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Original research article

Comparison of desflurane and sevoflurane for emergence and recovery characteristics in adult patients undergoing prolonged surgeries under general anaesthesia

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Abstract

Background: Ideal general anaesthesia must provide easy initiation, appropriate operating conditions, and rapid recovery with minimal adverse effects. So, study performed for desflurane and sevoflurane as general anaesthetics to compare recovery and emergence on procedure requiring over 4 hours of anaesthesia done on adult patients.

Introduction: Desflurane and sevoflurane are used in general anaesthetics due to administration ease and consistent intraoperative and recovery properties. Their emergence and recovery are limited, this investigation focused on patients need more than four hours of GA. Study contrast Desflurane with Sevoflurane in patients having lengthy GA surgeries by parametric evaluations.

Material and methods: The Command Hospital (Air Force), Bangalore, randomised 80 patients undergoing general anaesthesia procedures between January 2021 and June 2022 after approval from institution's ethical committee. 80 patients included, 40 with Desflurane and 40 with sevoflurane. Chronic opioid or alcohol abusers excluded from the study. SPSS Ver. 24 analysed annexure-data and normal quantitative variables with two-sample t-test. Clinical relevance measured using Student's t-test. All p-values 0.05.

Observation: DES and SEVO required 15.1 ± 4.4 and 19.5 ±5.8 minutes to reach MAS over 9 with 0.0003* p-value. DES and SEVO had mean spontaneous eye-opening times of 8.2 ±2.5 and 9.6 ±3.2 minutes, respectively. DES and SEVO emerged after 12.7 ±3.9 and 17.5 ±5.8 minutes, respectively (p=0.0001). SEVO (9%) exhibited more agitation than DES (5%). 7 suffered throat pain and vomiting.

Conclusion: Desflurane demonstrated faster emergence and recovery than sevoflurane. Both volatile anaesthetics had caused maintenance coughing same side effects, parameters and four-hour GA.

Keywords: Desflurane, Sevoflurane, General anesthesia surgeries

Introduction

To enable quick and simple anaesthetic induction, dependable intra-operative analgesia, and forgetting, novel medications are used in anaesthesia. When the anesthesiologist and patient depend on anaesthetic emergence during lengthy surgeries, this is particularly true. Inhalational and volatile liquid anaesthetics are gaining popularity because of how simple it is to administer them and because of how consistently they emerge and recover. Contrary to usual inhalational anaesthetics, desflurane (0.42) and sevoflurane (0.69) have low blood-gas partition coefficients [1, 2, 3]. If the patient wakes up more quickly, less time will be spent in the post-anesthesia care unit and with their airway exposed. The quality of emergence and rate of recovery are impacted by the anaesthetic method chosen. The best general anaesthesia should result in a painless induction, the best possible operating conditions, and a speedy recovery with the fewest possible side effects, such as nausea, vomiting, and postoperative discomfort.

Desflurane and sevoflurane, two inhaled general anaesthetics, are used the most frequently due to their simplicity of administration and consistent intraoperative and recovery characteristics. Rapid recovery minimises postoperative respiratory complications and ensures early, effective coughing. Sevoflurane and desflurane, two inhalational anaesthetics, may have differing effects on surgical quality and healing time due to their variable pharmacokinetic features. A fluorinated methyl isopropyl ether containing seven fluorine atoms is known as "sevoflurane." It functions in a vaporizer and has a smell. Sevoflurane has a 1.8 MAC. Sevoflurane has quick induction and emergence characteristics and a low blood:gas partition coefficient (0.65 at 37 °C) [4, 5, 6].

A fluorinated methyl ether called desflurane needs to be electrically heated before it may vaporise under pressure. The solubility of blood and tissues is completely decreased by fluorinating ether. Desflurane has a low blood:fat solubility of 27 at 37 °C and a MAC of 6.6 in human tissues and blood. These

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components support induction and recuperation. Desflurane, which was introduced in India after sevoflurane, provides a number of benefits over older inhalation anaesthetics. Desflurane was designed to adhere to ambulatory anaesthesia drugs' standards for quick recovery [6, 7, 8]. Particularly in lengthy surgeries, the pharmacological characteristics of desflurane may lead to a speedier recovery and better emergence than sevoflurane. Many studies have compared the anaesthetic qualities of these two drugs. There isn't much information available for lengthy operations requiring anaesthesia that continue more than four hours. Desflurane and sevoflurane's emergence and recovery properties in long-term anaesthesia patients will be compared in this study at our institution.

Material and Methods

During January 2021 to June 2022, the Department of Anaesthesiology at Command Hospital (Air Force), Bangalore, a tertiary care, referral, and teaching hospital, performed a prospective, randomised, controlled experiment. After receiving written consent, all individuals undergoing lengthy procedures under general anaesthesia were enrolled in the study.

After written consent, 80 individuals meeting inclusion criteria were randomised using a computer-generated process and concealed utilising opaque sealed envelopes [n=40]. Sevoflurane is for Group S, Desoflurane is for Group D. All patients' age, sex, height, weight, etc. were recorded. ASA physical state, co-morbidities, and medications. Both groups had similar pre-op and post-op drugs. Both groups used standardised GA. NIBP, HR, and SPO2 are baseline. Before induction, 2 g/kg of Fentanyl was injected (i.v.). Propofol 2 mg/kg i.v. caused anaesthesia. After confirming ventilation, the patient was given either 1.5 mg/kg Injection Succinylcholine i.v. for a difficult airway or 0.1 mg/kg Injection Vecuronium for a normal airway to secure endotracheal intubation.

"Aldrete Modified Scoring" This post anaesthesia scoring system evaluates patient discharge from PACU (PACU). It has 6 discharge variables, each with 3 weighted answer choices depicting patient condition. The overall score determines discharge recommendation. SPSS 24 analysed Annexure-data. Biochemical markers and other parameters are expressed using mean + SD or median. Absolute or percentage categories. Two-sample t-test normal quantitative variables. Chi-square skews and classifies data. Student's t-test confidence intervals evaluate clinical significance. 0.05 p-values [8, 9].

Inclusion criteria

1. Individuals must be between the ages of 15 and 55 in order to be included.
2. Grade I, II, and III of ASA physical status
3. Individuals who had longer-than-4-hour general anaesthesia procedures and intended to be extubated afterward

Exclusion criteria

1. Important metabolic, neurological, psychiatric, respiratory, hepatic, or cardiovascular disease
2. Heart and cranial surgeries
3. ASA Level III
4. Any issue that could prevent a proper evaluation of the research variables and cause a divergence from the specified anaesthesia plan.
5. An allergy to the anaesthesia being administered that has been medically verified.
6. An individual who takes alcohol or narcotic analgesics on a regular basis.
7. The participant's refusal to take part in the research

Result

Table 1: Gender distribution

Gender distribution	Desflurane	Sevoflurane	p-value
F	21	22	0.82 (χ^2: 0.05)
M	19	18	
M: F Ratio	0.90	0.82	

For the Desflurane and Sevoflurane groups, the male to female ratio was 0.9 and 0.82, respectively. The distribution's p-value of 0.82 indicated that it was not significant.

Table 2: Age distribution

Age	Desflurane	Sevoflurane	Total
21-30	1	3	4
31-40	11	11	22
41-50	9	17	26
51-60	19	9	28
Grand Total	40	40	80

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Mean ± SD (yrs)	46.13 ± 8.31	43.03 ± 8.21	44.58 ± 8.35
p-value	0.097		

The participants' average age was 44.58+ 8.35 years, with similar distribution in both groups (p-value 0.097). Participants in the DES and SEVO groups had median ages of 46.13 ± 8.31 and 43.03 ± 8.21 years, respectively.

Table 3: Height distribution of participants.

Height	Desflurane	Sevoflurane	Total
150-155	8	3	11
155-160	11	8	19
160-165	6	8	14
165-170	4	10	14
170-175	6	5	11
175-180	5	6	11
Grand Total	40	40	80
Mean ± SD (m)	162.9 ± 8.7	165.1 ± 7.8	163.9 ± 8.3
p-value	0.24		

The height distribution of the two agents did not differ statistically (p-value 0.24). 162.9 ± 8.7 cm and 165.1± 7.8 cm, respectively, were the mean values for the DES and SEVO groups.

Table 4: Weight distribution of participants

Weight	Desflurane	Sevoflurane	Total
41-50	5	2	7
51-60	20	20	40
61-70	9	10	19
71-80	4	6	10
81-90	2	2	4
Grand Total	40	40	80
Mean ± SD (kg)	60.9 ± 9.8	62.6 ± 9.6	61.8 ± 9.7
p-value	0.43		

The mean weights for the DES and SEVO groups were 60.9 kg and 62.6 kg, respectively, and there was no statistically significant difference between them (p-value 0.43).

Table 5: BMI distribution of participants

BMI	Desflurane	Sevoflurane	Total
16-19	1	1	2
19-22	16	12	28
22-25	17	23	40
25-28	5	4	9
28-31	1	0	1
Grand Total	40	40	80
Mean ± SD (yrs)	22.89 ± 2.41	22.87 ± 2.12	2.9 ± 2.25
p-value	0.95		

The distribution was non-significant, with the mean values for the DES and SEVO groups being 22.89 ± 2.41 and 22.87± 2.12 kg/m2, respectively (p-value 0.95).

Table 6: ASA classification of patients

ASA	Desflurane	Sevoflurane	Total
I	17	18	35
II	23	22	45
Grand Total	40	40	80
p-value (χ^2)	0.82		

Between 35 patients (43.7%) and 45 patients (56.3%) had ASA grades 1 and 2, respectively. The distribution was not noteworthy (p-value 0.82).

Table 7: Comorbidities of patients

Comorbidities	Desflurane	Sevoflurane	Total
DM	20	17	37
HTN	25	24	49

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DYSLIPIDEMIA	11	2	13
CAD	5	2	7
SMOKING	13	12	25
p-value (χ^2)	0.22		

The most common comorbidity among 49 patients (61.3%) was hypertension, which was followed by diabetes in 37 patients (46.3%), dyslipidemia in 13 patients, and coronary artery disease in 7 individuals. With a p-value of 0.22, the distribution of comorbidities was similar.

Table 8: Surgery duration

Duration	Desflurane	Sevoflurane
241-260	4	2
261-290	5	7
291-320	6	6
321-350	10	5
351-380	6	9
381-410	6	10
411-440	3	1
Mean ± SD (yrs)	338.7 ± 50.6	344.2 ± 46.9
p-value	0.61	

The height distribution of the two agents did not differ statistically (p-value 0.61). The average times for the DES and SEVO groups were respectively 338.7 $\pm$ 50.6 and 344.2 $\pm$ 46.9 minutes.

Table 9: Anaesthesia duration

Duration	Desflurane	Sevoflurane
231-260	4	2
261-290	5	7
291-320	6	6
321-350	10	5
351-380	6	9
381-410	6	10
411-440	3	1
Mean ± SD (yrs)	353.9 ± 50.7	360.1 ± 47.1
p-value	0.57	

There was no statistically significant difference in the distribution of anaesthesia between the two medications (p-value 0.57). The average times for the DES and SEVO groups were respectively 353.9 $\pm$ 50.7 and 360.1$\pm$ 47.1 minutes.

Table 10: MAS scores

MAS	DES 15	SEVO 15	DES 30	SEVO 30	DES 45	SEVO 45	DES 60	SEVO 60
8	0	11	0	0	0	0	0	0
9	17	21	0	3	0	0	0	0
10	23	8	40	37	10	10	10	10

Plots of both groups' MAS scores at 15-minute intervals were made. 17 patients in the DES gp had Mas of 9 at 15 minutes. 11 patients and 21 patients, respectively, received scores of 8 and 9 in SEVO gp. Except for three SEVO gp patients, all patients had scores of 10 at the 30-minute mark. Following that, all patients received ratings of 10.

Table 11: Spontaneous eye opening

Spont eye opening	Desflurane	Sevoflurane	Total
4-6	12	10	22
7-9	15	6	21
10-12	12	16	28
13-15	1	8	9
Grand Total	40	40	80
Mean ± SD (yrs)	8.2 ± 2.5	9.6 ± 3.2	8.9 ± 2.9
p-value	0.03*		

With a significant p-value of 0.03*, the mean spontaneous eye-opening times for the DES and SEVO groups were 8.2 $\pm$ 2.5 and 9.6 $\pm$ 3.2 minutes, respectively.

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Table 12: Extubation time

Extubation	Desflurane	Sevoflurane	Total
3-4	5	0	5
5-6	9	6	15
7-8	11	7	18
9-10	8	5	13
11-12	6	10	16
13-14	1	6	7
15-16	0	6	6
Grand Total	40	40	80
Mean ± SD (yrs)	7.7 ± 2.6	10.5 ± 3.2	9.1 ± 3.2
p-value	<0.0001*		

With a significant p-value of <0.0001*, the mean extubation times for the DES and SEVO groups were 7.7 ± 2.6 and 10.5± 3.2 minutes, respectively.

Table 13: Emergence duration

Emergence	Desflurane	Sevoflurane	Total
6-10	14	5	19
11-15	15	10	25
16-20	11	12	23
21-25	0	10	10
26-30	0	2	2
31-35	0	1	1
Grand Total	40	40	80
Mean ± SD (yrs)	12.7 ± 3.9	17.5 ± 5.8	15.1 ± 5.5
p-value	<0.0001*		

With a significant p-value of 0.0001*, the mean emergence times for the DES and SEVO groups were 12.7 ± 3.9 and 17.5 ± 5.8 minutes, respectively.

Table 14: Orientation Time

Orientation	Desflurane	Sevoflurane	Total
8-10	3	2	5
11-13	13	3	16
14-16	8	3	11
17-19	5	8	13
20-22	8	11	19
23-25	3	7	10
26-28	0	4	4
29-31	0	1	1
32-34	0	1	1
Grand Total	40	40	80
Mean ± SD (yrs)	15.9 ± 4.4	20.3 ± 5.5	18.1 ± 5.4
p-value	0.0001*		

With a significant p-value of 0.0001*, the mean orientation times for the DES and SEVO groups were 15.9 ± 4.4 and 20.3 ± 5.5 minutes, respectively.

Table 15: Time for MAS >9

Time MAS>9	Desflurane	Sevoflurane	Total
8-10	8	3	11
11-13	8	3	11
14-16	10	7	17
17-19	5	8	13
20-22	8	6	14
23-25	1	8	9
26-28	0	2	2
29-31	0	2	2
32-35	0	1	1
Grand Total	40	40	80
Mean ± SD (yrs)	15.1 ± 4.4	19.5 ± 5.8	17.3 ± 5.6
p-value	0.0003*		

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With a significant p-value of 0.0003*, the mean times for the DES and SEVO groups to reach MAS above 9 were 15.1 ± 4.4 and 19.5± 5.8 minutes, respectively.

Table 16: Emergence agitation

Emergence agitation	Desflurane	Sevoflurane	Total
N	36	33	69
Y	4	7	11
Grand Total	40	40	80
p-value (χ^2)	0.33		

The SEVO group had a higher incidence of emergency agitation (7 patients; 9%) than the DES group (4 patients; 5%). With a p-value of 0.33, the distribution was, nevertheless, not significant.

Table 17: Complications of anaesthesia

Complications	Desflurane	Sevoflurane	Total
Sore Throat	2	4	6
Sore Throat, Vomiting	1	6	7
Vomiting	4	4	8
NIL	33	26	59
p-value (χ^2)	0.17		

Six patients in total-two in DES and four in SEVO-reported having both a sore throat and a laryngospasm, four in both groups-four, reported having vomited, and seven reported both. Even though the SEVO group had a greater rate of complications, statistical analysis (2 test) with a p-value of 0.16 revealed that the distribution was not significant.

Discussion

A person in recovery from GA is described as being awake, easily arousable, and attentive of his surroundings and/or identity. The patient awakens as a result of the clearance of anaesthetic gases from the central nervous system when the alveolar concentration falls to 30% of the minimum alveolar concentration (MAC). Patients can now heal quickly and safely from surgery thanks to modern fast-acting anaesthetics. The amount of time it takes to recover from anaesthesia depends on the extent of the procedure, the type of anaesthetic used, and any unpleasant stimulation. Delayed awakening from anaesthesia is a typical side effect that is primarily impacted by the type of anaesthetic agents and medicines used as well as the duration of anaesthesia [9, 10, 11]. The emergence time normally grows along with the duration of anaesthesia. The recovery from anaesthesia is also postponed if long-acting drugs are given at the end of the procedure or soluble volatile agents are kept in place until the surgery is complete. Numerous authors, such as Kaur *et al*., Dupont *et al*., Juvin *et al*., Tachibana *et al*., and Dogru *et al*., have studied anaesthetic recovery in prolonged procedures. However, the surgical procedures in these trials took less time than four hours. When Bastola *et al*. compared neuro-anesthesia with propofol, desflurane, and sevoflurane in their RCT, they were the only ones to find some surgeries taking more than 4 hours. The current study was conducted to compare Desflurane with Sevoflurane with regard to emergence and recovery aspects in patients undergoing lengthy procedures (>4 hours) under general anaesthesia. The "Modified Aldrete Score" was one of the first to report on the topic. Ninety-two people were examined as part of our investigation; seven were eliminated due to exclusion criteria, one had broken protocol, and four had shown a lack of interest in taking part. Eighty patients underwent prolonged anaesthesia, and two groups received desflurane (DES) and sevoflurane anaesthesia (SEVO). Patients who met the study's eligibility requirements and participated in it were essentially the same as those whose parents had objections in terms of age, gender, and the male-to-female ratio. There were just two investigations that examined 100 and 75 patients, respectively, and they were those by Dupont *et al*. and Bastola *et al*. [11, 12, 13].

There were a total of 43 males and 37 women who took part in the trial out of the 80 patients included. Male to female ratios for the Desflurane and Sevoflurane groups were 0.9 and 0.82, respectively. The p-value of 0.82 for the distribution suggested that it was not significant. Kaur *et al*. and Juvin *et al*. reported bigger female populations in their investigations, in contrast to Dupont *et al*. and Dogru *et al*. who had more male patients. The participants' average age was 46.15 years and 11.54 months, and both groups' distributions were comparable (p-value 0.11). The age categories of 41 to 50 years had the highest representation in the study with 26 patients and a 32% contribution, followed by 31 to 40 years with 22 patients and a 29.3% contribution. The median ages of the participants in the DES and SEVO groups were 48.2 and 11.5 years, respectively. Most of them stood between 155 and 160 cm tall [13, 14, 15].

The two agents' height distributions did not differ statistically (p-value 0.24). Patients in the DES and SEVO groups were, on average, 162.9 cm and 165.1 cm taller than each other. 40 patients, or 50%, were

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between 51 and 60 kg, followed by 19 patients, or 24%, who were between 61 and 70 kg. There was no statistically significant difference between the mean weights of the DES and SEVO groups, which were 60.9 ± 9.8 kg and 62.6 ± 9.6 kg, respectively (p-value 0.43). 28 patients (35%) and 40 patients (50%) had BMIs between 19 and 22 and 22 and 25, respectively. The mean BMI for the DES and SEVO groups was 22.89± 2.41 kg/m2 and 22.87 ± 2.12 kg/m2, respectively, and the dispersion was non-significant (p-value 0.95). There was sufficient randomization because the anthropometric traits were comparable between the two groups [16, 17, 18].

ASA grades 1 and 2 were seen in 35 patients (43.7%) and 45 patients (56.3%), respectively. The distribution was unremarkable (p-value 0.82). Hypertension was the most prevalent concomitant condition in 49 patients (61.3%), followed by diabetes in 37 patients (46.3%), dyslipidemia in 13 patients, and coronary artery disease in 7. The distribution of comorbidities was similar with a p-value of 0.22. In none of the preceding investigations was the comorbidity profile of the individuals mentioned. The two groups' procedure times and levels of anaesthesia were comparable. In the DES group, surgeries lasted between 320 and 350 minutes, while in the SEVO group, surgeries lasted between 380 and 410 minutes, with a maximum of 10 patients. The length of the procedure did not statistically differ between the two drugs (p-value 0.61). The average operation time for the DES group was 338.7 minutes and for the SEVO group it was 344.2 minutes. Between the two drugs, there was no statistically significant variation in the anaesthesia distribution (p-value 0.57). The average duration of anaesthesia was 353.9 ± 50.7 minutes for the DES group and 360.1± 47.1 minutes for the SEVO group, respectively. The confounding factors were thus taken out of the study due to the randomization of the patients in both groups [17, 18].

Up to 15 individuals in the DES group had spontaneous eye opening lasting 7-9 minutes. Similar spontaneous eye opening lasting 10–12 minutes occurred in 16 patients in the SEVO group. The mean spontaneous eye-opening times for the DES and SEVO groups were 8.2 ± 2.5 and 9.6± 3.2 minutes, respectively, with a significant p-value of 0.03*. Desflurane, sevoflurane, and isoflurane all had similar periods for eye opening, which Dupont *et al*. found to be 7.2 (4.8), 13.7 (8.5), and 14.3 (11.0), respectively (P 0.0001). According to Kaur *et al*., the length of their procedures was much shorter and desflurane took less time to open the eye than sevoflurane did.

Maximum 11 patients in the DES group had extubation times of 7-8 minutes. Ten patients in the SEVO group had extubation periods ranging from 11 to 12 minutes. The mean extubation times for the DES and SEVO groups were 7.7 ± 2.6 and 10.5 ± 3.2 minutes, respectively, with a significant p-value of 0.0001*. Tracheal extubation times with desflurane, sevoflurane, and isoflurane were 8.9 (5.0), 18.0 (17.0), and 16.2 (11.0) min, respectively, according to Dupont *et al*. (P 0.0001). Juvin *et al*. reported that desflurane extubation times were 6.9 +/- 3 min.

For a maximum of 13 patients in the DES group, orientation times ranged from 11 to 13 minutes. 11 individuals in the SEVO group had orientation durations of 20 to 22 minutes. The mean orientation times for the DES and SEVO groups were 15.9± 4.4 and 20.3± 5.5 minutes, respectively, with a significant p-value of 0.0001*. In the DES group, most patients emerged between 6 and 15 minutes, but in the SEVO group, most patients emerged between 11 and 25 minutes. The mean emergence times in the SEVO and DES groups were 17.5 ± 5.8 minutes and 12.7 ± 3.9 minutes, respectively, with a significant p-value of 0.0001*. According to Bastola *et al*., desflurane patients' emergence times were 8.1-4.2 min while sevoflurane patients' emergence periods ranged from 10.3 to 3.4 min [18].

At intervals of 15 minutes, plots of the MAS scores for both groups were created. Only 17 patients in the DES group still had a Mas of 9 after 15 minutes. 11 and 21, respectively, of the patients in the SEVO group achieved scores of 8 and 9. Except for three patients in the SEVO group, all patients had scores of 10 at the 30-minute mark. Each patient was then given a score of 10. It took 8 to 16 minutes for the majority of the 26 patients in the DES group to reach MAS over 9. The majority of the 22 patients in the SEVO group took between 17 and 25 minutes to reach MAS over 9 in this group [19, 20]. The average time for the DES and SEVO groups to reach MAS above 9 was 15.1± 4.4 and 19.5 ± 5.8 minutes, respectively, with a significant p-value of 0.0003*.

It was found that the SEVO group had more patients who became agitated during an emergency (7 patients, or 9%) than the DES group (4 patients, or 5%). However, the distribution was inconsequential with a p-value of 0.33. In all, 6 patients-2 in DES and 4 in SEVO-reported experiencing both a sore throat and a laryngospasm, 4 patients-4 in each group-reported experiencing vomiting, and 7 patients reported experiencing both. Statistical analysis (2 tests) found that the distribution was irrelevant with a p-value of 0.16 despite the SEVO group having higher complication rates. Bastola *et al*. only reported PONV in the desflurane group. He also discussed the prevalence of seizures linked to both drugs in the immediate aftermath of surgery. There were no similar incidents recorded in our group [20].

Conclusion

Randomly assign 80 patients having long-term anaesthesia to DES or SEVO. 43 males and 37 women participated in the study. Desflurane and Sevoflurane have 0.9 and 0.82 M/F ratios. DES and SEVO participants averaged 48.2± 11.5, 44.07 ± 11.2. DES and SEVO averaged 162.9± 8.7 and 165.1± 7.8 cm. DES averaged 60± 9.8 kg and SEVO 62.6± 9.6 kg. DES and SEVO averaged 22.89 ± 2.41 and 22.87±

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2.12 kg/m2. All anthropometrics were normal. 35 (43.7%) patients had ASA grade 1, 45 (56.3%) grade 2. Insignificance (p-value 0.82). (p-value 0.82). Comorbidities included hypertension and diabetes. DES and SEVO surgeries lasted 338.7± 50.6 and 344.2 ± 46.9 minutes. DES and SEVO anaesthesia lasted 353± 50:7 and 360± 47.1. 17 DES patients had 15-minute MAS 9. 11 SEVO patients scored 8; 21 scored 9. DES and SEVO required 15.1± 4.44 and 19.5± 5.8 minutes to reach MAS over 9 with 0.0003* p-value. DES and SEVO had mean spontaneous eye-opening times of 8.2± 2.5 and 9.6± 3.2 minutes, respectively. DES and SEVO had mean extubation times of 7.7 ± 2.6 and 10.5 3.2 minutes, respectively. DES and SEVO emerged after 12.7 ± 3.9 and 17.5± 5.8 minutes, respectively (p=0.0001). DES and SEVO had mean orientation times of 15.9 ± 4.4 and 20.3 ± 5.5 minutes, respectively. SEVO (9%) had more emergent agitation than DES (5%). 7 individuals developed sore throat, laryngospasm, and vomiting (2 in DES, 4 in SEVO).

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References

1. Smiley RM, Ornstein E, Matteo RS, Pantuck EJ, Pantuck CB. Desflurane and isoflurane in surgical patients: comparison of emergence time. The Journal of the American Society of Anesthesiologists. 1991;74(3):425-428.
2. Green MS, Green P, Neubert L, Voralu K, Saththasivam P, Mychaskiw G. Recovery following desflurane versus sevoflurane anesthesia for outpatient urologic surgery in elderly females. Anesthesiology and Pain Medicine, 2015, 5(1).
3. Patel SS, Goa KL. Sevoflurance: A review of its pharmacodynamic and pharmacokinetic properties and its clinical use in general anaesthesia (vol 51, pg 660, 1996). Drugs. 1996;52(2):253-253.
4. White PF, Tang J, Wender RH, Yumul R, Stokes OJ, Sloninsky A, *et al*. Desflurane versus sevoflurane for maintenance of outpatient anesthesia: the effect on early versus late recovery and perioperative coughing. Anesthesia & Analgesia. 2009;109(2):387-393.
5. McKay RE, Malhotra A, Cakmakkaya OS, Hall KT, McKay WR, Apfel CC. Effect of increased body mass index and anaesthetic duration on recovery of protective airway reflexes after sevoflurane vs desflurane. British Journal of anaesthesia. 2010;104(2):175-182.
6. White PF, Tang J, Wender RH, Yumul R, Stokes OJ, Sloninsky A, *et al*. Desflurane versus sevoflurane for maintenance of outpatient anesthesia: the effect on early versus late recovery and perioperative coughing. Anesthesia & Analgesia. 2009;109(2):387-393.
7. Callaway JK, Wood C, Jenkins TA, Royse AG, Royse CF. Isoflurane in the presence or absence of surgery increases hippocampal cytokines associated with memory deficits and responses to brain injury in rats. Behavioural brain research. 2016;303:44-52.
8. Royse CF, Andrews DT, Newman SN, Stygall J, Williams Z, Pang J, *et al*. The influence of propofol or desflurane on postoperative cognitive dysfunction in patients undergoing coronary artery bypass surgery. Anaesthesia. 2011;66(6):455-464.
9. Mahmoud NA, Rose DJA, Laurence AS. Desflurane or sevoflurane for gynaecological day- case anaesthesia with spontaneous respiration? Anaesthesia. 2001;56(2):171-174.
10. White PF, Tang J, Wender RH, Yumul R, Stokes OJ, Sloninsky A, *et al*. Desflurane versus sevoflurane for maintenance of outpatient anesthesia: the effect on early versus late recovery and perioperative coughing. Anesthesia & Analgesia. 2009;109(2):387-393.
11. Royse CF, Newman S, Williams Z, Wilkinson DJ. A human volunteer study to identify variability in performance in the cognitive domain of the postoperative quality of recovery scale. Anesthesiology. 2013;119(3):576-581.
12. Heiberg J, De Steiger R, Reilly S, Richardson M, Dawson P, Williams Z, *et al*. Supplemental sedation with propofol or light general anesthesia with desflurane as adjuncts to general anesthesia in patients undergoing total hip replacement: A randomized pilot study assessing the effect on cognitive recovery. Archives of Psychology, 2017, 1(1).
13. Newman S, Wilkinson DJ, Royse CF. Assessment of early cognitive recovery after surgery using the P ost- operative Q uality of R ecovery S cale. Acta Anaesthesiologica Scandinavica. 2014;58(2):185-191.
14. Morgan GE, Mikhail MS, Murray MJ. Anesthesia for genitourinary surgery. Clinical anesthesiology. 3rd ed. New York: McGraw-Hill, 2002, 695-6.
15. McLaughlin DF, Eger EI. Repeated isoflurane anesthesia in a patient with hepatic dysfunction. Anesthesia & Analgesia. 1984;63(8):775-778.
16. Sakai EM, Connolly LA, Klauck JA. Inhalation anesthesiology and volatile liquid anesthetics: focus on isoflurane, desflurane, and sevoflurane. Pharmacotherapy: The Journal of Human Pharmacology and Drug Therapy. 2005;25(12):1773-1788.
17. Sdrales LM, Miller RD. Anesthesia Review: A Study Guide to Anesthesia, and Basics of

ISSN:0975 -3583,0976-2833 VOL13, ISSUE 08, 2022

Anesthesia. Churchill Livingstone. 2001.
18. Tempelhoff R, Snow CP. The new inhalational anesthetics desflurane and sevoflurane are valuable additions to the practice of neuroanesthesia: con. Journal of neurosurgical anesthesiology. 1997;9(1):9-71.
19. Sakai EM, Connolly LA, Klauck JA. Inhalation anesthesiology and volatile liquid anesthetics: focus on isoflurane, desflurane, and sevoflurane. Pharmacotherapy: The Journal of Human Pharmacology and Drug Therapy. 2005;25(12):1773-1788.
20. Pappas AL, Sukhani R, Lurie J, Pawlowski J, Sawicki K, Corsino A. Severity of airway hyperreactivity associated with laryngeal mask airway removal: correlation with volatile anesthetic choice and depth of anesthesia. Journal of clinical anesthesia. 2001;13(7):498-503.