|| ISSN(online): 2589-8698 || ISSN(print): 2589-868X ||
International Journal of Medical and Biomedical Studies
Available Online at www.ijmbs.info
Volume 3, Issue 1; January: 2019; Page No. 118-122
Original Research Article
PubMed (National Library of Medicine ID: 101738825)

PROPOFOL-FENTANYL FOR TRACHEAL INTUBATION IN CHILDREN WITHOUT NEUROMUSCULAR BLOCK

Dr. Anil Kumar Gupta[1], Dr. Pawan Kumar Agrawal[2]
[1]Assistant Professor Dept. of Anesthesiology K. M. Medical College and Hospital, Mathura (UP).
[2]Assistant Professor Dept. of Anesthesiology K.M. Medical College and Hospital, Mathura (UP).

Article Info: Received 08 December 2018; Accepted 17 January. 2019
Cite this article as: Gupta, D. A. K., & Agrawal, D. P. K. (2019). PROPOFOL-FENTANYL FOR TRACHEAL INTUBATION IN CHILDREN WITHOUT NEUROMUSCULAR BLOCK. *International Journal of Medical and Biomedical Studies*, *3*(1).
DOI: https://doi.org/10.32553/ijmbs.v3i10.672
Address for Correspondence: Dr. Pawan Kumar Agrawal, Assistant Professor Dept. of Anesthesiology, K.M. Medical College and Hospital, Mathura (UP).
Conflict of interest: No conflict of interest.

Abstract

INTRODUCTION: In paediatric anaesthesia tracheal intubation without prior administration of muscle relaxants is well-established practice. Depolarizing muscle relaxant such as suxamethonium is also used in induction but it may be associated with side effects such as postoperative myalgia, prolonged paralysis, and increase in intraocular pressure and hyperkalaemia.

MATERIAL AND METHODS: A total of 60 children were included in the study, of both sex, aged between 2 and 12 years. Patients were randomised in to two groups: Group 1: Inj. Fentanyland Inj. Propofoland group 2: Inj. Propofol and Inj. suxamethonium. The quality of intubation was graded by the consultant using the scoring system devised by Helbo-Hansen Raulo and Trap-Anderson.

RESULTS: A total of 60 patients were included in the study and were randomised in to two groups of 30 each.In group 1 mean age was 8.24±2.65 and in group 2 it was 7.96±2.77. Weight in group 1 was 21.58±6.22 and in group 2 was 22.87±5.59. There were 18 male and 12 female in group 1, while in group 2 there were 19 male and 11 female. No statistically significance e=was observedin both the group.*Acceptable intubating conditions* were observed in 29 (97%) out of 30 patients in group 1, whereas all (100%) patients in group S had excellent intubating conditions.

CONCLUSION: Tracheal intubation can be accomplished using a combination of Fentanyl Propofol combination and suxamethonium (muscle relaxant) can be avoided. When neuromuscular blocking drugs are contraindicated this method can be used.

Introduction

In paediatric anaesthesia tracheal intubation without prior administration of muscle relaxants is well-established practice[i].Several methods have been described to improve intubating conditions in children's like clonidine premedication, addition of nitrous oxide, or propofol. These technique may be one of the choices for the anesthetist when the use of muscle relaxants is precluded[ii]. Sevoflurane without a muscle relaxant for inhalation induction of anesthesia and tracheal intubation had been widely studied in pediatric patients but no satisfactory results were observed[iii],[iv].

Depolarizing muscle relaxant such as suxamethonium is also used in induction but it may be associated with side effects such as postoperative myalgia, prolonged paralysis, and

increase in intraocular pressure and hyperkalaemia[v]. Suxamethonium is reported to be associated with cardiac arrest and death in young children. Use of nondepolarizing relaxants may be associated with undesirable effects such as prolonged neuromuscular blockade or the inability to reverse the paralysis quickly if airway management via mask or tracheal intubation is not possible[vi].

Propofol has been reported provide adequate conditions for intubation in combination with Fentanyl[vii].

MATERIAL AND METHODS

The present study was conducted in the Dept. of Anesthesia at K.M. Medical College and Hospital, Mathura (UP). A total of 60 children were included in the study of American Society of Anaesthesiologists (ASA) Physical Status I and II, of both sex, aged between 2 and 12 years. The children posted to undergo various elective surgical procedures, for which endotracheal anaesthesia was planned, were selected for study. Informed and written parental consent was obtained. Patients were randomised in to two groups : Group 1: Inj. Fentanyl 4 μg/kg + Inj. Propofol 3 mg/kg and group 2 : Inj. Propofol 3 mg/kg + Inj. suxamethonium 1 mg/kg.

All patients were fasted 6 hours for solid food, but clear fluids will be given for up to 4 h pre-operatively. All patients were pre-medicated with 0.05 mg/kg midazolam atropine 0.01 mg/kg I.V., 10 minutes prior to induction.

One parent was allowed to accompany the child into the pre-operative holding area. On arrival in the anesthetic room, baseline heart rate, pulse oximeter oxygen saturation and non-invasive blood pressure was measured.

In group 1: Inj. Fentanyl 4μg/kg was given I.V. over 30 seconds. After 5 minutes, the children received Propofol 3 mg/kg over a period of 30 seconds, Lignocaine 0.2 mg/kg was added to Propofol solution to reducd pain on injection. Laryngoscopy and intubation were attempted 60 seconds after induction of anaesthesia . Additional bolus of 1 mg/kg of Propofol was given if laryngoscopy was not 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 was injected and intubation completed.

In group 2: Inj. Propofol 3 mg/kg was given, followed by Inj. suxamethonium 1 mg/kg and endotracheal intubation was performed 60 seconds later. The quality of intubation was graded by the consultant using the scoring system devised by Helbo-Hansen Raulo and Trap-Anderson[viii].

Table 1: Scoring criteria for intubating conditions

Score	1	2	3	4
Laryngoscopy	Easy	Fair	Difficult	Impossible
Vocal cords	Open	Moving	Closing	Closed
Coughing	None	Slight	Moderate	Severe
Jaw relaxation	Complete	Slight	Stiff	Rigid

Each patient was assessed for four variables:

- Ease of laryngoscopy
- Position of vocal cords
- Degree of coughing and
- Jaw relaxation

The observed conditions with respect to each of the above were allocated scores of 1 to 4. A score of 3-4 was considered excellent; 5-8, good; 9-12, poor; and 13-16, bad. Excellent and good scores were considered as clinically acceptable, and fair and poor scores were considered as clinically unacceptable.

Statistical analysis was done by using SPSS software. The results were expressed as mean with standard error of mean as index of dispersion. Blood pressure, pulse rate and arterial O_2 saturation were compared with baseline values using paired *t* test. Comparison of variables obtained with Propofol-Fentanyl was done with those obtained with Propofol-suxamethonium using Fisher exact test. $P<0.05$ was regarded as statistically significant, $P<0.001$ was taken as highly significant and $P>0.05$ was regarded as not significant. The Fisher exact test was used to compare the intubation scores.

RESULTS

A total of 60 patients were included in the study and were randomised in to two groups of 30 each.

Table 2: Demographic characteristics

Patient data (mean±SD)

variables	**Group 1**	**Group 2**
Number of patients	30	30
Age (years)	8.24±2.65	7.96±2.77
Weight (kg)	21.58±6.22	22.87±5.59
Male	18	19
Female	12	11

In group 1 mean age was 8.24±2.65 and in group 2 it was 7.96±2.77. Weight in group 1 was 21.58±6.22 and in group 2 was 22.87±5.59. There were 18 male and 12 female in group 1, while in group 2 there were 19 male and 11 female. No statistically significance e=was observedin both the group.

Table 3: scoring criteria comparison

Parameter	Score	Group 1	Group 2
Laryngoscopy	1	26	25
	2	2	4
	3	2	1
	4	0	0
Vocal cord position	1	22	26
	2	7	3
	3	1	1
	4	0	0
Cough	1	12	30
	2	15	0
	3	2	0
	4	1	0
Jaw mobility	1	26	29
	2	5	1
	3	1	0
	4	0	0

Table 4: Scoring conditions

Scores	Group 1	Group 2
Excellent (score 3-4)	11(37%)	27 (90%)
Good (Score 5-8)	18 (60%)	3 (10%)
Fair (Score9-12)	1 (3%)	0
Poor (Score 13-16)	0	0

Excellent intubating condition in group 1 (Fentanyl) was11 (37%) while in group 2 (Suxamethonium) was 27(90%).Good intubating condition in group 1 (Fentanyl) was18 (60%) while in group 2 (Suxamethonium) was 3(3%). *Fair* intubating conditions (intubation score, 9-12) were observed in 1 (3%) out of 30 patients in group 1 ((Fentanyl). Poor intubating condition was not observed in any group.

Acceptable intubating conditions (i.e., excellent and good) were observed in 29 (97%) out of 30 patients in group 1, whereas all (100%) patients in group S had excellent intubating conditions.There was significant decrease in heart rate in group 1 after intubation at 0, 1, 2, 3 and 5 minutes (P<0.001), whereas group 2 showed significant increase in heart rate after intubation at 0, 1, 2, 3 and 5 minutes (P<0.001).The systolic blood pressure decreased significantly after intubation at 0, 1,2, 3 and 5 minutes in group 1 (P<0.001), whereas group 2showed significant increase in systolic blood pressure at 0, 1, 2, 3 and 5 minutes (P<0.001).

DISCUSSION AND CONCLUSION

Tracheal intubation without the use of neuromuscular blocking drugs has been widely studied. Shah Et al showed that conditions for laryngoscopy were superior after induction of anaesthesia with Propofol rather than thiopentone[ix]. Intubating conditions can be improved by increasing the depth of anaesthesia by administering supplementary increments of induction agent or opioids or lignocaine[x]. Haemodynamic response to endotracheal intubation can be suppressed by administration of Fentanyl[xi]. Batra *et al*[xii]showed that remifentanil administered before Propofol provides acceptable tracheal intubating conditions in children and completely inhibits the increase in heart rate associated with intubation. In our study Propofol-Fentanyl was used. Gupta et al in their study on Propofol with 3 minutes before administration of 3 μg/kg of Fentanyl in children in the age group of 3 - 10 years found a dose of Propofol of 3.5 mg/kg to be effective in producing acceptable intubating conditions[xiii].Andelet alin their dose finding study, concluded that Propofol dose in

combination with Fentanyl allowing reliably successful tracheal intubation without neuromuscular blocking agents in all patients[xiv]. In our study induction dose of Propofol 3 mg/kg was used and 4 µg/kg Fentanyl was given 5 minutes before intubation. Lignocaine in the dose of 0.2 mg/kg body weight was mixed with Propofol to avoid pain on injection.

Our study showed that tracheal intubation was successful in 97% of children receiving Fentanyl-Propofol and 100% of patients receiving Propofol-suxamethonium. Only one patient had *unacceptable intubating conditions* in the Propofol Fentanylgroup (Group 1). Striebel HWet al showed that in 95% of adult patients Fentanyl and Propofol was successful in intubation[xv]. Saha TS et al also concluded that Propofol-Fentanyl provided adequate tracheal intubating conditions without significant haemodynamic changes[xvi].

In our study it was observed that after intubation, heart rate decreased significantly in patients who received Fentanyl and Propofol, whereas heart rate was increased in patients intubated with Propofol-suxamethonium. This has been observed in other studies[xvii, xviii].

Our study showed that systolic blood pressure was significantly decreased in Propofol-Fentanyl group after intubation, whereas it increased in the suxamethonium group. These findings were in accordance with the Srivastava *et al. study*[xix].

*To conclude*tracheal intubation can be accomplished using a combination of Fentanyl Propofol combination and suxamethonium (muscle relaxant) can be avoided. When neuromuscular blocking drugs are contraindicated this method can be used.

REFERENCES

1. [i]Blair JM, Hill DA, Wilson CM, Fee JP. Assessment of tracheal intubation in children after induction with propofol and different doses of remifentanil.Anaesthesia. 2004 Jan; 59(1):27-33.
2. [ii]Woods AW, Allam S. Tracheal intubation without the use of neuromuscular blocking agents.Br J Anaesth. 2005 Feb; 94(2):150-8.
3. [iii]Eikermann M, Hunkemöller I, Peine L, Armbruster W, Stegen B, Hüsing J, Peters J.Optimalrocuronium dose for intubation during inhalation induction with sevoflurane in children.Br J Anaesth. 2002 Aug; 89(2):277-81.
4. [iv]Aouad MT, Yazbeck-Karam VG, Mallat CE, Esso JJ, Siddik-Sayyid SM, Kaddoum RN. The effect of adjuvant drugs on the quality of tracheal intubation without muscle relaxants in children: a systematic review of randomized trials.PaediatrAnaesth. 2012 Jul; 22(7):616-26.
5. [v]Scheller MS, Zornow MH, Saidman LJ. Tracheal intubation without the use of muscle relaxants: a technique using propofol and varying doses of alfentanil.AnesthAnalg. 1992 Nov; 75(5):788-93.
6. [vi]Srivastava U, Kumar A, Gandhi NK, Saxena S, Agarwal S. Comparison of Propofol and Fentanyl with thiopentone and suxamethanium for tracheal intubation in children. Indian J Anaesth. 2001;45:263–6.
7. [vii]Striebel HW, Hölzl M, Rieger A, BrummerG.Endotracheal intubation with propofol and fentanyl. Anaesthesist. 1995 Dec; 44(12):809-17.
8. [viii]Helbo-Hansen S, Ravlo O, Trap-Andersen S.The influence of alfentanil on the intubating conditions after priming with vecuronium.ActaAnaesthesiol Scand. 1988 Jan; 32(1):41-4.
9. [ix]Shah TS. Tracheal intubation without neuromuscular block in children. J Postgrad Med. 2004;18:117–23.
10. [x]Saarnivaara L, Klemola UM. Injection pain, intubating conditions and cardiovascular changes following induction of anaesthesia with propofol alone or in combination with alfentanil.ActaAnaesthesiol Scand. 1991 Jan; 35(1):19-23.

11. [xi]Adachi YU, Satomoto M, Higuchi H, Watanabe K. Fentanyl attenuates the hemodynamic response to endotracheal intubation more than the response to laryngoscopy.AnesthAnalg. 2002 Jul; 95(1):233-7, table of contents.
12. [xii]Batra YK, Al Qattan AR, Ali SS, Qureshi MI, Kuriakose D, Migahed A. Assessment of tracheal intubating conditions in children using remifentanil and propofol without muscle relaxant.PaediatrAnaesth. 2004 Jun; 14(6):452-6.
13. [xiii]Gupta A, Kaur R, Malhotra R, Kale S. Comparative evaluation of different doses of propofol preceded by fentanyl on intubating conditions and pressor response during tracheal intubation without muscle relaxants.PaediatrAnaesth. 2006 Apr; 16(4):399-405.
14. [xiv]Andel H, Klune G, Andel D, Felfernig M, Donner A, Schramm W, Zimpfer M. Propofol without muscle relaxants for conventional or fiberopticnasotracheal intubation: a dose-finding study.AnesthAnalg. 2000 Aug; 91(2):458-61.
15. [xv]Striebel HW, Hölzl M, Rieger A, Brummer G. Endotracheal intubation with propofol and fentanyl.Anaesthesist. 1995 Dec; 44(12):809-17.
16. [xvi]Shah TS. Tracheal intubation without neuromuscular block in children. J Postgrad Med. 2004;18:117–23.
17. [xvii]Olmos M, Ubierna B, RuanoC.Intubation with propofol without neuromuscular blockade. Effect of premedication on fentanyl and lidocaine. Rev EspAnestesiolReanim. 1993 May-Jun; 40(3):132-6.
18. [xviii]Beck GN, Masterson GR, Richards J, Bunting P. Comparison of intubation following propofol and alfentanil with intubation following thiopentone and suxamethonium.Anaesthesia. 1993 Oct; 48(10):876-80.
19. [xix]Srivastava U, Kumar A, Gandhi NK, Saxena S, Agarwal S. Comparison of Propofol and Fentanyl with thiopentone and suxamethanium for tracheal intubation in children. Indian J Anaesth. 2001;45:263–6