



EMERGENCE QUALITY OF DESFLURANE VERSUS SEVOFLURANE IN PATIENTS UNDERGOING GENERAL ANAESTHESIA

Dr. Omais Ali Beigh

Senior Resident, Department of Anaesthesiology, SKIMS Bemina

Dr Basharat Ahad

Associate Professor, Department of Anaesthesiology, SKIMS Bemina

ABSTRACT

OBJECTIVES: To compare the emergence quality of desflurane versus sevoflurane in patients undergoing general anaesthesia.

METHODOLOGY: 40 patients of age between 14-50 years, belonging to ASA grade I and II, scheduled for elective surgeries under general anaesthesia were included in the study.

Patients belonging to ASA grade III and IV, those scheduled for emergency surgeries and patients with anticipated difficult airway were excluded from the study.

The patients were randomised into two groups of 20 each, Group-S and Group-D.

Patients in group-S received Sevoflurane as inhalation agent.

Patients in group-D received Desflurane as inhalation agent

Emergence quality with included restlessness, nausea/vomiting, drowsiness, respiratory depression, headache, laryngospasm

RESULTS: Complications like restlessness, nausea/vomiting, drowsiness, respiratory depression, headache and laryngospasm even though present slightly more in sevoflurane group but statistically insignificant.

CONCLUSION: In comparison of both desflurane and sevoflurane we found that emergence quality was slightly better with Desflurane group as compared to Sevoflurane group but statistically insignificant in our study.

KEYWORDS :

INTRODUCTION:

“Change means that what was before wasn't perfect. People want things to be better.”

--ESTER DYSEN

Two decades have passed since the clinical release of a new inhaled anesthetic. What we have is very good, but it seems wrong to stop just short of perfect. Patient care has been revolutionized by the use of inhalation anaesthetics. There is a constant change in the role and type of these inhalation agents. The need for change and the use of anaesthetics that provide rapid emergence with better quality is on the rise. Volatile anaesthetics, such as desflurane and sevoflurane, can help meet that need.

Sevoflurane is recommended for induction and maintenance of anaesthesia whereas desflurane is meant for maintenance only. Desflurane is a new volatile agent, present study is undertaken to compare the recovery and emergence quality of already existing sevoflurane with recently introduced desflurane.

However, given two different inhalational agents with similar safety, efficacy and emergence profiles, one agent may be chosen over the other. Given this very common clinical consideration, anaesthesia providers are responsible for assessing all factors that influence a patient's medical condition and selecting the optimal anaesthetic protocol. Therefore, it is important for those providers to be knowledgeable regarding the emergence profile for the use of one anaesthetic over the other.

There is a continuous search for an inhalation agent which can be crowned as an ideal inhalational anaesthetic agent. The rapid induction of anaesthesia, precise control on the delivered concentration of the agent and early recovery at the end of anaesthesia and which is independent of the amount of inhalation agent given is facilitated by their low solubility in blood.

The growing challenge to the anaesthesiologist is to exploit the pharmacokinetic advantages of these drugs while minimizing the risks and increased expense associated with the manufacture and increased cost of administration of these new drugs.

Anaesthesia is a delicate balance between the amount of anaesthetic drug administered and the state of arousal of the patient. It is important

to monitor the depth of anaesthesia also as it may reduce the incidence of awareness during anaesthesia (incidence 0.1-0.2%), thereby reducing the amount of anaesthetic used and hasten the emergence and recovery room discharge.

Materials and Methods:

For this prospective, randomized, comparative study 40 patients were randomly allocated by closed envelope method into two groups of 20 each in which group D receives Desflurane and group S receives Sevoflurane. After approval from the ethical committee and written informed consent from patients with ASA physical status I or II who will be scheduled for General Anaesthesia, will be randomized to the desflurane or sevoflurane group.

Patients with clinically significant cardiovascular, respiratory, hepatic, renal, neurologic, psychiatric, or metabolic disease were excluded from the study. Patients with a history of malignant hyperthermia and pregnant, possibly pregnant, or lactating women also were excluded. Atropine, benzodiazepine, and similar drugs were not used as premedications before induction of anaesthesia. Anaesthesia work station was checked.

Appropriate size endotracheal tubes, working laryngoscope with medium and large size blades, stylet and working suction apparatus were kept ready before procedure. After shifting the patient to operating room, IV access was obtained with 18G IV cannula and ringer lactate started.

All patients were preoxygenated with 100% oxygen for 3 minutes before the induction of anaesthesia with fentanyl 1.5 to 2 µg/kg IV and propofol 2mg/kg IV and vecuronium 0.1mg/kg IV. After loss of consciousness, patient were intubated. Anaesthesia was maintained with either sevoflurane 1% to 2% or desflurane 3% to 6% in N₂O:O₂ at a ratio of 60:40.

During the procedure, the patients were monitored by electrocardiography, pulse oxymetry, and noninvasive arterial blood pressure measurement. Volatile concentrations of sevoflurane and desflurane were determined using a multigas analyzer. Sevoflurane was administered using Ohmeda Sevotec-5 and desflurane was administered using Drager D Vapourizer. The inspired concentration of the volatile anaesthetic was adjusted to maintain mean arterial pressure within 20% of baseline values.

During the maintenance period, ventilation was controlled to maintain

normocarbica with a fresh gas flow (4.0 L/min) using a semiclosed circular system. Muscle relaxation was maintained by incremental doses of vecuronium. Fluid was administered at a rate of 10 to 15 ml/kg/hr.

At the end of surgery, inhaled anaesthetics were discontinued. The lungs were ventilated with 100% oxygen at a fresh gas flow rate of 8 L/min. Residual neuromuscular blockade reversed with Inj. Neostigmine 0.05 mg/kg and Inj. glycopyrrrolate 0.01 mg/kg.

Emergence quality was measured from the time of termination of anaesthetic gas.

Parameters evaluated:

Emergence Quality: Restlessness, Nausea and Vomiting, Drowsiness, Respiratory Distress, Laryngospasm, Headache

RESULTS

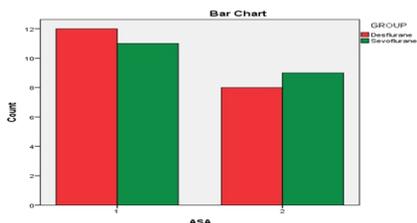
40 patients randomly divided into two groups with 20 patients in Group D (Desflurane) and 20 patients in Group S (Sevoflurane) scheduled for surgery under general anaesthesia was undertaken to assess the recovery time and emergence quality characteristics of the two volatile anaesthetic agents.

	GROUP	N	Mean	Standard Deviation	t	df	P VALUE
Age (in years)	Desflurane	20	36.6	10.399	0.133	38	0.895
	Sevoflurane	20	36.2	8.514			

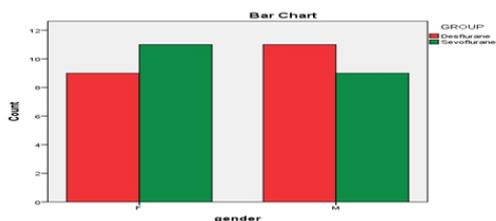
In Table we can see that Comparison of the age between the two groups shows that age is higher in Desflurane group with a t value of 0.133 and is statistically non significant with a p value of 0.895

		GROUP				Chi square	P value
		Desflurane		Sevoflurane			
		Count	Column N %	Count	Column N %		
ASA	1	12	60.00%	11	55.00%	0.102	0.749
	2	8	40.00%	9	45.00%		
Gender	F	9	45.00%	11	55.00%	0.4	0.527
	M	11	55.00%	9	45.00%		

TABLE : CHI SQUARE TESTS FOR CATEGORICAL VARIABLES



BAR CHART : ASA comparison between Desflurane and Sevoflurane groups was insignificant with a p value of 0.749



BAR CHART : Gender comparison is insignificant with a p value of 0.527 indicating that inhalation agents are not gender specific.

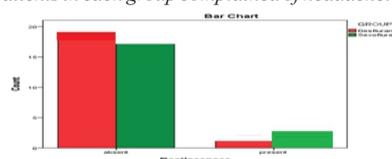
		GROUP				Chi square	P value
		Desflurane		Sevoflurane			
		Count	Column N %	Count	Column N %		
Restlessness	absent	18	90.00%	18	90.00%	0	1
	present	1	10.00%	3	10.00%		
Nausea/Vomiting	absent	18	90.00%	17	85.00%	0.229	0.633
	present	2	10.00%	3	15.00%		

Drowsiness	absent	20	100.00%	19	95.00%	1.026	0.311
	present	0	0.00%	1	5.00%		
Respiratory Distress	absent	20	100.00%	20	100.00%	.	.
	present	0	0.00%	0	0.00%		
Headache	absent	18	90.00%	18	90.00%	0	1
	present	2	10.00%	2	10.00%		
Laryngospasm	absent	20	100.00%	20	100.00%	.	.
	present	0	0.00%	0	0.00%		

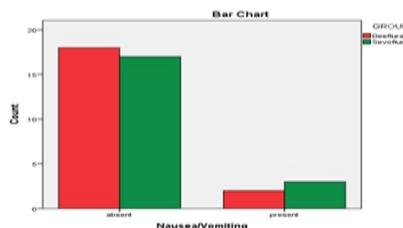
Table : CHI SQUARE TESTS FOR CATEGORICAL VARIABLES.

In Table we see,

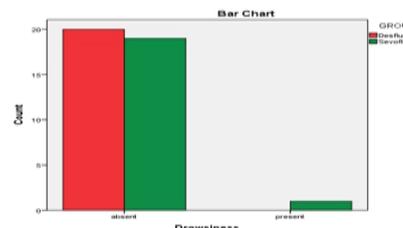
Parameters of emergence quality showed that Restlessness was present in 1 patient in desflurane group and 3 patients in sevoflurane group. Nausea/vomiting were present in 2 patients in desflurane and 3 in sevoflurane group. Drowsiness was seen only in 1 patient in sevoflurane group and none in desflurane group. Respiratory depression and laryngospasm was not found with any patients in both groups. 2 patients in each group complained of headache.



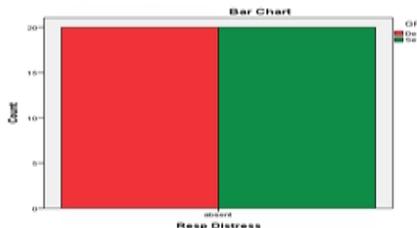
BAR CHART : Emergence quality showed that in desflurane group only 1 patient was Restless as compared to 3 patients in sevoflurane group.



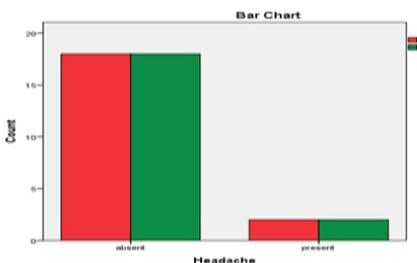
BAR CHART: 3 patients had nausea/vomiting in Sevoflurane group whereas only 2 had in Desflurane group.



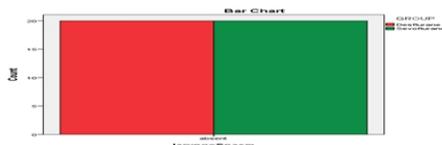
BAR CHART : 1 patient was drowsy in Sevoflurane group whereas none was drowsy in Desflurane group.



BAR CHART: None of the patients had Respiratory depression



BAR CHART : 2 patients from each group complained of headache



BAR CHART: None of the patients had Laryngospasm

DISCUSSION:

Inhalational agents are a part of balanced anaesthesia technique to prevent awareness in conduct of anaesthesia. Present study was conducted on 40 patients. Patients were divided into two groups with 20 patients in each group. In this study, we compared the recovery characteristics which included emergence quality of sevoflurane and desflurane, in patients who were undergoing surgeries under general anaesthesia.

In our study we further compared the emergence quality between the two groups which included the following parameters,

Restlessness was present in 1 patient in desflurane group and 3 patients in sevoflurane group.

Nausea/vomiting were present in 2 patients in desflurane and 3 patients in sevoflurane group.

Drowsiness was seen only in 1 patient in sevoflurane group and none in desflurane group.

Respiratory depression and laryngospasm was not found with any patients in both groups.

2 patients in each group complained of headache.

SUMMARY:

Anaesthetic agents influence and determine the recovery and its quality from anaesthesia. There has been marked improvement in the recovery time and quality of emergence with the newly added inhalational anaesthetic agents which is evident on comparing them with the older inhalational anaesthetic agents.

Desflurane and sevoflurane are newer inhaled anaesthetic agents with a very low blood-gas partition coefficient, which allows for rapid emergence and recovery at the end of surgery. In the present study, we investigated emergence quality of the two inhalational agents.

Study population consisted of 40 ASA I/II patients undergoing elective surgeries under general anaesthesia and randomly divided into two groups, Group D (desflurane) and Group S (sevoflurane). Demographic variables like age, ASA grading were comparable between the two groups. However gender distribution was unequal between the two groups.

Emergence quality as assessed by presence or absence of restlessness, nausea/vomiting, drowsiness, respiratory distress, headache and laryngospasm was almost similar in the both groups but slightly higher in the sevoflurane group.

References:

1. Inhaled Anesthetics. Robert K. Stoelting, Simon C. Hiller; Pharmacology & Physiology in Anesthetic Practice. Lippincott Williams & Wilkins. Fourth edition 2006. Page 64-67.
2. Inhaled Anesthetics. Robert K. Stoelting, Simon C. Hiller; Pharmacology & Physiology in Anesthetic Practice. Lippincott Williams & Wilkins. Fourth edition 2006. Page number 69.
3. Papadimos TJ et al, A suspected case of delayed onset malignant hyperthermia with desflurane anaesthesia. *Anesth Analg* 2004;98:548-549
4. Andrews JJ, Johnston Jr RV: The new Tec 6 desflurane vaporizer. *Anesth Analg* 1993;76:1338
5. Susay SR, Smith MA, Lockwood GG: The saturated vapor pressure of desflurane at various temperatures. *Anesth Analg* 1996; 83:864.
6. Johnston Jr RV, Andrews JJ: The effects of carrier gas composition on the performance of the Tec 6 desflurane vaporizer. *Anesth Analg* 1994; 79:548
7. Edmond I Eger II, Inhaled Anesthetics: 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 568-72.
8. Jindal R, Kumra VP, Narani KK, Sood Jayashree. Comparison of maintenance and emergence characteristics after desflurane or sevoflurane in outpatient anaesthesia. *Indian J Anaesth.* 2011;55:36-42.
9. Singh R, Kharbanda M, Sood N, Mahajan V, Chatterji C. Comparative evaluation of incidence of emergence agitation and post operative recovery profile in paediatric patients after isoflurane, sevoflurane and desflurane anaesthesia. *Indian J Anaesth.* 2012;56(2):156-161.
10. Strum EM, Szenohradszki J, Kaufman WA, Anthonie GJ, Manz IL, Lumb PD.