Anaesthesiology

EMERGENCE QUALITY OF DESFLURANE VERSUS SEVOFLURANE IN PATIENTS UNDERGOING GENERAL ANAESTHESIA

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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 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 was compared in both desflurane and 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.

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 anesthetics. There is a constant change in the role and type of these inhalation agents. The need for change and the use of anesthetics that provide rapid emergence with better quality is on the rise. Volatile anesthetics, 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, anesthesia providers are responsible for assessing all factors that influence a patient's medical condition and selecting the optimal anesthetic protocol. Therefore, it is important for those providers to be knowledgeable regarding the emergence profile for the use of one anesthetic over the other.

There is a continuous search for an inhalation agent which can be crowed as an ideal inhalational anesthetic 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 anesthetic used and hasten the emergence and recovery room discharge.

KEYWORDS:

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 anesthesia. 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 Drager D Vapourizer. The inspired concentration of the volatile anesthetic was adjusted to maintain mean arterial pressure within 20% of baseline values.

During the maintenance period, ventilation was controlled to maintain...
normocarbia 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. glycopyrrolate 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.

<table>
<thead>
<tr>
<th>GROUP</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>t</th>
<th>df</th>
<th>P VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (in years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desflurane</td>
<td>20</td>
<td>36.6</td>
<td>10.399</td>
<td>0.133</td>
<td>38</td>
<td>0.895</td>
</tr>
<tr>
<td>Sevoflurane</td>
<td>20</td>
<td>36.2</td>
<td>8.514</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>GROUP</th>
<th>Chi square</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desflurane</td>
<td>0.102</td>
<td>0.749</td>
</tr>
<tr>
<td>Sevoflurane</td>
<td>4.123</td>
<td>0.044</td>
</tr>
</tbody>
</table>

**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.

<table>
<thead>
<tr>
<th>GROUP</th>
<th>Chi square</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desflurane</td>
<td>2.045</td>
<td>0.154</td>
</tr>
<tr>
<td>Sevoflurane</td>
<td>1.026</td>
<td>0.311</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GROUP</th>
<th>Chi square</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desflurane</td>
<td>0.229</td>
<td>0.633</td>
</tr>
<tr>
<td>Sevoflurane</td>
<td>0.294</td>
<td>0.594</td>
</tr>
</tbody>
</table>

**Table :** Chi square tests for categorical variables.

### 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.
**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:**

10. Strum EM, SzemerediSZ J, Kaufman WA, Anthonie GJ, Manz IL, Lumb PD.