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*Original Article*

# TRACHEAL INTUBATION WITHOUT MUSCLE RELAXANT COMPARISON BETWEEN THREE TECHNIQUES

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**ABSTRACT:**

*The standard techniques of tracheal intubation are usually done after induction of anaesthesia followed by skeletal muscle relaxation. The muscle relaxants are associated with many side effects. These side effects have spurred research into development of alternative methods for providing good intubation condition.*

*Forty-five patients with ASA grade I or II, having Mallampati class-I or II airways were divided in three groups depending on administration of drugs in a double blind randomized study. Group-A, thiopental sodium (5mg/kg) + fentanyl (10mcg/kg) + lignocaine(1mg/kg), Group-B, thiopental sodium (5mg/kg) + fentanyl (10mcg/kg ) and Group-C, thiopental sodium (5mg/kg) + suxamethonium(1mg/kg) Group-C acted as control. The blood pressure and heart rate were measured before induction,after induction and after intubation. Ease of intubation was judged by Scheller intubation criteria. The intubation was possible in all patients of the three groups and there were no significant differences between them in respect to total score.*

**INTRODUCTION:**

The tracheal intubation is usually performed after induction of anaesthesia followed by relaxation of skeletal muscles with depolarising or nondepolarising muscle relaxant. But this conventional process of intuabtion is sometimes associated with side effects. Many of these effects are trivial but some are of grave consequences and the avoidance of them becomes a priorty for aneasthetist for the ultimate welfare of the patient[1]. Prolonged paralysis, malignant hyperthermia, anaphylactic reactions, myalgia, muscle damage, increased intracranial or intraocular pressure, hyperkalemia, masseter rigidity and increased intragastric pressure are among the many of the side effects of depolarising muscle relaxants. The use of nondepolarising agents may cause anaphylactic reactions, delayed onset, aspiration of gastric contents and inability to reverse the paralysis quickly etc.

The above side effects have spurred research into the development of alternative methods for providing good intubation conditions. Several combination of drugs like thiopentone, fentanyl, propofol, alfentanyl, lignocaine etc have been tried with satisfactory results[2,3,4,5,6]. As The availability of drugs is limited in Bangladesh; we have designed this study with three locally available drugs-thiopentone, fentanyl and lignocaine.

**MATERIALS AND METHODS**

Forty-five patients of both sexes and aged between 30 – 50 years of ASA physical status - I & II with Mallampati class-I & II were included in a double blind, randomized study. The local ethics committee approved the protocol. Written informed consent was taken from each patient. The patients having full stomach, reactive airways disease and history of addiction with drugs or alcohol were excluded from the study. Patients scheduled for routine surgical procedures were allocated randomly into three groups. The randomization was done by selecting cards named as 'A' 'B' & 'C'.

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Group A : TPS + Fentanyl + Lignocaine.

Group B : TPS + Fentanyl

Group C : TPS + Suxamethonium

The venous access was secured in all patients followed by premedication with intravenous midazolam. All patients were preoxygenated for three minutes. In Group-A, at first fentanyl at the dose of $10\mu kg^{-1}$ was given intravenously and one minute later, lignocaine $1mgkg^{-1}$ was also given intravenously. Then the patients were induced with TPS, $5mgkg^{-1}$. In Group-B, lignocane administration was avoided but other process of induction of anaesthesia was almost like Group-A. In Group-C, TPS was followed by suxamethonium. During this period, patients were ventilated with 100% oxygen. Thirty seconds after induction of anaesthesia, the patients were evaluated for ease of ventilation and ten seconds later, evaluation of ease of jaw opening was noted. Then laryngoscopy was attempted and parameter of the exposure of the vocal cords was recorded. If intubation would fail in any patient, it was planed to follow the failed intubation drill.

The arterial blood pressure both systolic and diastolic and heart rate were monitored before induction, after induction and after intubation. The study was terminated within two minutes of intubation. Data was compiled and was analyzed by using the student "t" test for comparison among the groups. Significant level was taken with 95% confidence limit.

**Appendix-I**

*Scoring criteria for various airway conditions and responses*

| Criteria | Score allotted | score received |
|---|---|---|
| Mask ventilation | | |
| Mask ventilation easy | 3 | |
| Mask ventilation difficult | 2 | |
| Mask ventilation impossible | 1 | |
| Jaw mobility | | |
| Jaw mobile | 3 | |
| Jaw partly mobile | 2 | |
| Jaw immobile | 1 | |
| Exposure | | |
| Vocal cord, arytenoids visible | 3 | |
| Vocal cords, arytenoids partly visible | 2 | |
| Vocal cords, arytenoids not seen | 1 | |
| Cord position | | |
| Vocal cords open | 3 | |
| Vocal cords midposition | 2 | |
| Vocal cords closed | 1 | |
| Movement & cough | | |
| No movement | 4 | |
| One or two coughs | 3 | |
| Persisting coughing | 2 | |
| Movement | 1 | |

## RESULTS

There was no significant ($p<0.05$) difference between groups in terms of gender distribution, mean patient age and weight (Table-I). There were no significant ($p<0.05$) preinduction differences between groups in heart rate or blood pressure (Table –II).

**Table –I**

*Patient characteristics of three groups*

| Characteristics | | Group A (n=15 | Group B (n= 15 | Group C (n=15) |
|---|---|---|---|---|
| Age (yrs) | | 38.13 (10.2 | 39.8 (12.53) | 39.13 (11.66) |
| Sex | Male | 3 | 5 | 5 |
| | Female | 12 | 10 | 10 |
| Body Weight | | 55.93 (6.36) | 54.4 (6.95) | 56.33(6.78) |

Mean $\pm$ SD

* $P<0.05$

**Table-II**

*Haemodynamic values in 3 groups*

| Parameters | Before induction | | | After induction | | | After intubation | | |
|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | A | B | C | A | B | C |
| B.P | | | | | | | | | |
| (mm of Hg) | 121 | 125.33 | 111.6 | 78.8 | 79.2 | 103.66 | 89.66 | 95.66 | 135.33 |
| | (13.9) | (22.44) | (17.28) | (13.7) | (16.56) | (16.95) | (10.7) | (14.74) | (13.95) |
| Diastolic | 77.66 | 79 | 71.6 | 61.3 | 62.3 | 68.66 | 61.3 | 67.66 | 88.33 |
| | (9.79) | (11.37) | (8.38) | (8.3) | (12.08) | (11.09) | (8.3) | (11.47) | (7.94) |
| Heart Rate | 98.26 | 92.06 | 90.04 | 78.26 | 79.2 | 88.4 | 81.6 | 79.86 | 102.4 |
| (per min ) | (12.66) | (14.63) | (9.65) | (6.79) | (3.47) | (10.3) | (7.49) | (12.03) | (8.25) |

Values are expressed as mean ± SD; values are regarded as significant if P<0.05.

The heart rate and blood pressure both systolic and diastolic were decreased significantly after induction in groups A and B but after intubation it rose significantly in these groups. The decrease in blood pressure after induction and intubation in Group-A & B were significantly lower than that of Group C. In Group-C, post induction fall of blood pressure was not significant in comparison to preinduction levels but the heart rate and blood pressure both systolic and diastolic rose after intubation (Table-II).

Induction parameters like jaw mobility, ease of ventilation were also similar (Table-III). Exposure and visualization of vocal cords was satisfactory in all patients as judged by Cormack and Lehane[7] classification and was found to be in grade I or II. No patient required subsequent suxamethonium for intubation.

**Table-III**

*Intubation score (Total) as the basis of scheller intubation score.*

| Parameters | A | B | C |
|---|---|---|---|
| Scheller Basis | 14.73 | 14.6 | 15.8 |
| Of intubation | (0.7) | (0.73) | (0.35) |
| Score (total) | | | |

Mean±SD; P<0.05

The position of vocal cords was found to be significantly (p<0.05) wide in Group-C (Table –IV). But no patient had closed vocal cords or incidence of laryngospasm during intubation.

**Table-IV**

*Breakdown score from scheller intubation parameters*

| | A | B | C |
|---|---|---|---|
| Score for | 2.2 | 2.31 | 3 |
| Cords position | (0.41) | (0.51) | (0) |
| Score for cough | 3.6 | 3.4 | 3.43 |
| And movement | (0.63) | (0.63) | (0.5) |

Mean±SD; P<0.05

Tolerance to intubation as indicated by absence of coughing immediately after intubation was significantly (p<0.05) better in Group-C. Only two patients in this group had one or two coughs after intubation as compared to four in Group-A and nine in Group-B. Among these, one patient in each group A and B had persistent coughing.

## DISCUSSION

Our study demonstrates that tracheal intubation is possible to perform reliably in premedicated patients with favorable airway anatomy after intravenous induction of anaesthesia without simultaneous administration of muscle relaxants.

Many authors have done near identical studies and have also found similar but not identical results. Scheller, et al[2] have used alfentanil instead of

fentanyl and have found ease of intubation which was similar to that of the control. However they have recorded more coughs after intubation. In there study, they did not used Lignocaine. Yukioka H, et al[3] have found that lignocaine suppressed cough significantly ($p<0.05$) when the patients were intubated without the use of skeletal muscle relaxant.

Hovorka J, et al[4] concluded that intubation condition were not readily acceptable without the use of muscle relaxant though they found difficulty during intubation in only one patient. They also did not compare there study with control group. They however concluded that tracheal intubation was more easily accomplished with thiopentone than propofol.

Results of Keller S[5] were much similar to our study, where the time taken for intubation from the start of inducion was four minutes. This may increase the susceptability of aspiration in high-risk patients. This can be avoided by using drugs with faster onset like alfentanil

The heart rate and blood pressure both systolic and diastolic were considerably reduced in Group-A and B as compared to preinduction values. In Group-C both systolic and diastolic blood pressure and heart rate rose significantly ($p<0.05$) after intubation. In this study we also found that attenuation of cardiovascular response to intubation can be achieved by this method.

Our study was terminated at two minutes of intubation and we also found that immediate administration of supplemental anaesthesia is required, otherwise the patient might move or cough within few minutes.

## CONCLUSION

It can be concluded that in premedicated healthy patients with favorable airway anatomy, tracheal intubation may be accomplished by using a combination of fentanyl (10mcg/kg) and lignocaine (1mg/kg) with Thiopentone sodium (5mg/kg). Simultaneous administration of muscle relaxant may not require for tracheal intubation. This technique may be of value where muscle relaxants are contraindicated due to the undesirable side effects. But routine use of the technique is neither acceptable nor recommended.

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