

ORIGINAL ARTICLE**Comparison of Desflurane versus Sevoflurane in patients undergoing elective laparoscopic cholecystectomy**

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ABSTRACT:

Background: Desflurane's low solubility in bodily tissues, such as fat promotes quick induction and recovery. Another halogenated ether that is a volatile anesthetic is sevoflurane. The present study compared Desflurane versus Sevoflurane in patients undergoing elective laparoscopic cholecystectomy. **Materials & Methods:** 70 patients, undergoing elective laparoscopic cholecystectomy were divided into 2 groups, 35 in each group. Group I was Desflurane, and group II was sevoflurane group. The time to eye opening, time to obey verbal command, the time to shifting to recovery, and quality of recovery questionnaire 40 were compared in both groups. **Results:** There were 5 males and 30 females group I and 4 males and 31 females in group II. The mean BMI was 23.7 kg/m² and 22.3 kg/m². ASA Grade (I/II) was 32/3 and 34/1 and the mean duration of surgery was 63.1 minutes in group I and 70.1 minutes in group II. The difference was significant (P < 0.05). The time to eye opening was 3.12 minutes in group I and 6.03 minutes in group II. The time to obey verbal command was 3.64 minutes in group I and 6.68 minutes in group II. The time to shifting to recovery was 5.07 minutes in group I and 7.84 minutes in group II. The mean orientation was 4.42 minutes in group I and 7.02 minutes in group II. The mean value of quality of recovery questionnaire 40 (QoR-40) in group I was 180.3 and in group II was 184.2. The difference was significant (P < 0.05). **Conclusion:** Both inhalational anaesthetic agents were good for maintenance of surgery but early recovery was better with desflurane in comparison to sevoflurane.

Keywords: Anesthetic, Desflurane, Sevoflurane

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INTRODUCTION

For patients in need of general anesthesia, an inhaled anesthetic gas, intravenous propofol, or a combination of the two can be used. Volatile anesthetic gases are less soluble in blood than other anesthetic gases, which enables quick anesthesia recovery. An ideal general anesthetic should provide smooth and rapid induction, optimal operating conditions, and rapid recovery with minimal side effects. A patient must be able to follow instructions, breathe on their own, regain awareness, and reverse any neuromuscular blockade that may have been applied.¹

Even though volatiles are generally safe for patients, inhalation agents do cause respiratory depression; this could still be a problem if the patient is transferred to the post-anesthesia care unit (PACU). Respiratory depression can lead to atelectasis, hypoxia, prolonged hospital or PACU admissions, and hypercarbia. Furthermore, pulmonary aspiration may occur due to the general anesthesia-induced loss of protective airway reflexes.²

Another halogenated ether is desflurane. Desflurane's low solubility in bodily tissues, such as fat (blood solubility of 27 at 37°C and blood partition coefficient of 0.42 in blood), promotes quick induction and recovery. Another halogenated ether that is a volatile anesthetic is sevoflurane.³ Due to low blood:gas

partition (blood: gas partition coefficient of 0.65 and fat: blood solubility 48 at 37°C), it also induces quickly. In order to evaluate the emergence features of the two medications for elective cholecystectomy procedures, a randomized control study was set up.⁴ The main goal was to assess the quality of recovery and early awakening (LIKERT scale) between desflurane and sevoflurane by measuring the duration between eye opening and verbal command response.⁵ The present study compared Desflurane versus Sevoflurane in patients undergoing elective laparoscopic cholecystectomy.

MATERIALS & METHODS

The present study comprised of 70 patients undergoing elective laparoscopic cholecystectomy. Patients' consent was obtained before starting the study.

Data such as name, age, etc. was recorded. Patients were divided into 2 groups, 35 in each group. Group I was Desflurane, and group II was sevoflurane group. Parameters such as duration of surgery, time to eye opening (minutes), time to obey verbal command (minutes), time to shifting to recovery (minutes), orientation and quality of recovery questionnaire 40 (QoR-40) was recorded. Results were subjected to statistical analysis. P value less than 0.05 was regarded as significant.

RESULTS

Table I Demographic characteristics

Parameters	Group I	Group II	P value
Gender (Male: Female)	5/30	4/31	0.05
BMI (kg/m ²)	23.7	22.3	0.34
ASA grade(I/II)	32/3	34/1	0.51
Duration of surgery (minutes)	63.1	70.2	0.03

Table I shows that there were 5 males and 30 females group I and 4 males and 31 females in group II. The mean BMI was 23.7kg/m² and 22.3kg/m². ASA Grade (I/II) was 32/3 and 34/1 and the mean duration of surgery was 63.1minutes in group I and 70.1minutes in group II. The difference was significant (P < 0.05).

Table II Assessment of parameters

Early recovery parameters	Group D	Group S	P value
Time to eye opening (minutes)	3.12	6.03	0.01
Time to obey verbal command (minutes)	3.64	6.68	0.01
Time to shifting to recovery(minutes)	5.07	7.84	0.05
Orientation(minutes)	4.42	7.02	0.03
QoR-40	180.3	184.2	0.05

Table II, graph I shows that the time to eye opening was 3.12minutes in group I and 6.03minutes in group II. The time to obey verbal command was 3.64 minutes in group I and 6.68minutes in group II. The time to shifting to recovery was 5.07 minutes in group I and 7.84 minutes in group II. The mean orientation was 4.42minutes in group I and 7.02minutes in group II. The mean value of quality of recovery questionnaire 40(QoR-40) in group I was 180.3 and in group II was 184.2. The difference was significant (P < 0.05).

DISCUSSION

In order to provide analgesia, amnesia, anesthesia, and muscle relaxation (or paralysis) during surgical procedures, breathing gases are utilized in combination with other drugs.⁶ Inhalation gasses are commonly used for the best outcome in order to promote a quick recovery and produce unconsciousness without discomfort. Although inhalation agents have been used since the 1840s, their exact mode of action on the human brain is still mostly unclear.⁷ Modern anesthetic gasses consist of one non-volatile agent (nitrous oxide) and three volatile agents (isoflurane, sevoflurane, and desflurane).⁸ These gases are used in conjunction with oxygen or room air to induce a slumber-like condition in patients while providing them with adequate oxygen to prevent tissue damage. alleged "anesthetic potency, arrhythmogenic properties, flammability, and chemical stability" of the substance.^{9,10} The present study compared Desflurane versus Sevoflurane in patients undergoing elective laparoscopic cholecystectomy.

We found that there were 5 males and 30 females group I and 4 males and 31 females in group II. The mean BMI was 23.7 kg/m² and 22.3kg/m². ASA Grade (I/II) was 32/3 and 34/1 and the mean duration of surgery was 63.1minutes in group I and 70.1minutes in group II. De Oliveira G Set al¹¹ compared time to awakening and upper airway morbidity between desflurane and sevoflurane using a Laryngeal Mask Airway (LMA) and a balanced anesthetic regimen inclusive of opioids. Patients were randomly assigned to receive desflurane or sevoflurane. The primary outcome was time to awakening as determined by an observer who was

blinded to study group allocation. Secondary outcomes included the frequency of sore throat, cough, and pain perioperatively and at 2 and 24 hours postoperatively. Quality of recovery (QoR; via QoR-40 questionnaire) at 24 hours also was determined. The median (IQR) time to eye opening following desflurane was 6.8 (5.0 - 9.8) minutes versus 11.8 (8.8 - 14.6) minutes following sevoflurane (P < 0.001), or a difference of 5.0 (99% CI 2.3 - 6.8) minutes. The median difference in response to verbal commands was 5.3 (99% CI 2.4 - 7.1) minutes. The frequency of cough, laryngospasm, sore throat, and hoarseness did not differ between groups. Quality of recovery at 24 hours was better in the desflurane group: difference in medians 6 (99% CI 0 - 12; P = 0.003).

We found that the time to eye opening was 3.12 minutes in group I and 6.03 minutes in group II. The time to obey verbal command was 3.64 minutes in group I and 6.68 minutes in group II. The time to shifting to recovery was 5.07 minutes in group I and 7.84 minutes in group II. The mean orientation was 4.42 minutes in group I and 7.02minutes in group II. The mean value of quality of recovery questionnaire 40(QoR-40) in group I was 180.3 and in group II was 184.2. Gupta et al¹² compared the effect of sevoflurane and desflurane anaesthesia on emergence and extubation in children undergoing spinal surgery. Sixty children, aged 1–12 years, undergoing elective surgery for lumbo-sacral spinal dysraphism were enrolled. The demographic profile, haemodynamics, MAS, pain and agitation scores and time to first analgesic were comparable in between the two groups (P > 0.05). The emergence time was shorter in desflurane group (2.75 [0.85–12] min) as compared to

sevoflurane (8 [2.5–14] min) ($P < 0.0001$). The extubation time was also shorter in desflurane group (3 [0.8–10] min) as compared to the sevoflurane group (5.5 [1.2–14] min) ($P = 0.0003$).

CONCLUSION

Authors found that both inhalational anaesthetic agents were good for maintenance of surgery but early recovery was better with desflurane in comparison to sevoflurane.

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