Vietnamese anesthesiologists training about emergency front of neck access in the cannot intubate - cannot oxygenate crisis

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Abstract

Background: Emergency front of neck access (eFONA) is the last resort in the Cannot Intubate - Cannot Oxygenate (CICO) crisis. The presence of an algorithm and a well-trained team have been recognized as being essential in reducing errors to achieve a positive outcome. The objective of this study was to evaluate the current situation regarding training, experience and availability of the various means of managing CICO and eFONA in Vietnamese hospitals. **Methods:** We sent out a link for a 10-question electronic survey to lead anaesthesiologists who subsequently distributed the link to their staff. This was followed by a paper questionnaire at the anaesthesia conference in Hue City. **Results:** 49.3% of anesthetists are aware of local guidelines in their hospital compared to 69.5% being aware of international guidelines. Only 90 (29.8%) respondents felt they could manage the CICO/eFONA crisis with confidence. Some form of training in managing a CICO crisis has been received by two thirds of respondents (203, 67.2%). Only 88 (29.1%) respondents had received any hands-on simulation training. The majority of participants agreed that some form of compulsory training for CICO/eFONA would be appropriate (98.7%, 298/302). **Conclusion:** There was a shortage in training, the experience of anesthetists and availability of the various means of managing CICO and eFONA in Vietnamese hospitals. Simulation training should play a vital part in this situation.

Keywords: *CICO, eFONA, training and equipment.*

1. INTRODUCTION

Acquiring the skills of airway management is a fundamental part of anesthesia training in every country. Research and technological development mean that all anesthesia providers need to keep their knowledge and skills updated [1].

With advanced training and experience, there remains the remote possibility that an unanticipated difficulty with airway management may progress to failure to deliver oxygen resulting in hypoxic brain damage and death [2]. Emergency front of neck access (eFONA), also referred to as the emergency airway, is the last resort in the cannot intubate cannot oxygenate (CICO) crisis [3]. In a stressful situation, the presence of an algorithm and a well-trained team have been recognized as being essential in reducing errors to achieve a positive outcome. Simulation-based training based on these has been shown to enhance patient safety.

Several countries have now introduced national guidelines and algorithms for managing the unanticipated difficult airway [4]. Although there remains some debate about the best method of gaining emergency airway access in such an algorithm, regular simulation-based training in the CICO scenario has been demonstrated to increase success rates [5].

In the world, training about emergency front of neck access in the COCI situation has been researched and published [1], [6], [7]. However, in Vietnam, there are no reports and studies on this issue at the time of writing. Therefore, we have set out to evaluate the current situation regarding training, experience and availability of the various means of managing CICO and eFONA in Vietnamese hospitals.

2. METHODS

This study used a cross-sectional design and a convenience sample of 420 anesthesiologists regardless of the number of years of experience.

We designed a questionnaire including 10 questions (Appendix 1). From 10th October to 10th December 2019, the questionnaire was sent to the participants by email or paper. The data was collected and analyzed at the end of December 2019 in Excel.

We surveyed the level of training, knowledge of guidelines for managing CICO and confidence to perform eFONA. We then asked about the experience of formal training in CICO/eFONA and their opinion of the appropriate frequency of training. Finally, we asked what equipment was immediately available for managing CICO/eFONA in respondents' hospitals.

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3. RESULTS

The response rate is 71.9% (302/420). Of which, 149 (49.3%) had completed training; the remaining 153 were either residents 16 (5.3%) or interns yet to enter formal training 137 (35.3%).

Table 1. Level of anesthesia experience

Level	n	%
Doctors have not had formal anesthesia training	49	16.2
Orientation on anesthesia	88	29.1
Resident	16	5.3
Level 1, 2	149	49.3
Total	302	100

Regarding managing CICO/eFONA, less than half (n=149, 49.3%) were aware of an algorithm in their hospital, compared to 210 anesthetists (69.5%) being aware of international guidelines.

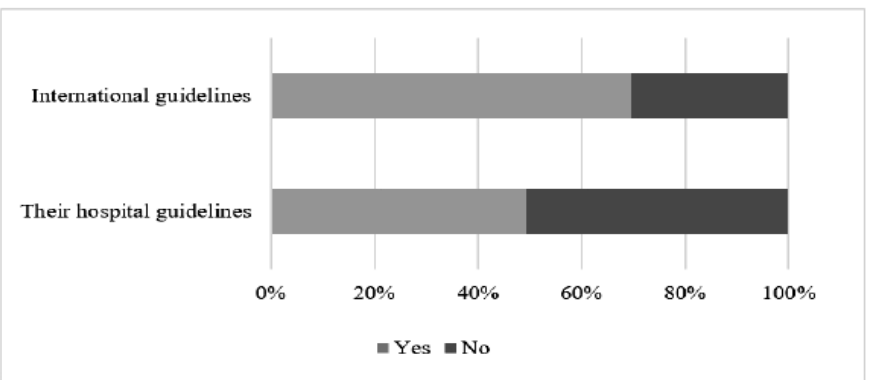

Figure 1. Awareness about guidelines for CICO/FONA

In case of a CICO/eFONA crisis, only 90 (29.8%) respondents felt they could perform the technique with confidence.

The preferred technique for eFONA access is given in Figure 2. Less than a third (92, 30.5%) chose a surgical cricothyrotomy, whereas 174 of respondents (57.6%) voted for needle cricothyrotomy, whether it is a commercially pre-made kit or a 'home-made' one.

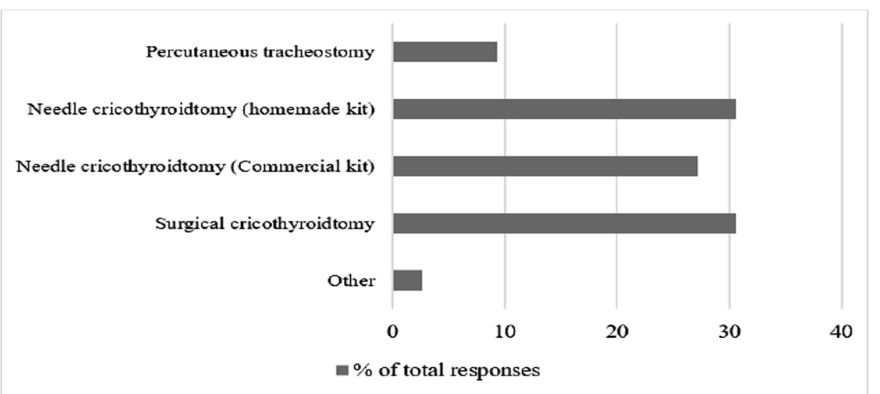

Figure 2. The preferred technique for eFONA

Some form of training in managing a CICO crisis has been received by two thirds of respondents (203, 67.2%). The type of training received is shown in Figure 3. Overall, only 29.1% (88/302) had received any hands-on simulation training.

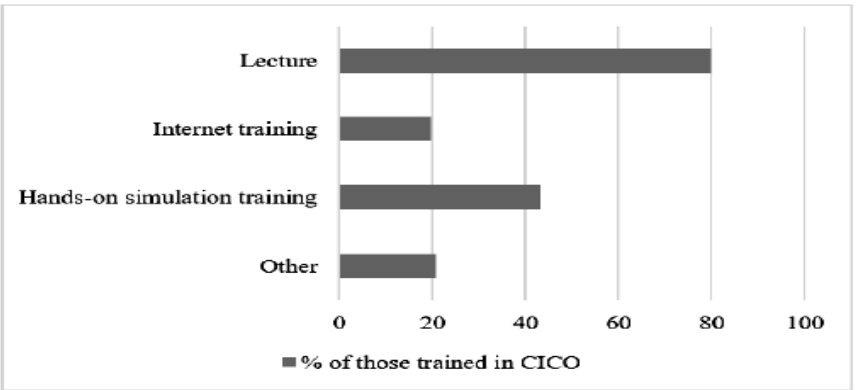

Figure 3. Method of CICO training undertaken by 203 trained respondents.

The overwhelming majority of respondents (98.7%, 298) agreed that some form of compulsory training for CICO/eFONA would be appropriate. Greater than 75% felt that the interval for this training should be every 6 - 12 months (Figure 4).

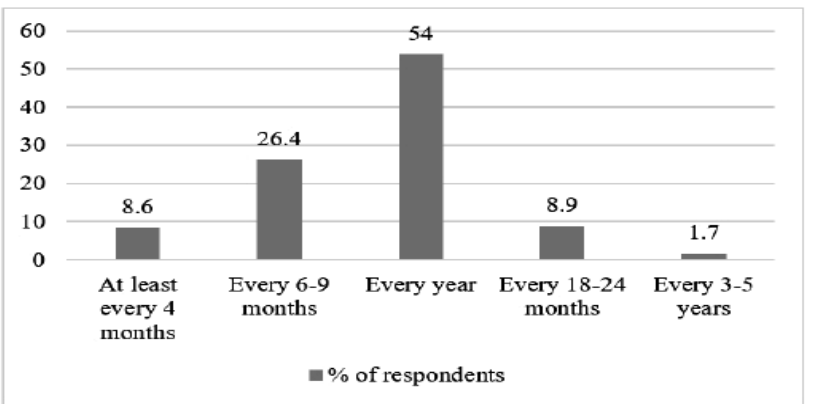

Figure 4. Suggested frequency of compulsory CICO/eFONA training among respondents.

Finally, the kit that was immediately available to manage CICO/eFONA is shown in Figure 5. No equipment to manage CICO/eFONA was available by 39 (12.9%) of respondents.

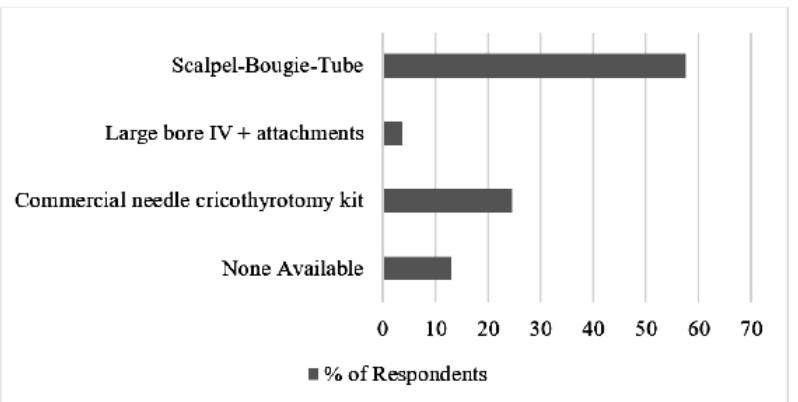

Figure 5. Immediately available equipment to manage CICO/eFONA.

4. DISCUSSION

In the UK, the 4th National Audit Project on major complications of airway management in the United Kingdom (NAP 4) identified poor training and education as a common contributing factor to critical airway events requiring eFONA [8]. According to the results of Carvey's research, the success rate of laryngotomy within a set period time on a cadaver was higher in participants who had device familiarity and previous clinical experience. The role of practical hands-on skill training is highlighted [6].

This is the first study of the CICO/eFONA crisis management among anesthetists in Vietnam. We have identified a gap in the knowledge and availability of guidelines, training and equipment available for managing this rare but high consequence anesthesia crisis in Vietnam.

In our survey, only 67% of participants have had some form of training in CICO/eFONA and less than 30% felt confident to manage such a crisis. In a survey among paramedics, 73% stated they were not adequately trained, and 40% felt they could not correctly perform a cricothyroidotomy [9]. Only 71 (37.6%) respondents indicated that they had formal FONA training within the last one year in the survey of Mendonca et al. [10].

Difficult Airway Society 2015 guidelines recommend scalpel-bougie-tube (surgical cricothyrotomy) as the preferred eFONA technique as NAP4 highlighted a high failure rate of emergency cannula cricothyroidotomy compared to a high success rate of the emergency surgical airway [3], [11]. A comprehensive meta-analysis of pre-hospital airway control techniques reported that narrow-bore cannula cricothyrotomy has a low rate of success (65.8%) if compared with surgical cricothyrotomy (90.5%) [12]. There is no consensus about the technique for eFONA shown in our results. The most preferred technique is needle cricothyrotomy with 58% (174/302). The insufficiency of training in managing a CICO crisis of Vietnameses anesthesiologists may lead to this difference. Only two thirds of respondents have been received training and just only 29.1% experienced hands-on simulation training.

Regarding equipment to manage CICO/eFONA, there are 39 (12.9%) of respondents don't have immediately available equipment. Although a rare event, CICO is a life-threatening situation. The shortage of equipment contributes to higher morbidity and mortality.

Our study has some limitations such as lack of survey of confidence level for performing FONA as well as the correlation between it with other factors. Training in managing a CICO crisis plays an important role in the clinical practice of anesthesiologists so there should be more research on this issue.

5. CONCLUSION

There was an insufficiency of training and equipment for managing CICO and eFONA in Vietnamese hospitals. The knowledge and skills must be maintained regularly as a compulsory competency for the anesthesiologist. Simulation training should play a vital part in this situation.

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Appendix 1

Questionnaire

Vietnamese anesthetists experience of CICO*/FONA* training and equipment

***CICO - Cannot Intubate Cannot Oxygenate; *FONA - Front of Neck Access**

1. Level of anesthesia experience?

a. Resident
b. Level 1, 2
c. Staff

2. Are you aware of any guidelines for CICO/FONA?

a. Your hospital - Yes/No
b. National Vietnamese - Yes/No
c. International - Yes/No

3. Have you ever had real-life experience of CICO – FONA?

a. Yes
b. No

4. Do you feel confident to attempt FONA?

a. Yes
b. No

5. Preferred technique for FONA?

a. Surgical cricothyrotomy (Scalpel, bougie, tube)
b. Needle cricothyrotomy
   i. Commercial kit ii. "Homemade" kit
c. Percutaneous tracheostomy
d. Others

6. Have you ever been trained in how to manage CICO scenario?

a. Yes:
   i. Lecture ii. Internet training
   iii. Hand-on simulation training iv. Others…
b. No

7. If you have had hands-on simulation training, was it:

a. Animal larynx
b. Cadaver larynx
c. Commercial training manikin
d. "Home-made" training manikin

8. Do you think that regular training for FONA access should be made mandatory?

a. If Yes – how often? _____
b. No

9. In your hospital is there regular training for CICO/FONA?

a. Yes – how often?
   i. Every year ii. Every 2-3 years
b. No

10. In your hospital what equipment is immediately available for managing CICO/FONA?

a. Scalpel/bougie/tube
b. Large bore IV + equipment to attach oxygen
c. Commercial needle cricothyrotomy kit
d. None immediately available