CHAPTER III
AIMS AND OBJECTIVES
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1. To evaluate sevoflurane as an inhalational induction agent in adults.
2. To study the effect of addition of 63% nitrous oxide in sevoflurane for induction in adults.
3. To compare sevoflurane (with or without nitrous oxide) with propofol as induction agent.
CHAPTER IV
MATERIAL AND METHODS
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Patient material

The present study was conducted in the Department of Anaesthesiology, Pt. B.D. Sharma PGIMS, Rohtak. A total of one hundred and fifty patients in the age group of 20-40 years of either sex belonging to physical status I or II according to American Society of Anesthesiologists, scheduled for short elective surgical procedure under general anaesthesia where use of LMA was considered appropriate, were included in the study.

Exclusion criteria

Patients having any neurological disease, history of malignant hyperthermia in the family, preexisting renal insufficiency, known hypersensitivity to halogenated hydrocarbons or propofol, upper respiratory tract infection, receiving sedatives or analgesics chronically, hyperactive airways, smokers, pregnant patients and lactating mothers were excluded from the present study.

Clinical evaluation

a. History

Patients were examined one day prior to surgery and a complete history of any past or present illness was obtained with special emphasis on:
* History suggestive of upper respiratory tract infection
* Past history of cardiac problem
* Any history of drug sensitivity especially to lignocaine / propofol

b. Examination

All patients were subjected to complete general physical as well as systemic examination. Basal values of pulse, systolic and diastolic blood pressure were recorded.

c. Laboratory investigations

Routine investigation e.g. haemoglobin, bleeding time, clotting time and urine for albumin and sugar were carried out along with any other specific investigations as required keeping in view the surgical condition of the patient.

Preparation of the patient

After determining the patient fitness for anaesthesia, procedure was explained to all the patients and written informed consent was obtained for participation in the study in a given set of proforma. No premedication was given.

In the operation theatre, after recording baseline blood pressure, pulse rate and haemoglobin oxygen saturation (SpO₂), an intravenous line with 20G cannula was secured in patient's non dominant hand. All patients were explained about the procedure and instructions regarding vital capacity breath and holding of a water filled 20 ml glass syringe by its nozzle between his thumb and index
finger for as long as he could were given. Patients were then randomly allocated to either of the three groups. Randomization was done by drawing a coded envelop from a box containing one hundred and fifty envelops.

Group I (n=50) patients received sevoflurane (8%) in 100% O₂ by face mask using Bain's circuit for induction of anaesthesia.

Group II (n=50) patients received sevoflurane (8%) and 63% nitrous oxide in oxygen by face mask using Bain's circuit.

Group III (n=50) patients received injection propofol 1% at a rate of 0.5ml/sec. until the various end points of induction were achieved.

**PROCEDURE**

**Anaesthesia technique**

Two ml of 1% lignocaine (preservative free) was administered in all patients. All patients breathed room air before the start of induction. In group I the circuit was primed with 8 litres of oxygen and sevoflurane (8%) and in group II it was primed with 3 litres of oxygen, 5 litres of nitrous oxide and 8% sevoflurane. The circuit the desired anaesthetic gas mixture was allowed to run through the bain's circuit with reservoir bag collapsed. During this period the patient end of circuit remained open. After thirty seconds the patient end was closed and the reservoir bag was allowed to fill to its capacity without tension. In group III no priming of the circuit was done.
After asking the patient to breath out to a maximum, the face mask was held tightly on to the patient's face who was instructed to take a maximum deep breath and hold it as long as comfortably possible. Following this vital capacity breath, patients were allowed to resume spontaneous respiration and to breath the same anaesthetic mixture till the dropping of weighted syringe, abolition of eye lash reflex and adequate jaw relaxation. The timing from the start of inhalation through face mask to accomplishment of the above observation were recorded.

In group I and II, the timing were as follows:

\[ T_D = \text{time of dropping the weighted syringe} \]
\[ T_E = \text{time of loss of eyelash reflex} \]
\[ T_J = \text{time of jaw relaxation} \]

In group III while breathing room air propofol 1% was administered at a rate of 0.5 ml/sec to all the patients and the time and dose of propofol was recorded at the time when:

patient dropped a weighted syringe,

the eyelash reflex got abolished,

there was jaw relaxation.

In group III, the time and dosages were as follows:

\[ T_D = \text{time taken from the start of propofol injection till the dropping of weighted syringe} \]
\[ T_E = \text{time taken from the start of propofol injection till the loss of eyelash reflex} \]
\( T_J = \) time taken from the start of propofol injection till jaw relaxation

\( D_D, D_E \) and \( D_J \) were the doses of propofol in mgm at the above mentioned end points respectively.

In all the groups a well lubricated proper sized LMA was introduced after adequate relaxation of jaw was achieved and anaesthesia was maintained using \( O_2 \), nitrous oxide, halothane 0.5% with or without muscle relaxants as dictated by the surgical procedure. The occurrence of excitatory phenomenon (movements, myoclonus); or respiratory problems e.g. cough, breath holding, laryngospasm, bronchospasm, excessive salivation or any other adverse effect, if any was noted during induction as well as while putting the LMA. If the insertion of LMA was not possible on first attempt it was labelled as failed. In these patients the LMA was placed using muscle relaxant. Thereafter anaesthesia was maintained using nitrous oxide, oxygen and halothane with or without muscle relaxant as dictated by the requirement of surgical procedure.

**Monitoring**

In each patient noninvasive blood pressure systolic as well as diastolic, pulse rate and SpO\textsubscript{2} were recorded just before induction, just after induction, after insertion of LMA and at one minute interval for five minutes thereafter. ECG was monitored throughout the study period for occurrence of any arrhythmias. Blood pressure was recorded by Riva Roci method. Pulse rate, ECG and SpO\textsubscript{2} was monitored using L&T Medical stellar pulse oximeter with ECG.
The timings of recordings of the above parameters were as follows:

- \( V_1 \) = Before induction
- \( V_{BL} \) = Just before LMA insertion
- \( V_{AL} \) = Just after LMA insertion
- \( V_1 \) = One minute after LMA insertion
- \( V_2 \) = Two minutes after LMA insertion
- \( V_3 \) = Three minutes after LMA insertion
- \( V_4 \) = Four minutes after LMA insertion
- \( V_5 \) = Five minutes after LMA insertion

Patient's performance of the manoeuvres was categorised as satisfactory or non satisfactory. Satisfactory performance implied just compliance with the instructions. Non satisfactory performance was recorded when the patient did not fully comply with the instruction e.g. by not taking a full vital capacity breath after maximum expiration but when induction was achieved. Finally, when seen after operation, the patients were asked how they would describe the induction procedure, whether they were willing to undergo a similar induction technique again.

All the data was compiled in the proforma attached. At the completion of study, the results were analysed using chi square, t-test, z-test and ANOVA wherever appropriate.