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Evaluation of Intubating Condition using Propofol and Propofol Plus Sevoflurane: A Randomized Controlled Trial

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Abstract

Background and Aims: *The purpose of the present study was*

1) *To study and compare the ease of intubation with combination of Sevoflurane4% and Propofol 1.5mg/kg with IV Propofol 3mg/ kg alone.*
2) *To study the quality of intubation at first attempt.*
3) *To study the hemodynamic response during induction and intubation*

Materials and Methods: *The study was conducted in 80pts of ASA I & II, non obese, adult patients aged between 20-40yrs coming for elective surgical procedures under General Anaesthesia. Anaesthesia was induced in Group A patients by 67% N_2O in O_2 and IV propofo 3 mg/kg injected over 30s. Group B patients were induced by mask with sevoflurane starting at 0.5% and incrementally increased to 4% inhaled concentration with 67% nitrous oxide in oxygen at a total gas flow of 8 liters/min and IV propofol 1.5mg/kg injected over 15s and tracheal intubation was attempted at 240s after the start of induction in both groups. The heart rate, systolic blood pressure, diastolic blood pressure and mean arterial pressure before and after induction and post-intubation at 1, 3 and 5 minutes were recorded. Intubating conditions were assessed by anaesthesiologist who performed intubation using Copenhagen Consensus Conference (CCC)[18] intubation score.*

Results: *Overall acceptable intubating conditions were significantly associated with Group B when compared with Group A. Number of attempts were significantly less in Group B when compared to Group A.*

Conclusion: *We concluded that combination of inhalational 4% sevoflurane with IV propofol 1.5mg/kg is superior to IV propofol 3mg/kg with respect to quality of intubation and less significance with respect to hemodynamic response during induction and intubation in adult patients undergoing various elective surgical procedures without muscle relaxants and also this combination is cost effective.*

Keywords: *Propofol, Sevoflurane, Copenhagen Consensus Conference intubation (CCC)Score.*

Introduction

Airway management is a fundamental aspect of anaesthetic practice and of emergency and critical care medicine. Endotracheal intubation (ETI) is a rapid, simple, safe and non surgical technique that achieves all the goals of airway management, namely, maintains airway patency, protects the lungs from aspiration and permits leak free ventilation during mechanical ventilation, and remains the gold standard procedure for airway

management.

Insufflation of the trachea for the purpose of ether anaesthesia was introduced in 1909 in USA and in 1912 in UK [1].

Neuromuscular blocking agents which aid tracheal intubation were first introduced into the clinical practice in 1942 in USA[1]. The neuromuscular blocking agents have made technique of endotracheal intubation much easier, but not without the risks of subjecting the patient to potential risks. Until early 1990, suxamethonium was the only drug which was used for facilitating tracheal intubation due to its rapid onset and ultra short duration of action, but it has many potential side effects like myalgia, elevated intraocular and intracranial pressures, hyperkalemia, prolonged apnea, masseter spasm and malignant hyperthermia [2-4]. In United States (1993), the FDA has advised that suxamethonium be contraindicated for routine use in children and adolescents [2-5]. This justification was made due to the increased incidence of fatal or near fatal cardiac arrest in children who had received suxamethonium.

Non-depolarizing, neuromuscular blocking agents are alternative, but are slower in onset and they have a prolonged neuromuscular blockade [3] and also an inability to reverse the paralysis quickly if airway management via mask or tracheal intubation is not possible[2-6].The excessive or unnecessary neuromuscular blockade contributes to awareness under general anaesthesia, residual paralysis and sometimes even allergic reactions [7]. So, avoiding muscle relaxants when they are not required for planned procedures, may prevent the complications of their use, misuse and antagonism. Due to these reasons, a method for providing good intubating conditions rapidly without using muscle relaxants has been sought.

Propofol is a short-acting intravenous anaesthetic with high lipid solubility and short elimination half-life. It has been reported to depress pharyngeal and laryngeal reactivity to a greater extent than equipotent doses of thiopental.[8] However, propofol has been associated with several adverse effects, including hypotension, apnea, pain on injection, and excitatory patient movements.[9] Pain on injection can be avoided if propofol is administered after inhalation induction of anaesthesia. Propofol is an appropriate intravenous anesthetic agent for rapid induction and suppression of airway reflexes.

Endotracheal intubation was usually performed under deep inhalation anaesthesia with ether. The same technique was continued with halothane and of late, sevoflurane is gaining attention. Sevoflurane with its relatively pleasant smell, low airway irritability and low blood-gas solubility allowing smooth and more rapid induction and recovery. sevoflurane is frequently used for intubation without muscle relaxants, mostly in children.[10-12] It has also been used in adults alone or in combination with nitrous oxide for intubation without muscle relaxants.[13]

Combination of lesser percentage of halothane with propofol has been studied and concluded that combination of inhalational agent and propofol is ideal for intubation in children.[14] Sevoflurane 8% can be used as tracheal intubation.[15,16] But it is not cost effective. Combination of Sevoflurane 8% and propofol 1.5mg/kg has been tried for Laryngeal Mask Airway insertion.[17] Induction of anaesthesia with a combination of lesser dose of propofol and lesser percentage of sevoflurane with opioid pre-medication may optimize the inserting conditions of endotracheal tube and decrease the side effects that may follow with propofol alone.[17]

Hence an attempt was made with a combination of lesser percentage of Sevoflurane with reduced dosage of Propofol for intubation with endotracheal tube to evaluate intubation conditions, hemodynamic response during induction and intubation and induction side effects without muscle relaxants in adult patients of age group 20-40yrs undergoing various elective surgical procedures.

Material and Methods

The clinical study was carried out in adult patients of age group between 20-40yrs posted for various

elective surgeries at VSSIMSAR, Burla, Sambalpur.

The study population consists of 80 ASA I & II, non-obese, adult patients aged between 20-40yrs coming for elective surgical procedures under General Anaesthesia and had Mallampatti class I, II airway anatomy.

After approval of the study by our institution ethical committee and obtaining patient's written informed consent, patients were randomized into two groups of 40 each i.e. Group A and Group B. Patients of either sex, between the age group of 20-40 years belonging to ASA grade I and II undergoing elective surgical procedures of 1 to 3 hours duration were included in the study. Patient refusal with a history or evidence of a difficult airway and malignant hyperthermia, Patients on MAO-inhibitors, Patients with previous history of allergy to volatile anaesthetics or Propofol, Patients with body mass index more than 1.5 times normal were excluded.

A thorough pre-anaesthetic evaluation was conducted on the day before surgery. Detailed history and physical examination was carried out in all patients. All relevant investigations were done. Nil per oral status for a minimum periods of 8 hrs was advised.

On the day of surgery, after arrival of the patient to the operation theatre, pulse-oxymeter, ECG, and non-invasive blood pressure monitors were connected. The baseline heart rate, systolic blood pressure, diastolic blood pressure and mean arterial pressure were recorded A suitable intravenous line was secured and a slow I.V drip was started in all patients with lactated Ringer's solution. All patients were premedicated with IV fentanyl 2µg/kg IV midazolam 0.05mg/kg & IV Glycopyrrolate 0.2mg 5min before induction.

All patients were pre-oxygenated with 100% O for 3 min. Anaesthesia was then induced in Group A patients by 67% N_2O in O_2 and IV propofo 3 mg/kg injected over 30s. Group B patients were induced by mask with sevoflurane starting at 0.5% and incrementally increased to 4% inhaled concentration with 67% nitrous oxide in oxygen at a total gas flow of 8 liters/min and IV propofol 1.5mg/kg injected over 15s and tracheal intubation was attempted at 240s after the start of induction in both groups. Lignocaine0.2mg/kg added to propofol to prevent pain on injection.

The heart rate, systolic blood pressure, diastolic blood pressure and mean arterial pressure before and after induction and post-intubation at 1, 3 and 5 minutes were recorded. Time to induction in seconds (start of anaesthetic until loss of eye lash reflex), induction side effects like breath holding, cough, excitatory movements, laryngospasm and others (bradycardia, hypoxia, hyperthermia, hypothermia and injection site pain) were noted. Tracheal intubation was performed using appropriately sized endo- tracheal tube. Intubating conditions were assessed by anaesthesiologist who performed intubation using Copenhagen Consensus Conference (CCC)[18] which graded the quality of tracheal intubation according to ease of laryngoscopy, position of the vocal cords, cough and movement of the limbs.

Table : 1 Copenhagen Consensus Conference (CCC) intubation score

Laryngoscopy	Easy	Fair	Difficult
Vocal cord position	Abducted	Intermediate	Closed
Vocal cord movement	None	Moving	Closing
Coughing	None	Diaphragmatic movement	Severe coughing
Quality of intubation	Excellent	Good	Poor

Excellent = all scores excellent Clinically acceptable
Good = all scores excellent or good
Poor = any score poor Clinically unacceptable

Intubations were Excellent, when there was easy laryngoscopy, abducted and immobile vocal cords, without any limb movements or coughing. Good, when the laryngoscopy was fair, intermediate position with moving vocal cords, with slight limb movements and diaphragmatic movements. Poor, when there was difficult laryngoscopy, closed vocal cords, with vigorous limb movements and severe cough.

When the trachea could not be intubated, IV succinylcholine 1.5mg/ kg was administered intravenously. Following tracheal intubation in all patients, the tracheal cuff was gently inflated after

confirming the position of the endo-tracheal tube by auscultation of chest and capnography and anaesthesia was maintained on oxygen, nitrous oxide and sevoflurane for 5min, afterwards sevoflurane was discontinued and muscle relaxants were administered.

The following parameters were studied during the procedure.

Time to induction (seconds): start of anaesthetic until loss of eye lash reflex.

Induction side effects: Breath holding, cough, excitatory movements, laryngospasm and others like bradycardia, hypoxia, hyperthermia, hypothermia and injection site pain.

Quality of endotracheal intubation: based on Copenhagen Consensus conference (CCC) scoring system.

Number of attempts taken for successful endotracheal intubation.

Supplementation of endotracheal intubation with IV succinylcholine.

Change in heart rate, systolic blood pressure, diastolic blood pressure, and mean arterial pressure during induction and intubation.

The data generated was statistically analyzed by using microsoft excel 2007, SPSS ver 19 & Graph pad Software. The tools employed for statistical analysis are:

Mean, Standard deviation, students *t* test, Chi-square test.

The description of the data done in the form of mean± SD for quantitative data. For quantitative data Student's t-test was used to compare between two groups. The intubating conditions were given in percentage. Chi-square test was used for qualitative data.

Significant $p < 0.05$, Strongly significant $p < 0.01$,Not significant $P>0.05$

Blood pressure and pulse rate were compared between the two groups, using student's test. We considered excellent and good conditions as acceptable whereas poor as non-acceptable. The Chi-square test was used to compare the intubation scores.

Observation and Results

All the patient parameters and the results from the two groups (group A and group B) were entered in the predesigned study proforma sheet. Intubating conditions were scored and haemodynamic parameters were noted. The observations were complied and the result were analysed statistically.

Table: 2 Age Distribution Among the Patient

Age in Yrs	Group A(n=40)	Group B(n=40)	
20 – 29	24 (60%)	26 (65%)	P value 0.888
Mean±SD 30 - 40	28.52 ±5.39 16 (40%)	28.35±5.68 14 (35%)	
Total	40	40	

Age in the two groups were statistically analyzed by student unpaired t test and it was found that there was no statistical difference between the two groups ($p>0.05$) (Table-2,Figure-1)

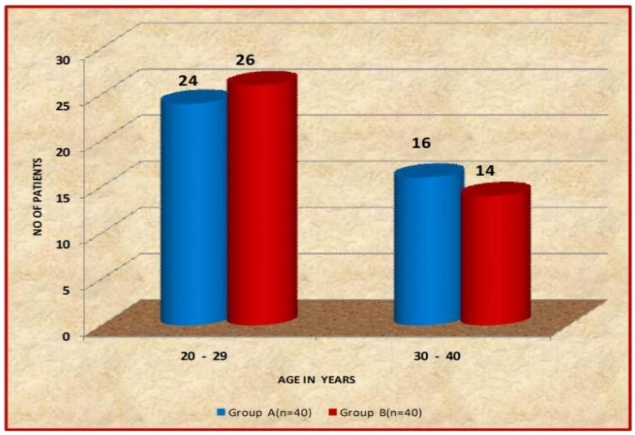


Figure 1 Age Distribution

Table: 3 Gender Distributions of Patients Studied

Gender	Group A (n=40)	Group B (n=40)	
Male	19(47.5%)	15(37.5%)	P value 0.366
Female	21(52.5%)	25(62.5%)	
Total	40	40	

After statistical analysis using chi square test, there was no statistical difference ($p>0.05$) found between the groups and the sex distribution between the two groups were comparable (Table 3, figure 2.)

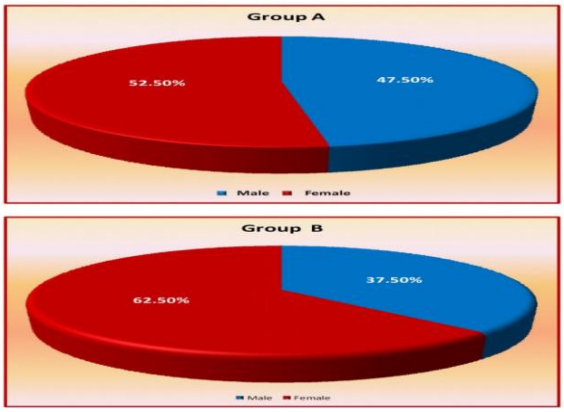


Figure 2 Gender Distribution

Table: 4 Weight Distribution of Patients Studied

Weight(kg)	Group A(n=40)	Group B(n=40)	P value
35 - 50	17(42.5%)	15(37.5%)	0.708
51 - 60	14(35%)	21(52.5%)	
61 - 70	09(22.5%)	04(10%)	
Mean±SD	53±9.44	52.25±8.35	

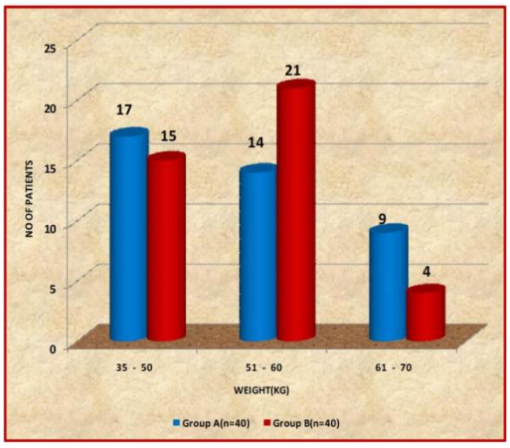


Figure-3: Weight Distribution

Weight in the two groups were statistically analyzed by student unpaired t test and it was found that there was no statistical difference between the two groups p>0.05) (Tabel-4,Figure-3)

Table : 5 Time to Induction (Seconds)

Time for induction(sec)	G roup A (n=40)	G roup B(n=40)	P value
1 -- 100	40	0	**<0.001**
>100	0	40	
Total	40	40	
M ean±SD	40.07±5.65	158.85±21.9	

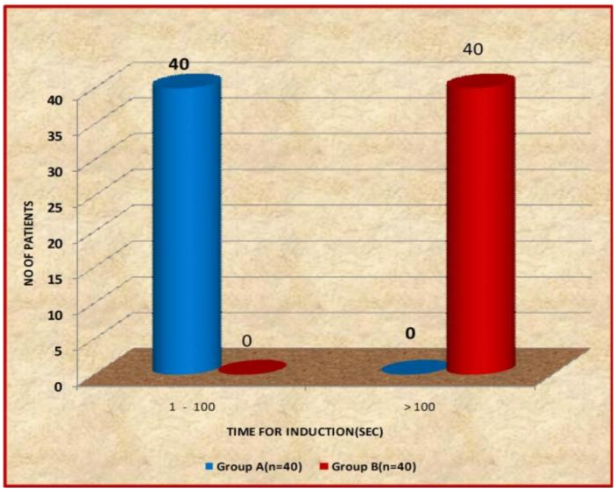


Figure-4: Time For Induction

Time to induction in seconds is significantly less in Group A (40.075 vs 158.85) with P<0.001. (Table-5 and Figure-4)

Table: 6 Induction Side Effects

Induction side effects	Group A (n=40)	Group B (n=40)	P value
Breath holding	3	0	0.077
Cough	8	3	0.105
Excitatory movements	4	1	0.166
Laryngospasm	0	0	
Others	0	0	

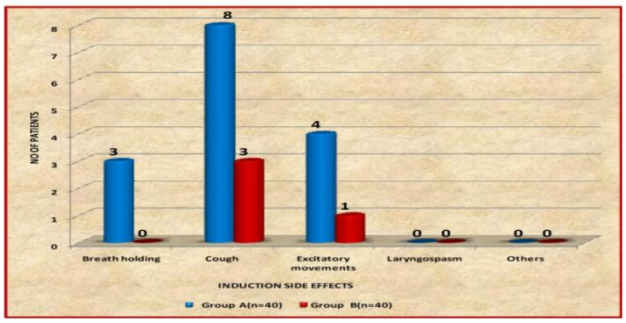


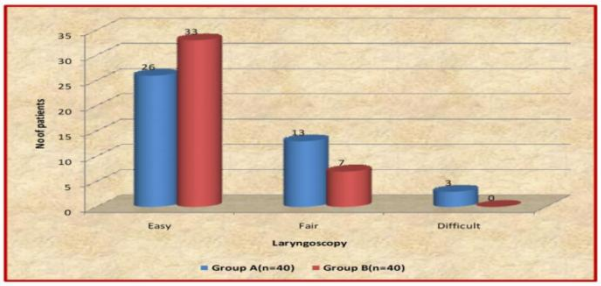
Figure-5: Induction Side Effects

Both groups were found to be statistically similar with respect to breath holding, cough, excitatory movements, laryngospasm and other induction side-effect.(Table-6 and Figure-5)

Table: 7 Inter Group Comparison of Laryngoscopy, Vocal Cords Position, Vocal Cords Movement, Limb Movement And Coughing

CCC endotracheal intubation score	Criteria	Group A (n=40)	Group B (n=40)	P value
Laryngoscopy	Easy	26(65%)	33 (82.5%)	0.094
	Fair	11(27.5%)	7(17.5%)	
	Difficult	3(7.5%)	0(0%)	
Vocal cords position	Abducted	27(67.5%)	33(82.5%)	0.127
	Intermediate	10(25%)	7(17.5%)	
	Closed	3(7.5%)	0(0%)	
Vocal cords movements	None	27(67.5%)	33(82.5%)	0.088
	Moving	9(22.5%)	7(17.5%)	
	Closing	4(10%)	0(0%)	
Limb movements	None	20(50%)	35(87.5%)	**0.001**
	Slight	11(27.5%)	4(10%)	
	Vigorous	9(22.5%)	1(2.5%)	
Coughing	None	23(57.5%)	35(87.5%)	**0.010**
	Diaphragmatic movement	12(30%)	4(10%)	
	Severe Coughing	5(12.5%)	1(2.5%)	
Quality of intubation	Excellent	17(42.5%)	33(82.5%)	**0.001**
	Good	12(30%)	4(10%)	
	Poor	11(27.5%)	3(7.5%)	

Laryngoscopy was easy in 65% of patients in Group A and 83% in group B. The two groups were comparable with respect to laryngoscopy. (p=0.094, not significant). Regarding position of vocal cords, they were abducted in 66.7% of patients, intermediate in 26.7% and closed in 6.7% of patients in group A. In group B, vocal cords were abducted in 83.3% and intermediate in 16.7% of patients. The two groups were comparable with respect to vocal cord position. (p=0.127, not significant). Vocal cords were not moving in 66.7%, moving in 23.3% and closing in 10% of patients in Group A. In Group B vocal cords were not moving in 83.3% and moving in 16.7% of patients. The two groups were comparable with respect to vocal cord movement. (p=0.088, not significant) Limb movements were absent in 50%, slight in 26.7% and vigorous in 23.3% patients in group A. In Group B 86.7% patients didn't move, 10% slightly moved, the remaining 3.3% of patients had vigorous movement. Patients in Group A had more limb movements than in Group B, which is significant. (p=0.001, highly significant). 56.7% of patients in group A had no coughing, while 30% patients had diaphragmatic movements and 13.3% had severe coughing after intubation. Group B patients had no coughing in 86.7%, diaphragmatic movement in 10% and severe coughing in 3.3%. Patients in group A had more coughing than in group B, which is significant. (p=0.010, significant).From the above studies, overall intubating conditions were significantly better in Group B than in Group A.



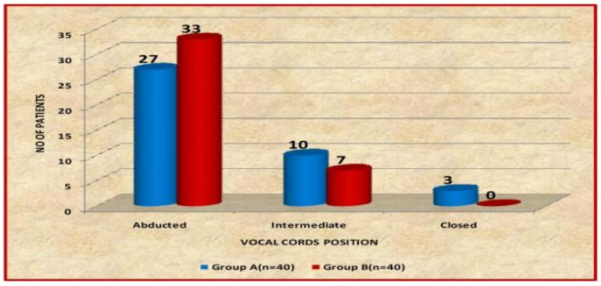
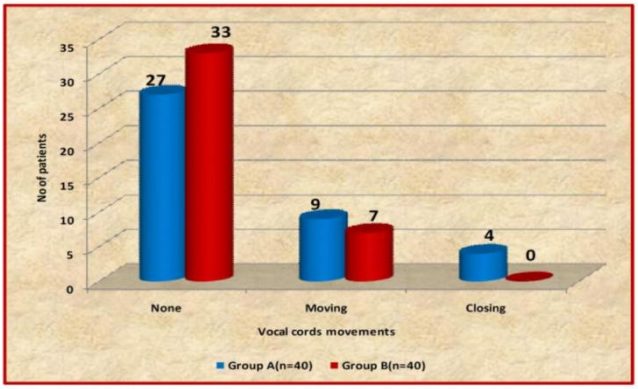


Figure-6 & 7: Laryngoscopy and vocal cord position Respectively



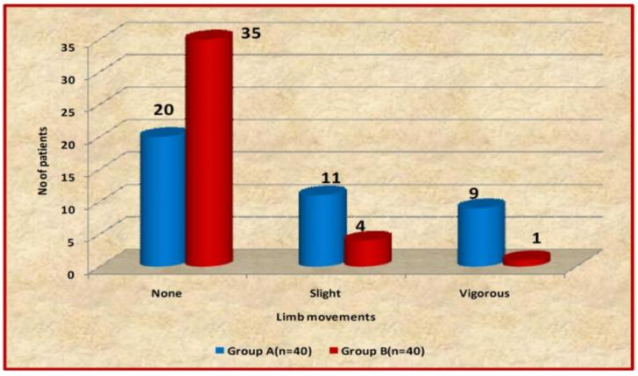
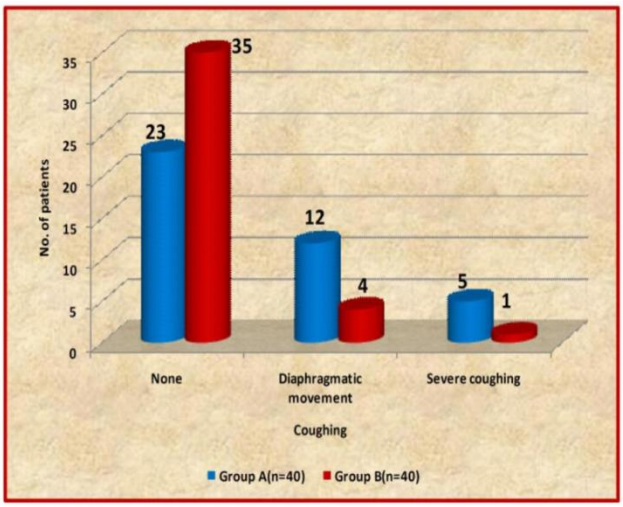
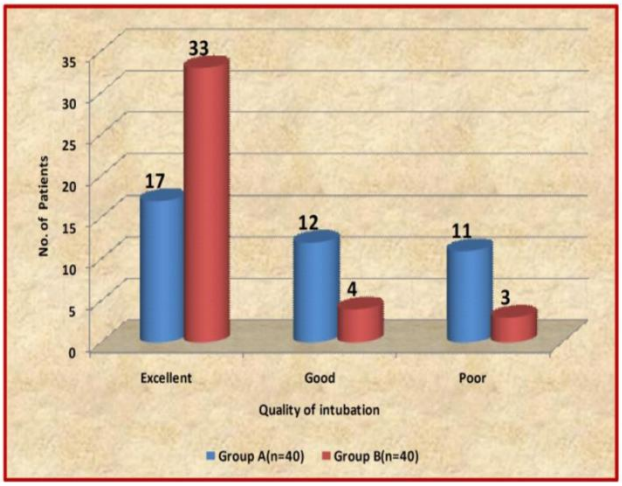


Figure: 8 & 9 Vocal cord movement and Limb Movement





Respectively

Figure-10 & Figure-11: Coughing and Quality of Intubatio Respectively

Table: 8 Overall Intubation Condition

Overall intubation condition	Group A(n=40)	Group B(n=40)	P value **0.019**
Acceptable	29(72.5 %)	37(92.5%)	
Unacceptable	11(27.5 %)	03(7.5%)	

Overall acceptable intubating conditions were significantly associated with Group B when compared with Group A (92.5% vs 72.5%) with P=0.019 (Table-8 and Figure-12)

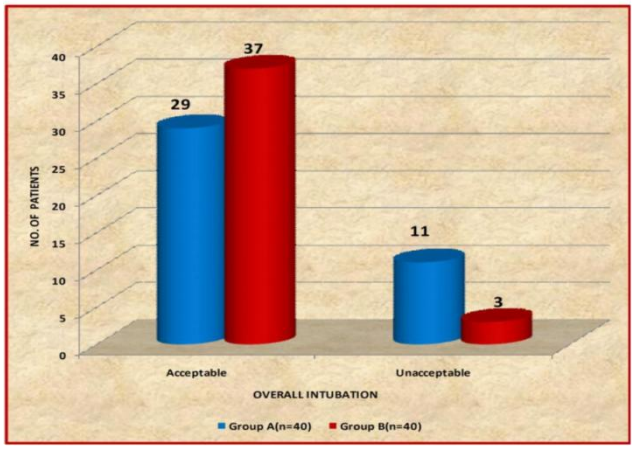


Figure12: Overall intubation

Table: 9 Number of Attempts

Number of attempts	Group A(n=40)	Group B(n=40)	P value **0.016**
1	31(77.5%)	39(97.5%)	
2	7(17.5%)	1(2.5%)	
3	2(5%)	0(0%)	

Number of attempts were significantly less in Group B when compared to Group A (2.5% vs 22.5%) with P<0.001.(Figure-13 and Table-9)

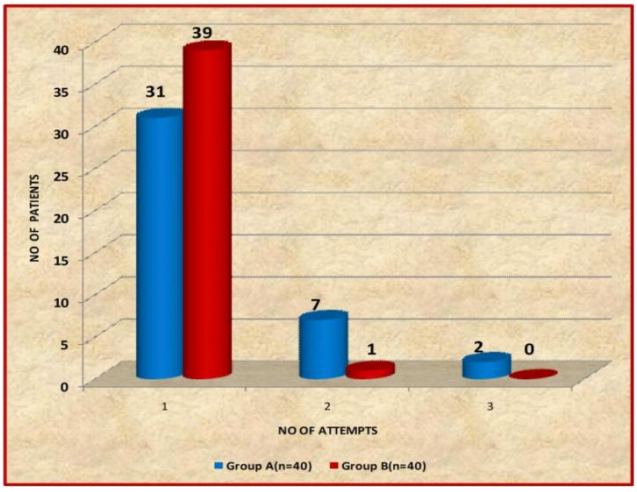


Figure-13: No. of Attempts

Table: 10 Tracheal Intubation Supplemented With Succinylcholine

Tracheal intubation supplemented with succinylcholine	Group A (n=40)	Group B (n=40)	P value 0.166
No	35(87.5%)	40(100%)	
Yes	5(12.5%)	0(0%)	

None of the patients in Group B required succinylcholine supplementation to achieve intubation, when compared with 12.5% in Group A, which is not significant (p=0.166) (Table-10

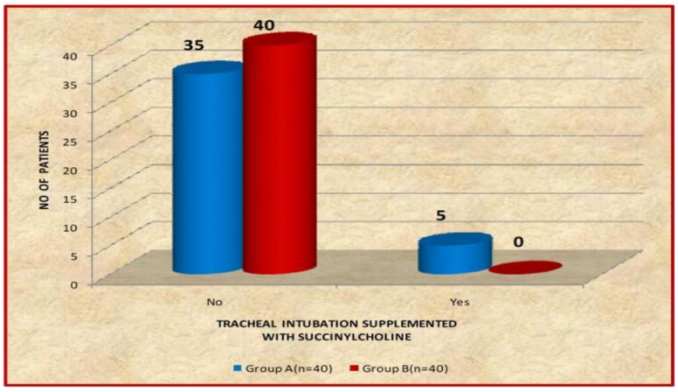


Figure-14: Tracheal Intubation Supplemented With Succinylcholine

Table :11 Comparison of Heart Rate (BPM) Between two Groups

Time interval	Group A (Mean±SD)	Group B (Mean ±SD)	P-value
Pre induction	90.175±9.28	88.32±12.19	0.447
Post induction	81.6±8.43	85.32±11.93	0.111
1 min after intubation	87.15±7.94	90.47±12.09	0.15
3 min after intubation	86.6±7.12	91.35±11.84	**0.032**
5 min after intubation	86.975±7.53	88.82±11.68	0.402

There was no significant difference in heart rate after induction and post-intubation between the two groups except 3min after intubation which was significant (p=0.032)

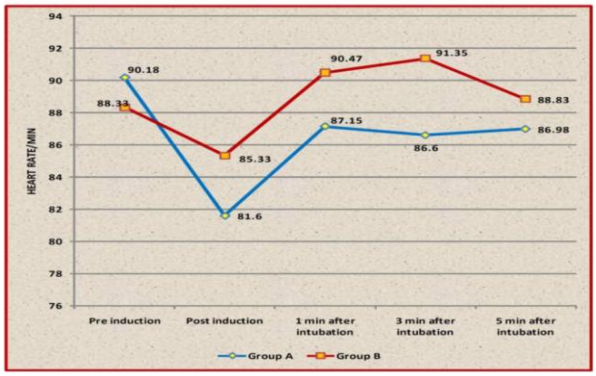


Figure-15: Comparision of Heart Rate

Table: 12 Comparison of SBP (mm hg) between two groups

Time interval	Group A (Mean±SD)	Group B (Mean±SD)	P value
Pre induction	124.15±9.35	122.35±9.08	0.385
Post induction	109.47±9.29	119.47±9.44	**<0.001**
1 min after intubation	118.32±8.47	125.05±8.77	**0.001**
3 min after intubation	119.9±8.55	123.95±8.10	**0.032**
5 min after intubation	117.57±7.62	123.22±8.91	**0.003**

There was a significant difference in systolic blood pressure after induction and post-intubation at 1, 3 & 5min between the two groups (p<0.001, p=0.001, p=0.032, p=0.003 respectively.(Table-12 and Figure-16)

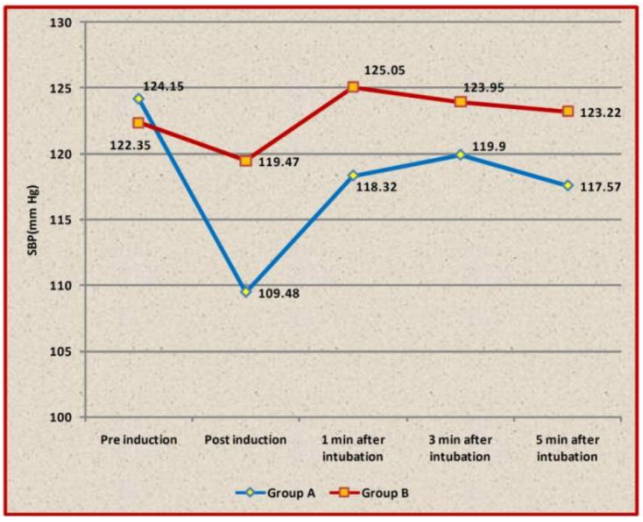


Figure-16: Comparison of SBP

Table: 13 Comparison of DBP (mm hg) between two groups

Time interval	Group A (Mean±SD)	Group B (Mean±SD)	P value
Pre induction	82.1±7.96	78.72±7.87	0.060
Post induction	73.07±8.19	74.92±8.15	0.314
1 min after intubation	79.27±8.05	79.22±7.93	0.977
3 min after intubation	81.85±8.97	80.17±7.66	0.372
5 min after intubation	79.95±8.38	78.6±7.66	0.454

There was no significant difference in diastolic blood pressure between the two groups following induction and intubation.(Table-13 and Figure-17)

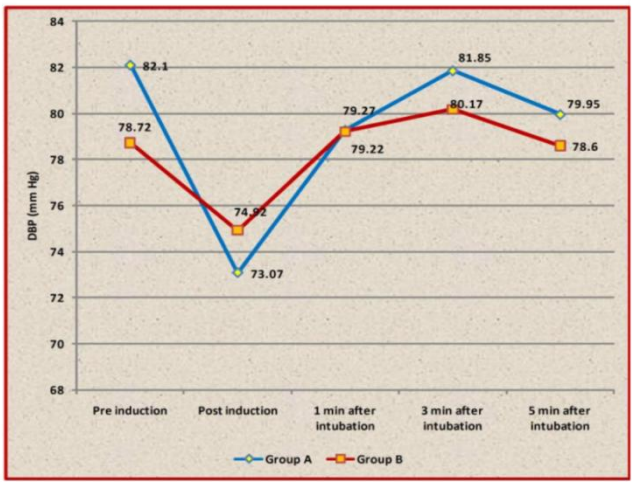


Figure-17 Comparison of DBP

Table: 14 Comparison of Map (mm hg) between two groups

Time interval	Group A (Mean±SD)	Group B (Mean±SD)	P value
Pre induction	95.9±7.88	93.3±7.12	0.125
Post induction	85.45±7.95	89.87±7.32	**0.011**
1 min after intubation	91.87±7.48	94.47±6.93	0.110
3 min after intubation	94.47±7.95	94.77±6.81	0.856
5 min after intubation	92.52±7.49	93.52±6.78	0.533

There was no significant difference in mean arterial pressure between the two groups following intubation, but there was a significant difference in mean arterial pressure following induction (p = 0.011). (Table-14 and Figure-18)

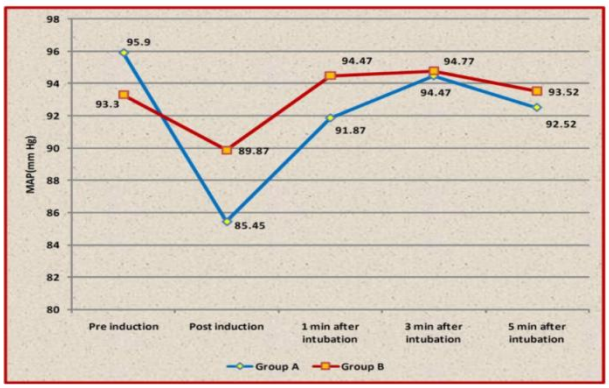


Figure-18: Comparison of Map

Discussion

For successful intubation the drugs should be combined in such a way that it produces unconsciousness, analgesia and muscle relaxation without compromising hemodynamic stability.[7] Usually a combination of hypnotic agent, opioid and a neuromuscular blocking agent is used.

Sevoflurane a new inhalational agent with low blood-gas solubility and a relatively pleasant odour produces rapid induction and recovery. It causes less myocardial depression and cardiac arrhythmias than halothane.

The present study was carried out to assess tracheal intubating conditions and hemodynamic changes after induction of anaesthesia without the use of neuromuscular blocking drugs. Out of 80 patients, 40 received sevoflurane & propofol and 40 received only propofol.

We took 240s as a fixed time interval from the start of induction to intubation in Group A patients (IV propofol 3mg/kg). The use of fixed time interval tests an easily reproducible technique, independent of subjective assessments of depth of anaesthesia.

In Group B patients (4%sevoflurane with IV propofol 1.5mg/kg), we chose to evaluate tracheal intubating conditions 240s after the start of induction. There is lack of reliable end points. Depth of anaesthesia is also difficult to assess clinically, with some anaesthesiologists using clinical indications such as constriction and centralization of pupils, and acceptance of face mask, while others have found eye signs unreliable. Swadia VN et al[20] and Bithal PK et al[19] had found significantly greater time for tracheal intubation with sevoflurane i.e. (242.2±52.67s) and (325.93±44.02s) respectively. This difference was not only because of different clinical end points but also a different induction technique in which sevoflurane concentration was increased incrementally and ventilation was not assisted manually.

In present study, tracheal intubation was accomplished in 87.5% of patients in Group A, only 72.5% of those patients had acceptable intubating conditions and remaining 27.5% of patients had unacceptable intubating conditions. Three factors made the intubating scores unacceptable were vocal cords movement (32.5%), coughing (42.5%) and limb movements (50%).

In Group A, laryngoscopy was easy in 65%, fair in 27.5% and difficult in 7.5% of patients and vocal cords were moving in 22.5% and closing in10% of patients, which is not significant. 12.5% of patients required succinylcholine supplementation to achieve intubation because of vocal cords movement, coughing and excessive limb movements. Only 76.7% of patients intubated at first attempt and remaining 23.3% required multiple attempts.

During induction, 7.5% of patients in Group A had breath holding, 20% had cough and 10% had excitatory movements, which is not significant. Induction time in Group A patients were

40.07±5.65

In our study, tracheal intubation was accomplished in 100% of patients in Group B, 92.5% of those patients had acceptable intubating conditions when compared with 72.5% in Group A, which is highly significant (p<0.001). In Group B, laryngoscopy was easy in 82.5% and fair in 17.5% of patients and vocal cords were abducted in 82.5% and moving in 17.5% of patients, which is not significant.

87.5% of patients had no cough in Group B, compared with 57.5% in group A. Coughing was significantly associated more with Group A (p=0.037). 10% of patients in Group B had diaphragmatic movements and 2.5% had severe coughing. Limb movements were absent in 87.5% of patients in Group B compared to 50% in Group A. Limb movements were significantly more in Group A (p=0.010). 10% of patients in Group B had slight and 2.5% had vigorous limb movements.

None of the patients in Group B required succinylcholine supplementation to achieve intubation. 97.5% of patients were intubated at first attempt in Group B when compared with 77.5% in Group A. Number of attempts were significantly less in Group B (p<0.001).

During induction in Group B patients 7.5% had cough and 2.5% had excitatory movements, which is not significant. Induction time in Group B patients were 158.85±21.91s, when compared with Group A (40.07±5.65). Induction time were significantly more in Group B patients (p<0.001).

In present study there was definite reduction in heart rate, systolic blood pressure, diastolic blood pressure and mean arterial pressure in Group A patients after induction and intubation when compared with pre-induction values. However, there was no significant difference among these parameters when compared with pre-induction values in Group B patients. Thus propofol decreased both heart rate and blood pressure, which indicates there was decrease in cardiac output. So propofol effectively attenuated the hemodynamic response to intubation.

The decrease in HR and blood pressure in our sudy was due to synergistic effects of fentanyl and propofol. Fentanyl blunted hemodynamic response to laryngoscopy and intubation whereas propofol decreased sympathetic nervous activity.

In our study, there was no significant difference in heart rate after induction and intubation between the two groups, except 3min after intubation, where, heart rate is significantly low in Group A (86.6±7.12) when compared with Group B (91.35±11.84), (p=0.033).

There was significant reduction in systolic blood pressure after induction and intubation in Group A patients when compared with Group B patients. However, there was no significant difference in diastolic blood pressure and mean arterial pressure between two groups, except mean arterial pressure being significantly low in Group A following induction (p=0.011). In Bithal PK et al[19] study,HR was significantly high in the sevolurane group,during post induction, immediate post intubation and 1 min post intubation.MAP also increased but slightly from baseline.

Conclusion

To summarize, intubation without muscle relaxants using combination of inhalational 4% Sevoflurane with IV Propofol 1.5mg/kg had more acceptable intubating conditions when compared with patients who received IV Propofol 3mg/kg.

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