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Survey of Current Difficult Airway Management Practice

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Abstract

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BACKGROUND: Even for the most experienced anesthesiologists “can’t ventilate can’t intubate” scenario in difficult airway management is challenging, and although rare it is life-threatening.

AIM: The aim of this survey was to analyse the current practice of difficult airway management at our University teaching hospital.

MATERIAL AND METHODS: A ten-question-survey was conducted in the Tertiary University Teaching Hospital “Mother Theresa”, Clinic for Anesthesia, Reanimation and Intensive Care. The survey included demographic data, experience in training anaesthesia, practice in management of anticipated and non-anticipated difficult airway scenario, preferable equipment and knowledge of guidelines and protocols. Responses were noted, evaluated and analysed with the SPSS statistical program.

RESULTS: The overall response rate was very good; 94.5% answered the survey. During the assessment of the level of comfort with diverse airway equipment, there was diversity of answers due the experience of anaesthesia training, although the most frequent technique among all responders for anticipated difficult intubation was video laryngoscopy (48%). As for non-anticipated difficult intubation when conventional techniques failed to secure the airway most of the responders answered that they used supra-gothic airway device – laryngeal mask (38%) as a rescue measure.

CONCLUSION: Airway assessment, adequate training, experience, and availability of essential equipment are the pillars of successful airway management.

Introduction

Airway management is the fundamental skill of an anesthesiologist. Every adverse event in airway management is unique, where the outcome depends on the emergency of the procedure, knowledge, skills and practice of the anesthesiologist, affected by the patient co-morbidities and accessible resources [1], [2].

Therefore, national guidelines, recommendations, clinical consensus on difficult airway management are available, published in the United Kingdom, in the USA, and western European countries. In them several techniques and protocols

have been described and recommended [1], [3], [4], [5], [6].

These declarations reflect common thinking and evidence on an appropriate reaction to difficult airway management when encountering an unconscious/induced patient. The importance of the appropriate applications from the statements is a simplified response to a “can not intubate, cannot ventilate” situation that is challenging even for the most experienced anesthesiologists [6], [7].

The aim of this survey study was to evaluate the current practice of difficult airway management in anticipated and non-anticipated circumstances at our Tertiary University Teaching hospital.

Material and Methods

A questionnaire was delivered among anaesthesia residents of the first to the fifth last year of residency, young specialists and experienced anesthesiologists at the Tertiary University Teaching Hospital "Mother Theresa", Clinic for Anesthesia, Reanimation and Intensive Care, University Ss. "Cyril and Methodius" of Skopje, Medical Faculty - Skopje.

The questionnaire contained 10 questions including: demographic data, experience in training anesthesia, preferred equipment for anticipated and non-anticipated difficult intubation, current practice, available resources and equipment, clinical examination and preferred test for predicting difficult intubation, the day / night shift influence on the usage of additional equipment, and the awareness of the current available guidelines. The questionnaire was anonymous, and the responders answered it voluntarily.

At the beginning of the questionnaire, mainly we collected demographic data, including gender, age, and years of experience.

The rest of the questionnaire assessed the practice for clinical examination and preferred test for predicting difficult intubation, availability of the resources, techniques and equipment, and the preferred choice for management of anticipated and non-anticipated difficult intubation scenario or the comfort with the usage of the equipment like fiberoptic bronchoscopy, video laryngoscopy, McCoy conventional laryngoscope, stylet or Boogie.

Also, the familiarity with protocols and guidelines for difficult airway was assessed.

The examiners were assessed for their preferred choice when managing anticipated and unanticipated difficult airway scenarios and their strategy.

The last question was: what is most important during difficulty airway scenario - the experience or the resources?

Statistical analysis was performed with SPSS (20.0) program. Categorical variables were expressed as percentage and data were reported as median and ranges.

Results

We distributed 55 questionnaires; 52 were returned. Thirty-two residents and 20 specialists (94.5%) in Anesthesia and Intensive Care responded to the survey.

Summarised demographic data are presented in Table 1. About 59% of responders were at the age ranging from 25 to 34 years, all of the residents, whereas 26% of responders were aged between 35-44 years, only one of them was resident. Gender distribution was: 31% males and 59% females. As for the experience 61% were residents, 15% with small experience in the field of anaesthesia (< 5 years), 11% had experienced between 5 and 10 years and only 5.7% had experience of 20 and > 20 years.

Table 1: Demographic data

Age Number (n) Percentage (%)		
25 – 34	31	59%
35 – 44	14	26%
45 – 54	6	11%
55 – 64	1	2%
Gender Number (n) Percentage (%)		
Male	16	31%
Female	36	69%
Experience Number (n) Percentage (%)		
Residents	32	61%
0 - 4	8	15%
5 - 9	6	11%
10 - 19	3	5.7%
>20	3	5.7%

All of the responders answered that they perform a clinical examination and have a preferred test for predicting difficult intubation. Both residents and specialists, selected Mallampati score as a preferred choice-38%, thyromental distance-25%, 5.7% use the 3-3-2 test, and 29% answered that they combined the clinical tests.

During the assessment of the level of comfort with diverse airway equipment, there was diversity of answers due to their experience although the most frequent technique among all responders for anticipated difficult intubation was video laryngoscopy (48%). As for non-anticipated difficult intubation when conventional techniques failed to secure the airway most of the responders answered that they used supra-gothic airway device – laryngeal mask (38%) as a rescue measure. Airway management technique of all responders in anticipated and non-anticipated difficult airway scenario is summarised and presented in Figure 1 and Figure 2.

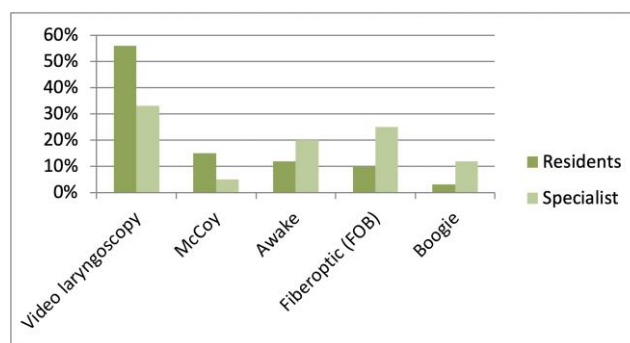


Figure 1: Number of responders comfortable with alternative airway devices in anticipated difficult airway management

When questioned about how many attempts they have to secure the airway with endotracheal tube before they request additional equipment, the answer

was after two attempts-55% of the specialists and 65% of the residents. 25% of the specialists and 34% of the residents require additional equipment after three attempts. None of the residents attempted more than three times. Only 5% of the specialists made four attempts before requesting additional equipment. As for the time of the day/ night shift for the usage of additional equipment, most of the responders used additional equipment in the day shift.

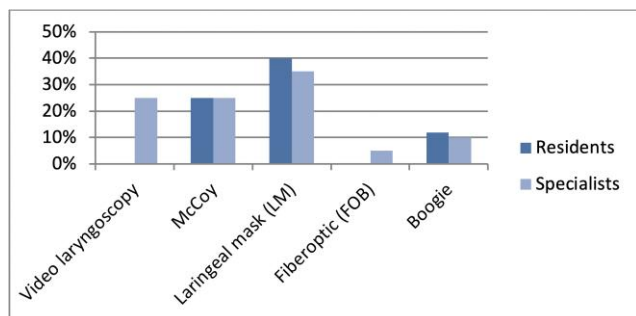


Figure 2: Number of responders comfortable with alternative airway devices in non-anticipated difficult airway management

Our survey found that only 12% of the residents and 10% of all responders are familiar with the protocols for difficult airway management and more of them consider experience as the most important in the management of difficult airway regardless the equipment and techniques available.

Discussion

This questionnaire addressed the common practice in our everyday clinical practice, the preferred equipment for anticipated and non-anticipated difficult airway management, available resources and equipment and the awareness of the currently present available guidelines. This is the first survey conducted at our Clinic and reported in our country. The response rate is excellent (95.4%) and comparable with other reports from eastern European countries, and the USA [8], [9], [10], [11].

All responders in our survey answered that they perform a clinical examination and have preferred test for predicting difficult intubation, which is very much similar to many other reports from all over the world [9], [12], [13].

A limiting factor in developing countries like ours is the resources restriction. In our University Teaching Hospital from recently, we have new airway management devices, including video laryngoscope, fibre optic stylet, and fibre optic bronchoscope. Availability of equipment is different between non-teaching and teaching hospitals according to the literature. There are similar findings in the report of Jenkins and colleagues where availability of fibre optic

bronchoscope was 99% among anesthesiologists in Canada [9], [14], [15], [16].

The level of comfort of the anesthesiologists in the management of difficult airway is related to the experience, practice and knowledge. In this survey, the majority of the experienced and not experienced anesthesiologists have reported usage of laryngeal mask as rescue measure in non-anticipated difficult airway management. Regarding anticipated airway management most of the experienced anesthesiologists use video laryngoscope technique. On the other hand, less experienced anesthesiologists always prefer awaken intubation [17]. More experienced anesthesiologists are still trying the conventional methods at least once or twice before requesting additional equipment. These findings are similar to others reported in the literature as those of Bokhari and coauthors [10].

Fibre optic bronchoscope is relatively new equipment available in our Hospital. Our medical staff doesn't have too much experience with its use, and therefore the fibre optic bronchoscope is not the preferred choice for management of difficult airway scenarios in our everyday clinical practice. In their observation, Jenkin and Wong report 59 % of the experienced and 22% of the not experienced residents used fibre optic bronchoscope. In our report only 25% of the specialists and none of the residents will lay hands-on fibre optic bronchoscope for managing difficult airway situation [14], [17]. It can be concluded that additional practising and training in the use of FOB is needed.

In contrast to fibre optic bronchoscope, video laryngoscope is a new gadget available at our Hospital, and although our experience is also limited concerning its use, still most of the responders answered that the first and preferred choice in management of difficult airway scenario is video laryngoscope. This finding is similar to the survey presented in a report from India [18].

Recently, video laryngoscope has been included in the algorithm of the difficult airway society, but rapidly it is gaining attention and is very promising due to its brief learning curve [4].

In a non-anticipated difficult airway scenario, most of the experienced specialists in anaesthesia will try the conventional method and afterwards will choose laryngeal mask 35% and video laryngoscope 25% of specialists. On the contrary, 40% of residents will choose laryngeal mask, and 25% will choose McCoy Only 6% will pick video laryngoscope. Similar reports were published by Dimitriou and colleagues and Ezri and colleagues. The probability of this choice is the availability and the easiness of its use [12], [16].

Regarding the low knowledge of the currently present guidelines, protocols and consensuses, our survey has different results from all other reported. This is maybe due to the restricted resources and

fund which are limiting our opportunities for continuing medical education, improving skills and practice outside the borders of our country.

It is confirmed that training, simulations, and practice are some of the tools for improving the skills and knowledge in anaesthesia. In this era of technology, computers and simulators can help us to improve that [19], [20].

In conclusion, guidelines are directed to special circumstances, and therefore knowledge in the field of difficult airway management can improve our practice and provide better care for our patients. Airway assessment, adequate training, experience, and availability of essential equipment are the pillars of successful airway management.

References

- Cook T, Woodall N, Frerk C. 4th National audit Project of the Royal College of Anaesthetists and the difficult airway society. Major complications of airway management in the United Kingdom. London: The Royal College of Anaesthetists. 2011.
- Hung O, Murphy M. Context-sensitive airway management. *Anesth Analg*. 2010; 110:982-3. <https://doi.org/10.1213/ANE.0b013e3181d48bbb> PMID:20357142
- Sun F, Wang Y, Ma S, Zhu H, Yu Z, Xu J. Clinical consensus of emergency airway management. *J Thorac Dis*. 2017; 9(11):4599-4606. <https://doi.org/10.21037/jtd.2017.10.79> PMID:29268532 PMCid:PMC5721045
- Frerk C, Mitchell VS, McNarry, et al. Difficult Airway Society 2015 guidelines for management of unanticipated difficult intubation in adults. *British Journal of Anaesthesia*. 2015; 115(6):827-48. <https://doi.org/10.1093/bja/aev371> PMID:26556848 PMCid:PMC4650961
- American Society of Anesthesiologists: Practice guidelines for management of the difficult airway: An updated report. *Anesthesiology*. 2003; 98:1269-1277. <https://doi.org/10.1097/00000542-200305000-00032> PMID:12717151
- J Law, N Broemling, R Cooper et al. The difficult airway with recommendations for management -Part 1 - Difficult tracheal intubation encountered in an unconscious/induced patient. *Can J Anesth/J Can Anesth*. 2013; 60(11):1089-1118. <https://doi.org/10.1007/s12630-013-0019-3> PMID:24132407 PMCid:PMC3825644
- Caplan RA, Posner KL, Ward RJ, Cheney FW. Adverse respiratory events in anesthesia: A closed claims analysis. *Anesthesiology*. 1990; 72:828-33. <https://doi.org/10.1097/00000542-199005000-00010> PMID:2339799
- Sahey BM, Jain S, Tidke S, Dhande PS, Premendran B, Dahake S. Difficult airway management methods: A survey in medical colleges in India. *Indian J Anaesth*. 2008; 52:51-7.
- Mellado PF, Thunedborg LP, Swiatek F, Kristensen MS. Anaesthesiological airway management in Denmark: Assessment, equipment and documentation. *Acta Anaesthesiol Scand*. 2004; 48:350-4. <https://doi.org/10.1111/j.0001-5172.2004.0337.x> PMID:14982570
- Bokhari A, Benham SW, Papat MT. Management of unanticipated difficult intubation: A survey of current practice in the Oxford region. *Eur J Anaesthesiol*. 2004; 21:123-7. <https://doi.org/10.1097/00003643-200402000-00007> PMID:14977343
- Rassam S, Sandbythomas M, Vaughan RS, Hall JE. Airway management before, during and after extubation: A survey of practice in the United Kingdom and Ireland. *Anaesthesia*. 2005; 60:995-1000. <https://doi.org/10.1111/j.1365-2044.2005.04235.x> PMID:16179045
- Dimitriou V, Iatrou C, Douma A, Athanassiou L, Voyagis GS. Airway management in Greece: A nationwide postal survey. *Minerva Anesthesiol*. 2008; 74:453-8.
- Kristensen MS, Moller J. Airway management behavior, experience and knowledge among Danish anesthesiologists-room for improvement. *Acta Anaesthesiol Scand*. 2001; 45:1181-5. <https://doi.org/10.1034/j.1399-6576.2001.450921.x> PMID:11683672
- Jenkins K, Wong DT, Correa R. Management choices for the difficult airway by anesthesiologists in Canada. *Can J Anaesth*. 2002; 49:850-6. <https://doi.org/10.1007/BF03017419> PMID:12374715
- Rosenblatt WH, Wagner PJ, Ovassapian A, Kain ZN. Practice patterns in managing the difficult airway by anesthesiologists in the United States. *Anesth Analg*. 1998; 87:153-7. <https://doi.org/10.1213/00000539-199807000-00032>
- Ezri T, Konichezky S, Geva D, Warters RD, Szmuk P, Hagberg C. Difficult airway management patterns among attending anaesthetists practising in Israel. *Eur J Anaesthesiol*. 2003; 20:619-23. <https://doi.org/10.1097/00003643-200308000-00005> PMID:12932062
- Wong DT, Lai K, Chung FF, Ho RY. Cannot intubate-cannot ventilate and difficult intubation strategies: Results of a Canadian national survey. *Anesth Analg*. 2005; 100:1439-46. <https://doi.org/10.1213/01.ANE.0000148695.37190.34> PMID:15845702
- Ramkumar V. Airway management: How current are we? *Indian J Anaesth*. 2011; 55:5-9. <https://doi.org/10.4103/0019-5049.76565> PMID:21431045 PMCid:PMC3057246
- Ti LK, Chen FG, Tan GM, Tan WT, Tan JM, Shen L, et al. Experimental learning improves the learning and retention of endotracheal intubation. *Med Edu*. 2009; 43:654-60. <https://doi.org/10.1111/j.1365-2923.2009.03399.x> PMID:19573188
- Schwid HA, Rooke GA, Carline J, Steadman RH, Murray WB, Olympio M, et al. Evaluation of anesthesia residents using mannequin-based simulation: A multiinstitutional study. *Anesthesiology*. 2002; 97:1434-44. <https://doi.org/10.1097/00000542-200212000-00015> PMID:12459669

Appendix 1: Survey Questions

1. Age _____
2. Gender _____
3. Anesthesia experience:
 - a) Resident
 - b) Consultant
 - 0 - 4 years
 - 5 - 9 years
 - 10 – 20 years
 - > 20 years
4. Your first choice in anticipated difficult airway scenario?
 - a) Awake intubation
 - b) Direct laryngoscopy with Mccoy laryngoscope
 - c) Bougie
 - d) Video laryngoscopy
 - e) Video stylet
 - f) Fiberoptic laryngoscope
5. Your preferred choice in unanticipated difficult intubation if conventional method fails?
 - a) Supraglottic devices (Laryngeal mask)
 - b) Direct laryngoscopy with Mccoy laryngoscope
 - c) Bougie
 - d) Video laryngoscopy
 - e) Video stylet
 - f) Fiberoptic laryngoscope
6. During emergency intubation, which one of the following is your preferred test for predicting difficult intubation?
 - a) Mallampati score
 - b) Thyromental distance
 - c) 3-3-2-test
 - d) Upper lip bite test (if applicable)
 - e) Other _____
7. After how many failed attempts of intubation you require additional equipment (Mccoy laryngoscope, Video laryngoscopy, Video stylet, Fiberoptic laryngoscope)?
 - a) 2
 - b) 3
 - c) 4
 - d) > 5
8. Do the time frames or day/ night shift has influence on the usage of additional equipment?
 - a) Often in day shift
 - b) Often in night shift
9. Are you familiar with the guidelines and protocols for difficult airway in emergency critical settings?
 - a) Yes
 - b) No

If you answer is Yes, please specified which one is it: _____
10. Which of the following you consider most important in difficult airway scenario?
 - a) Experience of the doctor
 - b) Equipment for difficult intubation