

A Hospital Based Observational Study to Assess the Effect of Dexmedetomidine Infusion on Desflurane Requirement and Recovery Characteristics in Entropy Guided General Anaesthesia at Tertiary Care Centre

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Abstract

Background: Newer anaesthetics such as desflurane have smaller blood-gas partition coefficient than older ones like halothane. Desflurane is preferred because it leads to faster onset of anaesthesia and faster emergence from anaesthesia once the administration of the anaesthetic is stopped. However, desflurane is considered to be more expensive than the other volatile anaesthetics. Highly selective alpha two adrenoceptor agonists like Dexmedetomidine reduce anaesthetic requirements. These have been used to measure the adequacy of depth of anaesthesia and to titrate the doses of both intravenous and volatile anaesthetic requirements. This study was designed to compare the effect of Dexmedetomidine infusion on desflurane consumption and recovery characteristics under entropy guided general anaesthesia. **Material and Methods:** Sixty patients aged between 18-55 years belonging to ASA I and II scheduled for elective surgeries under general anaesthesia were randomly divided into two groups. Group D patients received a loading dose of inj Dexmedetomidine 1 µg/ kg, over 10 minutes before the induction of anaesthesia, and 0.5 µg/ kg/ hour infusion following induction of anaesthesia till the end of surgery. Group C patients received similar volumes of normal saline as bolus before the induction and maintenance infusion till the end of the surgery. Desflurane concentration was adjusted to maintain response entropy values between 40 and 60, and based on clinical variables like heart rate (HR), and mean arterial pressure (MAP). Muscle relaxation was guided by TOF count. At end of surgery, desflurane was discontinued and patient extubated after adequate recovery and when TOF ratio was more than 0.9. Time to eye opening, extubation, response to verbal commands were recorded. **Results:** The mean consumption of desflurane at the end of one hour was significantly less in the group D with $p < 0.001$ (Group C 22.32 ± 6.30 ml/hr and Group D 14.32 ± 1.76 ml/hr). Eye opening time was significantly less in group D with $p < 0.001$ (Group C 298.42 ± 90.37 secs and Group D 170.56 ± 20.45 secs). Response to verbal commands was significantly faster in group D (270.75 ± 44.34 sec.) compared to group C (426.27 ± 116.12 sec.) ($p < 0.001$). **Conclusion:** Intraoperative Dexmedetomidine infusion reduces desflurane consumption, hastens recovery from desflurane during entropy guided general anaesthesia.

Keywords: Desflurane, Entropy, Dexmedetomidine, Depth of Anaesthesia, Blood Gas Partition Coefficient.

Received: 02 August 2026

Revised: 19 August 2026

Accepted: 07 September 2026

Published: 17 October 2026

INTRODUCTION

The development of anaesthesia since its introduction in 1846 has been phenomenal, long periods of stagnation being occasionally broken by improvements and advances. Continuous attempts were made to investigate into the new anaesthetic agents, the method of their administration, pieces of apparatus for delivering them.

Different concentrations of anaesthetic vapours were tried to increase their safety. Desflurane is a widely used major anaesthetic agent with rapid onset of action and rapid dispersal. It is one of the most commonly used volatile anaesthetic agent and has an excellent safety record. Because it can be irritating to the airways, desflurane is typically used to maintain anaesthesia after induction with other agents.

When general anaesthesia is provided to an adult patient planned for any surgery. The target is to achieve optimal

surgical conditions in terms of anaesthesia, analgesia and proper muscle relaxation, while ensuring a rapid early recovery from the anaesthesia with minimal side effects. Desflurane is currently in widespread clinical use for maintenance of anaesthesia in the adult patients. Desflurane offers an advantage

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DOI:

10.21276/amit.2026.v13.i3.1129

How to cite this article: Yadav P, Katewa MK, Kumar A, Yadav D, Vaibhav. A Hospital Based Observational Study to Assess the Effect of Dexmedetomidine Infusion on Desflurane Requirement and Recovery Characteristics in Entropy Guided General Anaesthesia at Tertiary Care Centre. Acta Med Int. 2026;13(3):690-694.

in long surgical procedures by virtue of decreased tissue saturation.^[1] Though desflurane is gaining popularity because of its rapid emergence and recovery characters its high cost is a hurdle in using it for day to day practices.^[2] Hence studies on reduction in its consumption have gained more importance.

The potential use of α_2 adrenergic receptor agonists in anaesthesia was recognized in patients who were treated with clonidine.^[3] Soon thereafter, a reduction of the MAC of halothane by clonidine was described.⁴ Dexmedetomidine is a highly selective α_2 adrenoceptor agonist, which possesses hypnotic, sedative, anxiolytic, sympatholytic and analgesic properties without producing significant respiratory depression.^[5,6] Sedative and hypnotic drugs have the ability to reduce both the anaesthetic and opioid requirements.^[7-9] Although experience with α_2 agonists as sole anaesthetic is limited, these drugs reduce anaesthetic requirement.^[10] Its sympatholytic effect decreases mean arterial pressure (MAP) and heart rate (HR) by reducing norepinephrine release.^[11,12]

Increasing prevalence of day care surgeries and pressure of demand for value for the expenditure play a major role in choosing the drugs and techniques of anaesthesia. Hence advanced drug monitoring might help to optimize quality of drug delivery, possibly reduce costs and improve patient outcomes. It is not uncommon for there to be critical imbalances between anaesthetic requirements and anaesthetic drug administration.^[13] This inappropriate titration of drugs like under dosing or excess doses might compromise patient outcome.^[14]

Among the various devices available to assess the depth of anaesthesia, BIS and entropy have gained popularity. Compared to BIS, the entropy indices are less interfered with by the electrocautery unit. The entropy parameters are superior to EEG spectral edge frequency regarding robustness against artefacts. Compared to BIS entropy is considered to be more accurate and reliable indicator of hypnotic effect of anaesthetic and sedative drugs.^[15]

Intraoperative infusion of Dexmedetomidine has not only shown to reduce the hemodynamic responses to laryngoscopy and intubation.^[16] but also reduces consumption of sevoflurane.^[17] isoflurane.^[18] intraoperatively. The analgesic potentiating property of Dexmedetomidine also reduces the requirement of intraoperative and post-operative analgesic consumption.^[19] Studies of Dexmedetomidine infusion on consumption of newer and costlier inhalational anaesthetics like desflurane are very sparse. Thus, the present clinical study was undertaken to assess the impact of Dexmedetomidine infusion on desflurane consumption and recovery characteristics in entropy guided general anaesthesia.

MATERIALS AND METHODS

This was a hospital based prospective study done on sixty patients aged between 18-55 years belonging to ASA I and II scheduled for elective surgeries under general anaesthesia at Maharishi Chyawan Govt. Medical College & Rao Tula

Ram Hospital, Koriawas, Narnaul, Haryana, India during one-year period.

Inclusion criteria:

1. Patients aged between 18 to 55 years.
2. Patients belonging to ASA Grade I and Grade II undergoing elective surgeries under general anaesthesia with endotracheal intubation expected to last less than 150 min.

Exclusion criteria:

1. An allergy to adrenergic agonists.
2. A history of uncontrolled hypertension.
3. Heart block greater than first degree.
4. A history of alcohol or drug abuse.
5. Clinically significant neurologic, cardiovascular, renal, hepatic, gastrointestinal diseases.
6. Anticipated difficult airway.

Sampling method: After obtaining informed written consent from patients, patients were randomly divided into 2 groups. Randomization was done based on computer generated randomization list and the patients were allotted accordingly into 2 groups, and the list maintained by the principal investigator without revealing it to any of co investigators till the end of study.

Group D: Patients were given a loading dose of inj. Dexmedetomidine 1 μ g/kg IV made to 20ml with normal saline, over 10 minutes.

Group C: Patients received similar volume of normal saline over 10 minutes.

Methods: With a minimum Fasting state of 6-8 hours before anaesthesia IV access was obtained and standard monitoring consisted of Electrocardiography (ECG), pulse Oximetry, Non-invasive Blood pressure (NIBP), Entropy sensor, Neuromuscular transmission indicator (NMT) and capnography. All patients were pre-oxygenated with 100% oxygen for 3 minutes and inj. Midazolam 0.03mg/kg IV, Inj glycopyrrolate 0.005mg/kg, inj. Fentanyl 2 μ g/kg IV were administered.

Anaesthesia was induced in both groups with inj. Propofol in successive 30 mg doses every 30 seconds until RE drops to 50 and was confirmed with loss of response to verbal commands. Additional doses of inj. Propofol 20-30 mg bolus were given if response entropy values increased beyond 60 before intubation and the total dose of propofol used was recorded. Intubation was facilitated with inj. Vecuronium 0.1mg/kg IV, once ability to mask ventilate the patient was confirmed. Patients were ventilated with 100% oxygen for 3 min following administration of inj. Vecuronium. Anaesthesia was continued with Desflurane in 60% nitrous oxide in oxygen and ventilated to maintain end tidal CO₂ between 35-40 mmHg. The inspired concentration of desflurane was initially set at 3% and then titrated subsequently to maintain response entropy values between 40 and 60, also based on haemodynamic parameters, to maintain heart rate and mean arterial pressure within 20% of baseline values. The fresh gas flow was initially set at 6 lts/ min till there was equilibrium between the set dial concentration and inspired concentration of desflurane and then subsequently reduced to 1.5 lts / min.

Dexmedetomidine was diluted with normal saline in a 20 ml syringe to attain a concentration of 5 μ g/ ml and a maintenance dose of inj. Dexmedetomidine infusion at 0.5 μ g/kg/hour, was

administered till the end of surgery in group D.

The patients in group C received similar volume of normal saline. The patient and the monitoring anaesthesiologist were unaware of the group allocation and the drug infusion. Adequate muscle relaxation was maintained using additional doses of vecuronium as guided by response to Train of Four (TOF) stimulus. All patients received inj. Paracetamol 1000 mg infusion over a period of 30 min after intubation.

Heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), Mean arterial pressure (MAP), peripheral oxygen saturation (SpO₂), end tidal carbon dioxide, response and state entropy values (RE & SE) were recorded at-baseline before induction, after induction, before intubation, 1 minute, 2 min, 3 min, 5 min after intubation and every 5 minutes thereafter, till the end of surgery. Inspired and expired concentrations of oxygen was continuously monitored.

The amount of desflurane consumed was directly recorded from the agent gas monitoring module at the end of first hour after intubation, and at the end of surgery.

A persistent difference of more than 10 between RE and SE values, was considered as inadequate analgesia and additional top ups of inj. Fentanyl 0.5 to 1 mcg/ kg was administered and total dose of fentanyl used was recorded. Bradycardia was defined as heart rate less than 50 beats/min and treated with inj. Atropine 0.6 mg intravenously hypotension was defined as more than 30% decrease in mean arterial pressure from baseline and treated with fluid boluses and inj. Mephentermine if necessary and recorded. Tachycardia and hypertension were defined as more than 20% increase in heart rate and mean arterial pressure from baseline and treated by increasing the depth of anaesthesia and analgesia as required and noted.

Desflurane administration was cut off at the beginning of skin closure and the fresh gas flow was increased to 6L/minute of 100% oxygen at the end of the skin closure. This would define the beginning of recovery period. Residual neuromuscular blockade was reversed with inj. Neostigmine 0.05mg/kg and inj. Glycopyrrolate 0.01mg/kg and patient were extubated after recovery of adequate respiratory effort and muscle power as guided by TOF ratio of >0.9.

Time to extubation was considered as time from discontinuation of desflurane till the patient was extubated. Time for eye opening was considered from the time of discontinuation of desflurane till the time when the patient opened his/ her eyes spontaneously. Time for response to verbal commands was recorded from the time of desflurane cut off till the patient responded to simple verbal commands. If time to extubation exceeded more than 30 minutes from the discontinuation of desflurane, it was

considered as delayed recovery and recorded. Age, sex, body weight, duration of surgery (minutes), duration of anaesthesia (minutes) was recorded.

Post operatively, recovery of patient was assessed using modified Aldrete scoring system at 5, 10, 15, 30, 45 and 60 min after extubation. Haemodynamic parameters were also recorded at same intervals and other side effects if any were noted.

Statistical Methods: Results on continuous measurements are presented on Mean $\pm$ SD (Min-Max) and results on categorical measurements are presented in Number (%). Significance is assessed at 5 % level of significance. Student t test (two tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups (Inter group analysis) on metric parameters. Chi-square/ Fisher Exact test has been used to find the significance of study parameters on categorical scale between two or more groups.

RESULTS

Age distribution was uniformly matched in both groups and the mean age in group D was 36.96 $\pm$ 7.24 years compared to 35.73 $\pm$ 7.38 years in group C (P>0.05). Majority of the patients were females in both the groups. The mean weight of the patients in group D was 50.78 $\pm$ 6.92 kgs and mean weight of patients in group C was 50.72 $\pm$ 6.72 kgs and was clinically and statistically not significant (p>0.05) [Table 1].

Mean total dose of propofol required for induction was 91.32 $\pm$ 9.83 mg in group D and 90.26 $\pm$ 14.26 mg in group P (p>0.05) and was comparable between the two groups.

Duration of surgery was 81.56 $\pm$ 16.75 min in group D and 82.78 $\pm$ 17.35 min in group C (p>0.05) and was comparable in both the groups. The duration of all surgeries did not last for more than 120 minutes [Table 1].

Duration of desflurane use was 74.33 $\pm$ 18.24 min in group D and 74.32 $\pm$ 18.66 min in group (p = 1.0), was clinically and statistically comparable [Table 1].

Consumption of Desflurane at 1 hour was 14.32 $\pm$ 1.76 ml in Group D, whereas in Group C Desflurane consumption was 22.32 $\pm$ 6.30 ml with P value <0.001 which was clinically and statistically highly significant [Table 2].

Total consumption of Desflurane was 20.34 $\pm$ 5.67 ml in Group D and in Group C total desflurane consumption was 28.86 $\pm$ 10.74 ml with P value 0.011 and was clinically and statistically highly significant [Table 2].

Time for eye opening in group D was significantly shorter in group D (170.56 $\pm$ 20.45 sec) compared to group C (298.42 $\pm$ 90.37 sec) (p <0.001). Time to extubation was significantly shorter in group D (230.6 $\pm$ 36.4) compared to group C (368.6 $\pm$ 98.17 sec.) (p <0.001). Response to verbal commands was significantly faster in group D (270.75 $\pm$ 44.34 sec.) compared to group C (426.27 $\pm$ 116.12 sec.) (p <0.001) [Table 3].

Table 1: Comparison of demographic and clinical variables in between group

Variables	Group D (N=30)	Group C (N=30)	P-value
Age (yrs) (Mean $\pm$ SD)	36.96 $\pm$ 7.24	37.53 $\pm$ 7.38	>0.05
Gender	Male	5	>0.05
	Female	25	
Weight (Kg) (Mean $\pm$ SD)	50.78 $\pm$ 6.92	50.72 $\pm$ 6.72	>0.05

Total dose of propofol (Kg)	91.32 ± 9.83	90.26 ± 14.26	>0.05
Duration of Surgery (min.)	81.56 ± 16.75	82.78 ± 17.35	>0.05
Duration of Desflurane used (in min)	74.33 ± 18.24	74.32 ± 18.66	1.000

Table 2: Desflurane consumption at 1 hour and total desflurane consumption

Parameter	Group D	Group C	P value
Desflurane consumption at 1 hour (Mean ± SD)	14.32 ± 1.76	22.32 ± 6.30	<0.001
Total Desflurane consumption (Mean ± SD)	20.34 ± 5.67	28.86 ± 10.74	0.011

Table 3: Comparison of recovery parameters between two groups

	Group D	Group C	P value
Eye opening (sec)	170.56 ± 20.45	298.42 ± 90.37	<0.001**
Time for extubation (sec)	230.6 ± 36.4	368.6 ± 98.17	<0.001**
Response to verbal commands (sec)	270.75 ± 44.34	426.27 ± 116.12	<0.001**

DISCUSSION

Newer anaesthetics such as desflurane have smaller blood-gas partition coefficient than older ones like halothane. Desflurane is preferred because it leads to faster onset of anaesthesia and faster emergence from anaesthesia. However, desflurane is considered to be more expensive than other volatile anaesthetics. Highly selective alpha two adrenoceptor agonists like Dexmedetomidine reduce anaesthetic requirements.

It was observed that Dexmedetomidine infusion reduced the desflurane consumption by 31%, and end tidal concentration of desflurane by 18.5 %. The time for eye opening and extubation were shorter and response to verbal commands was faster in patients receiving Dexmedetomidine infusion.

Use of monitors based on the principle of EEG have made significant contributions towards understanding the changes that occur in the activities of brain during anaesthesia. The development of various monitors which measure the state of consciousness during anaesthesia would also enable a safe and cost-effective procedure.

An EEG or Auditory evoked potential based monitor would enable objective, reproducible and continuous measurement of anaesthetic depth even when the patient is fully paralysed or lost all response to painful external stimuli.^[20]

There are many studies which reported the influence of Depth of Anaesthesia monitoring on consumption of anaesthetic drugs. A common protocol was used in most of these studies, wherein a standard group was compared with one or two study groups in which titration of the anaesthetic drug depended on the selected Depth of Anaesthesia monitors like BIS, Narco trend, Auditory evoked potential and Spectral entropy.

Khan ZP et al,^[21] in their study on human volunteers assessed the effect of different plasma concentrations of Dexmedetomidine on isoflurane requirements. They observed that there was dose dependent decrease in isoflurane requirement, with higher plasma concentrations of Dexmedetomidine producing greater decreases in isoflurane requirement. C R Patel et al,^[22] in their study assessing the effect of Dexmedetomidine on sevoflurane consumption, used 1 mcg/ kg of Dexmedetomidine as initial bolus followed by 0.2 to 0.8 mcg/ kg infusion throughout the surgery and observed 21% reduction in sevoflurane

consumption.

Dr. Neha Garg and co workers,^[23] comparing two different doses of Dexmedetomidine infusion (0.2 mcg/ Kg/ Hr versus 0.4 mcg/ kg/ hr infusion) as an anaesthetic adjuvant for maintenance of anaesthesia in patients undergoing major surgeries observed that group which received Dexmedetomidine 0.4 µg/kg/hr (Group B) showed a maximum reduction of 41.3% in the mean Isoflurane concentration requirement compared to the group which received Dexmedetomidine 0.2mcg/kg/hr (31.4%).

Kaymak C et al,^[24] in their study comparing two different doses of Dexmedetomidine on haemodynamic parameters during desflurane based BIS guided general anaesthesia, found that there was increase in heart rate compared to baseline during intubation in both groups. There was no significant change in mean arterial pressures between two groups. However, there was no significant increase in heart rate noted in present study during intubation in Dexmedetomidine group, which may be attributed to administration of initial bolus, in addition to infusion, in contrast to only infusion of Dexmedetomidine by Kaymac et al.

The present study has limitations. Recovery of cognitive functions, assessed using tests such as digit substitution test were not done in this study, as the primary focus was on early recovery.

Further studies may be done to assess the effect of Dexmedetomidine infusion on cognitive recovery in addition to recovery from anaesthesia during desflurane based anaesthesia and also dose response relationship between the Dexmedetomidine infusion and desflurane consumption may be studied.

CONCLUSION

Our study concludes that Dexmedetomidine infusion reduces desflurane consumption, and hastens recovery from anaesthesia without causing significant haemodynamic disturbances during desflurane based entropy guided general anaesthesia.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Barash, Paul G, Cullen, Bruce F., Stoelting, Robert K. Clinical Anesthesia, 5th Edition Lippincott Williams & Wilkins, USA. 2006:384-388.
- Edmond I-Eger II Inhalational anaesthetics uptake and distribution; Millers Anaesthesia Lavs I Ericsson. Lee A. Fleischer Jeanine P. Weiner-Kronish. William L. Young. Churchill Livingstone Elsevier; Philadelphia. 7th edition 2005. Page 554-558.
- Maze M, Tranquil w: Anesthesiology 1991;74:581.
- Ronald. D. Miller. Miller's Anaesthesia, 8th edition Elsevier. 2015;854.
- Hall JE, Uhrich TD, Barney JA, Arain SR, Ebert TJ. Sedative, amnestic and analgesic properties of small-dose Dex infusion. Anaesth Analg. 2000;90:699-705.
- Talke P, Richardson CA, Scheinin M, Fisher DM. Postoperative pharmacokinetics and sympatholytic effects of Dexmedetomidine. Anesth Analg 1997;85:1136 – 428.
- Aantaa R, Taakola ML, Kallio A, Kanto J. Reduction of the minimum alveolar concentration of isoflurane by Dexmedetomidine. Anaesthesiology 1997;86:1055-1060 .
- Aho M, Erkola O, Kallio A, Scheinin H, Korttila K. Dexmedetomidine infusion for maintenance of anesthesia in patients undergoing abdominal hysterectomy. Anaesth Analg 1992.
- Tanski DR: Monitoring depth of anesthesia. In: Miller RD (ed): Anesthesia, 4th ed. New York: Churchill Livingstone, 1994:1127–59.
- David B . Glick. The autonomic nervous system. Millers anaesthesia. Editors.Lavs I Ericsson. Lee A. Fleischer Jeanine P. Weiner-Kronish. William L. Young. Churchill Livingstone Elsevier ; Philadelphia. 7th edition 2005- 285.
- Talke P, Chen R, Thomas B, Aggarwall A, Gottlieb A, Thorborg P, Heard S, Chung A, Son SI, Kallio A. The hemodynamic and adrenergic effects of perioperative Dexmedetomidine infusion after vascular surgery. Anaesth Analg 2000;90:834-839.
- Guler G, Akin Z, Tosun E, Eskiatascoly, Mizrak A, Boyaci A. Single dose Dexmedetomidine attenuates airway and circulatory reflexes during extubation. Acta Anaesthesiol scand 2005;49:1088-1091.
- Domino KB, Posner KL, Caplan RA, Cheney FW . Awareness during anesthesia, a closed claims analysis. Anesthesiology 1999;90:1053-61.
- Monk TG, Siani V, Weldon BC, Sigl JC. Anesthetic management and one-year mortality after noncardiac surgery. Anesth Analg 2005;100:4-10.
- Sandin RH, Enlund G, Samuelson P, and Lennmarken C. Awareness during anesthesia: a prospective case study. Lancet 2000;355:707-11.
- M.Celik. Z Orhon, S Yuzeer, B. Sen. Different Doses of Dexmedetomidine on controlling haemodynamic responses to intubation. The internet Journal of anaesthesiology 2009; 27(2).
- Kim NY, Kim SY, Yoon HJ, Kil HK. Effect of Dexmedetomidine on sevoflurane requirements and emergence agitation in children undergoing ambulatory surgery. Yonsei Med Journal 2014 Jan; 55 (1) :209-15.
- Aantaa R, Taakola ML, Kallio A, Kanto J. Reduction of the minimum alveolar concentration of isoflurane by Dexmedetomidine. Anaesthesiology 1997;86:1055-1060.
- Gurbert A, Basagan-Moqol E, Turker G, et al Intraoperative infusion of Dexmedetomidine reduces perioperative analgesic requirement. Can J Anaesthesiology 2006 Jul ;53(7):646:52.
- Amornyotin somachai: monitoring for depth of anaesthesia: A review; Journal of biomedical graphics and computing, Dec 2012; 2 (2) : 119-27.
- Khan ZP, Munday IT, Jones RM, Thornton C, Mant TG, Amin D. Effects of Dexmedetomidine on isoflurane requirements in healthy volunteers.1: Pharmacodynamic and pharmacokinetic interactions. Br J Anaesth. 1999;83:372–80.
- Patel. C. R et al Effect of Dexmedetomidine on sevoflurane consumption. Ind Jou of Anaes 2013;54:212-215.
- Neha Garg, Dr Rama Upadhyaya and Dr Hetal Parik: Dexmedetomidine infusion as an anaesthetic adjuvant for maintenance of anaesthesia in patients undergoing major surgeries (A comparison of two different doses) International Journal of Biomedical Research. 2014;5(12).
- Kaymac C, Basar H, Doganci N, Sert O, Apan A. The Effects of Perioperative Low - Moderate Doses of Dexmedetomidine Infusion on Hemodynamic and Neuroendocrine Parameters. Turk J Med Sci 2008; 38 (1): 65-71.