

ORIGINAL ARTICLE

A comparative study of Sevoflurane anaesthesia and propofol based anaesthesia

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ABSTRACT:

Background: Propofol causes dose dependent reductions of cerebral metabolic rate and blood flow so coupling of flow metabolism is maintained. The present study was conducted to compare sevoflurane (inhalational) anaesthesia and propofol (TIVA) based anaesthesia. **Materials & Methods:** 90 patients aged 18-65 years were divided into two groups. Group I received inhalational sevoflurane induction for 1 minute. Group II patients were induced with propofol i.v 2-2.5mg/kg. Intraoperative maintenance was done with multistep propofol infusion (8mg/kg/hr -3mg/kg/hr) via infusion pump. Parameters such as MAP and recovery profile was recorded.

Results: Group I comprised of 22 males and 23 females and group II had 20 males and 25 females. Time of spontaneous eye opening was 9.4 minutes in group I and 13.1 minutes in group II, time to verbal communication was 12.5 minutes in group I and 15.3 minutes in group II and time to mental orientation was 16.2 minutes in group I and 20.6 minutes in group II. The difference was significant ($P < 0.05$). The mean MAP (mmHg) in group I and II was 102.5 and 104.1, before induction was 100.2 and 99.7, after induction was 91.0 and 90.4, 5 minutes after intubation was 95.4 and 93.0, at 15 minutes was 102.1 and 99.8, at 30 minutes was 102.0 and 101.3 and at 45 minutes was 102.9 and 101.1 respectively. The difference was non-significant ($P > 0.05$). **Conclusion:** Sevoflurane is better than propofol in terms of faster induction and rapid recovery.

Key words: Sevoflurane, propofol, Total intravenous anaesthesia

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INTRODUCTION

Total intravenous anaesthesia (TIVA) is a technique of anaesthesia which involves use of intravenous drugs to anaesthetize the patient without the use of inhalational agents. The popularity of propofol as a main component of TIVA has been attributed to its pharmacokinetic and pharmacodynamic properties. Its shorter onset of action, rapid metabolism and no significant accumulation on prolonged use makes it an ideal choice.¹ With the advent of advanced computer drug predictable. It allows the administration system, the i.v infusion of Propofol has become much safer and anaesthesiologist to vary the depth of anaesthesia by just controlling the rate of infusion of the drug. The TIVA concept is simple, less toxic than inhalational agents, less risk of malignant hyperthermia with no risk of any environmental pollution.²

Propofol causes dose dependent reductions of cerebral metabolic rate and blood flow so coupling of flow metabolism is maintained. It also causes reduction of intracranial pressure. Carbon dioxide reactivity and autoregulation are maintained. It has property of rapid onset and is short acting, rapid recovery, reduces ICP, antiemetic and anticonvulsant action which is beneficial in neurosurgery. It has no analgesic activity, so propofol combined with intravenous opioids for maintenance of anaesthesia.³ Sevoflurane is fluorinated methyl isopropyl ether. Vapor pressure is 160 mm of hg and is used in conventional

nonheated vaporizer. Blood gas partition coefficient is 0.69 and so induction and recovery are rapid. It has pleasant odor, non-irritant so, can be used for induction and maintenance of anaesthesia.⁴ The pharmacokinetics of the elimination of inhaled anaesthetics depends on the duration of anaesthesia and blood gas partition coefficient. Computer simulation is used to determine context sensitive half times for volatile anaesthetics.⁵ The present study was conducted to compare sevoflurane (inhalational) anaesthesia and propofol (TIVA) based anaesthesia.

MATERIALS & METHODS

The present study consisted of 90 patients aged 18-65 years of ASA I and II of both genders undergoing surgery under general anaesthesia. All were selected after obtaining their written consent.

Data such as name, age, gender etc. was recorded. Patients were divided into two groups. Group I received inhalational sevoflurane induction for 1 minute. Maintenance was done with 1.5-2% sevoflurane. Group II patients were induced with propofol i.v 2-2.5mg/kg. Intraoperative maintenance was done with multistep propofol infusion (8mg/kg/hr -3mg/kg/hr) via infusion pump. Parameters such as MAP and recovery profile was recorded. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I: Distribution of patients

Groups	Group I (45)	Group II (45)
Agent	inhalational sevoflurane	propofol i.v
M:F	22:23	20:25

Table I shows that group I comprised of 22 males and 23 females and group II had 20 males and 25 females.

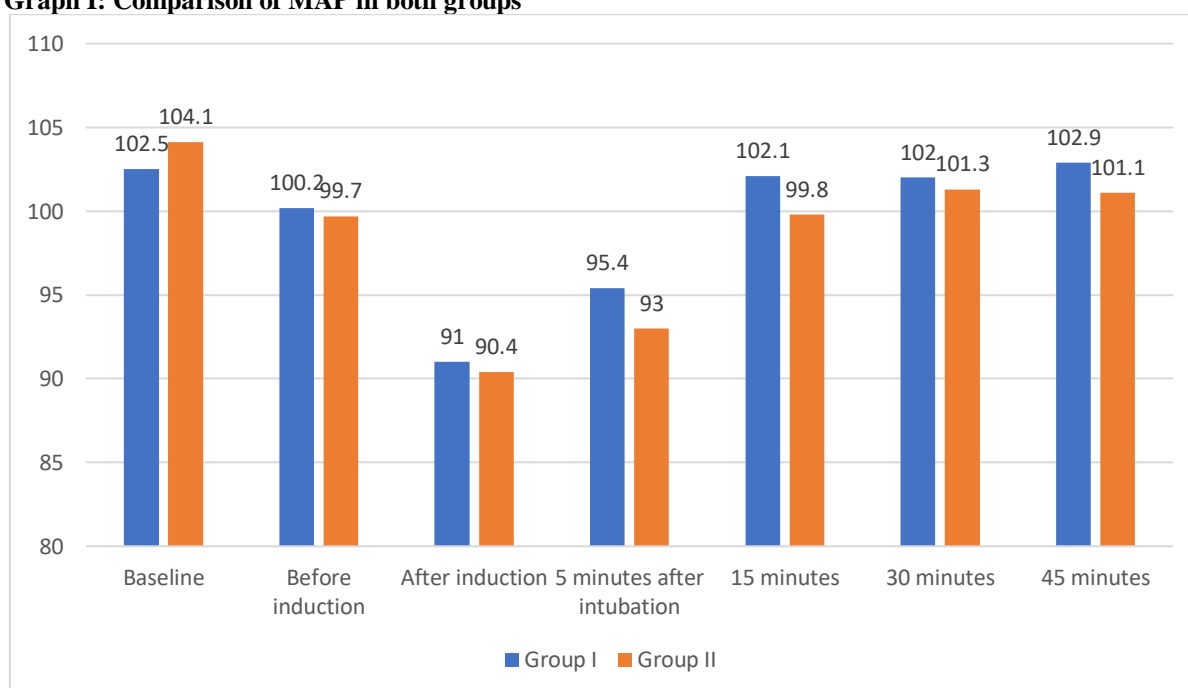
Table II: Comparison of recovery profile

Recovery profile(minutes)	Group I	Group II	P value
Time of spontaneous eye opening	9.4	13.1	0.02
Time to verbal communication	12.5	15.3	0.05
Time to mental orientation	16.2	20.6	0.04

Table II shows that time of spontaneous eye opening was 9.4 minutes in group I and 13.1 minutes in group II, time to verbal communication was 12.5 minutes in group I and 15.3 minutes in group II and time to

mental orientation was 16.2 minutes in group I and 20.6 minutes in group II. The difference was significant ($P < 0.05$).

Graph I: Comparison of MAP in both groups



Graph I shows that mean MAP (mmHg) in group I and II was 102.5 and 104.1, before induction was 100.2 and 99.7, after induction was 91.0 and 90.4, 5 minutes after intubation was 95.4 and 93.0, at 15 minutes was 102.1 and 99.8, at 30 minutes was 102.0 and 101.3 and at 45 minutes was 102.9 and 101.1 respectively. The difference was non-significant ($P > 0.05$).

DISCUSSION

Propofol can be used through manual infusion or target controlled infusion pump. When propofol infusion is given in manual infusion pumps, pharmacokinetics of drug to be utilized during infusion otherwise a fixed infusion rate may result in rising, declining or stable concentration leading to underdosage or overdosage. For a stable plasma concentration varying rate of infusion may be required.⁶

Sevoflurane is a relatively newer inhalational anaesthetic agent. Its insoluble nature, low blood gas partition coefficient, no pungency and rapid wash in and rapid wash out makes it an ideal choice for the volatile induction and maintenance of anaesthesia.⁷ Its good haemodynamic profile and non-irritating nature also adds to its increased acceptance amongst the anaesthesiologists.⁸ Use of Sevoflurane for the induction and maintenance of anaesthesia produces a reduction in costs, predominantly through less drug wastage.^{9,10} The present study was conducted to compare sevoflurane (inhalational) anaesthesia and propofol (TIVA) based anaesthesia.

We found that group I comprised of 22 males and 23 females and group II had 20 males and 25 females. Shah A and Adoraja RN¹¹ compared the emergence and post operative recovery profile between Sevoflurane and Propofol and found that

Sevoflurane has a better recovery profile than the intravenous Propofol.

We found that time of spontaneous eye opening was 9.4 minutes in group I and 13.1 minutes in group II, time to verbal communication was 12.5 minutes in group I and 15.3 minutes in group II and time to mental orientation was 16.2 minutes in group I and 20.6 minutes in group II. Kumar et al¹² in their study a total of 1621 patients were divided into propofol (685 patients) or inhalational anaesthesia (936 patients). Length of hospital stay was shorter with propofol, but the difference was only 14 min on average. per patient-anaesthetic episode. There was no difference in unplanned admission to hospital between propofol and inhalational anaesthesia (1.0% vs 2.9%, respectively; $p = 0.13$). The incidence of postoperative nausea and vomiting was lower with propofol than with inhalational agents (13.8% vs 29.2%, respectively; $p < 0.001$). However, no difference was noted in post-discharge nausea and vomiting (23.9% vs 20.8%, respectively; $p = 0.26$).

We observed that mean MAP (mmHg) in group I and II was 102.5 and 104.1, before induction was 100.2 and 99.7, after induction was 91.0 and 90.4, 5 minutes after intubation was 95.4 and 93.0, at 15 minutes was 102.1 and 99.8, at 30 minutes was 102.0 and 101.3 and at 45 minutes was 102.9 and 101.1 respectively. In the study by Rasool et al¹³ 60 patients were randomly divided into two groups. Group A received Sevoflurane inhalational induction. Group B patients were induced with Propofol i.v 2-2.5mg/kg. Induction time was faster in Sevoflurane group as compared to Propofol group. The intraoperative haemodynamics were comparable between the two groups with no statistically significant difference. The recovery profile was significantly better with Sevoflurane group as regards the spontaneous eye opening, verbal communication and mental orientation.

CONCLUSION

Authors found that sevoflurane is better than propofol in terms of faster induction and rapid recovery.

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