Section: Anaesthesia

Original Research Article

COMPARATIVE STUDY ON THE EFFECTIVENESS OF TWO ANESTHETIC AGENTS FOR OUTPATIENT SURGERIES

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ABSTRACT

Background: Currently, ambulatory anesthesia is a prevalent anesthetic technique. This popularity is due to advancements in minimally invasive surgical methods and the introduction of new, short-acting anesthetic agents that are quickly metabolized.

Materials and Methods: This research was carried out in the Department of Anesthesia at the Geetanjali Institute of Medical Sciences, Jaipur from December 2025 to March 2026. Sixty patients, classified as American Society of Anesthesiologists physical status I and II, scheduled for surgeries in the General Surgery department, were chosen for the study. The participants were randomly divided into two groups, each consisting of 30 patients, labeled as Group 1 and Group 2. Patients in Group 1 were administered Sevoflurane for anesthesia maintenance, while those in Group 2 received Desflurane.

Results: The study enrolled a total of 60 patients, who were categorized into two distinct groups for comparative analysis. Group 1 consisted of patients with a mean age of 46.5 years, while Group 2 had a slightly higher mean age of 48.0 years. The gender distribution showed that Group 1 included 22 male patients, compared to 14 males in Group 2, indicating a difference in sex composition between the groups. Anthropometric measurements revealed that the mean weight in Group 1 was 66.5 kg, whereas Group 2 had a lower mean weight of 60.2 kg. Similarly, the mean height was greater in Group 1 at 169.5 cm, compared to 158.4 cm in Group 2.

Conclusion: Both Sevoflurane and Desflurane are effective for outpatient surgical procedures. However, Desflurane appears to be superior to Sevoflurane in terms of shorter recovery time, as well as quicker eye-opening and verbal response times.

Key words: Outpatient Surgery, Anesthesia, Sevoflurane.

INTRODUCTION

Ambulatory anesthesia has gained widespread acceptance as an anesthetic technique due to advancements in minimally invasive surgical methods and the development of rapidly metabolizing anesthetic agents. These improvements have enabled the safe performance of surgeries on highly critical patients and complex procedures outside traditional inpatient settings. The shift towards ambulatory surgery is driven by the benefits of reduced hospital stay, faster patient turnover, decreased healthcare costs, and improved patient satisfaction. However, the success of ambulatory anesthesia depends not only on surgical advancements but also on careful patient selection and anesthetic management tailored to ensure rapid recovery and minimal postoperative complications.[1] The choice of anesthetic agents plays a pivotal role in optimizing outcomes in ambulatory surgery. Ideal agents should provide rapid induction and emergence, minimal side effects, and effective analgesia to facilitate early discharge. Desflurane and sevoflurane are two inhalational anesthetics that have become popular in outpatient settings due to their favorable pharmacokinetic profiles and low incidence of adverse effects. Both agents are characterized by low blood-gas solubility, which

contributes to faster elimination and recovery compared to older volatile anesthetics.[2]

Desflurane is known for its extremely low blood-gas partition coefficient, which allows for rapid adjustments in anesthetic depth and swift emergence from anesthesia. Sevoflurane, while slightly more soluble, is well tolerated and less pungent, making it suitable for inhalational induction, especially in pediatric and airway-sensitive patients. Both agents have demonstrated safety and efficacy when used with supraglottic airway devices such as the laryngeal mask airway (LMA), which are commonly employed in ambulatory procedures to reduce airway irritation and facilitate smoother recovery.[2]

Despite their widespread use, there remains ongoing debate regarding the relative benefits of sevoflurane versus desflurane in ambulatory anesthesia, particularly concerning recovery profiles, adverse event rates, and overall patient outcomes. This study was designed to evaluate and compare the efficacy of these two anesthetic agents in ambulatory surgical procedures, focusing on recovery times and postoperative respiratory events to inform optimal anesthetic choice in this setting.[3]

MATERIALS AND METHODS

The study was conducted in the Department of Anaesthesia of Geetanjali Institute of Medical Sciences, Jaipur from Dec,2025 to March 2026. The ethical clearance for the study was obtained from the ethical board of the institute prior to commencement of the study. Total 60 patients belonging to ASAP status I and II scheduled for surgical procedures at General Surgery department. The patients were randomly grouped into two groups with 30 patients in each group, Group 1 and Group 2. Group 1 patients received Sevoflurane for maintenance of Anaesthesia whereas Group 2 received Desflurane for maintenance of Anaesthesia. The Anaesthesia was induced for each patient according to the standardized guidelines. During the maintenance of Anaesthesia and during postoperative period, we studied the occurrence of cough, hiccups, breath holding and larygospasm. Another external anaesthetist, who was unaware of the inhalational agent used, assessed the time taken from switching off of the vaporizer 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.[4]

RESULTS

The study enrolled a total of 60 patients, who were categorized into two distinct groups for comparative analysis. Group 1 consisted of patients with a mean age of 46.5 years, while Group 2 had a slightly higher mean age of 48.0 years. The gender distribution showed that Group 1 included 22 male patients, compared to 14 males in Group 2, indicating a difference in sex composition between the groups. Anthropometric measurements revealed that the mean weight in Group 1 was 66.5 kg, whereas Group 2 had a lower mean weight of 60.2 kg. Similarly, the mean height was greater in Group 1 at 169.5 cm, compared to 158.4 cm in Group 2 (Table 1).

Regarding recovery parameters, Group 1 exhibited a longer total recovery time, averaging 40.3 minutes, in contrast to 32.8 minutes observed in Group 2. Postoperative recovery milestones further highlighted differences between the groups: the mean time to postoperative eye-opening was 11.7 minutes in Group 1, substantially longer than the 4.9 minutes recorded for Group 2. Additionally, the time taken to respond to verbal commands post-surgery was 12.6 minutes for patients in Group 1, compared to 6.5 minutes in Group 2 (Fig. 1).

These findings collectively suggest that patients in Group 2 experienced a faster recovery profile across multiple metrics compared to those in Group 1. The variations in demographic and anthropometric characteristics may contribute to these differences. Detailed numerical data and graphical representations supporting these observations are provided in Table 1 and Figure 1, respectively.

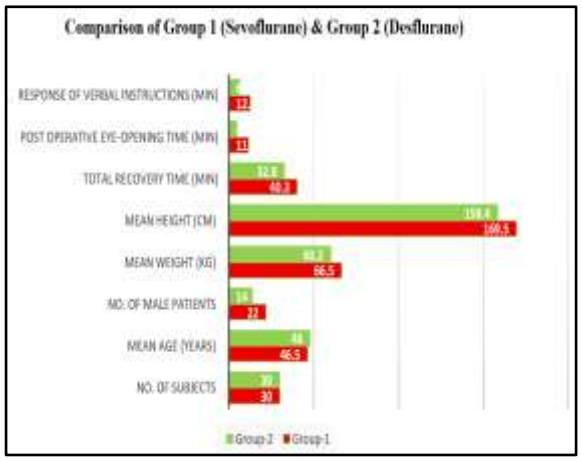

Figure 1: Comparison of Group 1 and 2

Table 1: Results of present study

Parameter	Group-1	Group-2
No. of subjects	30	30
Mean age (years)	46.5	48
No. of male patients	22	14
Mean weight (kg)	66.5	60.2
Mean height (cm)	169.5	158.4
Total Recovery Time (min)	40.3	32.8
Post operative Eye-opening time (min)	11.7	4.9
Response of verbal instructions (min)	12.6	6.50

DISCUSSION

This study aimed to compare the efficacy of sevoflurane and desflurane as inhalational agents for maintenance of general anesthesia in ambulatory surgical procedures. Ambulatory anesthesia requires agents that enable rapid induction and emergence to facilitate early recovery and discharge, minimizing postoperative complications and improving patient throughput. Our findings demonstrated that desflurane was associated with significantly faster postoperative recovery times compared to sevoflurane, including earlier eye opening, quicker response to verbal commands, and reduced total recovery time. These outcomes suggest that desflurane may be more suitable for ambulatory settings where rapid patient turnover and prompt recovery are priorities.

Kotwani MB et al conducted a study involving 60 children under the age of 6, comparing Sevoflurane and Desflurane. They found that Desflurane allowed for quicker emergence and recovery than Sevoflurane when used for anesthesia maintenance via SGA in children. No respiratory adverse events were noted in either group during maintenance. Desflurane resulted in shorter times to awakening and SGA removal compared to Sevoflurane. Meanwhile, Tarazi EM et al noted that using Desflurane as part of a balanced anesthetic approach led to a reduced discharge time from an ambulatory surgery unit.[5,6] Their findings indicated that recovery indices and psychomotor function were slightly, though not significantly, better with Sevoflurane than with Desflurane. Nathanson MH et al observed that Desflurane use resulted in faster emergence and shorter extubating times compared to Sevoflurane in 42 healthy, unpremeditated women undergoing laparoscopic sterilization. Dogru K et al also assessed early recovery in the surgical suite by measuring the time to a 50% reduction in end-tidal volatile concentration of Desflurane or Sevoflurane, along with times to extubation, eye opening, orientation, achieving a modified Aldrete Scale (MAS) score >8, and discharge from the post-anesthesia recovery room.[7,8] The faster recovery profile observed with desflurane can be attributed to its lower blood-gas partition coefficient, which facilitates rapid elimination from the body and quicker emergence from anesthesia. This pharmacokinetic property contrasts with sevoflurane, which has a slightly higher solubility and therefore slower washout, potentially prolonging recovery. Our results are consistent with previous studies that have reported similar findings in both pediatric and adult populations undergoing ambulatory surgeries. For instance, studies have shown that desflurane leads to shorter times to awakening and extubation compared to sevoflurane, without increasing the incidence of respiratory adverse events such as cough, laryngospasm, or breath holding.

In terms of safety, both agents demonstrated favorable profiles with no significant respiratory complications during maintenance or the postoperative period, underscoring their suitability for use with supraglottic airway devices such as the laryngeal mask airway (LMA). The absence of adverse respiratory events is particularly relevant in ambulatory anesthesia, where patient safety and comfort are critical to successful same-day discharge. Although desflurane showed superior recovery characteristics, it is important to consider patient-specific factors, surgical complexity, and potential cost implications when selecting an anesthetic agent. Sevoflurane remains a valuable option, especially in patients with airway sensitivity or where a smoother induction is desired, as it is less pungent and better tolerated during inhalational induction. Additionally, the choice of agent should be integrated into a balanced anesthetic technique that includes multimodal analgesia and optimized perioperative care to enhance overall patient outcomes.

Further research with larger sample sizes and diverse patient populations would be beneficial to confirm these findings and explore the impact of these agents on postoperative cognitive function, patient satisfaction, and discharge readiness. Moreover, studies comparing cost-effectiveness and environmental impact of these anesthetics could provide additional insights to guide clinical decision-making in ambulatory anesthesia.

CONCLUSION

While both sevoflurane and desflurane are effective for maintenance of anesthesia in ambulatory surgical procedures, we observed that desflurane offers advantages in terms of faster recovery times and earlier return of responsiveness, which are critical factors in the ambulatory care setting.

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