing elective surgeries under general anaesthesia.
Sampling done by Simple Random Sampling using computer generated table with the duration of study of 15 months i.e. from May 2023, to July 2024.

Statistical Analysis: Sample size calculated using OPEN EPI software with significance level of 95% power of 80% Allocation ratio of 1
Therefore a sample size of 60 in each group was considered.

Exclusion criteria
- Patients with anticipated difficult intubation

- Pregnant and lactating mother
- Patients on psychoactive medication, psychiatric patients, known or suspected EEG abnormalities(e.g. epilepsy and previous brain surgeries)
- Patients with abnormal kidney function, history of alcohol and drug abuse
- Deranged liver function
- Cardiovascular abnormalities

After the approval by the institutional Ethical committee (BMC&H/IEC/133/2023-24), written informed consent were obtained from all the patients before being included in the study.

Study population

Group A: Propofol 1.5 mg/Kg i.v induction (60 patients)
Group B: Propofol 2 mg/Kg i.v induction (60 patients)

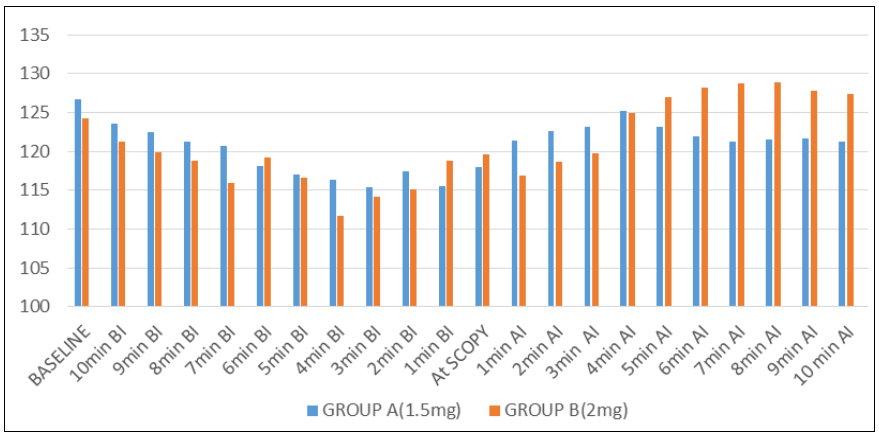
Technique

Pre anaesthetic evaluation was done a day prior to surgery.
Overnight fast according to ASA nil per oral status confirmed, Procedure was explained to the patient and written informed consent was taken.
Anaesthetic machine and all equipments checked and kept ready along with the crash cart.
Patient was shifted on to OT table &18 G Intravenous (IV) cannula secured. ASA standard monitor was attached.
Patients were randomly assigned by computer generated random table number to receive either intravenous Propofol 1.5 mg/Kg (Group A) or 2 mg/Kg (Group B).
All the study vital parameters required were recorded at baseline, at an interval of 1minute upto 10 minutes before intubation followed by each minute monitoring for 10 minutes after intubation.
Premedicated (Inj. Ondansetron 0.08mg/Kg IV; Inj Pantoprazole 40 mg IV; Inj. Glycopyrrolate 0.005 mg/Kg IV; Inj Fentanyl 2 mcg/Kg IV) and Pre-oxygenated.
Patients were induced with injection Propofol (at a dosage of 1.5 mg/Kg and 2 mg/Kg in group A and group B respectively) by anaesthesiologist who are not involved in the study and observer was blinded for the study; the loss of response to verbal command recorded.
Inj. Succinyl choli intubation and produce muscle relaxation. After receiving adequate neuromuscular relaxation, intubation done.
Anaesthesia maintained with 67% Nitrous oxide, 33% oxygen and Isoflurane 0.6%, maintenance dose of Vecuronium with a tidal volume of 8-10 ml/Kg and respiratory rate of 10-12 breaths per minute.
After surgery, the patients were given reversal and were extubated following standard extubation criteria; shifted to the recovery.
Any adverse effects related to the drug and anaesthesia were noted and attended to appropriately with necessary drugs.

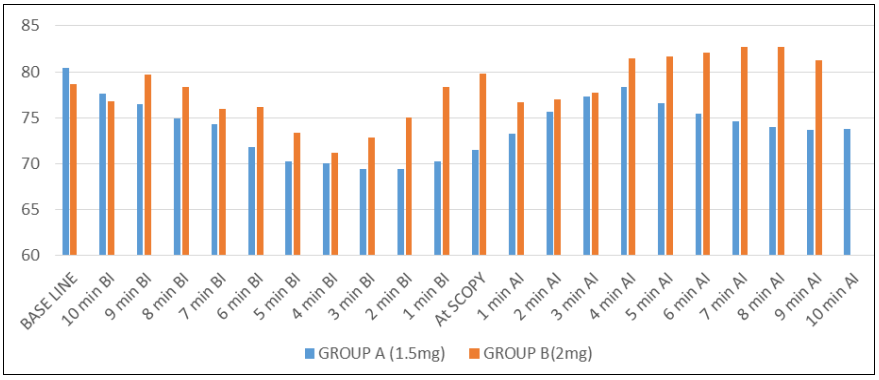
Results

Table 1: Demographic Profile

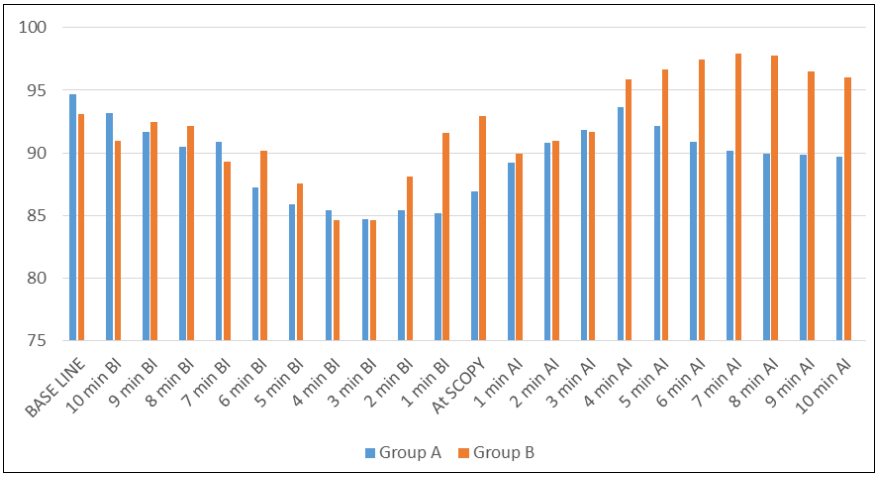
	Group A (1.5 mg/Kg)	Group B (2 mg/Kg)
Female	26	28
Male	34	32
Age	46.8	46.42
ASA I	27	33
ASA II	33	27
Height (MEAN±SD)	167.47±5.09	157.3±2.77
Weight (MEAN±SD)	67.68±6.64	65.28±10.74
BMI (MEAN±SD)	24.10±1.86	26.38±3.92



Graph 1: Systolic blood pressure



Graph 2: Diastolic blood pressure



Graph 3: Mean arterial pressure

Table 2: Comparison

	Group A (1.5 mg/Kg)	Group B (2 mg/Kg)	P value
Time of induction with Propofol	7.47±0.96	4.12±0.63	<0.0001
Hemodynamic stability	2.88±0.79	5.85±3.27	<0.0001
Duration of intubation	20.25±8.49	15.83±5.49	0.0010

Discussion

Induction dose titration of Propofol while keeping the target depth of anaesthesia is possible with BIS monitoring. In our study, group A patients achieved appropriate depth of anaesthesia with lesser induction dose of intravenous Propofol administration while achieving stable hemodynamics and early recovery [7].

Kumar B S *et al*. study showed that when the Bispectral index was maintained between 40 and 60 patients were haemodynamically stable and titration of doses according to the level of consciousness and thereby preventing complications like hypotension, respiratory depression with increased dosage [8].

Arya S *et al*. found no significant difference in the induction dose of Propofol when assessed clinically (loss of verbal response) or by BIS monitoring. The changes in BIS value and haemodynamic parameters are similar in both groups. Even in our study, both the groups showed no significant changes in haemodynamics, but there was difference in BIS values [9].

Shangne *et al*. showed BIS monitoring significantly reduces the consumption of Propofol for induction of anaesthesia. Incidence of hypotension was similar in both the BIS guided group as well as sleep guided, non –BIS group; Correlated with our study result concerning reducing the induction dose of Propofol without affecting patient hemodynamics.

Conclusion

Lesser induction dose of intravenous Propofol can provide adequate depth of anaesthesia and early recovery while maintaining stable haemodynamics. This fact can be used in patients were adverse haemodynamic variation is anticipated after induction.

INJ PROFOPOL of 1.5 mg injection is hemodynamically stable during intubation

Conflict of Interest

Not available

Financial Support

Not available

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