# Does Suction Tube Guiding Reduce Epistaxis From Nasotracheal Intubation?

**Isara Jongcharoenkamon[1], Tanatorn Juajarn[2] and Nipawan Pisilp[3]**

## ABSTRACT

**Background :** Epistaxis is a common complication of nasotracheal intubation that lead to more difficult to proceed intubation. Guiding catheter pass nasopharynx can reduce false tract and impingement of nasopharynx area that lead to epistaxis. Suction tube is an equipment that we always prepare for intubation, so no more cost needed to use it as the catheter tube.

**Methods :** A Randomized controlled trial study, compare nasotracheal intubation with suction tube guiding to conventional technique (blind insertion of tracheal tube through nasal cavity), primary outcome is incidence of epistaxis. secondary outcomes are grade of epistaxis, difficulty of nasopharynx insertion and numbers of attempt. Statistically significant was calculated by Fisher exact test.

**Results :** 70 patients who need nasotracheal intubation to proceed the operation were randomized into two groups (suction guiding group and conventional group; 35 patients each). The incidence of epistaxis is no difference between suction guiding group and conventional group 11(31.43%) VS 16(45.71%)(Risk ratio 0.68; 0.37-1.26). There was no severe bleeding in suction guiding group (0 VS 2). Difficulty score and number of attempts were statistically different between suction guiding group and conventional group; P-value=0.002 and 0.0473 consequently.

**Conclusion :** Suction guiding nasotracheal intubation does not reduce the incidence of epistaxis but there was no severe bleeding in suction guiding group. It was easier in passing tracheal tube through nasopharynx by use suction tube guiding to perform nasotracheal intubation.

**Keywords :** Nasotracheal Intubation, Guiding Catheter, Epistaxis

[1]Anesthesiologist, Department of Anesthesiology, Maharat Nakhonratchasima Hospital, Thailand

[2]Anesthesiologist, Department of Anesthesiology, Buayai hospital, Nakhoratchasima, Thailand

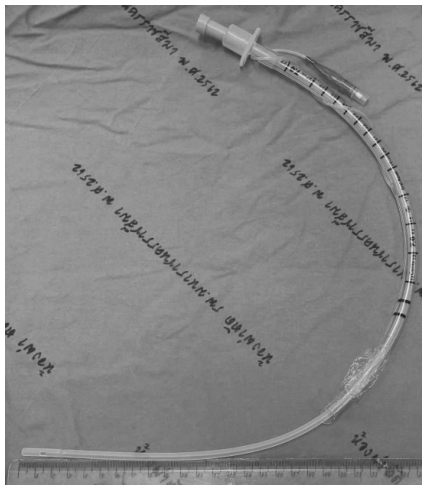
[3]Anesthesiologist nurse, Department of Anesthesiology, Maharat Nakhonratchasima Hospital, Thailand

**Background**

Nasotracheal intubation was is used for allowed a good surgical access for maxillofacial surgery, oropharyngeal surgery and dental surgery. The most common complication is epistaxis, which occurs with an incidence of 18–66%.6

Epistaxis can make nasotracheal intubation more difficult to success by poor vision of the vocal cords and more incidence of blood aspiration through lungs. One of the methods to reduce to incidence of epistaxis is pass the tracheal tube through the lower passage of nasal cavity: tunnel between inferior turbinate and floor of nasal cavity.2,3 Lim et al found that guided tube had more opportunity to pass tracheal tube through the lower passage 1.

Suction tube is the equipment that is always prepared at the time of intubation and its property maybe use as guiding tube for nasotracheal intubation to reduce epistaxis because it is longer than endotracheal tube about 20 cm and the average distance from nasal opening to oropharynx is 14-16 cm.2 we decided to experiment for suction tube guiding nasotracheal intubation that no more cost will be paid.





**Methods**

This article is randomized controlled trial. The population was enrolled by the patient that had to be performed nasotracheal intubation for maxillofacial bone surgery and oropharyngeal surgery with the inclusion criteria were 15 years of age to 65, ASA classification I-III, Planned to nasotracheal intubation. Exclusion criteria were coagulopathy state, prior epistaxis history, suspected fracture base of skull, abnormal anatomy of nostrils or nasal cavity and suspected C-spine injury.

After the patient was done the consent, they were divided into two groups by the random sequence generated by computer: 1 for suction guiding group and 2 for convention group

As soon as the monitoring (NIBP, pulse oximetry, EKG) was done, all patients were tested for which nostril was passed through. At the induction phase we gave 1-2 mcg/kg of fentanyl or 0.05-0.2 mg/kg plus 1-2 mg/kg of propofol then we gave 1.5-2 mg/kg of succinylcholine for intubation. In suction tube guiding group,

suction tube was inserted through selected size tracheal tube till the hub of suction tube met the slip joint of tracheal tube, was prepared before induction. In conventional group was no guiding tube added. K-Y jelly was applied at nasal opening then in Suction guiding group we passed the end of the suction tube through the nostril until it get through nasopharynx to oropharyngeal area and the tip of tracheal tube reached the nasal opening then we passed the tracheal tube through nasal cavity to oropharyngeal area as the suction tube, in the Conventional group the selected size tracheal tube was insert through nostril to oropharyngeal area without guiding tube. Video laryngoscope(C-MAC) was apply then bleeding was checked and graded. In Suction guiding tube group, we removed the suction tube and then in both groups forwarded the tube into trachea by either manipulating the tube directly or using Magill forceps. (figure 2.)

Nasotracheal intubation is this study were all performed by more than two-year experience anesthetic provider (nurse, resident, anesthetic doctor)

The outcome that was observed were the incidence of epistaxis and epistaxis grading defined as I: mild epistaxis (blood on the tracheal tube only), II: moderate epistaxis (blood pooling in the pharynx), III: severe epistaxis (blood in the pharynx sufficient to impede intubation). The number of attempts and difficulty score of passing tracheal tube through the nasal passage (defined as I=smooth, II=slight resistance and III=impinged) were recorded

**Statistical analysis**

Sample size was calculated by used the data of epistaxis out come from prior article of Lim et al[1] by use RCT for binary data formula (P treatment = 0.43, P control = 0.13) with 80% power and alpha error is 0.05. 35 patients in both groups were the calculated sample size. (calculated by n4study application)

$$n_{trt} = \left[ \frac{z_{1-\frac{\alpha}{2}} \sqrt{\bar{p}\bar{q}\left(1+\frac{1}{r}\right)} + z_{1-\beta} \sqrt{p_1 q_1 + \frac{p_2 q_2}{r}}}{\Delta} \right]^2$$

$$p_1 = P(outcome|treatment), q_1 = 1 - p_1$$

$$p_2 = P(outcome|control), q_2 = 1 - p_2$$

$$\bar{p} = \frac{p_1 + p_2 r}{1+r}, \bar{q} = 1 - \bar{p}, r = \frac{n_{con}}{n_{trt}}$$

P(outcome|treatment) = 0.13

P(outcome|control) = 0.46

Ratio (control/treatment) = 1

Alpha = 0.05, Z(0.975) = 1.959964

Beta = 0.20, Z(0.80) = 0.8416212

Sample size: treatments = 29, controls = 29

Sample size by using a continuity correction

: treatments = 35, controls = 35

The incidence, severity of epistaxis and difficulty score were compared by Fisher's exact test.

The number of attempts were compared by independent T-test. Data are presented means and standard deviations, number and percent.

**Results**

From September 2018 through July 2019, 82 patients were plan to nasotracheal intubation 70 patients were randomized 35 each group. Tracheal tubes were successfully insert by nasotracheal intubation in all patients. (figure 1)

The incidence and severity of epistaxis were not statistically significant, in suction guiding group was 11(31.43%) and conventional group was 16(45.71%), P-value=0.326. For epistaxis grading, there were 9(25.7%) VS 10(28.5%) in epistaxis grade I, 2(5.7%) VS 4(11.43) in epistaxis grade II and 0(0%) VS 2(5.7%) in severe epistaxis. P-value=0.326 (table 2).

Difficulty score and number of attempts were statistically different between suction guiding group and conventional group. There were 31(88.6%) VS 18(51.4%) for smooth, 4(11.4%) VS 14(40.0%) for slightly resistance and 0(0%) VS 3(8.6%) for impinged, P-value=0.002 (table 3). Mean number of attempts (±SD) were 1.0±0.17 VS 1.1±0.47, P-value=0.0473 (table 4).

**Discussion**

This study has shown that the suction tube guided nasotracheal intubation didn't reduce incidence of epistaxis unlike the previous study that use nasogastric tube guided technique that can reduce incidence and severity of epistaxis, Lim et al1. The similarly result is difficulty of passing tube was significant easier in suction guiding group as we have seen in difficulty score and number of attempts result.

We have done randomized controlled trial with 80% power and alpha error is 0.05, So 35 patients in both groups were sufficient to refer to our population but the larger sample size maybe reveal more difference of outcome in incidence and severity of epistaxis.

Though we think that the property of suction tube and nasogastric tube are similar except the length that is both enough for guiding from nostril through oropharyngeal area but we didn't use the thermo-softened tracheal tube technique like prior study that maybe the key to reduce epistaxis1,7.

Although we found that grade III (maybe clinically significant) was not found in suction tube guiding group, the amount of event was too small to make a statistically significant.

**Limitation**

Our limitation is variation of anesthetic provider that perform nasotracheal intubation because more than two-year experience anesthetic nurses and residents was involved in this study. We can reduce confound by have only one anesthetic provider perform nasotracheal intubation through the study.

Maybe the larger sample size will show us the significant in reducing incident and severity of epistaxis

## Conclusion

Suction guiding nasotracheal intubation does not reduce the incidence of epistaxis but there was no severe bleeding in suction guiding group. It was easier in passing tracheal tube through nasopharynx by use suction tube guiding to perform nasotracheal intubation. Larger population may reveal the benefits of this intervention.

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Figure 1.

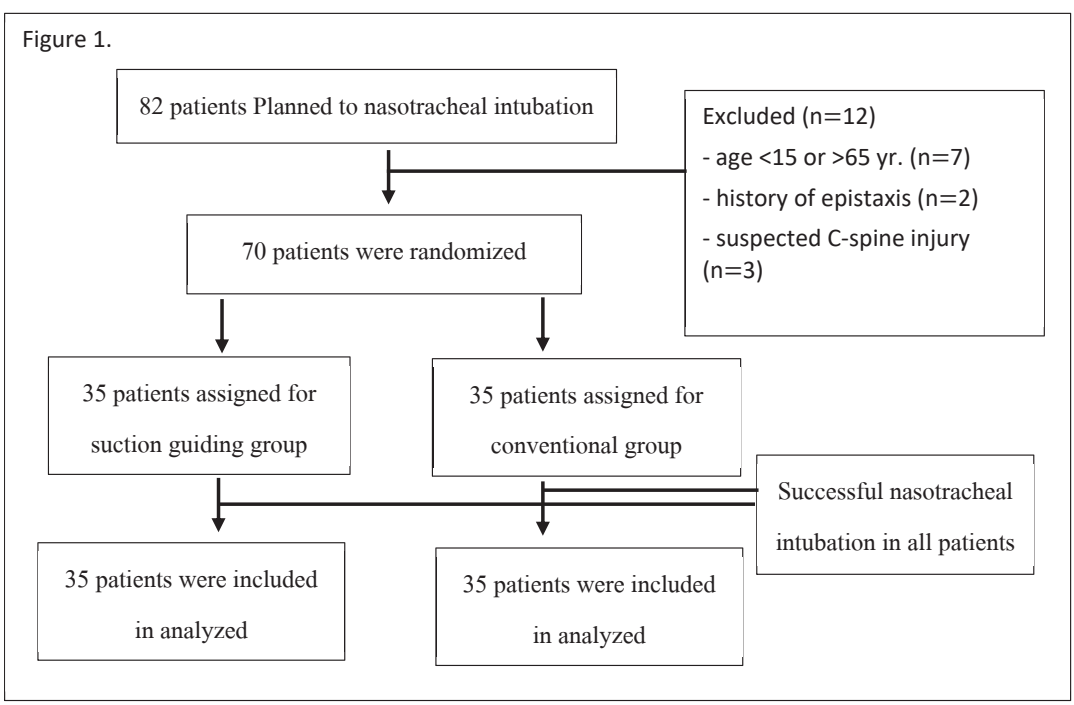
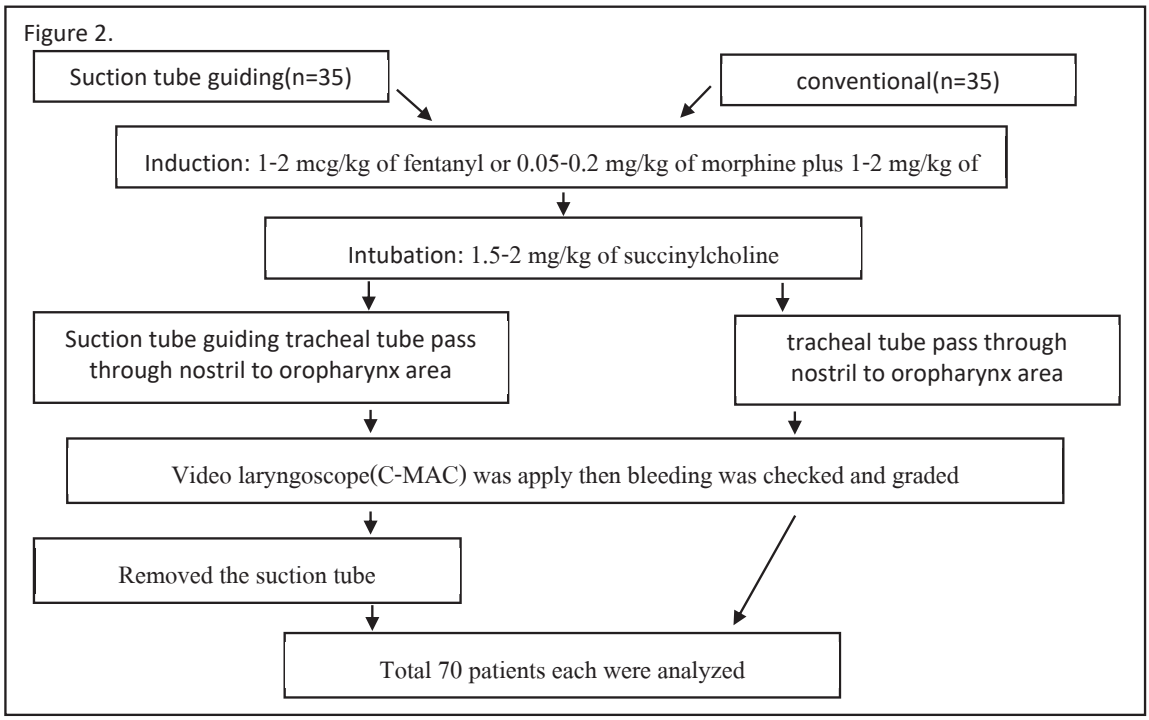


Figure 2.


Suction tube guiding(n=35)
conventional(n=35)
Induction: 1-2 mcg/kg of fentanyl or 0.05-0.2 mg/kg of morphine plus 1-2 mg/kg of
Intubation: 1.5-2 mg/kg of succinylcholine
Suction tube guiding tracheal tube pass through nostril to oropharynx area
tracheal tube pass through nostril to oropharynx area
Video laryngoscope(C-MAC) was apply then bleeding was checked and graded
Removed the suction tube
Total 70 patients each were analyzed

| Demographic data (Table 1.) | | |
|---|---|---|
| Characteristic | Suction tube guided group (N=35) | Conventional group (N=35) |
| Mean age (±SD) — yr. | 30.7±12.33 | 36.6±17.61 |
| Male sex — no. (%) | 28(80) | 28(80) |
| ASA classification — no. (%) | | |
| II | 28(80) | 24(69) |
| III | 7(20) | 11(31) |
| Mean systolic blood pressure (±SD) — mmHg | 133.6±15.71 | 134.3±18.47 |
| Mean diastolic blood pressure (±SD) — mmHg | 81.7±14.01 | 83.3±11.55 |
| Mean pulse rate (±SD) — beat per minute | 82.8±13.30 | 84.9±16.25 |
| Side of nostril: right — no. (%) | 20(57.1) | 20(57.1) |
| Type of operation — no. (%) | | |
| Maxillofacial bone surgery | 33(94.2) | 27(77.1) |
| Oropharyngeal surgery | 2(5.7) | 8(22.8) |

| Epistaxis outcome (table 2.) | Suction tube guided group (N=35) | Conventional group (N=35) | P-value |
|---|---|---|---|
| epistaxis — no. (%) | 11(31.4) | 16(45.7) | 0.326 |
| Epistaxis grade I | 9 (25.7) | 10 (28.5) | 0.437 |
| no. (%) II | 2 (5.7) | 4 (11.4) | |
| III | 0 (0) | 2 (5.7) | |

| difficulty outcome (table 3.) | Suction tube guided group (N=35) | Conventional group (N=35) | P-value |
|---|---|---|---|
| Difficulty score I (smooth) | 31 (88.6) | 18 (51.4) | 0.002 |
| no. (%) II (slightly resist) | 4 (11.4) | 14 (40.0) | |
| III (impinged) | 0 (0) | 3 (8.6) | |

| Number of attempts outcome (table 4.) | Suction tube guided group (N=35) | Conventional group (N=35) | P-value |
|---|---|---|---|
| Number of attempts 1 | 31 (88.6) | 18 (51.4) | |
| no. (%) 2 | 4 (11.4) | 14 (40.0) | |
| 3 | 0 (0) | 3 (8.6) | |
| Mean (±SD) — times. | 1.0±0.17 | 1.1±0.47 | 0.0473 |