

Comparison of Intraoperative Hemodynamic and Postoperative Cognitive Recovery Characteristics of Desflurane with Sevoflurane in General Anesthesia

Shilpinkumar Kamlesh Solanki¹, Manthan Purshottam Parmar¹, Hardik G Patel²

¹Assistant Professor, Department of Anesthesiology, GMERS Medical College and Hospital, Dharpur, Patan, Gujarat, India, ²Senior Resident, Department of Anesthesiology, B.J. Medical College, Civil Hospital, Ahmedabad, Gujarat, India.

Abstract

Background: Present study was done with an aim of Desflurane versus Sevoflurane on intraoperative hemodynamic and postoperative cognitive revival distinctiveness in general anesthesia. **Subjects and Methods:** 60 ASA I & II subjects were arbitrarily separated into 2 categories. The following parameters were observed: Time in use for (1) primary reply to authority by inquiring subjects to open eyes and press finger. (2) Extubation. (3) direction to time, place and person. Bring out through inquiring subjects to remember his forename, area etc. (4) Attain modified Aldrete score ≥ 9 . **Results:** Subjects in the group D improved considerably quicker as designated through the instance to primary rejoinder to authority. Direction to time, place and person were statistically significant between both groups. Instance to attain modified Aldrete score ≥ 9 was quicker with group D than group S. **Conclusion:** Desflurane provides improved intra-operative hemodynamic variables, a premature revival from anesthesia and premature postoperative cognitive revival contrast to Sevoflurane.

Keywords: Cognitive Recovery, Desflurane, Hemodynamic, Sevoflurane

Corresponding Author: Manthan Purshottam Parmar, Assistant Professor, Department of Anesthesiology, GMERS Medical College and Hospital, Dharpur, Patan, Gujarat, India.

E-mail: drmanthanparmar86@gmail.com

Received: 29 July 2020

Revised: 14 September 2020

Accepted: 24 September 2020

Published: 26 December 2020

Introduction

Extremely elevated jeopardy Subjects and chief surgical events now accepted out securely since of the accuracy in observing and complex surgical techniques.^[1] General Anesthesia is the mainly usually utilized method in the daycare setup. A perfect general anesthetic ought to offer even and quick initiation, most favorable operating conditions, and quick revival with negligible side effects. Inhaled anesthetics permit quick appearance from anesthesia as of simple testability with intrinsic neuromuscular blocking property that creates them added appropriate for daycare anesthesia.^[2,3] Constant intraoperative hemodynamic grounds slightest systemic commotion and fewer illnesses.

Desflurane and Sevoflurane are impulsive anesthetics with small blood gas solubility which helps quicker revival from anesthesia.^[3] Sevoflurane, is nonirritant, noninflammable, and generates bronchodilatation. It can be utilized for inhalational induction.^[4,5] Sevoflurane does not start the sympathetic nervous system.^[6] Desflurane has a strong scent, is prickly

to the respiratory tract, and is non-inflammable. The initiation of quick and little acting drugs for initiation and preservation of anesthesia has aid premature revival subsequent day care surgery.

Current research evaluates the consequence of all agents on intra-operative hemodynamic and postoperative cognitive revival uniqueness in general anesthesia.

Subjects and Methods

The current research was performed at the Department of Anesthesia, GMERS Medical College and Hospital, Dharpur, Patan, Gujarat from January 2019 to June 2019. Subjects aged 18-60 years, ASA Class I & II were utilized in research. Subjects with systemic diseases, psychiatric illness, complicated intubation, and pregnant subjects were debarred.

Subjects were aimlessly separated. 60 Subjects undergo possible surgical events into 2 groups, Group D- Desflurane and Group S.

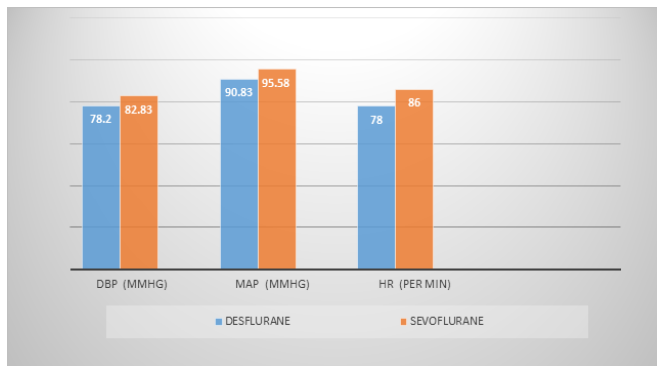


Figure 1: Comparison of intraoperative hemodynamic parameters

Subjects were reserved zilch orally intended for eight hours previous to surgery. Every Subject was pre-treated with injection section Glycopyrrolate 10mcg/Kg and injection action Ondansetron 4 mg IV 10 min before initiation.

Group D was preserved with 3-6% Desflurane and Group S with 1-2.5% Sevoflurane in 50% Oxygen with 50% Nitrous oxide. Heart rate, systolic and diastolic blood pressures, mean arterial pressure and O₂ diffusion be documented at prior initiation level and every five minutes until sixty minutes. The period of the strike of inhalational agents was recorded as time 0 for every added interpretation.

Following variables were recorded

Time in use for :(1) primary reply to authority through inquiring subjects to release eyes and press finger. (2) Extubation. (3) direction to moment, area and person. Bring out via inquiring subjects to remember his given name, location (4) Attain modified Aldrete score ≥ 9 .

Statistical analysis

The recorded information was investigated using SPSS version 15. Confidence and significance level were put at 0.95 and 0.05% correspondingly.

Results

Intraoperative standard diastolic blood pressure, Average mean arterial, Average heart rate was statistically significant among equal groups [Figure 1]

Extubation times were extended in Sevoflurane managed subjects in contrast to Desflurane managed Subjects. Direction to time, place and person were statistically significant between both groups ($P < 0.05$). Subjects in the Sevoflurane group requisite 14.63 min to achieve a modified Aldrete score of ≥ 9 as it got merely 9.76 min for the Desflurane group.

Discussion

Intraoperative systolic blood pressure did not vary equally in research groups. Subjects in Sevoflurane group requisite 14.63 min to achieve a modified Aldrete score of ≥ 9 as got merely 9.76 min for the Desflurane group. It advocates Subjects managed with Desflurane can be discharged residence prematurely devoid of many hospitals stays.

D. Rortgen et al. recommended that the appearance period for eye-opening and extubation were appreciably quicker for Desflurane, analogous with the current study.^[6] Comparable findings were acquired by Federico Bilotta et al.^[7] Chen and colleagues also got parallel results.^[8] Valentina Caverni et al had parallel intraoperative variables with Sevoflurane & Desflurane in their research but they establish premature revival with Desflurane.^[9] Similar findings were observed with La Colla L et and Heavner JE et al.^[10,11] Results of the present research are constant with the previous accounted data of quicker untimely revival with desflurane contrast to sevoflurane.^[12-16] Earlier types of research have described a little occurrence of respiratory difficulties and no noteworthy dissimilarity amid the two impulsive anesthetics.^[17-20] The drawback of research was the need for researcher canopy to the utilization of research drugs and in the evaluation of premature revival position.

Conclusion

Premature & even revival from general anesthesia with a premature revival of the cognitive role is advantageous for preferring inhalational anesthetic agents. Study findings were in the errand of Desflurane above Sevoflurane as an inhalational agent for improved hemodynamic organize, quicker post-operative revival and premature re-establishment of the cognitive role.

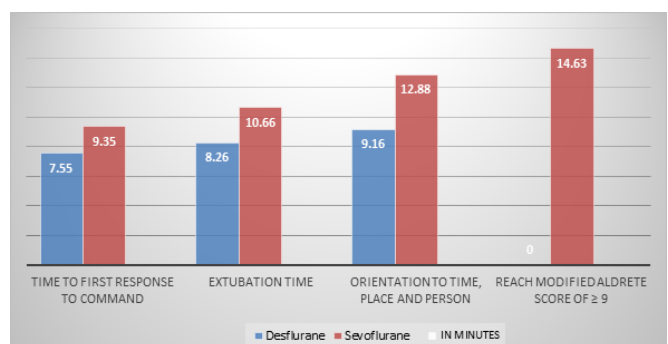


Figure 2: Comparison of postoperative cognitive recovery parameters

Table 1: Modified Aldrete score

Parameters	Description of Patient	Score
Activity	Can moves all extremities Can moves two extremities Cannot move	2 1 0
Breathing (Respiration)	Breathes deeply, can cough Dyspneic, shallow breathing Apnoeic	2 1 0
Circulation	BP +/- 20% of the pre-anesthetic level BP +/- 20-49% of pre-anesthetic level BP +/- 50% of the pre-anesthetic level	2 1 0
Consciousness	Fully awake Arousable on calling Not responding	2 1 0
O2 Saturation	>90% on room air Supplemental O2 to maintain >90% despite O2 supply <90%	2 1 0

References

- Gupta A, Stierer T, Zuckerman R, Sakima N, Parker SD, Fleisher LA. Comparison of Recovery Profile After Ambulatory Anesthesia with Propofol, Isoflurane, Sevoflurane and Desflurane: A Systematic Review. *Anesth Analg.* 2004;98(3):632–641. Available from: <https://dx.doi.org/10.1213/01.ane.0000103187.70627.57>.
- Eriksson LI. The effects of residual neuromuscular blockade and volatile anesthetics on control of ventilation. *Anesth Analg.* 1999;89(1):243–51. Available from: <https://doi.org/10.1097/0000539-199907000-00045>.
- Nathanson MH, Fredman B, Smith I, White PF. Sevoflurane versus desflurane for outpatient anesthesia: a comparison of maintenance and recovery profiles. *Anesth Analg.* 1995;81(6):1186–90. Available from: <https://doi.org/10.1097/0000539-199512000-00012>.
- Eberts TJ, Schmid PG, Barash PG, Cullen BF, Stoelting RK, Cahalan MK. Inhaled anesthetics. In: MC S, editor. *Clin Anesth.* Lippincott Williams and Wilkins; 2009. p. 413–456.
- Morgan GE, Mikhail MS, Murray MJ. *Inhalational anesthetics.* In: *Clinical Anesthesiology.* McGraw-Hill; 2006. p. 155–78.
- Rörtgen D, Kloos J, Fries M, Grottko O, Rex S, Rossaint R, et al. Comparison of early cognitive function and recovery after desflurane or sevoflurane anaesthesia in the elderly: a double-blinded randomized controlled trial. *Br J Anaesth.* 2010;104(2):167–174. Available from: <https://dx.doi.org/10.1093/bja/aep369>.
- Bilotta F, Doronzio A, Cuzzone V, Caramia R, Rosa G. Early Postoperative Cognitive Recovery and Gas Exchange Patterns After Balanced Anesthesia With Sevoflurane or Desflurane in Overweight and Obese Patients Undergoing Craniotomy. *Journal of Neurosurgical Anesthesiology.* 2009;21(3):207–213. Available from: <https://dx.doi.org/10.1097/ana.0b013e3181a19c52>. doi:10.1097/ana.0b013e3181a19c52.
- Chen X, Zhao M, White PF, Li S, Tang J, Wender RH, et al. The recovery of cognitive function after general anesthesia in elderly Subjects: a comparison of desflurane and sevoflurane. *Anesth Analg.* 2001;93:1489–94. Available from: <https://doi.org/10.1097/0000539-200112000-00029>.
- Caverni V, Rosa G, Pinto G, Tordiglione P, Favaro R. Hypotensive Anesthesia and Recovery of Cognitive Function in Long-term Craniofacial Surgery. *J Craniofac Surg.* 2005;16(4):531–536. Available from: <https://dx.doi.org/10.1097/01.scs.0000159084.60049.e6>.
- Colla LL, Albertin A, Colla GL, Mangano A. Faster wash-out and recovery for desflurane vs sevoflurane in morbidly obese patients when no premedication is used. *Br J Anaesth.* 2007;99(3):353–358. Available from: <https://dx.doi.org/10.1093/bja/aem197>.
- Sturm EM, Szenohradszky J, Kaufman WA. Emergence and recovery characteristics of desflurane versus sevoflurane in morbidly obese adult surgical patient: a prospective randomized study. *Anesth Analg.* 2004;99(6):1848–1853. Available from: <https://doi.org/10.1213/01.ane.0000136472.01079.95>.
- Eger EI, Bowland T, Ionescu P, Laster MJ, Fang Z, Gong D, et al. Recovery and Kinetic Characteristics of Desflurane and Sevoflurane in Volunteers after 8-h Exposure, including Kinetics of Degradation Products. *Anesthesiology.* 1997;87(3):517–526. Available from: <https://dx.doi.org/10.1097/0000542-199709000-00010>.
- Loop T, Priebe HJ. Recovery after anesthesia with remifentanyl combined with propofol, desflurane or sevoflurane for otorhinolaryngeal surgery. *Anesth Analg.* 2000;91(1):123–129. Available from: <https://doi.org/10.1097/0000539-200007000-00023>.
- Karlsen KL, Persson E, Wennberg E. Anesthesia, recovery and postoperative nausea and vomiting after breast surgery. A comparison between desflurane, sevoflurane and isoflurane anesthesia. *Acta Anesth Scand.* 2000;44:489–93. Available from: <https://doi.org/10.1034/j.1399-6576.2000.440423.x>.
- Heavner JE, Kaye AD, Lin BK, King T. Recovery of elderly patients from two or more hours of desflurane or sevoflurane anaesthesia †. *Br J Anaesth.* 2003;91(4):502–506. Available from: <https://dx.doi.org/10.1093/bja/aeg221>.
- Larsen B, Seitz A, Larsen R. Recovery of Cognitive Function After Remifentanyl-Propofol Anesthesia: A Comparison with Desflurane and Sevoflurane Anesthesia. *Anesth Analg.* 2000;90(1):168–174. Available from: <https://dx.doi.org/10.1097/0000539-200001000-00035>.
- Vallejo MC, Sah N, Phelps AL, O'Donnell J, Romeo RC. Desflurane versus sevoflurane for laparoscopic gastroplasty in morbidly obese patients. *J Clin Anesth.* 2007;19(1):3–8. Available from: <https://dx.doi.org/10.1016/j.jclinane.2006.04>.

- 003.
18. Moller JT, Cluitmans P, Rasmussen LS, Houx P, Rasmussen H, Canet J, et al. Long-term postoperative cognitive dysfunction in the elderly: ISPOCDI Study. *Lancet*. 1998;351:857–61. Available from: [https://doi.org/10.1016/s0140-6736\(97\)07382-0](https://doi.org/10.1016/s0140-6736(97)07382-0).
 19. Monk TG, Weldon BC, Garvan CW, Dede DE, van der Aa MT, Heilman KM, et al. Predictors of Cognitive Dysfunction after Major Noncardiac Surgery. *Anesthesiology*. 2008;108(1):18–30. Available from: <https://dx.doi.org/10.1097/01.anes.0000296071.19434.1e>.
 20. Coburn M, Baumert JH, Roertgen D, Thiel V, Fries M, Hein M, et al. Emergence and early cognitive function in the elderly after xenon or desflurane anaesthesia: a double-blinded randomized controlled trial †. *Br J Anaesth*. 2007;98(6):756–762. Available from: <https://dx.doi.org/10.1093/bja/aem103>.

Copyright: © the author(s), 2020. It is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits authors to retain ownership of the copyright for their content, and allow anyone to download, reuse, reprint, modify, distribute and/or copy the content as long as the original authors and source are cited.

How to cite this article: Solanki SK, Parmar MP, Patel HG. Comparison of Intraoperative Hemodynamic and Postoperative Cognitive Recovery Characteristics of Desflurane with Sevoflurane in General Anesthesia. *Acad. Anesthesiol. Int.* 2020;5(2): 151-154.

DOI: dx.doi.org/10.21276/aan.2020.5.2.31

Source of Support: Nil, **Conflict of Interest:** None declared.