COMPARISON OF ANAESTHETIC AGENTS PROPOFOL AND DESFLURANE FOR ELECTIVE SURGERIES IN COVID RECOVERED PATIENTS

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Abstract:

Background: Desflurane is noted for having a quick onset and quick offset of action, which enables the anaesthetist to quickly modulate the depth of anaesthesia.

Objective: To contrast the effects of desflurane and propofol when used as a single agent for brief elective procedures in COVID recovered patients.

Materials and Methods: Eighty patients scheduled for elective brief surgery were included in this hospital-based prospective comparative analysis who were recovered from COVID. Patients were given either Group D: O2:N2O (50:50) + Desflurane 3-4% OR Group P: O2:N20 (50:50) + Propofol 2.5 mg/kg after undergoing regular pre-anaesthetic workup. Between the two groups, comparisons were made for baseline data, pertinent intraoperative information, procedural simplicity, hemodynamic changes, recovery, and complication rate. With SPSS version 22, statistical analysis was carried out.

Results: The two groups' jaw opening, LMA insertion trial, and ease of insertion were comparable ($p>0.05$). The time to LMA insertion and loss of consciousness were both markedly accelerated by propofol ($p <0.05$). Participants in the desflurane group had mean arterial pressure and mean pulse rates that were considerably greater ($p <0.05$).

Conclusion: An LMA could be inserted under favourable conditions with inhaled desflurane, and the intraoperative hemodynamic profile remained stable during anaesthesia. Desflurane could be considered as a substitute induction agent when inhalational induction is necessary.

Key words: COVID, elective surgery, day care surgery, Desflurane, Propofol, Inhalational agent.

INTRODUCTION

Desflurane acts swiftly, both during its start and aftereffects, and hence the anaesthetist can rapidly adjust the level of anaesthesia. [1,2] Additionally, even in the presence of hypotension, it seems to provide relatively cardio-stable anaesthesia with preservation of tissue perfusion.[1] Nonetheless, two studies[3,4] have shown that when paired with opioid premedication, regulated desflurane induction can be quick and well tolerated. In another study, the prevalence of coughing dropped from 25% to 5% in the presence of fentanyl.[5] Currently, a popular induction drug for surgical anaesthetic is intravenous propofol. When it comes to inducing anaesthesia,

sodium thiopental has largely been replaced by propofol because of its faster and more transparent recovery time. But its potent smell and tendency to irritate the upper airway makes it inappropriate for maintenance, and specifically for producing anaesthesia, according to several anesthesiologists.[6,7] Thus, the current study compared desflurane and propofol as the only anaesthetic agents for quick elective procedures in COVID recovered patients.

MATERIALS AND METHODS

It was a hospital-based prospective comparative study conducted from April 2023 - August 2023. For the elective brief operation scheduled, 80 patients were selected who suffered from COVID (mild and moderate cases) in the past and have been recovered from the same and came to the hospital. The record of these patients was updated from the medical record section of the tertiary care hospital. Patients were divided into two groups of 40 each after receiving written informed consent from them & taking valid permission from the institutional ethical committee. Convenience sampling technique was used.

Inclusion Criteria:

- Age group: 18 to 60 years
- Mild to moderate COVID recovered patients
- ASA grade I – II
- Elective short surgeries – requiring general anaesthesia with laryngeal mask airway placement e.g. fibroadenoma, hernia, fistula, appendicitis

Exclusion Criteria:

- Severe COVID recovered patients
- Allergy to propofol /Egg allergy
- History of upper respiratory tract infection within 1 month of surgery
- Documented uncontrolled hypertension/chronic obstructive pulmonary disease
- Addiction to alcohol/drug abuse

METHODOLOGY

Patients were visited the night before surgery and informed about the procedure, anaesthesia, post-operative pain treatment, rescue medication, etc.

Following premedication with glycopyrrolate 0.004 mg/kg, fentanyl 3 mcg/kg, and midazolam 0.03 mg/kg and preloading with ringer's lactate 5-8 ml/kg, anaesthesia was induced with either Group D: O2:N2O (50:50) + Desflurane 3-4% by the tidal volume induction technique, stepping up by 1% with each breath; OR with Group P: O2:N20 (50:50) + 2.5 mg/kg of propofol.

The following factors for each group were observed - Conditions during LMA insertion: number of attempts in both the desflurane and propofol groups, time to loss of consciousness, LMA insertion, jaw opening & ease of insertion.[8]

Degree of jaw opening:

- ✓ Good: Jaw fully opened
- ✓ Moderate: Jaw partially opened
- ✓ Poor: Jaw needed to be prized open

Ease of LMA insertion:

- ✓ Good: Insertion smooth and easy
- ✓ Moderate: Insertion followed by cough, gag, excitatory movement that were self-limited and settled without intervention
- ✓ Poor: Insertion was met with resistance and cough, gag, or excitatory movement that required treatment with propofol.

Statistical Analysis:

The SPSS programme version 22 was used to analyse the data. When appropriate, data were statistically characterised using the mean (SD), frequencies (number of cases), and percentages. The independent samples were normally distributed, and the student's 't' test for independent samples was used to compare the quantitative variables between the research groups. Using the Chi square test, categorical data were compared. Statistical significance was defined as a probability value ('p' value) less than 0.05.

RESULTS

Table 1- Participants' baseline information, duration of surgery, time to loss of consciousness, and time to LMA insertion of both the study groups

Variable	Desflurane (n-40)		Propofol (n=40)		'p' value
	Mean	SD	Mean	SD	
Age	28.15	12.10	25.12	7.12	0.10
Weight (kg)	50.21	4.13	49.11	3.17	0.21
Duration of surgery (min)	54.11	12.47	59.49	11.35	0.32
Time to loss of consciousness (sec)	225.11	58.14	41.21	8.27	**0.02***
Time to LMA insertion (sec)	50.21	10.27	37.19	12.02	**0.01***

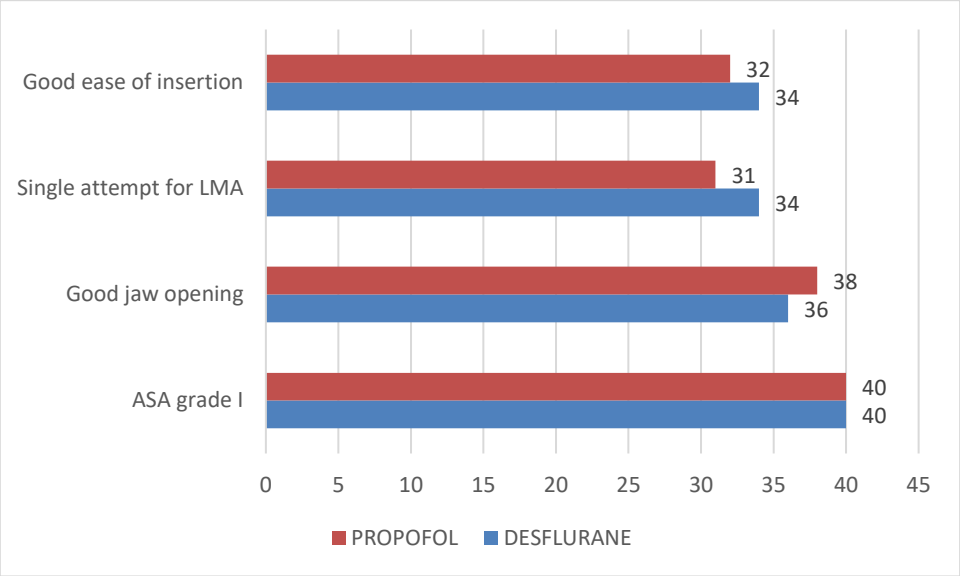
According to table 1, the two groups' demographic characteristics, such as age, weight and duration of surgery were equivalent ($p > 0.05$). Desflurane and propofol groups experienced loss of consciousness in 225.11 and 41.21 seconds, respectively ($p < 0.05$). When compared to the desflurane group, the propofol group's time to LMA insertion was considerably shorter (50.21 sec Vs 37.19 sec; $p < 0.05$).

Table 2- Comparison of pre-operative parameters in both the study groups

Variable	Desflurane (n-40)		Propofol (n-40)		'p' value
	N	%	N	%	
ASA grade I	40	100.0%	40	100.0%	1.21
Good Jaw Opening	36	83.3%	38	90.0%	0.15
Single attempt for LMA insertion	34	86.7%	31	82.0%	1.12
Ease of Insertion -Good	34	86.7%	32	84.0%	0.25

As per table 2; Jaw opening, attempts for LMA insertion and ease of insertion were also comparable in both the groups (p> 0.05).

Figure 1- Comparison of pre-operative parameters in both the study groups



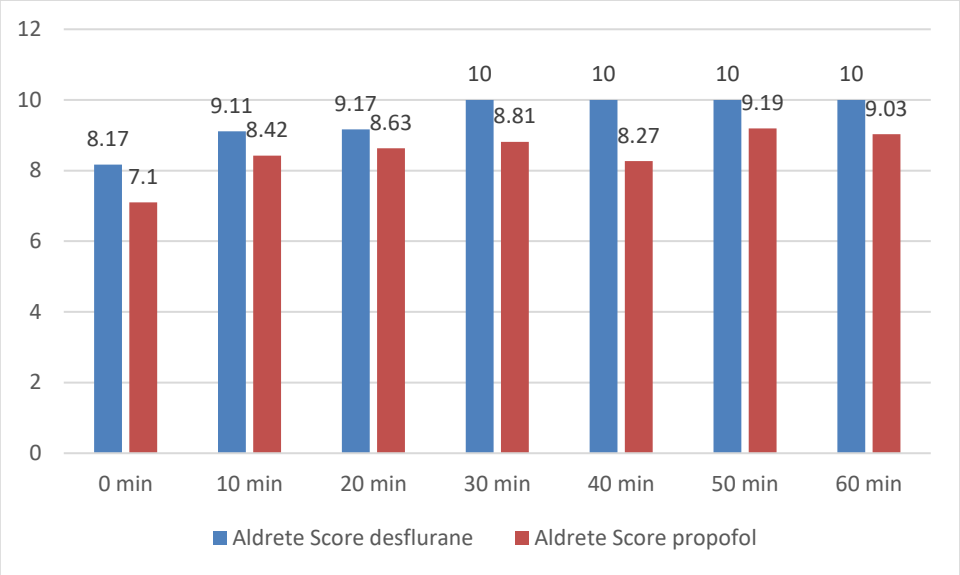
As per figure 1; both groups were compared for pre-operative parameters - good ease of insertion and single attempt for LMA insertion, which were better in desflurane group compared to propofol group, but it was not significant (p>0.05).

Table 3- Comparison of Aldrete score in both the study groups

Aldrete Score	Desflurane (n-40)		Propofol (n-40)		'p' value
	Mean	SD	Mean	SD	
0 min	8.17	0.54	7.10	0.41	0.01
10 min	9.11	0.51	8.42	0.42	0.01
20 min	9.17	0.26	8.63	0.45	0.01
30 min	10	0	8.81	0.34	0.01
40 min	10	0	8.27	0.15	0.01
50 min	10	0	9.19	0.45	0.01
60 min	10	0	9.03	0.49	0.01

The Modified Aldrete score was substantially higher in desflurane group than in propofol group from 0 to 60 minutes after extubation to 1 hour of recovery room stay, according to Table 3 (p <0.05).

Figure 2- Comparison of Aldrete score in both the study groups



As per figure 2, the Modified Aldrete score was substantially higher in desflurane group than in propofol group from 0 to 60 minutes after extubation to 1 hour of recovery room stay.

Table 4- Comparison of side effects in both the study groups

Complications	Desflurane (n-40)		Propofol (n-40)		'p' value
	N	%	N	%	
Cough	7	15.3%	4	8.7%	0.69
Nausea/Vomiting	6	13.3%	3	6.7%	0.27

As per table 4; side effect rate was comparable between desflurane and propofol groups (15.3% Vs 8.7%; 'p' value being 0.69). The main side effects were cough and nausea which were higher in desflurane group as compared to propofol group, but it was not significant (p>0.05).

Table 5- Comparison of pulse rate and Mean Arterial Pressure (MAP) in study groups

Variables	Desflurane (n-40)		Propofol (n-40)		'p' value
	0 min	60 min	0 min	60 min	
Pulse Rate	6	26	3	18	**0.01***
MAP	6	28	3	20	**0.01***

As per table 5; mean pulse rate from 0 min to 60 min and mean arterial pressure at 0 min and from 0 min to 60 min was statistically significantly higher in desflurane group in comparison to propofol group ($p< 0.05$)**.**

DISCUSSION

Desflurane and propofol were examined in the present study as stand-alone anaesthetic drugs. The two groups were comparable with respect to demographic characteristics such as age, weight, and duration of surgery ($p>0.05$) of COVID recovered patients. Jaw opening, LMA attempts, and ease of insertion of LMA were comparable in both the study groups ($p>0.05$). Eighty patients who were scheduled for elective surgery were split into two groups and assigned at random to receive 2.5 mg/kg propofol (n = 40) or tidal breath desflurane (n = 40) as an induction prior to the insertion of LMA.

In a notably shorter amount of time, the propofol group experienced both loss of consciousness and LMA insertion. Our findings corroborated a prospective trial by Wai May Leong and Ee Lyn Ong[7]on LMA insertion with desflurane induction.[7]In a study of sixty-day care patients, Wrigley et al. (2011)[8] investigated the effects of propofol and desflurane on induction and recovery. Desflurane caused loss of consciousness during gaseous inductions in around two minutes. There was a tendency for the desflurane-treated patients to recover from various measures more quickly, albeit not statistically significant. They concluded that desflurane would work well for day care anaesthesia since it would hasten recovery.

The modified Aldrete score was significantly higher in the desflurane group compared to the propofol group between 0 and 60 minutes after extubation and during the patient's hour-long stay in the recovery room ($p <0.05$). This was consistent with a study by Stoelting et al.[9] and Wade[10] that examined the effects of desflurane, sevoflurane, and propofol on the maintenance of anaesthesia and the criteria for release following laparoscopic tubal ligation surgery. Herregods et al[11] and Jennstrup[12]examined the recovery patterns after ambulatory anaesthesia with propofol, isoflurane, sevoflurane, and desflurane in systematic research. They found no differences in the early phases of recovery between both the anaesthetics. However, early recovery was more rapid ($p<0.05$) with desflurane compared to propofol and isoflurane, and with sevoflurane compared to isoflurane.

Our study supported the prospective examination of LMA insertion during desflurane induction conducted by studies Song D[13] and Gupta et al.[14] Eighty patients who were scheduled for elective surgery were split into two groups and assigned at random to receive 2.5 mg/kg propofol (n = 40) or tidal breath desflurane (n = 40) as an induction prior to LMA insertion. Coughing and airway excitation, which are serious issues during desflurane induction, occurred in 5% of individuals. The variance in the prevalence of airway irritation compared to other study (which found rates ranging from 26% to 59%), may be explained by a number of factors.[13] It has been demonstrated that fentanyl lessens respiratory irritation. Using both gases instead of just desflurane in oxygen may have helped minimize the coughing and agitation period since desflurane is more easily absorbed when mixed with nitrous oxide.[14]

CONCLUSION

Propofol and desflurane both have better induction qualities, however desflurane provided stable hemodynamic stability during anaesthesia as well as appropriate conditions for LMA insertion in COVID recovered patients. Desflurane is an alternative induction agent that can be used when inhalational induction is required, although it should still be administered carefully.

Source of Funding: None

Conflict of Interest: None declared.

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