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Assessment of intubating conditions and haemodynamic responses in children using fentanyl and propofol and its comparison with muscle relaxant technique

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Abstract

Background: The present study was undertaken to highlight the benefits of avoiding suxamethonium, using only the opioid-propofol technique for routine intubation in paediatric age groups.
Objective: the advent of shorteracting opioid drugs, intubating the trachea has been particularly successful when these drugs are used in combination with propofol. Propofol has been reported to possess some characteristics that provide adequate conditions for intubation in combination with fentanyl 1,2 or alfentanil 3,4 or remifentanil 5.6.
Material & Method: Sixty children of ASA grade I or II scheduled to undergo elective surgery under general anesthesia were studied. They were randomly divided into two groups of thirty patients each.
Group I: Inj. fentanyl 4 μg.kg-1 and 5 minutes later Inj. propofol 3mg. kg-1 was given.
Group II: Inj. propofol 3 mg. kg-1 followed by Inj. suxamethonium 1mg.kg-1 was given.
Intubation in all cases was done by senior anaesthesiologist, 60 secs after induction with propofol. Intubation scores were recorded according to Helbo-HansenRaulo and Trap-Anderson scoring system. Acceptable intubating conditions (i.e., excellent and good) were observed in 26 (86.7%) out of 30 patients in Fentanyl group. The systolic blood pressure and heart rate, decreased significantly after intubation at 3 and 5 minutes in group Fentanyl when compared with pre-induction values ($P<0.001$).
Result & Conclusion: Results of present study suggest that in premedicated healthy children administration of fentanyl 4μg.kg-1 in combination with propofol 3mg.kg-1, after adequate waiting period of 6min, reliably provides good to excellent conditions for tracheal intubation and blunts the pressor response to intubation adequately without significant cardiovascular depression. Thus ideal intubating conditions can be achieved without muscle relaxants using fentanyl and propofol and provide an useful alternative technique for tracheal intubation when neuromuscular blocking drugs are contraindicated or should be avoided. Refinement of this technique by adjustment of the dose of fentanyl and propofol, and addition of Lignocaine may minimize incidence of coughing and might improve intubating conditions further.

Keywords: Suxamethonium, tracheal intubation, fentanyl, neuromuscular blocking

Introduction

Neuromuscular blocking drugs to aid tracheal intubation were first introduced into clinical practice in 1942 in U.S.A and within several years gained widespread acceptance. Before advent of relaxants, tracheal intubation was usually performed under deep inhalational anaesthesia with ether. The continuing use of this technique to facilitate tracheal intubation with halothane and subsequently sevoflurane is still established, especially in paediatric practice. Muscle relaxant-based “balanced anaesthesia” undoubtedly facilitated the development of open heart surgery, organ transplant surgery and more recently, minimally invasive surgery.

Writing in 1955, *Alan Stead* summarised the main advantages of muscle relaxants in paediatric anaesthesia as follows: (1)

1. They provide a means of effecting tracheal intubation and maintaining control of respiration throughout the operation.
2. The patient is completely relaxed and the work of the surgeon facilitated.
3. The quantity of toxic anaesthetic agents is greatly reduced.

In recent years, several changes have occurred that have reduced or obviated the need for muscle relaxants during paediatric anaesthesia.

These include

1. The introduction of newer less toxic, shorter acting anaesthetic drugs and adjuvants (such as propofol, sevoflurane and remifentanil). Since the advent of shorter acting opioid drugs, intubating the trachea has been particularly successful when these drugs are used in combination with propofol. Propofol has been reported to depress pharyngeal and laryngeal reactivity to a greater extent than equipotent doses of thiopental.
2. The introduction of the laryngeal mask airway (LMA) which has replaced the tracheal tube as the method of controlling the airway in many paediatric operations. As the LMA can be inserted easily without the use of a muscle relaxant, its increasing popularity for airway control in children represents a decline in the use of muscle relaxants, which were previously widely used to facilitate tracheal intubation.
3. In addition, there have been concerns about the safety of succinylcholine (SCh) in children.

Endotracheal intubation is frequently facilitated by administration of a depolarizing muscle relaxant such as suxamethonium. However, suxamethonium administration may be associated with side effects such as postoperative myalgia, prolonged paralysis, increase in intraocular pressure and hyperkalaemia [1].

Aim & Objective

Purpose of the present study was

- To compare intubating conditions facilitated by suxamethonium versus fentanyl after induction of anaesthesia using propofol.
- To compare haemodynamic responses in both the techniques.

Material & Method

After obtaining approval from institute research and ethical committee and written consent from patient’s parent, this study was undertaken.

Selection of patient

The present study was conducted on 60 paediatric patients.

Inclusion criteria

- ASA I and II
- Schedule for elective surgery
- Either sex between 4year to 12 yr
- Weight 5kg to 30 kg

Exclusion criteria

- Children with suspected difficult intubation.
- ASA physical status 3 or 4.
- History of allergy to any of the study drugs.
- Undergoing ophthalmic and neurosurgical operations.

Selection of group

Patients were randomized using a random number generator to one of the two group
1. In group I, Inj. fentanyl 4 µg.kg-1 and 5 minutes later Inj. propofol 3 mg.kg-1
2. In group II, Inj. propofol 3 mg.kg-1 followed by Inj. suxamethonium 1mg.kg-1.

Parameter that will be measured

- Intubation Scoring.
- Pulse Rate.
- Systolic Blood Pressure.
- Spo2.

Technique

Preanesthetic check-up was done in the previous evening .Physical examination finding and investigations were recorded systemically in a chart. The patient was advised to keep fast over night before surgery. A 22-or 24-guage IV catheter was inserted in the operating room and an infusion of crystalloid lactated ringer's solution was started according to the 4-2-1 formula (based on bodyweight and hours of fasting). All patients were premedicated with inj midazolam 0.05 mg.kg-1-and atropine 0.01 mg.kg-1 i.v 10 minutes prior to induction. On arrival in the operative room, each patient received standard anaesthetic monitors, including.
- The Electrocardiogram, (lead II and lead V).
- Non Invasive Blood Pressure Cuff.
- Pulse Oximeter.

All the baseline parameter including heart rate, blood pressure, and oxygen saturation was recorded. Measurements at 1 minute after injection of atropine were taken as baseline values.
Group A (study group): Inj. fentanyl 4µg.kg-1 I.V. was given over 30 seconds. After giving inj fentanyl patients were watched for apnea, oxygen saturation and given 100% oxygen by mask. As fentanyl takes 5-7 mins for its plasma concentration to equilibriate with that of brain concentration, we waited for 5 minutes after which, the children received propofol 3 mg.kg-1 over a period of 30 seconds. Additional bolus of 1 mg.kg-1 of propofol was kept ready if laryngoscopy would not be possible due to muscle spasm, coughing or excessive

movements. In those patients where intubation was impossible after two attempts due to any cause, suxamethonium 1 mg.kg-1 was injected and intubation was completed.
Group B (control group): Anaesthesia was induced with Inj. propofol 3 mg.kg-1 followed by Inj. Suxamethonium 1 mg.kg-1.

Laryngoscopy and intubation was attempted 60 seconds after induction of anaesthesia in both the groups using proper size of laryngoscope size 0, 1, 2, according to the patient age without giving any muscle relaxant. Laryngoscopy and intubation were done in all the patients by a senior consultant anaesthesiologist.
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.

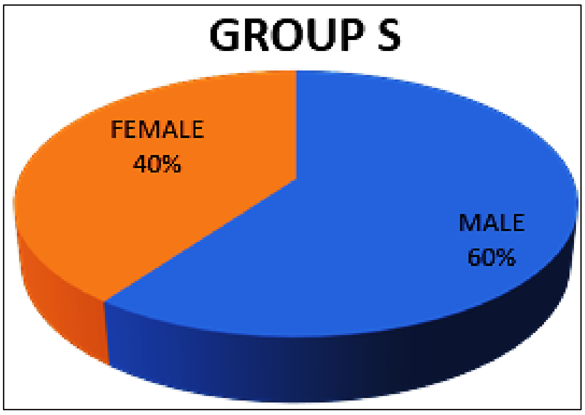
Significant figures

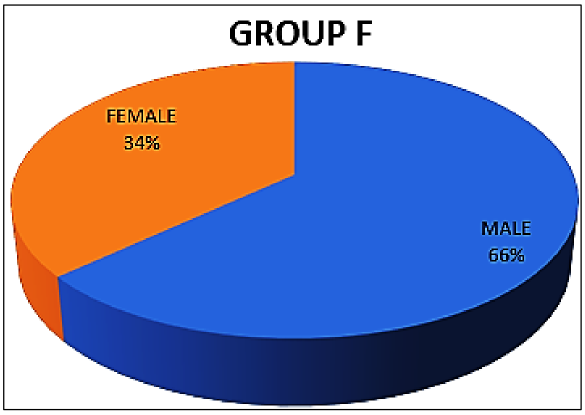
Significant $p < 0.05$.
Strongly significant $p < 0.01$.
Not significant $P>0.05$.

Observation & Discussion

Table 1: Sex Distribution among the Patient

Groups	Male n (%)	Female n (%)	P value
Group S	18(60)	12(40)	0.386
Group F	19(66)	11(34)	

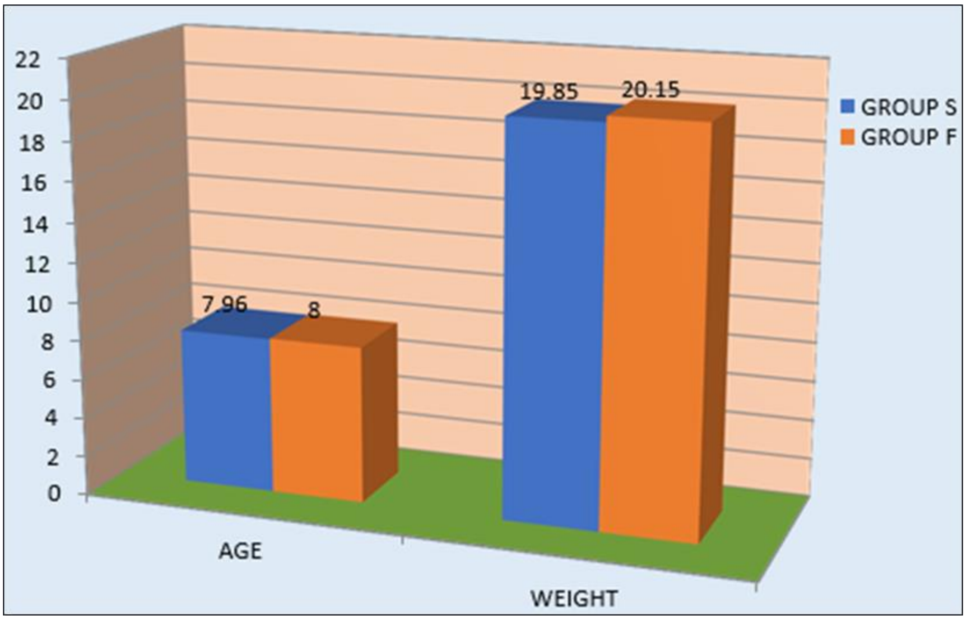




After statistical analysis using chi square test, there was no statistical difference (p>0.05) found between the groups and the sex distribution between the two groups were comparable.

Table 2: Age and Weight Distribution

Groups	Age (Mean ± S.D)	Weight (Mean ± S.D)
Group S	7.96 ± 1.98	19.85 ± 6.62
Group F	8± 2.36	20.15± 6.32
P value	0.94(NS)	0.86(NS)



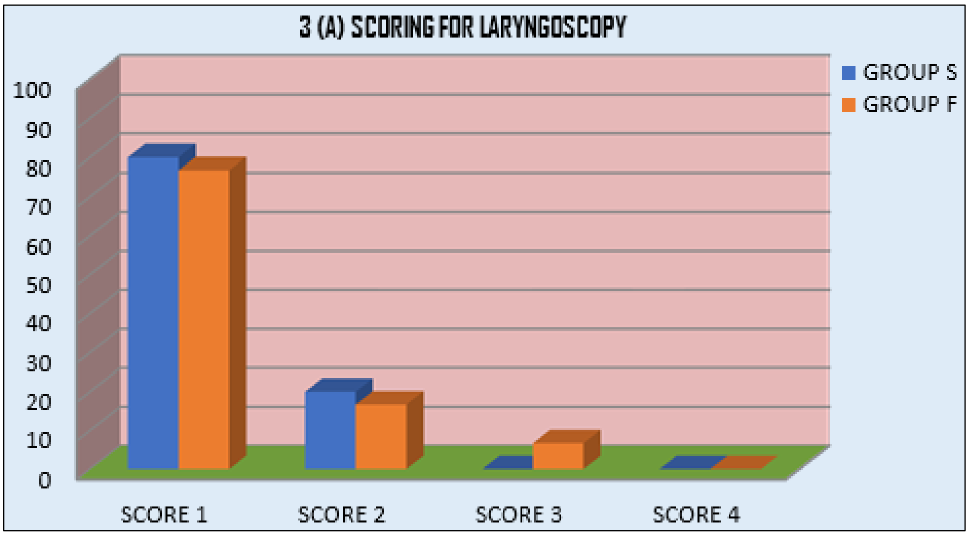
The age and weight in the two groups were statistically analyzed by student unpaired t test and it was found that there was no statistical difference between the two groups (p>0.05).

Table 3
Scoring system for intubation

The scores observed in each group based on the criteria used to assess ease of intubation are shown in Table 3.

Table 3A: Scoring for laryngoscopy

Groups	Score 1n (%)	Score 2n (%)	Score 3n (%)	Score 4n (%)	P value
Group S	24(80)	6(20)	-	-	0.582 (NS)
Group F	23(76.7)	5(16.7)	2(6.7)	-	



None of the patient of either group had a score of 3 or 4 except in 2 patients of fentanyl group (F). Laryngoscopy scores were compared between two groups using chi square test and found statistically not significant. Almost easy laryngoscopy occurred in both the groups.

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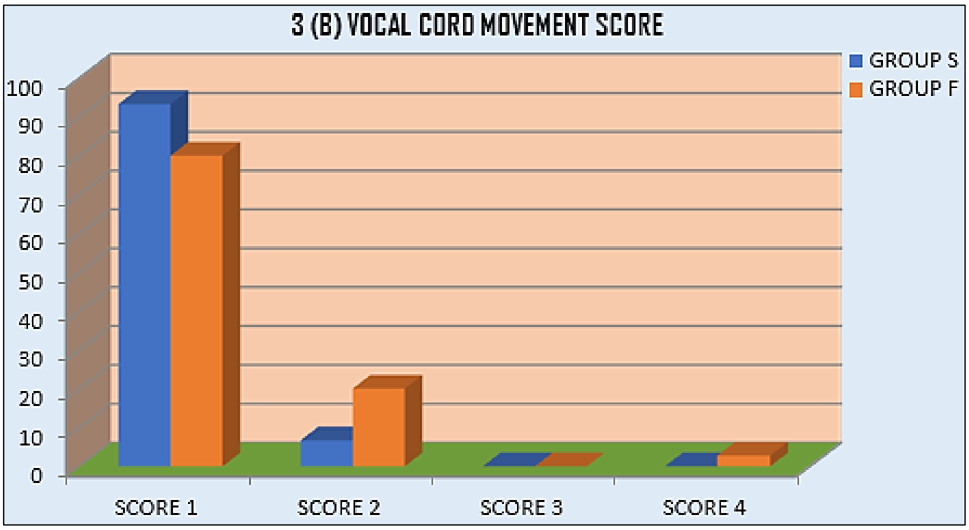
Table 3B: Vocal Cord Movement Score

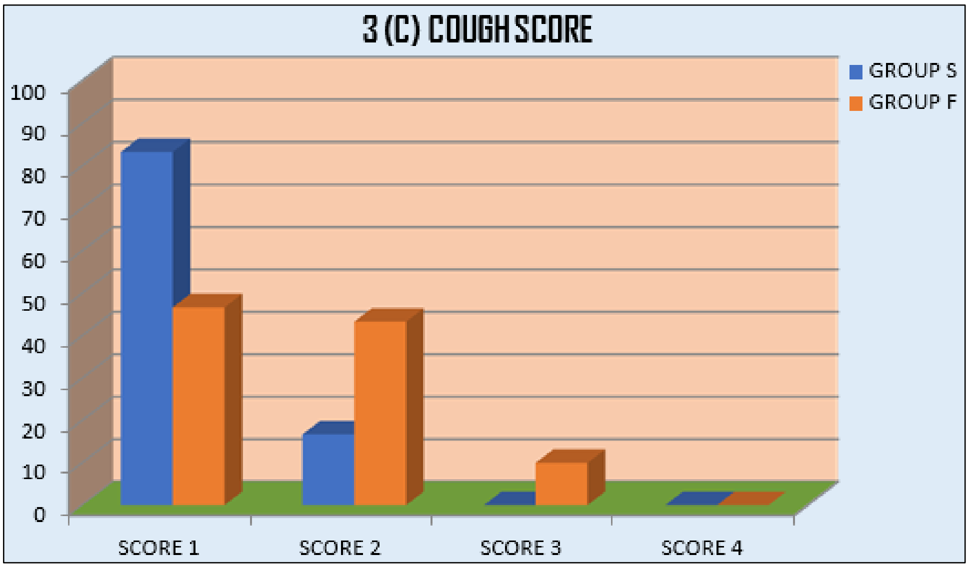
Groups	Score 1 n (%)	Score 2 n (%)	Score 3 n (%)	Score 4 n (%)	P value
Group S	28(93.3)	2(6.7)	-	-	0.24 (NS)
Group F	24(80)	6(20)	-	-	



The position of vocal cords during laryngoscopy was not-significantly different between the two groups (P value 0.24). Though in group F there were more incidence (20% of patient attend score 2) of vocal cord movement than the group S. chi square test was used for comparing the data.

Table 3C: Cough

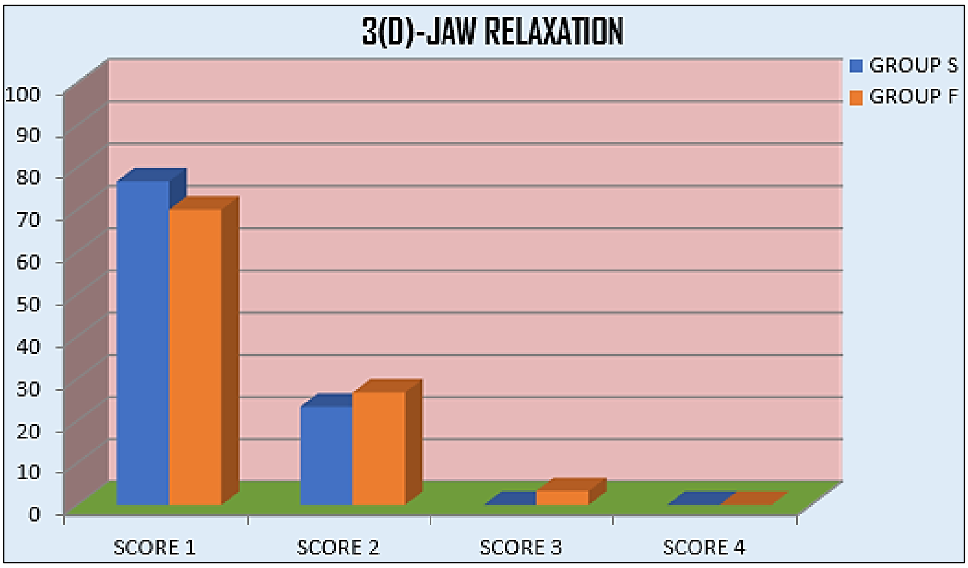
Groups	Score 1 n (%)	Score 2 n (%)	Score 3 n (%)	Score 4 n (%)	P value
Group S	25(83.3)	5(16.7)	-	-	0.006 (S)
Group F	14(46.7)	13(43.3)	3(10)	-	



After intubation of the trachea and inflation of the tracheal cuff, a small number of patients in each group coughed persistently, more in cases where muscle relaxant was not used. Both groups were compared statistically using chi square and found to be significant with a P value 0.006 which was highly significant. Slight cough was observed in 17% cases in group S, whereas 53% cases in group F had cough. Moderate cough was observed after intubation in 3 cases of group F, where fentanyl was used. Additional bolus of 1 mg/kg of propofol was used in those 3 cases, to maintain the anesthetic depth and stop cough.

Table 3D: Jaw Relaxation

Groups	Score 1 n (%)	Score 2 n (%)	Score 3 n (%)	Score 4 n (%)	P value
Group S	23(76.7)	7(23.3)	-	-	0.77 (NS)
Group F	21(70)	8(26.7)	1(3.3)	-	



Jaw relaxation was thought to be good in all patients. P value was 0.77 which was not significant. Only in one case jaw was stiff and in the same case laryngoscopy was also difficult with a score of 3. Intubation was achieved using succinylcholine in that patient. No patient appeared to manifest signs of opiod-induced rigidity at any time.

Table 4: Scoring conditions for tracheal intubation

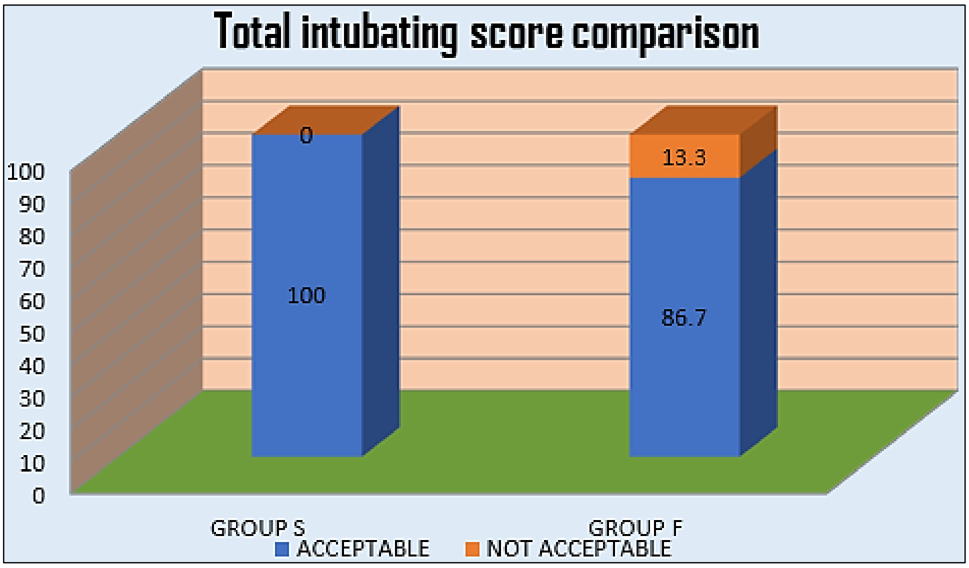
Groups	Score 3-4 (Excellent %)	Score 5-8 (Good %)	Score 9-12 (Fair %)	Score 13-16 (Poor %)
Group S	19(63.3)	11(36.7)	0	0
Group F	12(40)	14(46.7)	4(13.3)	0

Excellent intubating conditions (intubation score, 3-4) were achieved in 12 (40%) out of 30 patients in group F and 19 (63.3%) out of 30 patients in group S. Good intubating conditions (intubation score, 5-8) were achieved in 14 (40%) patients in group F and 11(36.7%) patients in group S.

Fair intubating conditions (intubation score, 9-12) were observed in 4 (13.3%) out of 30 patients in group F as compared to 0 in group S [Table 5]. 3 patients were having a score of 9 with fair laryngoscopy, moving vocal cord, moderate cough, only slight jaw relaxation. Only 1 patient had a score of 10 with difficult laryngoscopy, stiff jaw, vocal cord moving and slight cough in response to intubation. Poor intubating conditions (intubation score, 13-16) were observed in none among group F or in group S. There was one intubation failure in group F where succinylcholine was used.

Table 5: Total intubating score comparison

Intubating Conditions	Group I	Group II	P value
Acceptable (Excellent + good)	30/30(100)	26/30(86.7)	0 .112 (NS)
Not acceptable (Fair + Poor)	0/30	4/30(13.3)	



Overall intubating conditions

Acceptable intubating conditions (i.e., excellent and good) were observed in 26 (86.7%) out of 30 patients in group F, whereas all (100%) patients in group S had excellent intubating conditions (not statistically significant).
Unacceptable intubating conditions were observed in 4(13.3%) out of30 patients in group F and none in group S; this was not statistically significant [Table 6].

Haemodynamic changes during intubation

Table 6: Comparison of Changes in Heart Rate

Time Intervals	Group S (Mean ± S.D)	Group F (Mean ± S.D)	P-value
Base line	127.13±8.97	132.03±10	0.054(NS)
Pre induction	126.3±9.83	130.76±10.16	0.053(NS)
Post induction	126.7±14.16	129.53±10.59	0.392(NS)
Post-intubation 0min	137.8±8.56	127.96±9.15	0.00(S)
Post-intubation 1min	139.33±11.12	125.93±9.07	0.00(S)
Post-intubation 3min	136.3±12.23	122.56±8.61	0.00(S)
Post-intubation 5min	130.93±10.76	115.93±10.14	0.00(S)

Table 7: Comparison of Changes in Heart Rate

Time Intervals	Group S (Mean ± S.D)	Group F (Mean ± S.D)	P-value
Base line	127.13±8.97	132.03±10	0.054(NS)
Pre induction	126.3±9.83	130.76±10.16	0.053(NS)
Post induction	126.7±14.16	129.53±10.59	0.392(NS)

Post-intubation 0min	137.8±8.56	127.96±9.15	0.00(S)
Post-intubation 1min	139.33±11.12	125.93±9.07	0.00(S)
Post-intubation 3min	136.3±12.23	122.56±8.61	0.00(S)
Post-intubation 5min	130.93±10.76	115.93±10.14	0.00(S)

The mean basal heart rate was 127.13±8.97/min in group S and 132.03±10/min in group F, both of which were not statistically significant (P>0.05) [TABLE 6]. There was significant decrease in heart rate in group F after intubation at 0, 1, 3 and 5 minutes when compared with preinduction values (P<0.001),whereas group S showed significant increase in heart rate after intubation at 0, 1, 3 and 5 minutes when compared with preinduction values (P<0.001) [Figure 1].

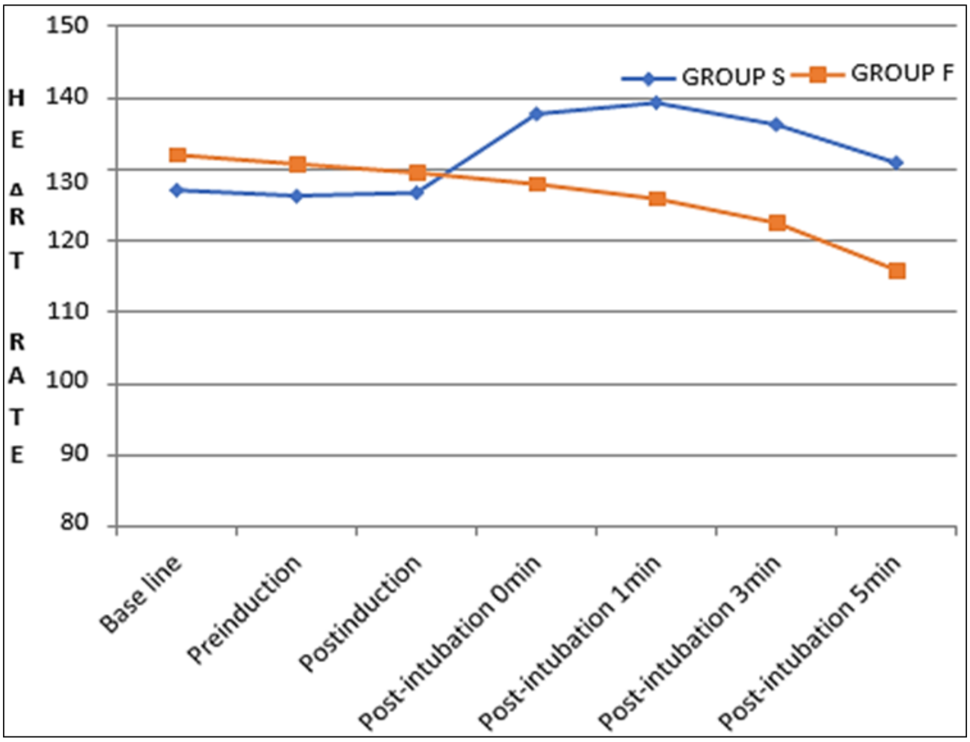


Table 8: Comparison of changes in systolic blood pressure

Time Intervals	Group S (Mean ± S.D)	Group F (Mean ± S.D)	P-value
Base line	113.87±10.12	114.63±14.37	0.812 (NS)
Pre induction	111.7±9.56	108.33±9.00	0.166(NS)
Post induction	102.13±12.53	102.13±6.74	1.00(NS)
Post-intubation 0min	126.87±9.29	107.07±7.06	.000(S)
Post-intubation 1min	129±8.63	105.47±6.18	.00(S)
Post-intubation 3min	125.33±10.76	102.4±6.17	.00(S)
Post-intubation 5min	116.13±9.45	98.47±5.37	.00(S)

The pre-induction systolic blood pressure was 114.6±14.37 mm Hg in group F and 113.87±10.12 mm Hg in group S, respectively, both of which were not statistically significant. The post-induction systolic blood pressures were significantly.

Groups	Score 1 n (%)	Score 2 n (%)	Score 3 n (%)	Score 4 n (%)	P value
Group S	28(93.3)	2(6.7)	-	-	0.24 (NS)
Group F	24(80)	6(20)	-	-	

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Post-induction	126.7±14.16	129.53±10.59	0.392(NS)	
Post-intubation 0min	137.8±8.56	127.96±9.15	0.00(S)	
Post-intubation 1min	139.33±11.12	125.93±9.07	0.00(S)	
Post-intubation 3min	136.3±12.23	122.56±8.61	0.00(S)	
Post-intubation 5min	130.93±10.76	115.93±10.14	0.00(S)	

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Discussion: Tracheal intubation without the use of neuromuscular blocking drugs is a technique which has been widely studied and practiced. The present study was carried out in children to assess tracheal intubating conditions and hemodynamic changes after induction of anaesthesia by using fentanyl-propofol without the use of neuromuscular blocking drugs. This was compared with the standard technique of using propofol-suxamethonium. Out of 60 patients, 30 received fentanyl-propofol and 30 received propofol-suxamethonium.

The study showed that healthy pre-medicated children with favourable airway anatomy who are scheduled for elective surgery can be reliably intubated 60 s after co- administration of fentanyl 4 µg.kg-1and propofol 3 mg.kg-1. This may be attributed to propofol as it decreases muscle tone and abolishes laryngeal responses to tracheal intubation or to laryngeal mask insertion. Propofol thus allows ease but the intubating conditions are not optimal. Increasing the depth of anesthesia by administration of fentanyl suppress the hemodynamic response to endotracheal intubation; as it's proved that addition of opioids in general improve intubating condition.

Keaveney and Knell were one of the first workers who reported 95% success rate of intubation without using muscle relaxants by the use of propofol 2.5 mg.kg-1. *Andel et al.* 5 studied the required dose of propofol used in combination with fentanyl for successful tracheal intubation without neuromuscular blocker. They reported that a dose of 2.7 mg.kg-1is needed. Propofol provides better jaw relaxation and attenuation of laryngeal reflexes than thiopental [46]. When used alone for tracheal intubation, propofol 2.5 mg.kg-1 provided satisfactory conditions in 19/20 (96%) patients and ideal intubating conditions in 14/20 (60%) patients [42]. Better intubating conditions with propofol than other hypnotics have been reported by *Erhan E et al* and *Mckeating K et al*., *Ko et al*., reported that administration of a bolus dose of fentanyl 5 min before intubation was more effective to blunt haemodynamic stress response for laryngoscopy and tracheal intubation.

Similarly, *Gupta et al.* and *de Fatima de Assuncao Braga et al*., 92 also concluded that propofol-fentanyl is a good combination for tracheal intubation without significant haemodynamic changes. Gupta and others in their study, on evaluation of different doses of propofol with prior administration (3 minutes before) of 3 µg.kg-1 of fentanyl in children in the age group of 3 to 10 years found a dose of propofol of 3.5 mg.kg-1to be effective in producing acceptable intubating conditions. Doses of 3 to 3.5 mg.kg-1of propofol produced good attenuation of haemodynamic responses to intubation.

In light of the above studies, in present study 4 µg.kg-1 fentanyl was given 5 minutes before induction, and induction dose of propofol 3 mg.kg-1was used. An additional advantage with fentanyl is the ability to maintain spontaneous breathing in case of intubation failure as a result of airway pathology. Fentanyl was one of suitable opiods used in this study as its short duration of action facilitated prompt recovery from anaesthesia, although duration of apnoea after intubation was not the subject of this study all the patients were breathing spontaneously before the completion of surgery and extubation was not delayed because of apnoea.

Results of present study showed that tracheal intubation was successful in 86.7% of children receiving fentanyl 4 μg.kg-1- propofol 3 mg.kg-1 and 100% of patients receiving propofol3 mg.kg-1-suxamethonium 1 mg.kg-1. Only 4 out of 30 patients had unacceptable intubating conditions in the fentanyl-propofol group. The overall scores for ease of laryngoscopy, the position of vocal cords, relaxed jaws and absence of coughing were however better in the propofol-suxamethonium group. This result is comparable with the finding of *Gupta A, Kaur R, Malhotra R, et al* who got acceptable intubating conditions in 80% patients with a combination of Propofol 3 mg.kg-1 preceded by fentanyl 3 μg.kg-1.Similar result was found in study of *De Fátima De Assunção Braga A, Da Silva Braga FS et al* who got adequate tracheal intubating conditions in 75% of the patients with Propofol 3 mg.kg-1preceded by fentanyl 3 μg.kg-[1] A lower success rate than my study might be due to the lower dose of fentanyl used by them. *Olmos, Stribel and colleagues* were successful in intubating more than 95% of adult patients given fentanyl and propofol. They stated that combination of fentanyl, thiopentone and succinylcholine results in no better intubating conditions than fentanyl plus propofol. *Safiya and Vijayalaxmi* reported that tracheal intubation could be accomplished using a combination of fentanyl (4 μg.kg-1) and propofol (3 mg.kg-1) in 95% cases. This may be attributable to methodologic differences in the two studies, as present study did not include lidocaine in premedication. Their high success rate could be due to the use of lignocaine before intubation Lignocaine has been shown to attenuate the pressor & heart rate response to laryngoscopy and intubation, it abolishes the pain on injection and due to antitussive effects, it improves the intubation scores(21). The addition of laryngotracheal lidocaine seems to be more successful in facilitating tracheal intubation. *Bulow and colleagues* used propofol 2.5 mg.kg-1and alfentanil 30 mg.kg-1 and then sprayed the vocal cords with lidocaine 160 mg, 90 s before intubation. Satisfactory conditions were obtained in all 27 patients in this group compared with 73% in the saline group. *Mullholand D et al., 19* have used lignocaine 1.5 mg.kg-1and found incidence of post intubation coughing lower than in which lignocaine was not used. Sustained cough is the main encountered obstacle when omitting relaxants. In the present study 4 cases in group F secured an intubation score greater than 9 out of which 3 cases scored maximum due to presence of moderate degree of post intubation coughing. It must be pointed out, though, that unless supplemental anesthesia is quickly administered, some patients will begin to cough or move within a few minutes, particularly in response to surgical positioning or preparation. Thus, when using this technique for tracheal intubation, additional anesthetic drugs such as nitrous oxide, isoflurane, propofol, or thiopental should be administered soon after induction to reliably prevent coughing or movement.

On the contrary, *Uma Srivastava et al.* [2] *Mencke Thomas et al.* and *Samar et al.* have achieved lower success rate despite augmentation of propofol with fentanyl. *Tsuda et al.* [14] also found that low-dose fentanyl in the presence of propofol provided poor intubating conditions. The result obtained in present study are significantly better than *Leitaut T et al.* [9] who found clinically acceptable intubating conditions in only 35% of patients with propofol 2.5 mg.kg-1 and fentanyl 3 μg.kg-1. In their study authors performed laryngoscopy and intubation 3 min after fentanyl injection whereas in present study laryngoscopy and intubation were performed 6 min after fentanyl injection. The peak action of fentanyl comes after 7 min and the smaller time lag after fentanyl injection might be the cause of their poor success.

Many studies using alfentanil or remifentanil as an alternative to neuromuscular blocking drugs for intubation of the trachea have been done. A dose of alfentanil 40 μg.kg-1 was needed by patients in a study by *Scheller and colleagues* to provide satisfactory intubating conditions in 100% of his patients with 2 mg.kg- 1propofol. *Stevens and Wheatly* [1] found that remifentanil 3 mg.kg-1, given with propofol 2 mg.kg-1, was the minimum dose necessary to produce acceptable intubating conditions in nearly all patients. Remifentanil has the potential to allow rapid emergence and return of spontaneous ventilation, hence seems to be a more practical opioid choice in day-surgery setting. But these studies also reported of prolonged apnoea time and muscle rigidity.

The pattern of haemodynamic response to induction of anesthesia in present study was consistent with other studies; Safiya and Vijayalaxmi reported that heart rate decreased significantly after intubation in patients who received fentanyl and propofol, whereas heart rate was increased in patients given propofol-suxamethonium. Similar result was seen in present study. *Kanaya et al*. explained that induction of anesthesia with propofol caused larger decrease in blood pressure, indicating a decrease in peripheral sympathetic nerve activity with an insignificant increase in heart rate, indicating a decrease in cardiac parasympathetic nerve activity in humans. In the present study, there was no significant change in heart rate in group F after induction when compared to basal values, also in group S no significant change in heart rate after induction was observed.

Uma Srivastava et al. found there was a significant decrease in heart rate and arterial pressure from the baseline value, post induction in children who were given propofol and fentanyl. This finding was contrary to present study. In present study the post-induction changes in heart rate from the baseline value were insignificant but post intubation the heart rate decreased significantly in fentanyl group and increased in succinylcholine group. *Steyn et al.* observed no change in the heart rate but found a significant fall in the mean arterial pressure after the induction and following the intubation with a dose combination of propofol 3 mg.kg-1and alfentanil 15 picog.kg-1 in children. Results of the study by *Steyn et al.* matched with that of the present study. *Blair et al.* 123 found a reduction in the heart rate before the intubation, in children who received propofol 3 mg.kg-1 and alfentanil 10 μg.kg-1. However, they did not mention about the arterial blood pressure and the heart rate changes after the intubation. *Coghlan et al.* 83 compared propofol with or without alfentanil in healthy adult patients and found that propofol 2.5 mg.kg-1 alone caused a significant increase in the heart rate and the mean arterial pressure after the intubation. The addition of alfentanil (20 μg.kg-1) produced a slight increase in the mean arterial pressure and no change in the heart rate. From the above studies, it has been found that propofol, causes reduction in the heart rate and blood pressure following induction and that it attenuates the haemodynamic responses to laryngoscopy and intubation. In present study post-induction changes in heart rate and arterial pressure from the baseline value were insignificant in both the groups. But the decrease in the heart rate and systolic blood pressure after intubation in present study were due to the synergistic effects of fentanyl and propofol. Fentanyl blunted the haemodynamic response to laryngoscopy and intubation, whereas propofol decreased the sympathetic nervous activity.

In present study there was significant decrease in systolic blood pressure in both groups after induction when compared to pre induction values. The administration of propofol in a dose of 2-2.5 mg.kg-1 can lower mean blood pressure by 25% to 40%. This drop is secondary to both the vasodilator and the myocardial depressant effects of propofol. This relative hypotension is always associated with good peripheral perfusion, as evidenced by continuing digital pulse oximetry readings, and is short lived. In view of the drop in mean arterial pressure, this technique of tracheal intubation without muscle relaxants may not be appropriate for elderly patients and in patients with cardiovascular or cerebrovascular disease. Intubation of the trachea is almost always followed by an increase in arterial blood pressure. Present results showed that systolic blood pressure was decreased in propofol-fentanyl group after intubation, whereas it increased in the suxamethonium group. The fall in systolic blood pressure from the pre-induction value was highly significant in the propofol-fentanyl group. The fall in systolic blood pressure is comparable to that in studies by *Uma Srivastava et al., Tahira Shah* and *Billard et al.* [and *Safiya and Vijayalaxmi*. This result are comparable with the finding of *Dahlgren and Messeter* [23] who reported that low dose fentanyl before intubation effectively blunt the hemodynamic response to intubation.

Muscle rigidity following opiate administration has been studied in human volunteers, and previous reports show that rigidity occurs in 80% of patients when 175 μg.kg-1 of alfentanil is administered and in 50% of patients when 15µg.kg-1 of fentanyl was used. Muscle rigidity was not observed during this study. The jaw was judged to be relaxed in all patients and the lungs of all could be easily ventilated via mask. In no patient was ventilation via mask deemed impossible. The absence of muscle rigidity in present study can be attributed to the much lower dosage of narcotic used and also to slow injection rate of narcotics, since there is evidence that the incidence and severity of opiate-induced rigidity are not only dependent on the dosage but also on the rate of administration. In present study midazolam and propofol were administered in combination with fentanyl. There is evidence in animals and humans that benzodiazepines and barbiturates do prevent or attenuate fentanyl-induced muscular rigidity. Propofol may have similar properties, but this has not been studied as of yet. The slow rate of infusion of the fentanyl bolus dose may also have made opioid induced rigidity less likely.

This study had the limitation of lack of double blinding .Also here it is to be highlighted that, there exists wide subjectivity when assessing individual variables such as coughing , vocal cord movement and jaw relaxation. From a clinical point of view, excellent intubation conditions might be considered by some as the standard, rather than clinically acceptable intubating conditions, which inclu2aw2des both excellent and good conditions. The debate about this issue was re-opened by the work of *Mencke and colleagues* in his study, vocal cord sequelae were more frequent when the intubation score subcomponent, ‘reaction to tube insertion or cuff inflation’ was not excellent. In the present study, excellent conditions occurred less frequently when omitting relaxants. This suggests that, if excellent intubation conditions are required, then the use of muscle relaxants is mandatory.

Result & Conclusion

The present study was undertaken to highlight the benefits of avoiding suxamethonium, using only the opioid-propofol technique for routine intubation in paediatric age groups.

Sixty children of ASA grade I or II scheduled to undergo elective surgery under general anesthesia were studied. They were randomly divided into two groups of thirty patients each.

Group I: Inj. fentanyl 4 µg.kg-1 and 5 minutes later Inj. propofol 3mg.kg-1 was given.

Group II: Inj. propofol 3 mg.kg-1 followed by Inj. Suxamethonium 1mg.kg- 1 was given.

Intubation in all cases was done by senior anaesthesiologist, 60 secs after induction with propofol. Intubation scores were recorded according to Helbo-Hansen Raulo and Trap-Anderson scoring system. Acceptable intubating conditions (i.e., excellent and good) were observed in 26 (86.7%) out of 30 patients in Fentanyl group. The systolic blood pressure and heart rate, decreased significantly after intubation at 3 and 5 minutes in group Fentanyl when compared with pre-induction values ($P<0.001$).

In present study suggest that in premedicated healthy children administration of fentanyl 4µg.kg-1 in combination with propofol 3mg.kg-1, after adequate waiting period of 6min, reliably provides good to excellent conditions for tracheal intubation and blunts the pressor response to intubation adequately without significant cardiovascular depression. Thus ideal intubating conditions can be achieved without muscle relaxants using fentanyl and propofol and provide an useful alternative technique for tracheal intubation when neuromuscular blocking drugs are contraindicated or should be avoided. Refinement of this technique by adjustment of the dose of fentanyl and propofol and addition of Lignocaine may minimize incidence of coughing and might improve intubating conditions further.

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