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Original Article

Comparison of Sevoflurane and Propofol for Insertion of I-Gel in Patients Undergoing Minor Elective Surgical Procedures Under General Anesthesia

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ABSTRACT

The usage of Propofol is the most common method for the sake of insertion of I-Gel. But when propofol is used it may cause serious problems like swelling or inflammation at the injection site, low blood pressure, and apnea. There is a need to find another better method for providing anesthetics during the insertion of I-Gel. **Objective:** To find out the effects of two anaesthetics propofol and sevoflurane during the insertion of I-Gel. **Methods:** For the sake of the study a group of 66 patients were selected. All of these patients have to go under some surgeries using commonly available an aesthetics. The patients were divided into two groups 33 patients in each group. One group received Propofol before surgery and the other group receive sevoflurane. Then after the insertion of I -Gel, patients were analyzed in detail for all the changes that took place. **Results:** After the insertion of I-Gel, all the physical changes of the patients were analyzed in detail. Both of the study groups were given different drugs, but after surgery, no difference was observed between two groups having different an aesthetic. Both of the group have same heart rate, blood pressure and other insertion details except that Sevoflurane need much time to perform it's an aesthetic function as compared to Propofol. **Conclusion:** After all these experiments, it is inferred that, when the effects of both drugs were compared, Sevoflurance has stability in the case of hemodynamics, it can replace propofol in a number of procedures due to its stability. Propofol does not have so much hemodynamic stability. But when I-Gel insertion has to be performed, Propofol has a better rate of induction as compared to sevoflurane.

INTRODUCTION

In recent years, a new device name "Supraglottics" device is much popular during surgeries on the Air passage way. I-Gel is a cuff less gadget belonging to the second generation. It has a non-billow seal which diminishes different constrictive trauma which is a side effect of other devices. It provides some internal anatomical insignia to the laryngeal, pharyngeal, and per laryngeal assembly. The usage of I-Gel has many advantages like minimization of hemodynamic alterations, laryngoscopy, and relaxation of the muscular system. An adequate quantity of anesthetic is required for the insertion of I-Gel in non-paralyzed patients. For the I-Gel surgery, this device is designed in such a way that, it consists of a mask having morphology like a larynx. By the use of this device, the air passageway received only a limited amount of oxygen. Insertion of I-Gel is that it provides a controlled amount of oxygen to the patient by creating positive pressure. But before the insertion of I-Gel, different anesthetics are given to the

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patients [1]. The main purpose of these anesthetics is to induce unconsciousness before insertion, relaxation of jaws, and controlled oxygen supply without disturbing the heart-related mechanisms. So, before insertion, usually, propofol is recommended in the protocol, but when all the characteristics of different anesthetics were compared, another drug named Sevoflurane came as an option because this drug has much stability in terms of hemodynamics. Sevoflurane has one more advantage, it smells non-pungent as compared to propofol and this drug is not soluble in blood or water, so it can also be an ideal choice for its usage as an anesthetic in case of insertion of I-Gel. This drug has one more advantage it does not cause any irritation in the respiratory system. When this drug was given to the patients it may cause cough, shortness of breath, and laryngospasm [2-3]. This drug also facilitates the rapid insertion of the I-Gel by quickly inducing its effect in the patient. Its induction capacity is quite high as compared to propofol. It leads to unconsciousness for a long time as compared to the other drug. In this study different hemodynamic alteration was observed within two groups having these anesthetics before surgery [4-6]. The efficiency of both of the drugs was compared in this study, to find which one is better and has low side effects as an anesthetic during insertion of I-Gel and is more beneficial with regard to cost and providing better results in case of other surgeries as well [5-8].

METHODS

For this study, clearance from the ethical committee of the institute was got as well as all the information from the patients was taken with their consent. Patients were selected from December 2020 to December 2021. A group of 66 patients was selected and their average age was from 20 to 60 years. All of these patients have to undergo I-Gel insertion. These patients were divided into two groups, i.e. 33 patients in each group. One group was given propofol drug as Anesthesia and the other group was given sevoflurane. Before the insertion of I-Gel, patients were not given food for 6 hours. Before the start of treatment, Anesthesia was given to both of the groups in prescribed quantities (3 mg/kg of propofol with 0.2 mg of glycopyrrolate), in the case of sevoflurane 8% was given to the patients. After providing Anesthesia, its reaction was observed in the patient. The duration of the effect of Anesthesia was also measured and analyzed. Before giving the dose of Anesthesia, the weight of the patients was measured, and the dose was decided according to the weight of the patient. The assessment of the effect of anesthetics was predicted by calling patients by their names. The peak point of Anesthesia was when the reflex action of eyelashes is lost for that particular time. After observing the general aspects of both anesthetics, other parameters were also assessed such as blood pressure, heart rate, the solubility of drugs within the blood, and oxygen absorbance capacity of the blood after giving the dose. The exact dose required to develop complete unconsciousness was also optimized. To analyze the results different statistical approaches were applied such as a t-test for the prediction of alterations in hemodynamics. Probability of error less than 0.05 was considered significant.

RESULTS

A total of 33 patients were taken in group 1 and group 2 respectively. There was no difference found between the age groups in case of both groups. And the results were not significantly variable with respect to body weight distribution as well. The average of the age was 37± 7.2 (SD) and in group S it was 39± 6 (SD). The mean weight that was observed after compiling results came out to be 54± 6 (SD) in case of group P and in case of group S it was 57± 6 (SD) as described in Table 1.

1. Group P or group 1 : Propofol 2.5 mg/kg body weight
2. Group S or group 2: Sevoflurane 8% was introduced

Characteristics	Group 1 Average+SD	Group 2 Average+SD	Unpaired T- test	p-value
Age in years	37+7	39+6	-0.99	0.4
Weight (kg)	54+6	57+6	-2.0	0.052

Table 1: Demographic features of the patients

After using IV propofol the induction was more strongly observed. And the mean of the time of induction that was carried out in group P was 28± 7 (SD) and in case of group S it was 49± 9 (SD). (p=0.005). It was found that there was no change in the mean time of 1- Gel incorporation in the two groups. The mean time that was recorded in sec for I- Gel insertion in case of Group P was 10± 3 (SD) sec and in case of other group 11± 5 (S.D), Table 2.

Variables	Propofol	sevoflurane	p-value
Induction time in sec	28± 7	49± 9	0.001
I Gel time of insertion in sec	10± 3	11± 5	0.57

Table 2: Induction time and insertion of 1Gel

The first attempt to place I-Gel in all patients was successful. There was no statistical significance found between groups in the insertion of I-Gel. The conditions of I-Gel insertions in 27 (80%) patients were found to be successful with a score of 18. And in the remaining 7 (21%) of the patients the result came out to be average, Table 3.

Grading	Propofol group	Sevoflurane group	p-value
Excellent	31 (93%)	27 (80%)	0.2
Satisfactory	2 (6%)	7 (21 %)	0.18

Table 3: Grading of state for I Gel insertion

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Average arterial blood pressure	Baseline	At 1 min	2 min	3 min	4 min	5 min
Group S	98.4	81.5	78.5	78	78.2	78
Group P	92.7	0.7	79.8	68.3	68.1	68
p-value	.3	6.45	.28	.14	.4	.04
Rate of Heart beat						
Group S	95.5	84.5	82	82	82	880
Group P	88.1	76.9	74.3	75	75	75
p-value	0.38	0.18	0.78	0.2	0.17	0.06

Table 4: Assessment of haemodynamic parameters

DISCUSSION

Muhammad A. Nasir invented I-Gel in cooperation with the inter surgical company in 2007. This gel is now very important in the air way control and is used in surgeries with successful rate. After the induction of Anesthesia, a very promising and satisfactory insertion of I Gel is required with a sufficient depth and a proper blunting of airway reflexes is also needed. As compared with endotracheal incubation, the installment of I-Gel is linked with less intense variations in hemodynamics [9-11]. In this study the patients were divided into two groups each containing 33 patients. All the patients were confirmed for fasting and the pre-evaluation of the patients was carried out before administration of Anesthesia [12,13]. Due to its enhanced negative effect on reflexes of airway and because of its prominent jaw relaxation properties, propofol is used as a successful intravenous induction agent. However, it has some adverse side effects including pain, apnea, hypotension etc. If we look that the inhalational induction agents that can used, it was found that sevoflurane is the most effective because of its nice smell and, quick and smooth induction, and less irritation in the respiratory tract as compared to other induction agents. The vital capacity of both sevoflurane is relatable to the bolus introduction of propofol. This is linked with efficient hemodynamic stability and elevated patient approval range [14-16]. It was found that the I-Gel insertion was superior to the working of propofol than the sevoflurane. The excellent conditions that were found were 93% in case of propofol and 80% in case of sevoflurane [17-18]. Quite similar results were found in a study carried out by Chavan et al., by using an exact point of induction in there was loss of eye lash function in both of the participating individuals. Moreover, sevoflurane has been compared to the working of propofol in many studies for the I-Gel analysis. And it was later on found that the reliability, excellent quality and safety of sevoflurane makes it an excellent alternative for propofol in case of adults [19]. The studies show that the comparisons of hemodynamic aspects (heart rate, arterial pressure) between the two groups revealed that there was a prominent difference between these aspects in the two groups. The propofol group depicted lessened arterial pressure as compared to the sevoflurane one. (p=0.007). But after the insertion of I-Gel there was a mean decrease in arterial blood pressure in both groups. There was no prominent variation found the heat rates in both groups. (p=0.09) Moreover, if the heart rate was discussed in the group after every minute there was a significant decrease in the heart rate in case of both groups after the insertion of I Gel as compared to the other strategy mean arterial pressure (MAP). In this study I-Gel was able to be effectively inserted in the patients in the first try. The induction duration was found to be significantly higher in sevoflurane as compared to propofol. These findings are almost same as found by Kannaujia et al., In the present study it was revealed that the hemodynamic parameters were constant and similar in case of both group of patients. However, there was a statistically prominent difference between heart rate (HR) and MAP in propofol group after 3 minutes of induction [20]. Ahmeduddin et al., later on relate the results that the hemodynamic characteristics were constant in case of both groups. Thus we can say that the insertion and the fitting of I- Gel is done speedily and with proper safety in case of propofol. But as far as sevolfurane is concerned it has very efficient hemodynamic response. Sevoflurane can prove to be very useful in case of cardiovascular disorder. If VCB technique is used sevoflurane 8 % can be compared to intravenous delivery of propofol in adults that are carrying out general surgical procedure under Anesthesia. Although according to the studies there is a reasonable amount of time that is required to relax the jaws after using sevoflurane which can lead to hindrance in I-Gel insertion. Sevoflurane can prove to be an excellent alternative of intravenous induction especially in patients that have cardiovascular disease at critical stage or in any case where the propofol can't be used. Sevoflurane is the most desirable alternative of propofol and is used in I-Gel insertions in case of adults [21-22].

CONCLUSION

Propofol is proved to be an efficient for the installment of I-Gel. It is also calmer to perform as compared to other drugs. But sevoflurane has an advantage that it has effective hemodynamic stability therefore it can be efficiently used for patients suffering from cardiovascular disorders.

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