

A Prospective Study of Comparing the Hemodynamic, Emergence and Recovery Characteristics of Sevoflurane with those of Desflurane in General Anesthesia

Amitha P. Rao

Anesthesiology, District Hospital, Davanagere

Received: 24-05-2026 / Revised: 27-06-2026 / Accepted: 16-07-2026

Corresponding Author: Dr Amitha P. Rao

Conflict of interest: Nil

Abstract:

Inhalational volatile anaesthetics remain the most widely used drugs for maintenance of general anesthesia because of their predictable intraoperative and recovery characteristics. Management of intraoperative haemodynamic stability and early recovery is the most important part of a standardized balanced technique. Rapid induction and recovery may lead to faster operating room turnover times, shorter recovery room stays, and earlier discharges to home. Over the last 15 years, there has been an explosive growth in the trend to provide cost-effective care in the practice of medicine.

Keywords: Inhalational, Haemodynamic, Sevoflurane, Desflurane.

DOI: 10.25258/ijcpr.18.7.225

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

The introduction of general anaesthesia in the field of medicine remains as one of the important milestone. The introduction of general anaesthesia contributes to development in the field of surgery and expanded the boundaries of anaesthesia. General anaesthesia can be defined as reversible depression of central nervous system resulting in loss of consciousness and absence of response to external stimuli. General anaesthesia is usually defined as triad of amnesia, analgesia and muscle relaxation. Inhalational anaesthetics are the drugs which are most commonly used for the maintenance of general anaesthesia. Adding only a small amount of volatile anaesthetic to the inspired mixture of gases results in a state of unconsciousness and amnesia. When combined with intravenous adjuvants, opioids, benzodiazepines and muscle relaxants, a balanced anaesthetic technique is achieved that results in analgesia, amnesia and muscle relaxation.

The popularity of the inhaled anaesthetics is because of their ease of administration and the ability to reliably monitor their effects with clinical signs and end tidal concentration. Inhalational volatile anaesthetics remain the most widely used drugs for maintenance of general anesthesia because of their predictable intraoperative and recovery characteristics.

Management of intraoperative haemodynamic stability and early recovery is the most important

part of a standardized balanced technique. Rapid induction and recovery may lead to faster operating room turnover times, shorter recovery room stays, and earlier discharges to home. Over the last 15 years, there has been an explosive growth in the trend to provide cost-effective care in the practice of medicine. Ambulatory surgery is an increasingly important part of that trend.

Ambulatory surgery continues to grow and thrive such that the vast majority (65–70%) of all surgical procedures is performed on an outpatient basis. Expedient recovery and shorter hospital stays are necessary to improve efficiency of an ambulatory facility and reduce health care costs. One of the major factors that determine the speed of recovery from anesthesia is the choice of anesthetic technique. Although local and regional anesthesia techniques are increasingly used in the ambulatory setting because they allow a more rapid recovery, general anesthesia is still the most common anesthetic technique.[1-8]

Materials and Methods

After institutional ethical committee approval, the study was conducted in 40 patients. All were ASA I and II patients undergoing elective surgical procedures under general anesthesia lasting for less than 2 hours but more than 1 hour duration. After getting consent, the anesthetic technique was performed.

Selection of Patients: The patients selected for this study were of ASA Risk I&II undergoing elective surgical procedures under general anesthesia lasting for less than 2 hours but more than 1 hour duration. It was a prospective randomized controlled single

blinded study. The patients exhibiting the following were excluded from the study.

Results

Table 1: Time to response for verbal commands in both groups

Variable	Sevoflurane group (Mins)	Desflurane group (Mins)	P value
Mean	6.2	4.3	<0.001
Standard deviation	0.69	0.67	
Range	5-7.5	3-5.5	

The time to response for verbal commands is lesser in desflurane group which is 4.3 mins as compared to sevoflurane group which is 6.2 mins. This difference was statistically significant with P value <0.001.

Table 2: Time to eye opening in both groups

Variable	Sevoflurane group (Mins)	Desflurane group (Mins)	P value
Mean	6.85	5.0	<0.001
Standard deviation	0.69	0.67	
Range	6-8	4-6	

The time to eye opening is lesser in desflurane group which is 5 mins as compared to sevoflurane group which is 6.85 mins. This difference was statistically significant with P value <0.001.

Table 3: Time to telling name in both groups

Variable	Sevoflurane group (Mins)	Desflurane group (Mins)	P value
Mean	7.5	5.7	<0.001
Standard deviation	0.67	0.76	
Range	7-9	4-6	

The time to telling name is lesser in desflurane group which is 5.7 mins as compared to sevoflurane group which is 7.5 mins. This difference was statistically significant with P value <0.001.

Table 4: Time to Squeezing fingers in both groups

Variable	Sevoflurane group (Mins)	Desflurane group (Mins)	P value
Mean	8.3	6.4	<0.001
Standard deviation	0.74	0.64	
Range	7-9.5	5-7.5	

The time to squeezing fingers is lesser in desflurane group which is 6.4 mins as compared to sevoflurane group which is 8.3 mins. This difference was statistically significant with P value <0.001.

Table 5: Comparison of Aldrete score in both groups at 5 and 10 minutes

Variable	Sevoflurane group	Desflurane group	P value
5 minutes			
Mean	6.9	8.2	<0.001
Standard deviation	0.80	0.76	
Range	5-7	7-9	
10 minutes			
Mean	8.1	9.3	<0.001
Standard deviation	0.82	0.61	
Range	7-9	8-10	

Aldrete score at 5 minutes was higher with desflurane group (mean=8.2) than with sevoflurane group (mean=6.9). 10 minutes Aldrete score was also higher with desflurane group (mean=9.3) compared to sevoflurane group (mean=8.1). This difference was statistically significant with P value <0.001.

Discussion

General anesthesia is popular among the surgeons, anaesthesiologists, and patients and still remains the mainstay of anesthesia in many centres across the world. With the introduction of less soluble volatile

anesthetics like desflurane and sevoflurane which promotes early recovery and also maintains hemodynamics stability and provide amnesia makes general anesthesia the technique of choice for many patients. It is desirable to have a faster recovery from

anesthesia. This study compared the hemodynamic, emergence and recovery characteristics of sevoflurane with desflurane in general anesthesia. The time to spontaneous eye opening, response to painful stimuli were shorter in the desflurane group. The time to response for verbal commands, telling name, and squeezing fingers were also shorter in the desflurane group compared to sevoflurane group. The time to response for painful stimuli is lesser in desflurane group which is 3.6 mins as compared to sevoflurane group which is 5.6 mins. The time to response for verbal commands is lesser in desflurane group which is 4.3 mins as compared to sevoflurane group which is 6.2 mins. The time to eye opening is lesser in desflurane group which is 5 mins as compared to sevoflurane group which is 6.85 mins. The time to telling name is lesser in desflurane group which is 5.7 mins as compared to sevoflurane group which is 7.5 mins. The time to squeezing fingers is lesser in desflurane group which is 6.4 mins as compared to sevoflurane group which is 8.3 mins. Aldrete score at 5 minutes was higher with desflurane group (mean=8.2) than with sevoflurane group (mean=6.9). 10 minutes aldrete score was also higher with desflurane group (mean=9.3) compared to sevoflurane group (mean=8.1). The study by Nathanson et al.[1] suggested that sevoflurane and desflurane provided similar intraoperative conditions during the maintenance period. Although early recovery was more rapid after desflurane, there was no difference in later recovery end-points. Song et al.⁹ found that the late recovery profiles and incidences of postoperative side effects were similar after desflurane and sevoflurane. It was also showed that regardless of the duration of anaesthesia, elimination was faster and recovery was quicker for the inhaled anaesthetic desflurane than for the inhaled anaesthetic sevoflurane. In our study also, recovery was earlier with desflurane than with sevoflurane. Hemodynamic profile: S Gergin, B Cevik et al.[2] in their study concluded that desflurane, like sevoflurane, maintains haemodynamic stability during intraoperative period. In our study also, both the desflurane and sevoflurane maintained the hemodynamics within 20% of the baseline values. Hypotension was easily managed with fluids and blood replacement and none of the patients were excluded in both the groups. There was no significant difference in total dose of fentanyl / vecuronium used between two groups.

Conclusion

Desflurane provides earlier emergence and recovery from anesthesia compared to sevoflurane. Both desflurane and sevoflurane maintained hemodynamic stability. There was no significant difference in the total dose of fentanyl and vecuronium used

References

1. Nathanson MH, Fredman B, Smith I, White PF. Sevoflurane versus desflurane for outpatient anaesthesia: A comparison of maintenance and recovery profile. *Anesth Analg* 1995; 81: 1186-1190.
2. Edmond I. Eger, MD; Terri Bowland, BS; Pompiliu Ionescu, MD; Michael J. Laster, DVM; Zexu Fang, MD; et al, Recovery and Kinetic Characteristics of Desflurane and Sevoflurane in Volunteers after 8-h Exposure, including Kinetics of Degradation Products, *Anesthesiology* 9 1997, Vol.87, 517-526.
3. Gergin S, Cevik B, Yildirim GB, Ciplakligil E, Colakoglu S. Sevoflurane Vs Desflurane: Haemodynamic Parameters and Recovery Characteristics. *Internet J Anesthesiol*. 2005; 9:1.
4. Ebert TJ, Muzi M. Sympathetic hyperactivity during desflurane anesthesia in healthy volunteers. A comparison with isoflurane. *Anesthesiology* 1993;79:444-53.
5. Weiskopf RB, Moore MA, Eger El II, et al. Rapid increase in desflurane concentration is associated with greater transient cardiovascular stimulation than with rapid increase in isoflurane concentration in humans. *Anesthesiology*. 1994;80:1035-45
6. Eger II EI, Gong D, Koblin DD, et al: Effect of anesthetic duration on kinetic and recovery characteristics of desflurane vs. sevoflurane in volunteers. *Anesth Analg* 1998; 86:414-421.
7. McKay RE, Large MJC, Balea MC, McKay WR: Airway reflexes return more rapidly after desflurane anesthesia than after sevoflurane anesthesia. *Anesth Analg* 2005; 100:697-700.
8. Juvin P, Vadam C, Malek L, et al. Postoperative recovery after desflurane, propofol, or isoflurane anesthesia among morbidly obese patients: a prospective, randomized study. *Anesth Analg* 2000; 91:714.
9. Song D, Joshi GP, White PF. Fast-track eligibility after ambulatory anesthesia: A comparison of desflurane, sevoflurane, and propofol. *Anesth Analg*. 1998;86:267-73