

Original Article

Assessment of efficacy of two anesthetic agents for ambulatory surgical procedures: A Comparative study

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ABSTRACT:

Background: Ambulatory anaesthesia is a widely used anesthetic procedure at present. This is because of the availability of improved minimally invasive surgical techniques and addition of new short acting and rapidly metabolizing anaesthetic agents. **Aim of the study:** To assess the efficacy of two anaesthetic agents for ambulatory surgical procedures. **Materials and methods:** The study was conducted in the Department of Anesthesia of the Mahatma Gandhi Missions Medical College, Kamothe, Navi Mumbai, Maharashtra, India. For the study we selected 40 patients belonging to American Society of Anesthesiologists physical status I and II scheduled for surgical procedures at General Surgery department. The patients were randomly grouped into two groups with 20 patients in each group, Group 1 and Group 2. Group 1 patients received Sevoflurane for maintenance of anesthesia whereas Group 2 received Desflurane for maintenance of anesthesia. **Results:** A total of 40 patients were included in the study. Mean age of patients in Group 1 was 38.54 years and in Group 2 was 42.28 years. Number of male patients in Group 1 was 11 and in Group 2 were 13. Mean weight of patients in Group 1 was 70.58 kg and in Group 2 was 69.5 kg. Total recovery time in Group 1 was 41.33 min and in Group 2 was 30.28 min. Time for opening eyes postoperatively was 9.21 min and 6.01 min. **Conclusion:** From the study, we conclude that both the anesthetic agents, Sevoflurane and Desflurane are efficacious in ambulatory surgical procedures. Some of the recovery parameters were seen to be taking more time duration in cases with Desflurane cases as compared to Sevoflurane cases; however, results are statistically non-significant.

Key words: Ambulatory surgery, anesthesia, sevoflurane.

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INTRODUCTION:

Ambulatory anaesthesia is a widely used anesthetic procedure at present. This is because of the availability of improved minimally invasive surgical techniques and addition of new short acting and rapidly metabolising anaesthetic agents.¹ Very high-risk patients and major surgical procedures can now be conducted safely because of the precision in monitoring and advanced surgical techniques. For a successful ambulatory surgery, it is necessary that both the patient and the procedure are appropriate for ambulatory anaesthesia.² The advantages of ambulatory surgery disappear in cases in which an emergency occurs or an unplanned hospital admission is required. Thus, patients intending to undergo an

ambulatory operation should consider the numerous potential risks involved. The choice of anesthetic method is based on the operation, patient factors, the anticipated degree of pain, and possible complications.^{3, 4} Desflurane and sevoflurane are the two most commonly administered inhaled anaesthetics for outpatient surgeries due to their favorable pharmacokinetic profiles and low incidence of untoward effects. Both of these agents have been safely used for anaesthesia maintenance using a laryngeal mask airway (LMA).⁵ Multiple studies have demonstrated that desflurane allows for a more rapid emergence than sevoflurane, and this may be beneficial for outpatient surgery, where quick case turnover and reduced post-anaesthesia care unit (PACU) time is essential to ensure a

good workflow.⁶ Hence, the current study was planned to assess the efficacy of two anesthetic agents for ambulatory surgical procedures.

MATERIALS AND METHODS:

The study was conducted in the Department of Anesthesia of the Mahatma Gandhi Missions Medical College, Kamothé, Navi Mumbai, Maharashtra, India. The ethical clearance for the study was obtained from the ethical board of the institute prior to commencement of the study. For the study we selected 40 patients belonging to American Society of Anesthesiologists physical status I and II scheduled for surgical procedures at General Surgery department. The patients were randomly grouped into two groups with 20 patients in each group, Group 1 and Group 2. Group 1 patients received Sevoflurane for maintenance of anesthesia whereas Group 2 received Desflurane for maintenance of anesthesia. The anesthesia was induced for each patient according to the standardized guidelines. During the maintenance of anesthesia and during post-operative period, we studied the occurrence of cough, hiccups, breathholding and larygospasm. Another qualified anaesthetist, who was unaware of the inhalational agent used, assessed the time taken from switching off of the vaporiser to eye opening, time to obey verbal commands (tongue protrusion), time to sit with support, time to shift

out of the recovery room and orientation in time, place and person.

The statistical analysis of the data was done using SPSS version 20.0 for windows. The Student’s t-test and Chi-square test were used to check the significance of the data. The p-value less than 0.05 was predetermined as statistically significant.

RESULTS:

A total of 40 patients were included in the study. **Table 1** shows the demographic data of the patients. Mean age of patients in Group 1 was 38.54 years and in Group 2 was 42.28 years. Number of male patients in Group 1 was 11 and in Group 2 were 13. Mean weight of patients in Group 1 was 70.58 kg and in Group 2 was 69.5 kg. The mean height of patients in Group 1 was 163.19 cm and in Group 2 was 161.29 cm. **[Fig 1]** **Table 2** shows the recovery variables for Group 1 and 2. Total recovery time in Group 1 was 41.33 min and in Group 2 was 30.28 min. Time for opening eyes postoperatively was 9.21 min and 6.01 min. Time taken to respond to verbal commands was 11.78 min and 8.28 min. Time duration to sit in bed with support was 39.28 min and 21.12 min. On comparison the results were observed as statistically non-significant. (p>0.05) **[Fig 2]**

Table 1: Demographic details of the patients

Parameters	Group 1	Group 2
No. of subjects	20	20
Mean age (years)	38.54	42.28
No. of male patients	11	13
Mean weight (kg)	70.58	69.5
Mean height (cm)	163.19	161.29

Fig 1: Demographic data of subjects

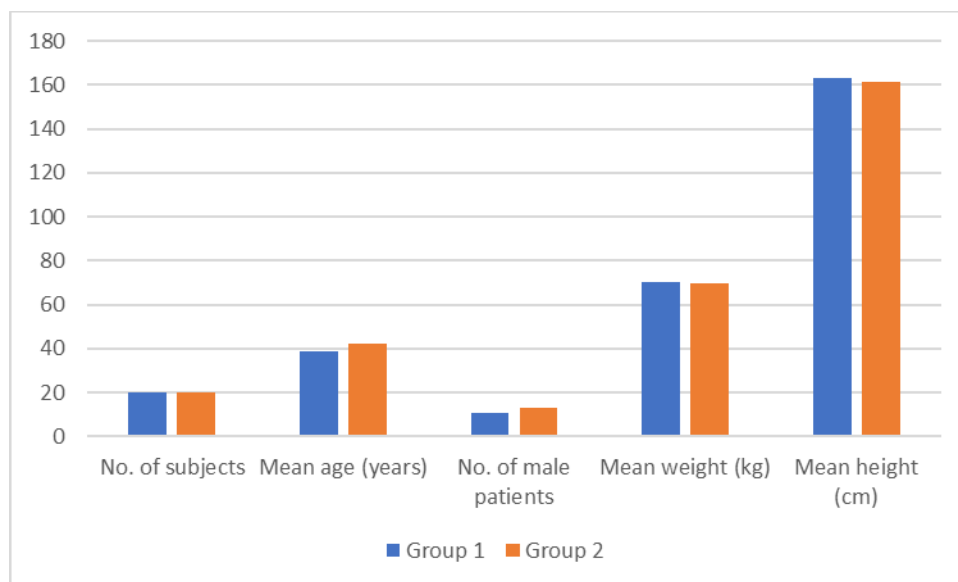
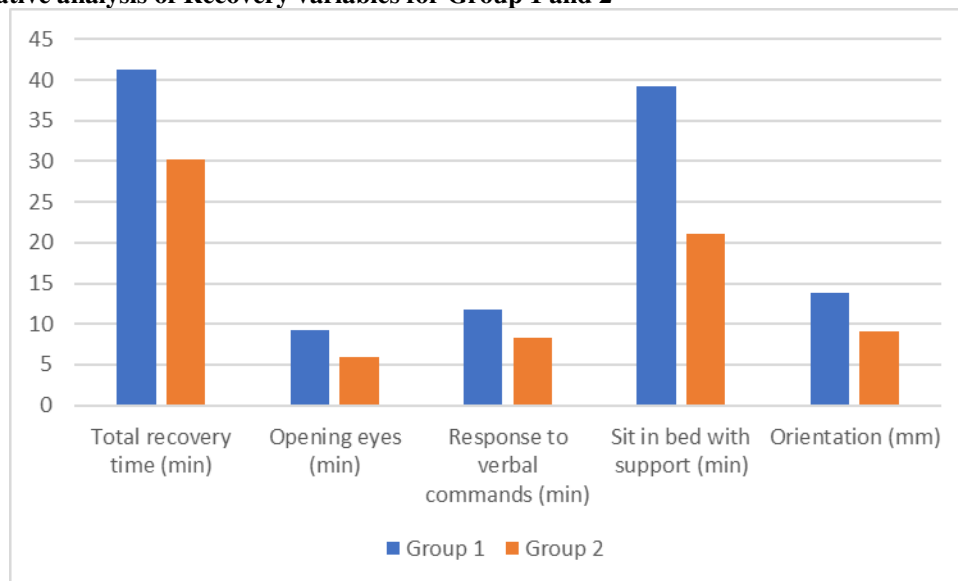


Table 2: Recovery variables for Group 1 and 2

Recovery variables	Group 1	Group 2	p-value
Total recovery time (min)	41.33	30.28	0.33
Opening eyes (min)	9.21	6.01	
Response to verbal commands (min)	11.78	8.28	
Sit in bed with support (min)	39.28	21.12	
Orientation (mm)	13.89	9.01	

Fig 2: Comparative analysis of Recovery variables for Group 1 and 2



DISCUSSION:

In the present study we compared efficacy of Desflurane with Sevoflurane for general anesthesia in ambulatory surgical procedures. We observed that Sevoflurane was more efficacious and had less post-operative recovery time. But the results were observed to be statistically non-significant. The results were compared with previous studies and results were consistent with previous studies. Kotwani MB et al compared the maintenance, emergence and recovery characteristics of sevoflurane and desflurane for pediatric ambulatory surgery. Sixty children aged 6 months to 6 years posted for short surgical procedures were enrolled into the study. Anesthesia was induced with intravenous propofol (maximum 4 mg/kg), SGA was inserted, and children were randomized to receive sevoflurane or desflurane for the maintenance of anesthesia. No muscle relaxants were administered, and all children received caudal block and rectal paracetamol suppository. Demography, perioperative hemodynamics, and duration of inhalational anesthesia were comparable between two groups. There were no respiratory adverse events in either group during maintenance. Time to awakening and time to removal of SGA were shorter with desflurane than sevoflurane. Recovery was faster with desflurane than sevoflurane. The incidence of EA was 16.7% with

desflurane and 10% with sevoflurane. They concluded that desflurane provides faster emergence and recovery in comparison to sevoflurane when used for the maintenance of anesthesia through SGA in children. Tarazi EM et al determined if there is a difference between sevoflurane and desflurane when used as part of a balanced anesthetic technique in terms of time to discharge from an ambulatory surgery unit. 60 ASA physical status I and II adult women undergoing laparoscopic tubal ligation on an outpatient basis were selected for the study. Patients were randomized to receive either sevoflurane or desflurane as a component of a balanced anesthetic technique. Visual analog scores (VAS) for discomfort, nausea, and wakefulness, and digit-symbol substitution tests (DSST) were completed preoperatively and at specified intervals after extubation. Time to eye opening, command response, orientation, sitting in bed, sitting with legs dangling, standing, walking, discharge, and departure were measured for all patients. VAS and DSST scores were compared with preoperative baseline scores. It was concluded that the recovery indices and psychomotor function are marginally but not significantly better with sevoflurane than desflurane.^{7,8} Nathanson MH et al compared the recovery characteristics of desflurane and sevoflurane when used for maintenance of ambulatory anesthesia. After obtaining informed consent,

42 healthy, unpremedicated women undergoing laparoscopic sterilization procedures were studied. Anesthesia was induced with propofol, 1.5-2.0 mg/kg, and maintained with either desflurane 3%-6% (n = 21) or sevoflurane 1%-2% (n = 21) with 60% nitrous oxide in oxygen. Visual analog scales (VAS) and the digit-symbol substitution test (DSST) were performed preoperatively and at 30-min intervals during the recovery period. Heart rate (HR) values were lower in the sevoflurane group during the induction-to-incision period. However, HR and MAP were otherwise similar during the maintenance and recovery periods. Use of desflurane led to a more rapid emergence and shorter time to extubation compared to sevoflurane. Intermediate recovery times, postoperative VAS and DSST scores, and side effects were similar in the two treatment groups. Dogru K et al compared the early recovery properties of desflurane and sevoflurane in patients with American Society of Anesthesiologists physical status I or II undergoing total hip replacement (THR) surgery. Early recovery was assessed in the surgical suite by measuring the time to 50% decline of end-tidal volatile concentration of desflurane or sevoflurane; time to extubation, eye opening, orientation, and a modified Aldrete Scale (MAS) score >8; and time to discharge from the postanesthesia recovery room. Time to 50% decline of end-tidal volatile concentration of desflurane or sevoflurane, tracheal extubation, eye opening, orientation, and MAS score >8 occurred significantly more rapidly in the desflurane group than in the sevoflurane group. However, the groups did not differ significantly in duration of anesthesia; time to discharge from the postanesthesia recovery room; or incidences of nausea, vomiting, dizziness, and drowsiness in the first 24 hours after anesthesia. In this study population, they did not find any beneficial effects of desflurane on intermediate recovery.^{9,10}

CONCLUSION:

From the study, we conclude that both the anesthetic agents, Sevoflurane and Desflurane are efficacious in ambulatory surgical procedures. Some of the recovery parameters were seen to be taking more time duration in cases with Desflurane cases as compared to Sevoflurane cases; however, results are statistically non-significant.

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