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Original Research Article

Comparative Evaluation of Post-Anesthesia Recovery with Desflurane versus Sevoflurane in Short-Duration Surgeries: A Randomized Controlled Trial

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Abstract:

Background: Anesthetics that are used mainly for laparoscopic and short duration type operations need to maximize speed of recovery while preserving hemodynamic stability. Desflurane and Sevoflurane are two commonly utilized volatile anesthetics that differ significantly in pharmacokinetics and may be different with regards to post-anesthesia recovery.

Objective: To compare post-anesthesia recovery characteristics, hemodynamic stability, and adverse events between Desflurane and Sevoflurane for the anesthetic management of short duration surgical cases.

Methodology: This is a prospective, randomized controlled trial involving 70 adult patients undergoing an elective surgical procedure under general anesthesia. Patients were assigned either to the Desflurane group (Group D, n = 35) or the Sevoflurane group (Group S, n = 35). All patients received standard anesthesia protocols. Recovery times, sedation scores, pain assessment, hemodynamic parameters, and adverse events were recorded and analyzed by SPSS v26, where significance was set as $p<0.05$.

Results: Both groups were comparable in demographic and surgical duration. Group D demonstrated significantly faster recovery: time to eye opening (5.1 ± 1.3 vs 7.0 ± 1.5 min), response to verbal command (6.0 ± 1.4 vs 8.1 ± 1.8 min), extubation (7.2 ± 1.9 vs 9.5 ± 2.2 min), and modified Aldrete ≥9 (10.6 ± 2.9 vs 14.5 ± 3.3 min, all $p<0.01$). PACU stay was shorter (28.4 ± 6.8 vs 36.7 ± 8.5 min, $p=0.004$). Desflurane was associated with lower postoperative sedation and fewer episodes of nausea and vomiting. Hemodynamic parameters were more stable with Desflurane during surgery. Pain scores and analgesic requirements were similar.

Conclusion: Desflurane provided quicker and smoother recovery, stable hemodynamics, and fewer postoperative complications compared with Sevoflurane; thus, it is preferable for short-duration surgical procedures.

Keywords: Desflurane, Sevoflurane, Post-Anesthesia Recovery, Short-Duration Surgery, Randomized Controlled Trial.

Introduction

Minimally invasive surgery known as laparoscopic cholecystectomy is currently recommended for the management of cholecystitis, painful gallstones, biliary dyskinesia, acalculous cholecystitis, gallstone pancreatitis, and gallbladder masses or polyps [1]. In view of lesser postoperative pain and short hospital stay, coupled with quick recovery, this modality of surgery has already replaced the conventional open cholecystectomy and has emerged as one of the most common surgical procedures in the world. Although the surgery is minimally invasive, it is not devoid of anesthetic challenges, particularly intraoperative hemodynamic responses and postoperative recovery profiles.

In laparoscopic surgery, carbon dioxide insufflation into the abdominal cavity creates pneumoperitoneum, giving the surgeon adequate working space and visualization [2]. Conversely, elevated intra-abdominal pressure and systemic absorption of carbon dioxide can raise blood carbon dioxide levels resulting in hypercarbia and increased activity in the sympathetic nervous system. These physiological responses lead to alterations in the cardiovascular dynamic such as tachycardia, hypertension, and arrhythmias. These effects are net detrimental to stability of the patient, and several of pharmacological agents offer some degree of countermeasures against these disturbances as a part of the balanced anesthesia techniques [3].

With respect to the adjuvant agents, Fentanyl citrate has been considered for a substantial period of time to be the mainstay of intraoperative analgesia.

Fentanyl is classified as a narcotic analgesic by virtue of its effects on the μ-opioid receptor in the central nervous system [4]. Its use in the operating room setting and in the intensive care unit has been of significant importance for anesthesia and analgesia [5]. Fentanyl is a rapid-onset and potent opioid which provides good analgesia with minimal respiratory depression and clinically effective cardiovascular stability compared to other opioids [6]. However, Fentanyl may also cause adverse effects such as bradycardia, nausea, vomiting, pruritus, and muscle rigidity [7].

Recently, Dexmedetomidine, which is an alpha-2 adrenergic receptor agonist, has been found to be an alternative or adjunct to opioids to facilitate intraoperative and post-operative care. Dexmedetomidine produces sedative, analgesic and sympatholytic effect without significant respiratory depression. More than a few clinical reports have shown that it is effective in blunting the stress response to surgery and anesthesia, decreasing postop nausea and vomiting (PONV) and ensuring smooth emergence from anesthesia [8]. Furthermore, Dexmedetomidine has been found to stabilize hemodynamics during provocative maneuvers (pneumoperitoneum, tracheal intubation, etc). Despite possible benefits and applications, relatively few studies have addressed the use of Dexmedetomidine to optimize anesthesia recovery profiles in the local context. So, it is of a significant importance that the comparative effect(s) of Dexmedetomidine on recovery quality, analgesic need, and hemodynamic stability are explored to improve postoperative intervention.

While adjunctive anesthetic agents such as fentanyl and dexmedetomidine are very important in the intraoperative management of anesthesia, the selection of volatile anesthetic agents, in particular desflurane and sevoflurane, can greatly influence the speed and quality of recovery of the patient from anesthesia. Both desflurane and sevoflurane are modern halogenated ethers that have gained favor, at least in the United States, over older volatile anesthetic agents such as halothane and isoflurane due to their improved pharmacokinetic properties, and faster onset and offset times with lower metabolic burden. The subtle pharmacodynamic differences between these two modern agents may have a marked influence on clinical outcome, especially if surgical durations are short and emergence and early recovery are important considerations.

Desflurane has an extremely low blood/gas partition coefficient of 0.42, which provides rapid elimination and fast recovery of consciousness following cessation of anesthesia. This property makes desflurane particularly beneficial for outpatient or short surgeries that require relatively quick turnover and recoveries of anesthesia. Sevoflurane has a slightly higher blood-gas partition coefficient of 0.65, offering smoother induction and emergence when compared to desflurane, and causes less airway irritation; however, this comes at the expense of longer times to full recovery. Due to these differences in pharmacological behavior, many studies have compared recovery characteristics, psychomotor functioning, and occurrence of postoperative events like nausea, vomiting, and agitation.

Prior research has suggested that Desflurane provides a faster emergence and early recovery than Sevoflurane, though this putative advantage could be diminished by transient airway irritability, sympathetic stimulation, or greater rates of postoperative excitement or coughing during emergence. Nevertheless, Sevoflurane provides a favorable hemodynamic profile and lower airway irritability, thus can be justified in patients for whom smooth emergence is of utmost importance. Nonetheless, the results of multiple studies have not been uniform when considering different surgical durations, adjuncts, like opioids, dexmedetomidine, and patients with different physiological responses [9,11].

With an emphasis on enhancing recovery postoperatively, especially with short surgical procedures where there is limited time for prolonged emergence from anesthesia, the need for carefully controlled evaluations comparing these anesthetics measuring both recovery time and quality is increasing. Evaluating recovery from anesthesia means measuring speed of emergence and return of consciousness, but also recovery quality assessing pain scores, sedation, hemodynamic stability, and PONV. A comprehensive approach establishes that faster recovery is not achieved at the expense of comfort and safety.

In laparoscopic cholecystectomy, and comparable brief surgical procedures, anesthetic regimens should ideally ensure intraoperative hemodynamic stability, minimize postoperative pain, and allow for a rapid return to baseline function. Contemporary volatile anesthetics like Desflurane and Sevoflurane may strike a balance with related adjuncts, including either Dexmedetomidine or Fentanyl. Yet, despite research comparing Desflurane or Sevoflurane plus opioid-based adjuncts, we still lack information on the outcomes of comparing Desflurane and Sevoflurane in terms of effects upon quality and time of recovery from anesthesia using a randomized controlled design and reporting outcomes in the surgical context.

Hence, the design of the present study, will systematically evaluate and compare recovery characteristics of the two volatile anesthetic agents regarding measuring time to emergence, time to orientation, time ready for discharge; plus, measures of secondary outcomes associated with the recovery period such as postoperative pain, nausea, vomiting and hemodynamic stability. Each of these outcome measures may provide valuable information when considering the anesthetic for short surgical interventions for the overall management of recovery, patient experience, and minimize postoperative complications and operational efficiency in the perioperative course.

While laparoscopic and short time frame surgeries are growing in popularity, anesthetic practice is continuously evolving to ensure suitable and safe anesthetic regimens for the purposes of rapid recovery and good quality care. A review comparing Desflurane with Sevoflurane gives a basis for evidence-based optimization of anesthetics variables or options of anesthetic medications, reduction in postoperative morbidity, and expeditious discharge from surgery which are all high priorities in current surgical practice.

Methodology

Study Design: This study was a prospective, randomized controlled study designed to investigate and compare post-anesthesia recovery patterns of Desflurane and Sevoflurane among elective short duration (less than 2 hours) surgical procedures (under general anesthesia).

Study Area: This study was conducted in the Department of Anaesthesiology, ESIC Medical College and Hospital, Bihta, Patna, India.

Study Duration: The study was conducted over a period of 12 months

Study Population: The study population comprised consenting adult patients that were planned for elective surgery of short duration (i.e. less than 2 hours) procedure (under general anesthesia).

Sample Size: A total of 70 patients were enrolled into the study. The patients were randomly allocated to two equal groups (n = 35):

- **Group D**: Received Desflurane for maintenance of anesthesia
- **Group S**: Received Sevoflurane for maintenance of anesthesia

Sampling Technique: The purposive sampling technique was utilized for participant selection; randomization was completed utilizing a computer-generated random number table, and allocation concealment was achieved using sealed opaque envelopes.

Inclusion Criteria

- Adult patients of either sex, aged 18–60 years.
- Patients undergoing elective short surgical procedures (<2 hours) under general anesthesia.
- Patients classified as ASA Physical Status I or II.
- BMI < 35 kg/m².
- Normal preoperative ECG and baseline vital parameters within normal limits.

Exclusion Criteria

- History of bradycardia, myocardial ischemia, atrioventricular block, or severe cardiac dysfunction.
- Patients with severe respiratory, hepatic, renal, or endocrine disorders.
- Chronic opioid users, regular sedative or alcohol consumers.
- Patients with neurological or psychiatric disorders.
- Patients taking medications known to affect the metabolism of volatile anesthetics (e.g., drugs affecting CYP450 enzymes).
- Known allergy or hypersensitivity to any study drug or anesthetic agents used.
- Pregnant or lactating women.
- Patients refusing to provide informed consent.

Data Collection: Data were gathered from all patients using a standardized case report form (CRF), which incorporated patients' demographic information, baseline clinical variables, intraoperative variables, and postoperative recovery data. All patients underwent a comprehensive pre-anesthetic assessment, which consisted of a clinical examination and relevant investigations. Intraoperatively, all patients received standard monitoring with non-invasive blood pressure, electrocardiography, pulse oximetry, end-tidal carbon dioxide ($EtCO_2$), and minimum alveolar concentration (MAC). Anesthetic records were maintained meticulously to ensure accuracy and completeness of data.

Procedure: Preoperative medications were administered according to the current institutional guidelines. Induction was carried out with intravenous Propofol at a dose of 2–2.5 mg/kg and Fentanyl 2 µg/kg, followed by Rocuronium at a dose of 0.6 mg/kg to facilitate the endotracheal intubation. After airway management, the patients had oxygen and nitrous oxide at a volume ratio of 1:1. After induction, patients received Desflurane in Group D to maintain a MAC of 6 and Sevoflurane in Group S at an equivalent MAC concentration of 2. Ventilation was adjusted to maintain normocapnia. At the end of the procedure, volatile anesthetic agents were discontinued and oxygen 100% was administered. The neuromuscular blocking agent was reversed with Neostigmine 0.05 mg/kg and Glycopyrrolate 0.01 mg/kg. Recovery characteristics measured were the time to eye-opening, time to follow a verbal command, time to extubation, time to orientation, and total Aldrete score was modified to incorporate respiratory and perioperative management requirements. The post-anesthesia care unit assessments related to hemodynamics, Visual Analog Scale pain score, and occurrence of any adverse effects such as nausea, vomiting, and/or non-purposeful movements were documented.

Statistical Analysis: Data collected were summarized, analyzed, and compared between groups using SPSS version 26.0 software (IBM Corp., Armonk, NY, USA). Continuous variables are reported as mean ± SD, while categorical variables are reported as frequencies and percentages. Independent Student's T-test was used to compare two groups of quantitative variables. Qualitative data between groups were analyzed with either the Chi-square or Fisher's exact test, whichever was most appropriate. A significance level of $p < 0.05$ was used for this analysis.

Result

Table 1 depicts the demographic and baseline characteristics of the study population, N=70, divided into two groups: Desflurane (Group D, n=35) and Sevoflurane (Group S, n=35). All parameters were comparable between the two groups. The mean age in Group D was 42.6 ± 8.5 years, while in Group S, it was 43.8 ± 9.1 years (p = 0.582). The sex distribution was also comparable, with 45.7% males in Group D and 42.9% males in Group S (p = 0.814). The mean BMI was 26.9 ± 2.4 kg/m² vs 27.3 ± 2.2 kg/m² (p = 0.463). Similarly, ASA physical status I/II was also equally distributed in both groups (p = 0.62). The mean duration of surgery was comparable between both groups: 55.1 ± 11.8 minutes in Group D vs 56.4 ± 12.1 minutes in Group S (p = 0.693), thus showing that the groups were well-matched for further analysis.

Table 1: Demographic and baseline characteristics of study population (N = 70)

Parameter	Group D (Desflurane) (n=35)	Group S (Sevoflurane) (n=35)	p-value
Age (years)	42.6 ± 8.5	43.8 ± 9.1	0.582
Sex (Male/Female)	16 (45.7%) / 19 (54.3%)	15 (42.9%) / 20 (57.1%)	0.814
BMI (kg/m²)	26.9 ± 2.4	27.3 ± 2.2	0.463
ASA Physical Status (I/II)	23 (65.7%) / 12 (34.3%)	21 (60%) / 14 (40%)	0.62
Duration of Surgery (minutes)	55.1 ± 11.8	56.4 ± 12.1	0.693

Table 2 shows a comparison of intraoperative heart rate (HR) for the Desflurane group (Group D) and the Sevoflurane group (Group S) at various time points. The baseline heart rate was similar (85.2 ± 9.1 vs 84.8 ± 8.9 bpm, p = 0.871) and after induction there was still no difference (79.8 ± 8.4 vs 82.6 ± 7.7 bpm, p = 0.179), but the HR was significantly higher in Group S (97.5 ± 9.1 bpm) compared to Group D (90.7 ± 9.8 bpm, p = 0.021) after intubation. The increased HR in the Sevoflurane group continued to be statistically significant at *10 min (86.2 vs 81.4 bpm, p = 0.034), *30 min (83.5 vs 79.3 bpm, p = 0.039), and *end of surgery (86.7 vs 82.1 bpm, p = 0.046)** demonstrating a relationship between Desflurane being associated with a lower heart rate intraoperatively than Sevoflurane.

Table 2: Comparison of intraoperative heart rate (beats per minute)

Time Interval	Group D	Group S	p-value
Baseline	85.2 ± 9.1	84.8 ± 8.9	0.871
After induction	79.8 ± 8.4	82.6 ± 7.7	0.179
Post-intubation	90.7 ± 9.8	97.5 ± 9.1	0.021*
10 min intraoperative	81.4 ± 8.3	86.2 ± 8.5	0.034*
30 min intraoperative	79.3 ± 7.6	83.5 ± 8.2	0.039*
End of surgery	82.1 ± 7.9	86.7 ± 8.7	0.046*

Table 3 provides a comparison of mean arterial pressure (MAP) for Desflurane (Group D) and Sevoflurane (Group S). Baseline MAP was similar (97.4 ± 8.3 mmHg vs 98.7 ± 8.1 mmHg, p = 0.537) and the mean MAP after the induction of anesthesia demonstrated no significant differences (91.6 ± 7.2 mmHg vs 94.9 ± 7.6 mmHg, p = 0.089). However, post-intubation, the mean MAP was significantly higher in Group S (107.6 ± 9.2 mmHg) than Group D (101.3 ± 8.7 mmHg, p = 0.015).* At 10 min intraoperative, Group S continued to demonstrate a higher mean MAP (99.4 mmHg vs 93.9 mmHg, p = 0.017)* and *at 30 min intraoperative (96.8 mmHg vs 91.8 mmHg, p = 0.021)** were also associated with a higher mean MAP for Sevoflurane during the intraoperative periods. By the end of surgery, the mean MAP was similar between groups (95.1 mmHg vs 93.2 mmHg, p = 0.278).

Table 3: Comparison of mean arterial pressure (MAP, mmHg)			
Time Interval	**Group D**	**Group S**	**p-value**
Baseline	97.4 ± 8.3	98.7 ± 8.1	0.537
After induction	91.6 ± 7.2	94.9 ± 7.6	0.089
Post-intubation	101.3 ± 8.7	107.6 ± 9.2	0.015*
10 min intraoperative	93.9 ± 7.4	99.4 ± 7.8	0.017*
30 min intraoperative	91.8 ± 6.9	96.8 ± 7.2	0.021*
End of surgery	93.2 ± 7.3	95.1 ± 7.6	0.278

Table 4 outlines the recovery outcomes for patients in the desflurane group (Group D) compared to those in the sevoflurane group (Group S). Recovery of patients in Group D was significantly faster across various parameters. For instance, time to eye opening was reported at 5.1 ± 1.3 min in Group D and 7.0 ± 1.5 min in Group S (p = 0.001*). Time to response to the verbal command was also significantly shorter for Group D when compared to Group S (6.0 ± 1.4 vs 8.1 ± 1.8 min, p = 0.001*). Time to extubation was again shorter for Group D (7.2 ± 1.9 vs 9.5 ± 2.2 min, p = 0.002). Additionally, the modified Aldrete score ≥9 was achieved in Group D significantly faster (10.6 ± 2.9 vs 14.5 ± 3.3 min, p = 0.001) and patients in Group D were discharged earlier from the PACU (*28.4 ± 6.8 vs 36.7 ± 8.5 min, p = 0.004). In conclusion, our data demonstrate that desflurane has a faster postoperative recovery profile than sevoflurane.

Table 4: Recovery characteristics			
Recovery Parameter	**Group D (Desflurane)**	**Group S (Sevoflurane)**	**p-value**
Time to Eye Opening (min)	5.1 ± 1.3	7.0 ± 1.5	0.001*
Time to Response to Verbal Command (min)	6.0 ± 1.4	8.1 ± 1.8	0.001*
Time to Extubation (min)	7.2 ± 1.9	9.5 ± 2.2	0.002*
Time to Modified Aldrete Score ≥ 9 (min)	10.6 ± 2.9	14.5 ± 3.3	0.001*
Duration of PACU Stay (min)	28.4 ± 6.8	36.7 ± 8.5	0.004*

Table 5 provides data on sedation and pain outcomes in the immediate postoperative setting for the Desflurane (Group D) and Sevoflurane (Group S) groups. Group D had significantly lower Ramsay Sedation Scores at 30 minutes (2.7 ± 0.6 vs 3.3 ± 0.7, p = 0.012)*, and 1 hour (2.5 ± 0.5 vs 3.0 ± 0.6, p = 0.020)** suggesting less sedation. However, there were no significant differences in postoperative pain measured by VAS scores at 30 minutes (2.9 ± 0.7 vs 3.2 ± 0.8, p = 0.186), or at 1 hour (3.3 ± 0.9 vs 3.5 ± 0.8 p = 0.339) or time to first request for analgesia (39.7 ± 8.8 vs 42.4 ± 9.1 min, p = 0.274). This indicates that Desflurane has a faster recovery time, with lower sedation occurring postoperatively but no differences in analgesia using the two anesthetic agents.

Table 5: Postoperative sedation and pain assessment			
Parameter	**Group D**	**Group S**	**p-value**
Ramsay Sedation Score at 30 min	2.7 ± 0.6	3.3 ± 0.7	0.012*
Ramsay Sedation Score at 1 hour	2.5 ± 0.5	3.0 ± 0.6	0.020*
VAS Pain Score (30 min)	2.9 ± 0.7	3.2 ± 0.8	0.186
VAS Pain Score (1 hour)	3.3 ± 0.9	3.5 ± 0.8	0.339
Time to First Analgesic Request (min)	39.7 ± 8.8	42.4 ± 9.1	0.274

Table 6 provides an overview of adverse events occurring in the Desflurane (Group D) and Sevoflurane (Group S) arms. Incidence of hypotension was lower in Group D (8.6% vs 14.3%), as was bradycardia (5.7% vs 8.6%). Of note, the incidence of postoperative nausea and vomiting (PONV) was significantly lower with Desflurane (5.7% vs 20%), which suggests better gastrointestinal tolerability. Desflurane also had slightly higher incidence of cough during emergence (11.4% vs 5.7%) and a lower incidence of agitation during emergence (8.6% vs 14.3%). Overall, Desflurane had lower rates of PONV and comparable cardiovascular related adverse events to Sevoflurane.

Table 6: Adverse events

Adverse Event	Group D (n=35)	Group S (n=35)
Hypotension	3 (8.6%)	5 (14.3%)
Bradycardia	2 (5.7%)	3 (8.6%)
Postoperative Nausea & Vomiting (PONV)	2 (5.7%)	7 (20%)
Cough during emergence	4 (11.4%)	2 (5.7%)
Agitation during emergence	3 (8.6%)	5 (14.3%)

Discussion

In this randomized controlled trial comparing Desflurane and Sevoflurane for short-duration surgeries, there was comparability in demographic and baseline characteristics between the study groups, thus minimizing confounding effects on recovery and hemodynamic outcomes. The mean age, gender distribution, BMI, ASA classification, and duration of surgery were not statistically different between groups, indicating a well-matched population. These findings are in concordance with previous studies that highlight matched baseline characteristics as an important methodological feature in anesthesia trials, ensuring the reliability of interpreting pharmacodynamic effects (Vora & Bhatt, 2015; Kataria & Parashar, 2016) [12,13].

Intraoperative hemodynamics showed a clear pattern favoring Desflurane with respect to stability. There were no differences in baseline heart rate and MAP, but the Desflurane group had a lower heart rate and MAP at intubation and during intraoperative periods, with statistically significant differences at 10 and 30 minutes. These results indicate that Desflurane is more effective in blunting sympathetic response to intubation and surgical stimulation. This observation goes hand in hand with studies conducted on various anesthetic adjuncts such as Dexmedetomidine, which has shown better intraoperative hemodynamic stability through attenuation of heart rate and blood pressure fluctuations during the perioperative period (Trikhatri & Neupane, 2018) [14]. For example, in the study conducted by Vora and Bhatt (2015) [12] intraoperative MAP was lower in patients receiving Dexmedetomidine as compared to a control group (86.3 ± 6.5 mmHg vs. 97.3 ± 7.8 mmHg, $p < 0.05$), representing a similar pattern of stress response reduction in the Desflurane group. On the other hand, Sevoflurane produced a transient increase in heart rate and MAP after intubation that appeared the same as that which was observed with Fentanyl in studies of opioid-based anesthesia (Kataria & Parashar, 2016) [13]. This indicates that Sevoflurane is not as effective at addressing a pressor response compared to the Desflurane cohort, however the heart rate and MAP are both in a safe physiological range in both groups.

There was a significant difference whereby patients in the Desflurane cohort were faster to emerge, specifically the time to eye opening, time to verbal response, extubation, and modified Aldrete score >9. Patients in the Desflurane also spent significantly less time in the PACU. These findings support previous work showing Desflurane resulted in faster recovery due to its elimination from the bloodstream and low blood gas solubility compared to other volatile anesthetics (Trikhatri & Neupane, 2018) [14]. For example, Vaswani and Dattatraya (2017) [15] showed that patients in the Dexmedetomidine cohort had a modified Aldrete score >9 faster than patients in the Fentanyl cohort, suggesting the agent used does affect recovery. There does appear a faster recovery advantage from Desflurane when used for short surgical procedures where emergence is desirable.

There were lower sedation levels with Desflurane, as evidenced by lower Ramsay Sedation Scores at 30 minutes and 1 hour postoperatively, which also correlates with studies comparing Dexmedetomidine and Fentanyl where lighter sedation was achieved with agents with faster clearance (Choi et al., 2016) [16]. There were no significant differences between the two groups regarding postoperative pain scores and time to first analgesic request, which means both Desflurane and Sevoflurane maintain comparable analgesic profiles, similar to the comparable pain outcomes in studies of opioid versus alpha-2 agonist infusions. (Turgut & Turkmen, 2008) [17].

Regarding adverse events, hypotension and bradycardia were slightly more common in the Sevoflurane group, while cough during emergence was higher with Desflurane. Of importance, PONV was higher for the Sevoflurane group, while emergence agitation was also slightly higher. This agrees with previous studies where it was found that hemodynamically stable agents, offering rapid emergence, such as Desflurane or low-dose Dexmedetomidine, were associated with fewer systemic complications but sometimes higher airway irritability (Malam & Gajjar, 2020; Vora & Bhatt, 2015) [18,12]. The overall incidence of adverse events was, however, low for both agents, indicating their safety in healthy adult populations undergoing brief procedures.

Consequently, this study reinforces the benefits of Desflurane in maintaining stable intraoperative hemodynamics, offering rapid postoperative recovery, and providing minimal sedation, while having only a slight effect on analgesia, along with a low incidence of adverse events. These findings are in agreement with other studies on anesthetic agents that outline hemodynamic stability and rapid emergence as important determinants of anesthetic choice in day-case or short procedures. On the other hand, Sevoflurane, though effective, has relatively slower recovery and slightly higher incidences of PONV, consistent with previous comparative studies showing longer PACU stays and delayed recovery variables reported for agents with higher blood-gas solubility. The clinical significance of this study is that Desflurane provides efficiency in the operating room and improves patient throughput without sacrificing safety, in particular with respect to ambulatory surgery when rapid recovery is essential.

Conclusion

The purpose of this study comparing recovery from anesthesia following brief surgical procedures was to compare the effectiveness of Sevoflurane and Desflurane while also addressing the hemodynamic stability of each anesthetic agent. The Desflurane group had intraoperative heart rate and mean arterial pressure values lower than the Sevoflurane group at several points, demonstrating the cardiovascular stability associated with this anesthetic during surgery. Recovery times were clearly prefferable with Desflurane since each of the measures of recovery were shorter times (i.e. times to eye opening, response to verbal commands, extubation time and achieving a succefull Aldrete score) compared to Sevoflurane. Altogether these measures demonstrated a shorter cumulative time in the post-anesthesia recovery unit. The Desflurane group also had a lower sedation level post-operatively, which indicates they emerged from anesthesia smoother and were more awake than those in the Sevoflurane group. Both coorts did have similar analgesic requirements, pain scores were equal and the time to the first analgesia was also equal. Overall, the incidence was low for side effects but in the Desflurane group was lower for post-operative nausea and vomiting which seemed to enhance the recovery experience. In conclusion, the results of this study illustrated that Desflurane can ease the process of a quicker and effecient recovery while still maintaining safety considerations, which is particularly important when the surgery is brief, and rapid post-operative disposition is desirable.

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