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"COMPARING DESFLURANE TO SEVOFLURANE FOR THE EFFECT OF RECOVERY TIME IN PATIENT UNDERGOING LONG DURATION SURGERY"

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ABSTRACT In long duration surgeries, Due to prolonged duration, more hemodynamic changes occur in the body. This compensatory response of the body to surgical stress& anesthesia increase postoperative complication and morbidities. The use of anesthetic agents that provide fast &smooth induction, hemodynamic stability and allow early recovery are suggested. Both desflurane and sevoflurane are rapidly eliminated with minimum metabolic breakdown. Studies have shown that Recovery from desflurane anesthesia is significantly earlier than recovery from sevoflurane anesthesia.

Aims: To compare effects of desflurane and sevoflurane on recovery time & characteristics in patients undergoing long duration surgery (more than 3 hours)

KEYWORDS : Desflurane and sevoflurane, recovery time, long duration surgeries

INTRODUCTION:

In modern era, ambulatory surgery/ day care or outpatient surgery trends are more popular because of less post - operative complications and early discharge from hospital which provide early mobilization of patients to their routine activity. Advanced technique of surgery and approach decrease duration of surgery. So, more concerns for anesthesiologists to provide anaesthesia for early recovery and emergence.

"Surgery is major stress that not only overwhelms the patient's psychology but also overwhelms physiology & hormone homeostasis".

Complications of Prolonged surgery:

1. Increase surgical stress due to autonomic response
2. More blood loss
3. Endocrine dysfunction- hypo/hyperglycemia
4. More fluid loss – electrolyte imbalance
5. Hypothermia
6. Acid-base disturbances – systemic acidosis (lactic acidosis)

All these complications participate in delayed recovery from general anaesthesia. So, our main goal is to reduce these complications and provide haemodynamically stable environment for surgery. Balanced steady state of anaesthesia (triad of narcosis- unconsciousness + autonomic reflex suppression + muscle relaxation) require for haemodynamic stability during surgery along with better surgical field.

Prolonged duration of surgery requires more time for anaesthesia which lead to delayed recovery & increase post - operative complications and morbidity. The choice of anaesthesia is one of the contributing factors for the speed of recovery from anaesthesia. Inhalation agents with low blood gas partition coefficient like desflurane and sevoflurane.

Both desflurane and sevoflurane are rapidly eliminated with minimum metabolism breakdown (0.02 % & 2-5% respectively) may reduce cognitive dysfunction in surgical patient and fasillating a faster recovery after general anaesthesia.

In this study, the effect of desflurane & sevoflurane on recovery time in long duration surgery more than 3 hours is comparatively investigated. Primary outcome of the study was to evaluate the duration of anaesthesia effect of both agents on recovery time. The secondary outcome was to evaluate other recovery characteristics for discharge criteria

MATERIALS METHODS;

A study of 60 patients of either sex, ASA-I/II/III in the age 20- 55 years was conducted in patients after obtaining inform consent in civil hospital, Ahmedabad during a period from July 2018- Nov 2019.

STUDY DESIGN:

- A randomized, prospective and controlled study was done.
- 60 patients were divided into two equal groups.

1. **Group D**: Desflurane (3-6%) + 50% O_2 & 50% N_2O.
2. **Group S**: Sevoflurane (1-3%) + 50% O_2 & 50% N_2O.

PATIENT SELECTION CRITERIA:

INCLUSION CRITERIA:

- Patients in the age group 20 to 55 years
- Either gender
- Written and informed consent
- ASA GRADE I, II and III patients
- Patient undergoing long duration surgeries (more than 3 hours).

EXCLUSION CRITERIA:

- Those with clinically severe significant cardiovascular, respiratory, hepatic, renal, neurologic, psychiatric or metabolic disease
- ASA GRADE IV and V patients
- Pregnant women
- Morbid obesity (BMI > 40 kg/m^2)
- Those with a history of chronic drug abuse

A thorough preoperative check-up with general physical examination was done.

All the patients were kept nil by mouth after the previous midnight of surgery. After written informed consent, patient will be taken on O.T table & baseline monitoring and all standard monitors including non-invasive blood pressure (NIBP), pulse oximetry (SpO2), electrocardiogram (ECG) and capnography ($EtCO_2$) were attached. After establishing intravenous access using an 18G cannula, ringer lactate was started and pre-operative vital parameters were recorded.

All patients were premedicated with Inj. Glycopyrrolate (0.004mg/kg), Inj. Fentanyl (1-2 mcg/kg) and Inj. Ondansetron 0.15mg/kg intravenously.

After preoxygenation with 100% O_2 for five minutes, patients were induced with Inj. Propofol (2-3 mg/kg) intravenously in both groups, intubation was done with appropriately sized of endotracheal cuffed tube after giving Inj. Succinylcholine (2mg/kg).

Now patients will be randomly divided to one the following groups (group D and group S) and patient will be maintained on desflurane (6% for first 6 mins than 3-4% with 50% O_2 & 50% N_2O and sevoflurane (1- 3%) till end of the surgery.

The inspired concentration of the volatile anaesthetic will be adjusted to maintain MAP within 20% of baseline values. Inj. Fentanyl 0.5 mcg/kg to control acute hemodynamic changes not responding to 50% rise in inspired concentration of volatile agents.

Inj. Vecuronium 0.1 mg/kg used as a muscle relaxant for loading dose and 0.05 mg/kg for maintenance dose. Injection paracetamol 1000 mg was infused IV in every patient.

Desflurane / sevoflurane discontinued 15 minutes before the end of surgery to facilitate rapid emergence from anaesthesia and nitrous oxide was discontinued at the end of surgery.

Neuromuscular blockade was reversed with Inj. Neostigmine 0.05 mg/kg and Inj. Glycopyrrolate 0.008 mg/kg were given immediately after completion of surgery. Extubation was done after adequate recovery from the effects of neuromuscular blockade.

Patients will be monitored for the mean time for various recovery characteristics (respond to painful stimuli, Eye opening, respond to simple verbal commands, Stating name, limb movement). Modified Aldrete Score will be recorded at regular intervals. Time to achieve the Aldrete score of 9 will and Extubation time also be recorded. Patients were observed for adverse events, for example, bradycardia, hypotension, and hypertension during postoperative period in post anaesthesia care unit.

DISCUSSION:

Long duration surgery and its related complications delay recovery of patients and increase postoperative complications. The uses of anaesthetics agents that provide fast and smooth induction, hemodynamically stability & allow fast changes in intensity during maintenance anaesthesia, early recovery and minimal side effects are suggested. Considering these characteristics, our main concerns to choose inhalational anaesthetic agent with low blood gas co-efficient partition. Newer inhalation agents like desflurane and sevoflurane provide faster recovery in long duration of anaesthesia by faster washout with minimum metabolism than older inhalation agents like isoflurane & halothane. In our study our main goal to compare recovery characteristics in two different group receiving desflurane and sevoflurane and impact of duration of anaesthesia on recovery profile.

Recovery characteristics like time to respond painful stimuli, follow verbal command, eye opening, stating name, limb lift and time to achieve Aldrete score of 9 were noted and compared between Group D & group S which suggested that all these achieved faster in desflurane - group D than sevoflurane – group S.

Time to respond to painful stimulus was less in desflurane than sevoflurane group (mean of 4.016(3-6) mins in desflurane and 6.983 (5.5-8.5) mins in sevoflurane group, P value <0.0001) in (Table and graph no. 5)

Time to respond to verbal command was less in desflurane than sevoflurane group (mean of 5.383 (3.5-7.5) mins in desflurane and 8.133 (6.5-10) mins in sevoflurane group, P value(<0.0001)

Time to spontaneous eye opening was also less in desflurane than sevoflurane group (mean of 5.883(4-8) mins in desflurane and 8.966(7-10) mins in sevoflurane group, P value <0.0001)

Time to respond by stating name was less in desflurane than sevoflurane group (mean of 7.916 (5-10.5) mins in desflurane and 11.266 (9.5-14) mins in sevoflurane group, P value (<0.0001)

Time to limb lift was also less in desflurane than sevoflurane group (mean of 8.816 (6-12) mins in desflurane and 13.33 (12-15.5) mins in sevoflurane group, P value <0.0001)

CONCLUSION

In comparison of desflurane vs sevoflurane Time to respond to painful stimuli, respond to verbal command spontaneous eye opening, response by stating name, limb movement and lift was earlier in group D patients than group S patients. Time to achieve Aldrete score of 9 was almost half in desflurane group than sevoflurane. Even after long duration of anaesthesia more than 3 hours, Extubation time was faster in desflurane than sevoflurane.

Postoperative complications nausea and vomiting was observed in 4 patients of group D and 2 patients of group S. Other complications like bradycardia, convulsion, dizziness and respiratory depression was not observed in both groups.

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