

Comparison of Desflurane and Sevoflurane for recovery profile and airway responses

Dr. V.S.Kapurkar¹, Dr. Sushant Mane², Dr. Resmy John V.³

¹Associate Professor, Department of Anaesthesiology, KIMS, Karad, Maharashtra, India.

²Assistant Professor, Department of Anaesthesiology, KIMS, Karad, Maharashtra, India. (Corresponding author)

³Senior Resident, Department of Anaesthesiology, KIMS, Karad, Maharashtra, India.

Abstract:

Background: Anesthetics such as sevoflurane and desflurane are widely used for general anesthesia because of their convenience and predictable therapeutic effects. The present study was conducted to compare Desflurane and Sevoflurane for recovery profile and airway responses.

Materials & Methods: 60 patients of both genders were divided into 2 groups of 30 each. Group I patients received sevoflurane for maintenance of anaesthesia, and group II patients received desflurane for maintenance of anaesthesia. Baseline hemodynamic, and biochemical variables were evaluated. **Results:** The mean age in group I patient was 45.2 years and in group II was 46.3 years. The mean weight was 65.2 kgs and 66.1 kgs and mean height was 170.2 cms and 171.4 cms in group I and II respectively. The difference was non-significant ($P > 0.05$). Opening of eyes (mins) was 11.2 and 5.7, response to verbal commands (mins) was 14.6 and 7.4, orientation to time and place (mins) was 16.8 and 8.2 and total recovery time (mins) was 48.2 and 30.5 in group I and II respectively. The difference was significant ($P < 0.05$). Adverse events reported were hiccups seen in 1 in group I and 2 in group II, laryngospasm 1 each in group I and II and cough 1 in group I. The difference was non-significant ($P > 0.05$). **Conclusion:** Desflurane is significantly superior to sevoflurane. Desflurane has faster awakening properties than sevoflurane without an increase in adverse airway events.

Key words: Desflurane, sevoflurane, verbal commands

Introduction

With the advent of minimally invasive surgical techniques, ambulatory surgeries are on the rise, leading to an increased demand for fast tracking.¹ This necessitates early recovery in the form of clear-headedness, control of protective airway reflexes and satisfactory relief from pain and emesis. As a result, there is a need for the use of short-acting anaesthetic drugs for a better quality of recovery.²

Volatile anesthetics such as sevoflurane and desflurane are widely used for general anesthesia because of their convenience and predictable therapeutic effects. Maintaining anesthesia with sevoflurane in day surgery is popular because it has a relatively lower solubility than other volatile anesthetics and allows for rapid emergence and recovery.³ The faster recovery after desflurane and sevoflurane anaesthesia compared with other inhaled anaesthetics is attributable to their low solubility (blood-gas partition coefficient are 0.69 and 0.42, respectively). Though the difference between the blood-gas coefficient seems minimal, it has been

observed that there is a significant difference in the recovery profile of these two inhaled anaesthetics.⁴

Recent studies suggest that desflurane compared to sevoflurane leads to earlier recovery of airway reflexes.⁵ However, comparative results of recovery of cognitive function vary significantly.⁶ The present study was conducted to compare Desflurane and Sevoflurane for recovery profile and airway responses.

Materials & Methods

The present study consisted of 60 patients of both genders. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 30 each. Group I patients received sevoflurane for maintenance of anaesthesia, and group II patients received desflurane for maintenance of anaesthesia. Baseline hemodynamic, and biochemical variables were evaluated. Pre-medication of all the patients was done using IV midazolam 0.03 mg/kg and

fentanyl 1µg/kg. at the same time, pre-oxygenation with 100% oxygen was also given followed by induction of anaesthesia using propofol. Modified

Aldrete scoring system was recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Results

Table I Distribution of patients

Parameters	Group I	Group II	P value
Age (years)	45.2	46.3	0.81
Weight (kgs)	65.2	66.1	0.89
Height (cm)	170.2	171.4	0.75

Table I shows that mean age in group I patient was 45.2 years and in group II was 46.3 years. The mean weight was 65.2 kgs and 66.1 kgs and mean height was 170.2 cms and 171.4 cms in group I and II respectively. The difference was non- significant ($P > 0.05$).

Table II Assessment of recovery variables

Recovery variables	Group I	Group II	P value
Opening of eyes (mins)	11.2	5.7	0.04
Response to verbal commands (mins)	14.6	7.4	0.02
Orientation to time and place (mins)	16.8	8.2	0.01
Total recovery time (mins)	48.2	30.5	0.05

Table II, graph I shows that opening of eyes (mins) was 11.2 and 5.7, response to verbal commands (mins) was 14.6 and 7.4, orientation to time and place (mins) was 16.8 and 8.2 and total recovery time (mins) was 48.2 and 30.5 in group I and II respectively. The difference was significant ($P < 0.05$).

Graph I Assessment of recovery variables

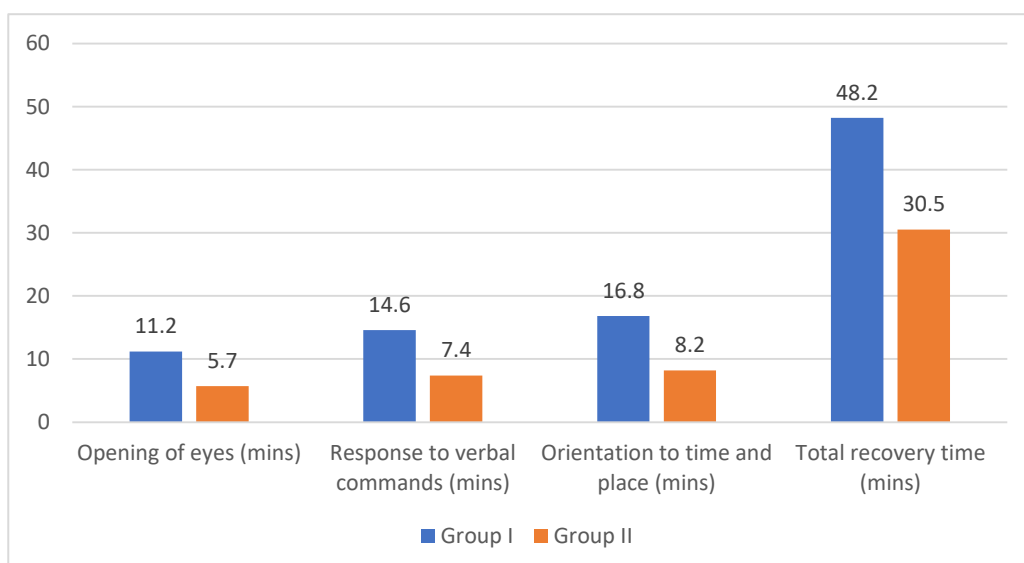


Table III Adverse airway events

Adverse events	Group I	Group II	P value
Hiccups	1	2	0.05
Laryngospasm	1	1	1
Cough	1	0	0.17

Table III shows that adverse events reported were hiccups seen in 1 in group I and 2 in group II, laryngospasm 1 each in group I and II and cough 1 in group I. The difference was non-significant ($P > 0.05$).

Discussion

Early recovery from anaesthesia is desirable for day care surgeries.^{7,8} Quick regaining of consciousness in terms of responding to verbal commands and eye opening are not enough to avoid the risk of aspiration-related pulmonary complications.⁹ Inhalational anaesthetics that provide smooth and rapid induction, optimal operating conditions, and rapid recovery with minimal side effects like nausea, vomiting, bleeding, postoperative pain and cognitive dysfunction, are appropriate for this purpose.^{10,11} The present study was conducted to compare Desflurane and Sevoflurane for recovery profile and airway responses.

We found that mean age in group I patient was 45.2 years and in group II was 46.3 years. The mean weight was 65.2 kgs and 66.1 kgs and mean height was 170.2 cms and 171.4 cms in group I and II respectively. Bansal et al¹² assessed the efficacy of Desflurane and Sevoflurane for Recovery Profile and Airway Responses. 50 patients were divided into two study groups with 25 patients in each group as follows: Group A: Patients receiving sevoflurane for maintenance of anaesthesia, and Group B: Patients received desflurane for maintenance of anaesthesia. Baseline hemodynamic, and biochemical variables were evaluated in all the patients. Although non-significant, incidence of adverse airway events was higher among subjects of group A (8 percent) in comparison to subjects of group B (16 percent). Mean time to opening of eyes was 11.2 minutes among subjects of group A and 5.9 minutes among subjects of group B. Mean time to verbal response was 14.5 minutes among subjects of group A and 8.6 minutes among subjects of group B. Mean total recovery time was 47.2 minutes among subjects of group A and 29.6 minutes among subjects of group B. Recovery profile among subjects of group A in comparison to group B.

We found that opening of eyes (mins) was 11.2 and 5.7, response to verbal commands (mins) was 14.6 and 7.4, orientation to time and place (mins) was 16.8 and 8.2 and total recovery time (mins) was 48.2 and 30.5 in group I and II respectively. Dalal et al¹³ compared desflurane and sevoflurane with respect to recovery and occurrence of adverse airway responses in spontaneously breathing patients while using the ProSeal™ laryngeal mask airway (LMA). Ninety-four adult patients undergoing hysteroscopic procedures were divided into sevoflurane (S) group or desflurane (D) group. Patients were premedicated with midazolam 0.03 mg/kg and fentanyl 1µg/kg. Anaesthesia was induced with propofol 2.0–2.5 mg/kg, followed by insertion of a ProSeal™ LMA. Adverse airway responses such as cough, hiccups, laryngospasm and breathholding were recorded. In the post-operative period: time to awakening, response to verbal commands, orientation, ability to sit with support and the recovery room Aldrete score were recorded. Three patients in group S (6.4%) and six patients (13.3%) in Group D had adverse airway events. The mean time to eye opening (Group S-10.75 ± 7.54 min, Group D-4.94 ± 1.74 min), obeying verbal commands (Group S-13.13 ± 8.75 min, Group D-6.55 ± 1.75 min), orientation (Group S-15.42 ± 8.46 min, Group D-6.23 ± 2.4 min) and to sit with support (Group S-36.09 ± 12.68 min, Group D-14.35 ± 3.75 min) were found to be lesser with desflurane than with sevoflurane. The mean time to recovery was delayed in Group S-46.00 ± 12.86 minutes compared to Group D-26.44 ± 5.33 minutes.

We found that adverse events reported were hiccups seen in 1 in group I and 2 in group II, laryngospasm 1 each in group I and II and cough 1 in group I. Saha et al¹⁴ compared the times of recovery from anaesthesia following desflurane versus sevoflurane anaesthesia. A standard general anaesthesia protocol was followed with either sevoflurane (group A = 30 patients) or desflurane (group B = 30 patients) along with bispectral index and neuromuscular monitoring.

Following extubation, tests for recovery of airway reflexes and cognitive function were conducted and various time intervals were noted. The mean time from first verbal response to first passing the swallowing test was comparable in both the groups (5.50 ± 3.45 vs. 4.10 ± 3.42 min, P value = 0.120). Patients receiving desflurane showed faster response to verbal commands (5.93 ± 4.13 vs. 8.20 ± 3.39 min), passed the swallowing test earlier (10.03 ± 4.97 vs. 13.70 ± 3.48 min) and short orientation memory concentration test (SOMCT) earlier (9.83 ± 4.51 vs. 14.10 ± 4.31 min, P value ≤ 0.001) compared to sevoflurane.

The limitation the study is small sample size.

Conclusion

Authors found that desflurane is significantly superior to sevoflurane. Desflurane has faster awakening properties than sevoflurane without an increase in adverse airway events.

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