

**ORIGINAL ARTICLE****A Comparative Analysis of Desflurane and Sevoflurane for Ambulatory Surgery**

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**ABSTRACT:**

**Aim of the study:** To compare desflurane and sevoflurane for ambulatory surgery. **Materials and methods:** The study was conducted in the Department of Anesthesia of the medical institution. For the study we selected 120 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 120 patients in each group, Group S and Group D. Group S patients received Sevoflurane for maintenance of anesthesia whereas Group D received Desflurane for maintenance of anesthesia. **Results:** Mean age of patients in group S was 37.12 years and in group D was 39.15 years. Number of male patients in group S was 38 and in group D were 34. Total recovery time in group S was 33.41 min and in group D was 31.12 min. **Conclusion:** We conclude that 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, the results were statistically non-significant.

**Keywords:** Sevoflurane, Desflurane, Ambulatory surgery.

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**INTRODUCTION:**

Sevoflurane and desflurane have been in use for ambulatory anaesthesia as they both have properties of an ideal agent. Desflurane has lower blood gas solubility than sevoflurane resulting in rapid induction and emergence from anaesthesia.<sup>1, 2</sup> However, desflurane is pungent and can be irritant to the airway leading to coughing, breathholding, laryngospasm and copious secretions.<sup>3</sup> This property may make sevoflurane an agent of choice for cases on spontaneous respiration. The time required between the end of surgery till extubation is of special interest to anesthesiologists because it is affected by anesthesia agents administered.<sup>4</sup> Therefore, it is essential for anesthesiologists to choose appropriate agents to avoid prolonged extubation to improve the efficiency of operating room.<sup>5-7</sup> Hence, the present study was conducted to compare the efficacy of desflurane and sevoflurane for ambulatory surgery.

**MATERIALS AND METHODS:**

The study was conducted in the Department of Anesthesia of the medical institution. 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 120 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 120

patients in each group, Group S and Group D. Group S patients received Sevoflurane for maintenance of anesthesia whereas Group D 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, breath holding and laryngospasm. Another qualified anaesthetist 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 120 patients were included in the study. **Table 1** shows the demographic data of the patients. Mean age of patients in group S was 37.12 years and in group D was 39.15 years. Number of male patients in group S was 38 and in group D were 34. Mean weight of patients in group S was 66.58 kg and in group D was 67.98 kg. **Table 2** shows the comparative analysis of recovery variables for Group S and D. Total recovery time in group S was 33.41

min and in group D was 31.12 min. Time for opening eyes postoperatively was 8.98 min and 6.87 min. Time taken to respond to verbal commands was 15.45 min and 9.32 min. Time duration to sit in bed with support was 49.12 min and 36.65 min. On comparison the results were observed as statistically non-significant. ( $p>0.05$ ) [Fig 1]

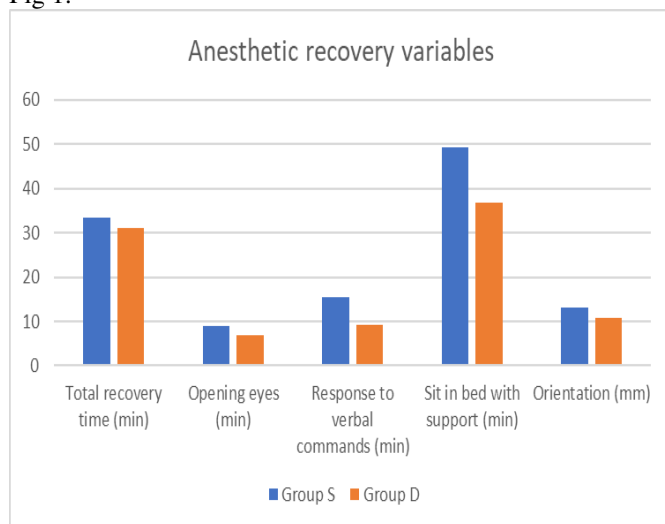
**Table 1: Demographic details of the patients**

Parameters	Group S	Group D
No. of subjects	60	6
Mean age (years)	37.12	39.15
No. of male patients	38	34
Mean weight (kg)	66.58	67.98
Mean height (cm)	166.58	162.21

**Table 2: Comparative analysis of Recovery variables for Group S and D**

Recovery variables	Group S	Group D	p-value
Total recovery time (min)	33.41	31.12	0.12
Opening eyes (min)	8.98	6.87	
Response to verbal commands (min)	15.45	9.32	
Sit in bed with support (min)	49.12	36.65	
Orientation (mm)	13.12	10.65	

Fig 1:



**DISCUSSION:**

In the present study we compared efficacy of Desflurane with Sevoflurane for general anesthesia in ambulatory surgical procedures. We observed that patients receiving Sevoflurane were more efficacious and had less postoperative recovery time. But the results were observed to be statistically non-significant. Smith I et al<sup>7</sup> compared

induction of, maintenance of, and recovery from sevoflurane anesthesia with propofol and isoflurane anesthesia when administered with nitrous oxide to patients undergoing gynecologic surgery. Seventy-five healthy (ASA I or II), consenting patients were randomly assigned to receive either (I) propofol for induction of anesthesia and isoflurane-nitrous oxide for maintenance (control), (II) propofol for induction and sevoflurane-nitrous oxide for maintenance, or (III) sevoflurane-nitrous oxide for induction and maintenance of anesthesia. Inhaled induction of anesthesia with sevoflurane-nitrous oxide was rapid and without any untoward hemodynamic changes or episodes of coughing and laryngospasm. Mean arterial blood pressure after induction of anesthesia with propofol was lower than when sevoflurane was used. The emergence time after discontinuation of isoflurane-nitrous oxide was significantly longer than after propofol-sevoflurane-nitrous oxide or sevoflurane-nitrous oxide alone. However, later recovery events did not differ between groups. In conclusion, induction of anesthesia with either propofol or sevoflurane-nitrous oxide was rapid and without significant side effects. Emergence and early recovery after maintenance of anesthesia with sevoflurane-nitrous oxide was significantly faster than that after an isoflurane-nitrous oxide combination. Magni G et al<sup>8</sup> compared early postoperative recovery and cognitive functions within the two groups; they also evaluated hemodynamic events, vomiting, shivering, and pain. One hundred twenty patients (64 males; age 15-75 years) were randomized to either total intravenous anesthesia (group T) or sevoflurane anesthesia (group S). Emergence and extubation times and cognitive function (Short Orientation Memory Concentration Test [SOMCT]) were compared in the two groups. Brain swelling, incidence of hypotensive and hypertensive episodes, postoperative vomiting, shivering, and pain were also analyzed. The mean emergence time and extubation time were similar in the two groups. Average SOMCT scores, both 15 minutes after extubation and 45 minutes after extubation were also comparable. Their study demonstrates that there is no patient benefit of using total intravenous anesthesia with an ultra-short-acting opioid over the conventional balanced volatile technique in terms of recovery and cognitive functions.

Chan W-H et al<sup>9</sup> conducted a retrospective study to investigate the anesthesia-controlled time and factors that contribute to prolonged extubation in open colorectal surgery. In conclusion, the anesthesia-controlled time was similar in desflurane anesthesia and propofol-based total intravenous anesthesia for open colorectal surgery in our hospital. Surgical time greater than 210 minutes, as well as age, contributed to prolonged extubation. Liu T-C et performed a retrospective study using data collected in hospital to compare the anesthesia-controlled time of FESS using either TIVA via target-controlled infusion with propofol/fentanyl or DES/fentanyl-based anesthesia between January 2010 and December 2011. They included

data from 717 patients, with 305 patients receiving TIVA and 412 patients receiving DES. An emergence time >15 minutes is defined as prolonged extubation. The extubation time was faster, and the percentage of prolonged extubation was lower in the TIVA group than in the DES group. However, there was no significant difference between ACT, total OR stay time, and PACU stay time.

#### CONCLUSION:

Within the limitations of the study, we conclude that 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, the results were statistically non-significant.

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