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Original Research Article.

Assessment of Desflurane and Sevoflurane for Recovery Profile and Airway Responses

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ABSTRACT

Background: To assess the efficacy of Desflurane and Sevoflurane for Recovery Profile and Airway Responses.

Materials & Methods: 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. 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. This was followed by induction of anaesthesia using propofol. All the patients received anaesthetic agent for maintenance of anaesthesia according to their respective study groups. Modified Aldrete scoring system was used for evaluation of patients. A score of ≥8 was considered suitable for discharging the patient from the post-anaesthesia care unit to the ward. All the results were recorded in Microsoft excel sheet followed by assessment using SPSS software.

Results: 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 (p- value < 0.05).

Conclusion: From the results, it can be concluded that desflurane is significantly superior to sevoflurane.

Key words: Desflurane, Sevoflurane, Airway.

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INTRODUCTION

With the advent of minimally invasive surgical techniques, ambulatory surgeries are on the rise, leading to an increased demand for fast tracking. This necessitates early recovery in the form of clear-headedness, control of protective airway reflexes and satisfactory relief from pain and emesis. 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. Additionally, sevoflurane provides smooth volatile induction due to its lack of airway irritation, and it is often used as an induction agent. Desflurane has the lowest solubility of currently available volatile anesthetics, which may allow for more rapid emergence and recovery than sevoflurane. Additionally, the use of desflurane is associated with more predictable emergence and recovery than sevoflurane.[1-3]

Desflurane and sevoflurane are the two most commonly administered inhaled anesthetics for outpatient surgeries due to their favorable pharmacokinetic profiles and low incidence of untoward effects. Both of these agents have been safely used for anesthesia maintenance using a laryngeal mask airway (LMA).[4-6] Hence; under the light of above-mentioned data, the present study was planned for assessing efficacy of Desflurane and Sevoflurane for Recovery Profile and Airway Responses

MATERIALS & METHODS

The present study was planned for assessing efficacy of Desflurane and Sevoflurane for Recovery Profile and Airway Responses. A total of 50 subjects were enrolled in the present study. After explaining in detail, the entire research protocol, written consent was obtained from all the patients. All the patients belonged to the age range of 20 to 60 years with ASA grading of I or II. Exclusion criteria included patients with history of any

systemic illness, or any known drug allergy. Patients with history of any respiratory illness were also excluded from the present study.

By employing random sampling method, all the 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. 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. This was followed by induction of anaesthesia using propofol. All the patients received anaesthetic agent for maintenance of anaesthesia according to their respective study groups. Modified Aldrete scoring system was used for evaluation of patients. A score of ≥ 8 was considered suitable for discharging the patient from the post-anaesthesia care unit to the ward. All the results were recorded in Microsoft excel sheet followed by assessment using SPSS software.

RESULTS

Mean age of the subjects of group A and group B was 56.2 years and 52.7 years respectively. Majority proportion of subjects of both the study groups were males. Mean weight of the subjects of group A and group B was 68.4 Kg and 67.1 Kg respectively. 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 (p- value < 0.05).

Table 1: Demographic variables

Variable		Group A (n)	Group B (n)
Age group (years)	**Less than 30**	5	4
	30 to 50	8	7
	More than 50	12	14
Gender	**Males**	18	16
	Females	7	9
Mean weight (Kg)		68.4	67.1
Mean height (cm)		157.3	158.5

Table 2: Incidence of adverse airway events

Adverse events	Group A; n (%)	Group B; n (%)
Cough	1 (4)	1 (4)
Hiccups	0 (0)	1 (4)
Breath holding	1 (4)	1 (4)
Laryngospasm	0 (0)	1 (4)
Overall	2 (8)	4 (16)
p- value	0.7745	

Table 3: Recovery variables

Recovery variables	Group A	Group B	p- value
Opening of eyes (mins)	11.2	5.9	0.010*
Response to verbal commands (mins)	14.5	8.6	0.001*
Orientation to time and place (mins)	16.3	7.4	0.010*
Total recovery time (mins)	47.2	29.6	0.010*

*: Significant

DISCUSSION

Ambulatory surgeries have been possible due to rapid advancements in the field of anesthesia. Fast track anesthesia primarily aims to provide optimal surgical conditions along with rapid recovery and minimal side effects with resultant decrease in the duration of hospital stay. Newer short-acting drugs with advanced monitoring aids to allow careful titration of anesthetic drugs have made this distant dream into present-day reality. For fast tracking of patients in an ambulatory setting, meeting the discharge criteria from postanesthesia care unit (PACU) at the earliest is of utmost importance. The most important determinant affecting the recovery from anesthesia is the type of anesthesia technique. Desflurane and sevoflurane are the two routinely used inhalational agents for conduct of anesthesia in day care settings owing to their pharmacological properties. Although desflurane provides rapid onset and offset of anesthesia as desired for successful conduct of ambulatory anesthesia, its physical property of being an irritant inhalational agent may result in increased airway morbidity. Therefore, the role of desflurane in spontaneous breathing patients remains questionable for the fear of increased chances of adverse airway events. There are very limited studies to support the use of desflurane in spontaneous respiration with emphasis on associated airway morbidity.[6- 8]

The faster recovery after desflurane and sevoflurane anaesthesia compared with other inhaled anaesthetics is attributable to their low solubility. 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. Recent studies suggest that desflurane compared to sevoflurane leads to earlier recovery of airway reflexes.[7-10] Hence; under the light of above-mentioned data, the present study was planned for assessing efficacy of Desflurane and Sevoflurane for Recovery Profile and Airway Responses.

Mean age of the subjects of group A and group B was 56.2 years and 52.7 years respectively. Majority proportion of subjects of both the study groups were males. Mean weight of the subjects of group A and group B was 68.4 Kg and 67.1 Kg respectively. 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. Our results were in concordance with the results obtained by Jadhav SV et al who also reported similar findings. In their study, authors comparatively evaluated outcome of early postoperative recovery profile in patient undergoing elective ambulatory surgical operations and receiving anaesthesia with sevoflurane or desflurane using supreme LMA. Patients were randomized into two groups receiving desflurane (Group Dn=40) and sevoflurane (Group S- n=40) for maintenance of anaesthesia. Patients were monitored for recovery by using fast track criteria (FTC) score at different time intervals. The mean time taken for postoperative recovery characteristics were significantly lower in in Group D than Group S (p=0.00). The FTC score was significantly higher in group D as compared to group S at all times ($p<0.05$) for thirty minutes. The prevalence of consuming additional analgesic was 12.5% in group D and 15% in group S (p=1.000). The additional antiemetic requirement was seen in 10% patients in both the groups (p=1.000). The incidence of coughing was seen in among 5% of Group D patients and in none among Group S (p=0.152).[10] 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 (p- value < 0.05). Similar results were also seen the study conducted by Dalal et al. In their study, authors 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. 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, obeying verbal commands, orientation and to sit with support were found to be lesser with desflurane than with sevoflurane. The mean time to recovery was delayed in Group S-46.00 ± 12.86 min compared to Group D-26.44 ± 5.33 min. Desflurane has faster awakening properties than sevoflurane without an increase in adverse airway events when used during spontaneous ventilation through a ProSeal™ LMA along with propofol and fentanyl.[11]

CONCLUSION

From the results, it can be concluded that desflurane is significantly superior to sevoflurane.

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