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Difficult airway awareness of physicians with specialty training in medicine

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Abstract

Aim: Today, many physicians with specialization training in medicine need to intervene in emergency situations in patients whose airway is predicted to be difficult. In the new time, many new equipment is used to intervene in difficult airways. Being aware of and using these technologies is difficult or frightening for most physicians. This study was conducted to determine the awareness of physicians who are less likely to encounter patients with difficult airways, who are outside the department of anesthesiology and reanimation.

Material and Methods: This study was a survey study conducted by asking 15 questions about difficult airway management to 150 physicians who received specialization training in the internal and surgical departments of Pamukkale University Faculty of Medicine. Their approaches to the difficult airway and their awareness ofn this issue, as well as and their responses to the applications in emergency situations related to the patients who were predicted to have a difficult airway were evaluated.

Results: If the main results are summarized; as a result, the majority of the participants (76%) had practical experience in using the airway. In difficult airway situations, the majority of the participants (71.3%) preferred to use the general airway method as the first choice. Regarding the first person to be asked for help, the majority of the participants (59.3%) stated that they would call the assistant of the anesthesia department. The situation of refraining from intubation is related to gender, and female participants experienced this situation more frequently than male participants (p=0.016). Among participants specializing in internal medicine, the use of the general airway method was significantly lower than the use of the Laryngeal Mask Airway (LMA) and was similar to the use of intubation. In contrast, those specializing in surgical medicine used the general airway method significantly more frequently than the LMA, while the use of intubation was similar (p=0.003). Those with knowledge of the Mallampati score preferred the LMA significantly more frequently, followed by the airway method and intubation. Being a woman female gender increases the risk of abstaining from intubation by 2.56 times, while not working as a general practitioner increases the risk by 2.22 times.

Disccussion: Anticipating the difficulties that may occur in airway control is vital for safe ventilation. In our study, we evaluated the approaches to difficult airway and their awareness of this issue of physicians who received specialization training in medicine apart from the department of anesthesiology and reanimation. Our findings showed that most of the residents had insufficient knowledge and experience in difficult airway management. All findings emphasizes the importance of interdisciplinary training and presents residents' understanding of difficult airway management and shows that they need more training and they need to gain more experience in this regard. The results of our study show that residency students from many different clinical branches actually need an interdisciplinary education.

Keywords

Difficult Airway, Airway Awareness, Awareness of Physicians

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Introduction

Protecting and ensuring airway safety is something that every physician who receives medical education should know, but is also feared [1]. Many physicians with specialized medical specialty training in medicine need to intervene in emergency situations in patients who are predicted to have a difficult airway [2]. This situation has been felt more by during the Corona virus pandemic, which has shaken the whole world very recently [3]. Today, a lot of many new equipments are is being used to intervene in the difficult airway [4]. It is important for specially trained physicians who receive specialty training to know whatich equipment to use for a particular patient in an emergency [6]. This study was carried out to determine the awareness of physicians outside the department of anaesthesiology and reanimation, who are less likely to encounter patients with difficult airways on this issue.

Material and Methods

This study was a survey study conducted by asking 15 questions about difficult airway management to 150 physicians who received specialization training in the internal and surgical departments of Pamukkale University Faculty of Medicine. The study was started after the approval of Pamukkale University Non-Interventional Ethics Committee (E-60116787-020-333909). The units where the physicians who received specialization training in medicine work their medical experiences before the specialty training were questioned. Their approaches to the difficult airway and their awareness of this issue and their responses to the applications in emergency situations related to the patients who were predicted to have a difficult airway were evaluated.

Statistical analysis

In summarizing the data obtained from the study, descriptive statistics were tabulated as mean ± standard deviation or median, minimum and maximum depending on the distribution for of continuous (numerical) variables. Categorical variables were summarized as numbers and percentages. The Normality of the numerical variables was checked by the Shapiro- Wilk test, Kolmogorov-Smirnov and Anderson-Darling tests. In comparisons of differences between categorical variables according to groups, Pearson's Chi-Square test was used in 2x2 tables with expected values of 5 and above, Fisher's Exact Test was used in tables with expected values below 5, and Fisher Freeman Halton test was used in RxC tables with expected values below 5. The Mann- Whitney U test was used in two independent group comparisons when numerical variables did not show normal distribution. In independent comparisons of more than two groups, the Kruskall- Wallis H test was used when numerical variables were not normally distributed. In nonparametric tests, differences between groups were evaluated by the Dwass-Steel-Critchlow- Fligner test. Statistical analyses were performed with Jamovi (Version 2.3.24.0) and JASP (Version 0.17.1) programs, and the significance level for statistical analysis was assumed to be 0.05 (p-value). was considered as 0.05 (p-value) in statistical analyses.

Ethical Approval

Ethics Committee approval for the study was obtained.

Results

The study included a total of 150 participants, with nearly equal representation from internal medicine (72 participants, 48%) and surgical medicine (78 participants, 52%). The majority of the participants were in their second year of residency, as represented by the median residency duration of 2 years. The gender distribution was somewhat skewed towards males, with 89 male participants (59.3%) and 61 female participants (40.7%) . In terms of practical experience, a significant number of residents (115 or 76.7%) had previously worked as general practitioners. Of these, a large majority (80.9% or 93 participants) had experience working in the emergency department, while the remaining 19.1% (or 22 participants) had experience in health care units other than the emergency department. As for specialized training, only a minority of participants (23 or 15.3%) had undergone an anesthesia rotation during their residency. The vast majority (127 participants or 84.7%) had not experienced an anesthesia rotation as part of their training . In the study sample, nearly all participants (144 or 96%) indicated that they received their initial airway management training during medical school. Only a small fraction reported receiving this training while working as general practitioners (2 participants or 1.3%), or during their practice in their own clinics (4 participants or 2.7%). When asked about specific assessment methods, slightly over half of the participants (89 or 59.3%) reported being familiar with and capable of assessing the Mallampati score, - a classification system used in anesthesiology to predict the ease of intubation.

Table 1. Comparison of demographic and professional characteristics in participants with and without reluctance in intubation procedure.

	Reluctance to Intubate		p
	Yes (n=44)	No (n=100)	
Branch [J]			
Internal	19 (43.2)	53 (50.0)	0.561*
Surgery	25 (56.8)	53 (50.0)	
Duration of residency [§]	1.0 [1.0 - 5.0]	2.0 [1.0 - 5.0]	0.054**
Gender [J]			
Woman	25 (56.8)	36 (34.0)	0.016*
Male	19 (43.2)	70 (66.0)	
General Practice Experience, yes [J]	29 (65.9)	86 (81.1)	0.073*
Emergency services	22 (75.9)	71 (82.6)	0.603*
Other	7 (24.1)	15 (17.4)	
Is Anesthesia Rotation Done? [J]			
Yes	3 (6.8)	20 (18.9)	0.106*
No	41 (93.2)	86 (81.1)	
First Place to Receive Airway Training [J]			
Faculty of Medicine	43 (97.7)	101 (95.3)	0.259*
General Practice	1 (2.3)	1 (0.9)	
Own Clinic	0 (0.0)	4 (3.8)	
Mallampati Score Knowledge [J]			
Yes	22 (50.0)	67 (63.2)	0.188*
No	22 (50.0)	39 (36.8)	

J: n (%), §: median [min-max]; *. Pearson's Chi-Square or Fisher's Exact test. **. Mann-Whitney U test.

Table 2. Comparison of knowledge and skill levels of airway techniques in participants with and without intubation reluctance and the methods they use in difficult airway cases.

	Reluctance to Intubate		
	Yes (n=44)	No (n=100)	p
Airway [J]			
I don't know	4 (9.1)	5 (4.7)	0.155*
I know	11 (25.0)	16 (15.1)	
I used it	29 (65.9)	85 (80.2)	
LMA [J]			
I don't know	12 (27.3)	27 (25.5)	0.894*
I know	18 (40.9)	41 (38.7)	
I used it	14 (31.8)	38 (35.8)	
Stillet [J]			
I don't know	29 (65.9) [a]	27 (25.5) [b]	<0.001*
I know	10 (22.7) [a]	28 (26.4) [a]	
I used it	5 (11.4) [a]	51 (48.1) [b]	
Gum Plug [J]			
I don't know	39 (88.6)	88 (83.0)	0.816*
I know	5 (11.4)	16 (15.1)	
I used it	0 (0.0)	2 (1.9)	
Video Laryngoscope [J]			
I don't know	13 (29.5) [a]	22 (20.8) [a]	0.031*
I know	30 (68.2) [a]	65 (61.3) [a]	
I used it	1 (2.3) [a]	19 (17.9) [b]	
Fiberoptic Laryngoscope [J]			
I don't know	22 (50.0)	61 (57.5)	0.680*
I know	20 (45.5)	40 (37.7)	
I used it	2 (4.5)	5 (4.7)	
First Preferred Technique for Difficult Airway [J]			
Airway	35 (79.5)	72 (67.9)	0.420*
LMA	3 (6.8)	10 (9.4)	
Intubation	6 (13.6)	24 (22.6)	
First Person to Call for Help in Difficult Airway Cases [J]			
Own Senior Resident	12 (27.3) [a]	48 (45.3) [b]	0.027*
Anesthesia Department Resident	31 (70.5) [a]	58 (54.7) [a]	
Emergency Resident	1 (2.3) [a]	0 (0.0) [a]	
Intubation Experience [J]			
Yes	26 (59.1) [a]	97 (91.5) [b]	<0.001*
No	15 (34.1) [a]	8 (7.5) [b]	
Call an Experienced Physician	3 (6.8) [a]	1 (0.9) [b]	
Calling an Experienced Physician After the Number of Intubation Attempts [§]	2.0 [1.0 - 4.0]	2.0 [1.0 - 4.0]	<0.001**
Best Indicator for Successful Intubation [J]			
Intubation Tube Steam	1 (2.3)	3 (2.8)	0.053*
Chest Inspection	3 (6.8)	2 (1.9)	
$ETCO_2$	30 (68.2)	56 (52.8)	
Auscultation	10 (22.7)	45 (42.5)	

J: n (%), §: median [min-max]; a, b: Different letters showing significant differences between the groups. *. Pearson's Chi-Square or Fisher's Exact test. **. Mann-Whitney U test.

Table 3. Results of logistic regression analysis to predict intubation reluctance.

	Univariable OR. [95%CI]	p value	Multivariable OR. [95%CI]	p value
Gender: male vs female	2.56 [1.25 – 5.25]	0.01	3.51 [1.50 – 8.22]	0.004
General Practice Experience: Yes vs No	2.22 [1.01 – 4.9]	0.048	1.91 [0.79 – 4.64]	0.152
First Person to Call for Help in Difficult Airway Cases: ref.=Own senior Resident				
Anesthesia Department Resident	0.47 [0.22 – 1.01]	0.053	-	-
Emergency resident	0.01 [0.01 – 0.02]	0.986	-	-
Intubation Experience: ref.= Yes				
No	0.14 [0.05 – 0.37]	<0.001	0.10 [0.03 – 0.29]	<0.001
Call an Experienced Physician	0.09 [0.01 – 0.89]	0.04	0.11 [0.01 – 1.21]	0.071

OR. Odds ratio, CI. Confidence interval

On the contrary, a significant portion of the participants (61 or 40.7%) admitted to having no knowledge of the Mallampati score. The participants were asked about their knowledge and experience regarding different airway management tools and techniques. Of the total, only a small fraction (9 or 6%) reported having no knowledge of airway use, while 27 participants (18%) had knowledge but lacked practical experience. A significant majority (114 or 76%) had previous hands-on experience in airway use. When questioned about the use of a Laryngeal Mask Airway (LMA), more than a quarter of participants (39 or 26%) admitted having no knowledge, while 59 participants (39.3%) had knowledge without prior experience. A total of 52 participants (34.7%) reported having previous experience using an LMA . As for Gum plugs, a vast majority of participants (127 or 84.7%) lacked knowledge about them, while 21 participants (14%) had knowledge but no experience. A very small portion of the participants (2 or 1.3%) reported previous experience using Gum plugs. Regarding the use of a Stillet, the participants' responses were evenly divided. Exactly 56 participants (37.3%) lacked knowledge about it, while the same number (56 or 37.3%) reported having previous experience. The remaining participants (38 or 25.3%) knew about Stillet, but lacked experience. Regarding the use of When it came to using a video laryngoscope, only 35 participants (23.3%) reported having no knowledge, whereas a majority (95 or 63.3%) had knowledge but lacked practical experience. A smaller group (20 or 13.3%) had previous experience using a video laryngoscope. Lastly, when asked about a the fibere-optic laryngoscope, over half of the participants (83 or 55.3%) reported no knowledge. A sizeable group (60 or 40%) had knowledge but no practical experience, while a very small percentage (7 or 4.7%) had previous experience with the device. In managing difficult airway cases, a majority of participants (107 or 71.3%) reported that their first choice was to use the general airway method,

while a smaller fraction preferred using the Laryngeal Mask Airway (LMA) method (13 or 8.7%) or the intubation method (30 or 20%). In terms of seeking assistance, 60 participants (40%) would first turn to their supervisor, a significant majority (89 or 59.3%) would call an anesthesia resident, while only 1 participant (0.7%) would turn to an emergency resident first. Regarding intubation experience, 123 participants (82%) reported having performed intubation in the past. However, 23 participants (15.3%) claimed no prior experience with intubation, and 4 participants (2.7%) reported calling an experienced doctor when intubation was indicated. If a second attempt at intubation also failed, the general consensus was to call an experienced physician . While 44 participants (29.3%) expressed a reluctance to perform intubation in clinical situations where it was necessary, a substantial majority (106 or 70.7%) reported no issues with performing intubation under such circumstances. When asked about methods to assess successful intubation, a very small number of participants mentioned seeing vapor in the intubation tube (4 or 2.7%) or chest inspection (5 or 3.3%) as indicators. Most participants deemed $ETCO_2$ as the best indicator (86 or 57.3%), while a significant portion opted for auscultation (55 or 36.7%) as a reliable method to confirm successful intubation. A significant gender difference was observed in the reluctance to perform intubation, with female participants demonstrating this reluctance more frequently than their male counterparts (p=0.016). Furthermore, participants with longer residency durations showed a trend towards less frequent reluctance during intubation, although this observation was only borderline significant (p=0.054) (Table 1). However, no significant differences were found when considering other factors. These included the primary specialty in which the participants were trained, whether they had experience working as a general practitioner, the setting of their practice as a general practitioner, whether they had an anesthesia rotation during their training, where they first received airway training, and knowledge of the Mallampati score. All these variables showed p-values greater than 0.05, indicating no statistical significance (Table 1).When comparing the knowledge and skill levels of participants in terms of airway management, as well as their chosen strategies in difficult airway cases, significant differences were found depending on whether or not they experienced reluctance during intubation (Table 2). Specifically, those who were unfamiliar with the use of a Stillet exhibited a significantly higher frequency of reluctance during intubation. Conversely, those who had previous experience using a Stillet demonstrated less reluctance (p<0.001). Participants who had experience using a video laryngoscope also showed significantly less reluctance during intubation (p=0.031). Moreover, those who didn't hesitate were not hesitant about intubation were significantly more likely to seek assistance from a senior colleague in difficult airway cases (p=0.027) (Table 2). Notably, the frequency of reluctance was significantly higher among participants who had no prior experience with intubation and who would typically call an experienced physician in cases requiring intubation (p<0.001). Those demonstrating reluctance to intubate were also significantly less likely to make multiple attempts at intubation before consulting an experienced physician (p<0.001) (Table 2). However, no significant differences were observed between participants who were hesitant about intubation and those who were not when it came to knowledge and skills related to the use of general airway, LMA, Gum plugs, and fiberoptic laryngoscope (p>0.05 for each). Furthermore, the first preferred approach in difficult airway cases and the preferred method for confirming successful intubation did not differ significantly between the two groups (p=0.420 and p=0.053, respectively) (Table 2). When demographic and professional characteristics were analyzed in relation to the first preferred method in difficult airway cases, certain patterns emerged. Among participants trained in internal medicine specialties, the use of the general airway method was significantly lower than the use of the Laryngeal Mask Airway (LMA) and was similar to intubation use. In contrast, those trained in surgical specialties used the general airway method significantly more often than LMA, while their use of intubation was similar (p=0.003). Gender also played a role in these preferences. Female participants used the LMA more frequently than the airway method or intubation (LMA>airway=intubation). In contrast, male participants used the LMA less frequently than either the airway method or intubation (LMA<airway=intubation) (p=0.021). Knowledge of the Mallampati score was also a factor. Those familiar with the Mallampati score preferred using the LMA significantly more often, followed by the airway method and then intubation (LMA>airway>intubation). Among those unaware of the Mallampati score, intubation was the most preferred method, followed by the airway method and then the LMA (intubation>airway>LMA) (p=0.001) . The analysis showed that participants who preferred intubation in difficult airway cases made significantly more attempts at intubation before calling an experienced physician compared to those who preferred using the general airway method (p=0.022). However, the number of attempts made before seeking help was similar among participants who preferred the general airway method and LMA, as well as those who preferred the LMA and intubation methods (p=0.830 and p=0.440, respectively). No significant differences were found when considering participants' knowledge and skill levels regarding the use of different airway management tools (such as general airway, LMA, Stillet, Gum plugs, video laryngoscope, and fiberoptic laryngoscope) in relation to their preferred methods in difficult airway cases (p>0.05 for each). Similarly, there were no significant differences found in the variables including the first person to ask for help in difficult airway cases, intubation experience, hesitation towards the intubation procedure, and the best indicator for successful intubation, all with respect to the first preferred practices in difficult airway cases (p>0.05 for each) . The logistic regression results revealed some significant factors that influenced the likelihood of reluctance towards intubation. Being Ffemale gender was associated with a 2.56-fold increased risk of reluctance to intubate, while not having worked as a general practitioner raised the risk by a factor of 2.22 (Table 3). Participants with no previous intubation experience were found to have a 14% increased risk of reluctance compared to those with prior intubation experience. Similarly, those who would call another experienced physician in cases requiring intubation had a 9% increased risk of intubation

reluctance (Table 3). However, the identity of the first person called for help in difficult airway cases did not significantly affect the likelihood of reluctance towards intubation (Table 3). After adjusting the results, being female gender remained a significant factor, with a 3.51-fold increased risk of reluctance towards intubation. Additionally, a lack of prior intubation experience was associated with a 10% increased risk of reluctance, as compared to those with prior intubation experience (Table 3).

Discussion

Anticipating the difficulties that may occur in airway control is vital for safe ventilation [7]. In a study in which anesthesiologists were asked the question "When do you feel satisfied?", 15.2% of anesthesiologists reported that they were satisfied with the management of difficult patients, and this has also been an important issue in anesthesia residency training [8]. In our study, we evaluated the approaches to difficult airway and their awareness of this issue of physicians who received specialization training in medicine apart from the department of anesthesiology and reanimation. Our findings showed that most of the residents had insufficient knowledge and experience in difficult airway management. This is in line with the findings of the article published by Mohan et al. on patients with Treacher Collins Syndrome. This article is for a special patient group and, discusses difficult airway management in the population and highlights its impact on the general physician population. Indicates that they need to gain more experience in airway management [9]. This shows that assistants need more training and gain more experience in difficult airway management. Evaluating the effectiveness of simulationbased training article [3] shows that simulation-based training can help gain more experience in airway management. The findings of this study may be similar to the level of education in our study. The analyzes of the two studies show that the physicians need more training in this subject and they should gain more experience in this subject. Clevert et all. findings emphasizes the importance of interdisciplinary training and presents residents' understanding of difficult airway management, it. Shows that they need more training and they need to gain more experience in this regard [10]. The results of our study show that residency students from many different clinical branches actually need an interdisciplinary education. In a study conducted in our country, it was seen that balloon mask ventilation in the emergency department frightened physicians in terms of the risk of aspiration, and they did not find this procedure safe, and the use of alternative methods was emphasized [11]. This study supports the awareness of using alternative difficult airway equipment in our study. As a result, our findings emphasize the importance of the approach and awareness of the difficult airway of the physicians who receive specialty training in medicine, and show that the residents need more training on this issue and they should gain more experience in this regard.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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Conflict of interest

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