

## COMPARISON OF INTUBATING CONDITIONS, FOLLOWING PROPOFOL WITH MUSCLE RELAXANT AND PROPOFOL WITHOUT MUSCLE RELAXANT

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### Abstract

**Introduction:** After induction of anaesthesia, tracheal intubation is usually facilitated by the use of muscle relaxants. Neuromuscular blocking drugs, particularly Succinylcholine, may cause serious side effects, but remain in clinical use to facilitate tracheal intubation due to a lack of suitable alternatives. Recent studies have suggested that propofol provides good intubating conditions without muscle relaxants, due to its relaxing action on upper air way. A search for better and ideal intravenous induction agent has led to propofol, a 2, 6, di-isopropyl phenol which was developed following a series of investigations. Propofol reduces hypertension and tachycardia during intubation. The changes in blood pressure observed are due to both decrease in cardiac output and decrease in systemic vascular resistance. Increasing the depth of anaesthesia by administering supplementary increments of induction agent, opioids or lignocaine may improve conditions. These techniques also protect against the potentially adverse effects of tracheal intubation namely systemic, intra-cranial and intra-ocular hypertensions and tachycardia.

**Material and Methods:** 50 patients were randomly divided into two groups of 25 patients each. Group I: 2.5 mg/kg body weight of propofol injected slowly over 20 seconds. Group II: 2.5 mg/kg body weight of propofol injected slowly over 20 seconds. After loss of eye lash reflex, induction time was noted with stop watch and then injection succinylcholine 2mg/kg body weight was injected. Patients were monitored throughout the operation E.C.G. using cardiac monitor on lead II, PaO<sub>2</sub> with Pulse Oxymeter. Pulse and blood pressure were recorded.

**Results:** Youngest patient was of 20 years in group I and 22 years in group II. Eldest patient was of 56 years in group I and 60 years in group II. Maximum number of patients were in 20-30 years of age 15 (60%) in group I and 11 (44%) in group II. Excellent intubating conditions were seen in 15 (60%) patients of group I and 25 (100%) patients of group II. The pre induction mean pulse rate (base line) was 103.04±13.08 and 104.56±17.14 in group I and group II respectively. There was slight decrease in pulse rate initially after induction with mean 99.92±13.87 and 98.32±14.60 in group I and group II respectively, but the difference was not statistically significant from the baseline values. (p>0.05). There was slight decrease in arterial pressure initially after induction with mean 80.88 ±6.59 and 85.31±8.71 in group I and group II respectively, but the difference was not statistically significant (P>0.05) from the baseline values. There was slight increase in mean arterial pressure just after intubation with mean 94.10 ±8.07 and 95.58±9.46 in group I and group II respectively, which was not statistically significant (p>0.05). These changes in M.A.P. values return to baseline values 5 minutes after intubation.

**Conclusion:** Propofol 2.5mg/kg when used alone as inducing agent without the aid of any neuromuscular blocking agents produced acceptable intubating conditions, when compared to propofol, 2.5mg/kg along with succinylcholine. It was shown that there were no significant cardiovascular changes when intubation was done without relaxant after induction with propofol.

### Introduction:

After induction of anaesthesia, tracheal intubation is usually facilitated by the use of muscle relaxants. Neuromuscular blocking drugs, particularly Succinylcholine, may cause serious side effects, but remain in clinical use to facilitate tracheal intubation due to a lack of suitable alternatives. Recent studies have suggested that propofol provides good

intubating conditions without muscle relaxants, due to its relaxing action on upper air way. A search for better and ideal intravenous induction agent has led to propofol, a 2, 6, di-isopropyl phenol which was developed following a series of investigations. A description of the discovery of anesthetic activity of this and other alkyl-phenol has been provided by James and Glen in 1977<sup>1</sup>. Propofol causes rapid and

symptoms free clear headed recovery<sup>ii</sup> particularly for day case surgery. There is very low incidence of post-operative sickness and much lower incidence of PONV with propofol.

Propofol reduces hypertension and tachycardia during intubation. The changes in blood pressure observed are due to both decrease in cardiac output and decrease in systemic vascular resistance, both of which are decreased by 10% - 20%. It appears that propofol does not impair baroreceptor sensitivity and that central sympatholytic and/or vagolytic mechanism prevents increase in heart rate despite decrease in blood pressure. The only drawback of propofol is that it is very expensive, slight fall in BP, particularly in large doses<sup>iii</sup>. Pain when injected into small vein, some incidence of apnoea and thrombophlebitis has been reported.

Increasing the depth of anaesthesia by administering supplementary increments of induction agent, opioids or lignocaine may improve conditions. These techniques also protect against the potentially adverse effects of tracheal intubation namely systemic, intra-cranial and intra-ocular hypertensions and tachycardia. However this must be balanced against the increased risks of hypotension, bradycardia, emesis, delayed recovery and systemic local anaesthetic toxicity<sup>iv</sup>.

### Material and Methods

The present study was conducted in the Dept. of Anesthesiology Shankaracharya Institute of Medical Sciences, Junwani, Bhilai, (CG). The study comprised of 50 adult patients of ASA grade I & II of either sex

belonging to the age group of 20-60 years, drawn from various surgical specialties and undergoing surgery under general anaesthesia. Pregnant ladies, Paediatric patients, Patients with deranged hepatic functions, renal functions and cardiovascular hematologic complications, with potential airway problems, difficult intubation and patients with electrolyte imbalance and known allergy to anaesthetic agents were excluded from the study. Thorough pre anesthetic check-up was carried out in all patients and informed consent for surgery and general anaesthesia was obtained. Routine investigations were carried out in all patients.

50 patients were randomly divided into two groups of 25 patients each.

**Group I :** 2.5 mg/kg body weight of propofol injected slowly over 20 seconds.

**Group II :** 2.5 mg/kg body weight of propofol injected slowly over 20 seconds. After loss of eye lash reflex, induction time was noted with stop watch and then injection succinylcholine 2mg/kg body weight was injected.

Patients were monitored throughout the operation E.C.G. using cardiac monitor on lead II, PaO<sub>2</sub> with Pulse Oxymeter. Pulse and blood pressure were recorded.

All the observation were recorded and tabulated. Results were analyzed statistically by X<sup>2</sup> test and 'P' value was less than 0.05 the difference of the two sets of observation was considered significant.

### Observations and Results

**Table I:** Distribution of cases

Group	Drugs	No of cases
I	Propofol without succinylcholine	25
II	Propofol with succinylcholine	25

Table I shows the distributions of cases according to propofol with or without succinylcholine.

Youngest patient was of 20 years in group I and 22 years in group II. Eldest patient was of 56 years in group I and 60 years in group II. Maximum number of patients were in 20-30 years of age 15 (60%) in group I and 11 (44%) in group II.

**Table 2:** Sex wise distribution of cases

S. No.	Sex	Group I		Group II	
		No.	%	No.	%
1	Male	19	76	18	72
2	Female	06	24	07	28

Table 2 shows sex wise distribution of cases. In both the groups, there was male predominance with 19 (76%) in group I and 18 (72%) in group II.

Excellent intubating conditions were seen in 15 (60%) patients of group I and 25 (100%) patients of group II.

**Table 3: Overall intubating conditions**

S. No.	Intubating conditions	Group I		Group II		Group I Vs Group II		Significance
		No.	%	No.	%	X <sup>2</sup>	P-value	
1	Excellent 8-9	15	60	25	100	6.54	<0.05	S
2	Good 6-7	10	40	00	00	—	—	NS
3	Fair 3-5	00	00	00	00	—	—	NS
4	Poor 0-2	00	00	00	00	—	—	NS

The difference was statistically significant ( $p < 0.05$ ) between group I & group II. Intubating conditions were good in 10 (40%) patients of group I and 0 patient of group II.

The pre induction mean pulse rate (base line) was  $103.04 \pm 13.08$  and  $104.56 \pm 17.14$  in group I and group II respectively. Their was slight decrease in pulse rate initially after induction with mean  $99.92 \pm 13.87$  and  $98.32 \pm 14.60$  in group I and group II respectively, but the difference was not statistically significant from the baseline values. ( $p > 0.05$ ).

**Table 4: Changes in Mean arterial pressure (As compared to baseline)**

S. No.	Pulse Rate	Group I		Group II		T-value	p-value
		Mean	SD	Mean	SD		
1	Before Induction	92.11	8.48	94.64	10.22	0.92	>0.05
2	After Induction	80.88	6.59	85.31	8.71	1.99	>0.05
3	After relaxant	-	-	83.22	7.07	-	-
4	Just after intubation	94.10	8.07	95.58	9.46	0.58	>0.05
5	One min. after intubation	85.03	9.90	89.20	7.32	1.65	>0.05
6	Two min. after Intubation	85.18	6.53	87.98	6.37	1.50	>0.05
7	Five min. after intubation	90.51	4.48	86.38	6.00	2.70	>0.05

The pre induction mean arterial pressure (MAP) (baseline) was  $92.11 \pm 8.48$  and  $94.64 \pm 10.22$  in group I and group II respectively.

There was slight decrease in arterial pressure initially after induction with mean  $80.88 \pm 6.59$  and  $85.31 \pm 8.71$  in group I and group II respectively, but the difference was not statistically significant ( $P > 0.05$ ) from the baseline values.

There was slight increase in mean arterial pressure just after intubation with mean  $94.10 \pm 8.07$  and  $95.58 \pm 9.46$  in group I and group II respectively, which was not statistically significant ( $p > 0.05$ ).

These changes in M.A.P. values return to baseline values 5 minutes after intubation.

## DISCUSSION

Induction of anaesthesia using short acting hypnotic drugs is frequently facilitated by the simultaneous administration of a depolarizing muscle relaxant such as succinylcholine for endotracheal intubation. Even the non-depolarising muscle relaxants may be associated with undesirable side effects such as

prolonged neuromuscular blockade, the need to reverse neuromuscular blockade, or the inability to reverse the paralysis quickly if need arises. For these reasons, a method of providing good intubating conditions rapidly without using muscle relaxants has been sought by many investigators<sup>4</sup>.

Jaw relaxation was good in 23 (92%) patients of group I and 25 (100%) patients of group II, and moderate in 2 (8%) patients of group II. In none of the patients of either group, the jaw relaxation was minimal or poor<sup>v</sup>. Mark S. Scheller *et al*<sup>vi</sup>. (1992) observed good jaw relaxation in all 100% patients receiving propofol with alfentanil. None of the patients manifested opioid induced rigidity at any time.

In our study, the pre induction mean pulse rate (baseline) was  $103.04 \pm 13.08$  and  $104.56 \pm 17.14$  in group I and group II respectively. There was slight decrease in pulse rate initially after induction with mean  $99.92 \pm 13.87$  and  $98.32 \pm 14.60$  in group I and group II respectively ( $p > 0.05$ ) but the difference was not statistically significant from the baseline values.

There was slight increase in pulse rate just after intubation with mean  $115.04 \pm 10.15$  and  $108.96 \pm 11.31$  in group I and group II respectively ( $p > 0.05$ ) but the difference was not statistically significant from the baseline values. These changes returned to baseline values 5 minutes after intubation.

Increase in pulse rate after intubation in both the groups may attributed to sympathetic stimulation caused by laryngoscopy and intubation (Table XIII).

C. GuidonAttali *et al*<sup>vii</sup> (1990) in their study observed that the heart rate increased significantly 5 minutes after intubation and during maintenance, but the increase never exceeded 15% of the basal value.

I. A. Mc Neil *et al*<sup>viii</sup> (2000) in their comparison of intubating conditions following propofol with Succinylcholine verses propofol and remifentanyl  $2 \mu\text{g}/\text{kg}$  ( $\text{PR}_2$ ) or  $4 \mu\text{g}/\text{kg}$  ( $\text{PR}_4$ ) found that values of post induction heart rate decreased from baseline on groups  $\text{PR}_2$  and  $\text{PR}_4$  by 14% ( $P < 0.01$ ) and 19% ( $p < 0.001$ ) and increased in PS by 15% ( $P < 0.01$ ).

Mean arterial pressure in our study was  $92.11 \pm 8.48$  and  $94.64 \pm 10.22$  in group I and group II respectively.

There was slight decrease in arterial pressure initially after induction with mean  $80.88 \pm 6.59$  and  $85.31 \pm 8.71$  in group I and group II respectively ( $P > 0.05$ ) but the difference was not statistically significant from the baseline values.

There was slight increase in mean arterial pressure from the baseline just after intubation with mean  $94.10 \pm 8.07$  and  $95.58 \pm 9.46$  in group I and group II respectively which was not statistically significant ( $P > 0.05$ ).

These changes returned to baseline values 5 min after intubation. This increase in M.A.P. is also attributed to the increase sympathetic response caused by Laryngoscopy (Table XIV).

C GuidonAttali *et al*<sup>7</sup> (1990) observed no significant fall in systolic or diastolic blood pressure during anaesthesia. I. A. Mc Neil *et al*<sup>8</sup> (2000) in their study observed similar baseline pre-induction values of M.A.P. in all three groups. Post induction M.A.P. values decreased from baseline in groups  $\text{PR}_2$ ,  $\text{PR}_4$ , and PS by 21% ( $P < 0.0001$ ), 28% ( $P < 0.0001$ ) and 8% ( $P > 0.05$ ) respectively.

The mean pulse rate was  $103.04 \pm 13.08$  and  $104.56 \pm 17.14$  in group I and Group II respectively.

There was slight decrease in pulse rate initially after induction with mean  $99.92 \pm 13.87$  and  $98.32 \pm 14.60$  in group I and group II respectively. There was slight increase in pulse rate just after intubation with mean  $115.04 \pm 10.15$  and  $108.96 \pm 11.31$  in group I and group II respectively.

Mean arterial pressure in the present study was  $92.11 \pm 8.48$  and  $94.63 \pm 10.22$  in group I and group II respectively. There was slight decrease in mean arterial pressure initially after induction with mean  $80.88 \pm 6.59$  and  $85.31 \pm 8.71$  in group I and group II respectively.

There was slight increase in mean arterial pressure just after intubation with mean  $94.10 \pm 8.07$  and  $95.58 \pm 9.46$  in group I and group II respectively. These cardiovascular effects, both pulse rate and M.A.P. returned to baseline 5 minutes after intubation.

## CONCLUSION

This study has demonstrated that, in healthy adults, with normal airway anatomy, propofol  $2.5 \text{mg}/\text{kg}$  when used alone as inducing agent without the aid of any neuromuscular blocking agents produced acceptable intubating conditions, when compared to propofol,  $2.5 \text{mg}/\text{kg}$  along with succinylcholine. It was demonstrated that there was no significant cardiovascular changes when intubation was done without relaxant after induction with propofol.

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