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Knowledge Level of Health Professionals in Charge of COVID-19 Vaccination About Adrenaline and Its Use

COVID-19 Aşısı Yapan Sağlık Profesyonellerinin Adrenalin ve Kullanımı Konusundaki Bilgi Düzeyi

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Abstract

Objective: It was aimed to investigate the knowledge, attitudes and behaviors of health professionals such as specialist doctors, assistant doctors, and nurses in charge of COVID-19 vaccination about adrenaline application.

Material and Methods: With the questionnaire method, the occupational groups, demographic characteristics, knowledge, education and experience levels of the participants were investigated.

Results: Of the 218 participants included in the study, there were 15 (6.9%) specialists, 107 (49.1%) assistant, 2 (0.9%) practitioners, and 94 (43.1%) nurses. It was observed that 78.9% of the participants preferred adrenaline as the first drug to be administered in the treatment of anaphylaxis. Among the participants who said adrenaline is the first drug to be administered in the treatment of anaphylaxis, 97 were (90.7%) assistants, 59 (62.8%) were nurses, 14 (93.3%) were specialist doctors and 2 (90.7%) 100) were practitioners (p= 0.002). Of the 165 (75.7%) participants who reported that the vastus lateralis muscle is the right place for intramuscular adrenaline administration, 57 (60.6%) were nurses, 97 (90.7%) were assistant doctors, 10 (66.7%) were specialist doctors and 1 (50%) was a practitioner (p< 0.001). It was determined that 143 (65.6%) of the participants had received prior training on adrenaline administration. It was determined that 106 (74.1%) of the healthcare professionals who had received adrenaline training and 39 (52%) of those who had not been trained chose intramuscular administration as the mode of administration of adrenaline during anaphylaxis (p= 0.001).

Conclusion: In our study, it was determined that most of the health professionals had received training on the use of adrenaline. While these results are good, they are not sufficient. For this reason, all health personnel should be educated on anaphylaxis diagnosis and the use of adrenaline.

Keywords: Adrenaline, anaphylaxis, drug allergy, hypersensitivity reaction

Öz

Giriş: Bu çalışmada COVID-19 aşılamasında görevli uzman doktor, asistan doktor, hemşire gibi sağlık profesyonellerinin adrenalin uygulaması konusunda bilgi, tutum ve davranışlarını araştırılması amaçlandı.

Gereç ve Yöntemler: Anket yöntemi ile katılımcıların meslek grupları, demografik özellikleri, adrenalin uygulaması konusunda bilgi, eğitim ve tecrübe düzeyleri araştırıldı.

Bulgular: Çalışmaya dahil edilen 218 katılımcının, 15 (%6.9)'i uzman doktor, 107 (%49.1)'si asistan doktor, 2 (%0.9)'si pratisyen doktor ve 94 (%43.1)'ü hemşire idi. Anafilaksi tedavisinde verilmesi gereken ilk ilaç olarak katılımcıların %78.9'unun adrenalini tercih ettiği görüldü. Anafilaksi tedavisinde verilmesi gereken ilk ilaca adrenalin diyen katılımcıların, 97 (%90.7)'si asistan doktor, 59 (%62.8)'u hemşire, 14 (%93.3)'ü uzman doktor ve 2 (%100)'si pratisyen doktor idi (p= 0.002). İntramusküler adrenalin uygulaması için doğru yerin vastus lateralis kası olduğunu bildiren 165 (%75.7) katılımcıdan, 57 (%60.6)'si hemşire, 97 (%90.7)'si asistan doktor, 10 (%66.7)'u uzman doktor ve 1 (%50)'i pratisyen doktor idi (p< 0.001). Katılımcıların 143 (%65.6)'ünün adrenalin uygulaması ile ilgili önceden eğitim aldığı tespit edildi. Adrenalin eğitimi almış olan sağlık çalışanlarının 106 (%74.1)'sının, eğitim almamış olanların 39 (%52)'unun anafilaksi sırasında adrenalinin veriliş şekli olarak intramusküler uygulamayı seçtikleri saptandı (p= 0.001).

Sonuç: Çalışmamızda sağlık profesyonellerin büyük bir kısmının adrenalin kullanımı konusunda eğitim aldığı saptandı. Bu sonuçlar iyi olmakla birlikte yeterli değildir. Bu nedenle anafilaksi tanısı ve adrenalin kullanımı konusunda tüm sağlık personeline eğitim verilmelidir.

Anahtar Kelimeler: Adrenalin, anafilaksi, ilaç alerjisi, aşırı duyarlılık reaksiyonu

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Introduction

Vaccination remains critical as the COVID-19 pandemic continues. In fact, severe allergic reactions to vaccines are extremely rare and anaphylaxis occurs in approximately 1.3 of one million doses of vaccine (1).However, we do not have much detail about the allergic reactions that may develop with the COVID-19 vaccine (2-4). It is accepted as a common practice to monitor each person for at least 30 minutes after vaccination all over the world. Therefore, all healthcare facilities in charge of vaccination should be equipped with trained personnel and equipment to both recognize allergic reactions and provide appropriate treatment. This applies to all vaccines, including COVID-19 vaccines.

Anaphylaxis is an allergic reaction that can start within seconds, affects the entire system and can result in death (5,6). When anaphylaxis is observed in drug applications, the most important and basic drug that should be used immediately is adrenaline (7,8). Adrenaline can be life-saving when administered quickly in case of anaphylaxis (9). If there is delay in the administration of adrenaline in case of anaphylaxis, even mortality can be observed in anaphylaxis, which initially occurs with mild symptoms, and exacerbation of allergic reaction, increase in morbidity and frequency of biphasic reactions are inevitable (10,11).

Adrenaline should be administered intramuscularly to the vastus lateralis muscle as 0.01 mg/kg, not to exceed 0.5 mg per injection for adults (12,13). Injections may be repeated at least once or twice at intervals of 5-15 minutes in cases in whom the reaction progresses rapidly, who does not respond to the first dose, or in biphasic anaphylaxis.

Due to this critical situation, our aim in this study was to investigate the knowledge, attitudes and behaviors of health professionals such as specialist doctors, assistant doctors and nurses in this field against the risk of anaphylaxis that may develop with the COVID-19 vaccine, which we do not have enough information about, by means of a questionnaire consisting of related questions.

Materials and Methods

This study was designed as a cross-sectional study. The study was designed in accordance with the Declaration of Helsinki and the Good Clinical Practice Guidelines. The study was approved by the Ankara City Hospital Ethics Committee (AŞH-E2-21-138).

The study included specialist doctors, assistant doctors, general practitioners and nurses who took part during the COVID-19 vaccination process. With a standard questionnaire we created in the appendix, the occupational groups, demographic characteristics, knowledge, education and experience levels of the participants were investigated.

Questionnaire

1. Have you received training on adrenaline application?
a. Yes b. No
2. If you have received training on adrenaline administration, how much time has passed since the training?
a. ≤6 months b. 6 months-2 years c. 3-5 years d. ≥6 years
3. Which drug should be given first in the treatment of anaphylaxis?
a. Volume expanders (eg. saline) b. Antihistamines c. Corticosteroids d. Antihistamine + Corticosteroid e. Adrenalin
4. Have you ever used adrenaline in a patient with anaphylaxis?
a. Yes b. No
5. What is the recommended route of administration of adrenaline in anaphylaxis?
a. Intravenous b. Subcutaneous c. Intramuscular
6. Which is the right place for intramuscular adrenaline administration?
a. Vastus lateralis muscle (outer thigh) b. Deltoid muscle (outer upper arm) c. Gluteal muscle d. I do not know
7. What is the dose of intramuscular adrenaline used in adults?
a. 0.15 mg b. 0.3-0.5 mg c. 0.6 mg
8. If symptoms persist, how long can the dose be repeated?
a. Dose cannot be repeated b. 5-15 min c. 15-20 min d. 20-30 min
9. Are there any absolute contraindications for the use of adrenaline?
a. Yes b. No c. I don't know
10. In which commercial form is adrenaline found in the unit you work in?
a. 1/1000 (1 mg/mL) b. 1/2000 (0.5 mg/mL) c. 1/4000 (0.25 mg/mL) d. I do not know
11. Have you ever heard of adrenaline auto injector?
a. Yes b. No

Table 1. Knowledge level of health professionals about adrenaline and its use

Questions	Study population n= 218	Specialist n= 15	Assistant n= 107	Practitioners n= 2	Nurse n= 94	p
Those trained in adrenaline application before	143 (65.6%)	11 (73.3%)	65 (70.7%)	1 (50%)	66 (70.2%)	p= 0.412
Time passed after adrenaline training						
≤6 years	20.2%	0%	4.7%	0%	11%	
6 months-2 years	14.9%	6.7%	25.2%	0%	19.3%	
3-5 years	22.5%	6.7 %	26.2%	50%	20.2%	
≥6 years	17%	66.6%	8.4%	0%	19.1%	
First drug to be given in anaphylaxis						
Adrenaline	172 (78.9%)	14 (93.3%)	97 (90.7%)	2 (100%)	59 (62.8%)	p= 0.002*
How to administer adrenaline in anaphylaxis						
Intramuscular	145 (66.5%)	11 (73.3%)	76 (71.02%)	2 (100%)	56 (59.6%)	p< 0.001*
The right place for intramuscular adrenaline administration						
Vastus lateralis	165 (75.7%)	10 (66.7%)	97 (90.7%)	1 (50%)	57 (60.6%)	p< 0.001*
Intramuscular dose of adrenaline used in adults						
0.3-0.5 mg	185 (83%)	13 (86.7%)	92 (86%)	2 (100%)	74 (78.7%)	p= 0.264

Statistical Analysis

Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) for Windows 20 (IBM SPSS Inc., Chicago, IL). Normal distribution of the data was evaluated with the Kolmogorov-Smirnov test. Numerical variables showing normal distribution were shown as mean ± standard deviation, and numerical variables not showing normal distribution were shown as median (min-max). Categorical variables were expressed as numbers and percentages. ANOVA test was used to compare data between the groups. p< 0.05 (*) value was accepted as significant in statistical analysis.

Results

A total of 218 healthcare professionals working in the COVID-19 vaccination program participated in the study. The study population consisted of 15 (6.9%) specialist doctors, 107 (49.1%) assistant doctors, 2 (0.9%) general practitioners and 94 (43.1%) nurses. As the first drug to be given in the treatment of anaphylaxis, 78.9% of the participants preferred adrenaline, 13.3% preferred antihistaminic + corticosteroid combination, 4.6% preferred antihistamines, and 2.3% preferred corticosteroids. Among the participants who said adrenaline is the first drug to be administered in the treatment of anaphylaxis, 97 (90.7%) were assistant doctors, 59 (62.8%) were nurses, 14 (93.3%) were specialist doctors and 2 (100%) were general practitioners (p= 0.002). Of the 165 (75.7%) participants who reported that the vastus lateralis muscle is the right place for intramuscular adrenaline administration, 57 (60.6%) were nurses, 97 (90.7%) were assistant doctors, 10 (66%) were specialist doctors and 1 (50%) was a general practitioner (p< 0.001) (Table 1). It was determined that 143 (65.6%) of the participants had received prior training on adrenaline administration. It was determined that 106 (74.1%) of the healthcare professionals who had received adrenaline training and 39 (52%) of those who had not been trained chose intramuscular administration as the mode of administration of adrenaline during anaphylaxis (p= 0.001) (Table 2).

Discussion

During the vaccination process due to COVID-19, allergic reactions and anaphylaxis, which often occur in vaccinations, have come to the fore. Although adverse reactions have been detected at a low rate in the safety studies of COVID-19 vaccines, adverse reactions related to vaccines may be seen more frequently in clinical practice. While adverse reactions in inactivated vaccines are usually local and non-serious, adverse reactions in vaccines produced with new techniques cause systemic and serious adverse reactions (14,15). Therefore, this study aimed to evaluate the knowledge levels of healthcare professionals working in vaccination centers during the COVID-19 vaccination process regarding the use of adrenaline in case of anaphylaxis.

Anaphylaxis is one of the very emergency situations that we rarely encounter in allergic reactions to drugs. We know that timely and conscious intervention is life-saving in case of anaphylaxis. We also know that timely intervention limits allergic reaction and prevents it from reaching more serious levels. For this reason, we think that health professionals should know the timely and effective administration of adrenaline in case of anaphylaxis in places where new and critical drugs such as vaccines are administered and in almost all drug treatment centers.

Table 2. Evaluation of the level of knowledge about adrenaline use of those who received and did not receive adrenaline training

Variables	Those who received training on adrenaline administration n= 143	Those who did not receive training on adrenaline administration n= 75	p
Those who preferred adrenaline as the first drug to be given in the treatment of anaphylaxis	116 (81.1%)	56 (74.7%)	p= 0.296
Those who chose intramuscular administration as the form of adrenaline administration	106 (74.1%)	39 (52%)	p= 0.001
Choosing the vastus lateralis muscle as the right site for intramuscular adrenaline administration	111 (77.6%)	54 (72%)	p= 0.407
Those who knew that the dose of intramuscular adrenaline used in adults is 0.3-0.5mg	123 (86%)	58 (77.3%)	p= 0.129
Those who knew that if the symptoms persisted, the dose could be repeated with an interval of 5-15 minutes.	74 (51.7%)	42 (56%)	p= 0.550
Those who knew that there are no absolute contraindications for the use of adrenaline	55 (38.5%)	28 (37.3%)	p= 0.871

In our study, we found that approximately 65% of the entire population had received training on adrenaline. Undoubtedly, this ratio should have been 100%. At least three years had passed since the training period in nearly 40% of those who had received training. In order for such important trainings to be carried out effectively, they need to be repeated frequently. Since anaphylaxis is a rare clinical condition by its nature, anaphylaxis approach is easily forgotten. Approximately 79% of the entire population knew that the first drug to be used in anaphylaxis should be adrenaline. When we looked at the subgroups, we found that more than 90% of the doctors flagged adrenaline and about 63% of the nurses marked adrenaline, lowering the overall average.

Although guidelines recommend the use of adrenaline as first-line therapy in anaphylaxis, antihistamines and corticosteroids are usually the first drugs administered by physicians to patients presenting with anaphylaxis. As a matter of fact, approximately 21% of the entire population in our study knew that the first drug to be used in case of anaphylaxis was corticosteroid or antihistamine or corticosteroid + antihistamine. Studies have shown that adrenaline is not used in even half of the patients presenting to the emergency department with anaphylaxis, and poor results are associated with delayed adrenaline administration (16-20). Corticosteroids + antihistamine drugs are frequently used in systemic allergic reactions. Anaphylaxis accounts for only a small part of systemic allergic reactions. For this reason, it is thought that corticosteroids + antihistamine drugs used in the first place in case of anaphylaxis is a wrong application. It is thought that there are many areas that need improvement regarding the diagnosis of anaphylaxis and the use of adrenaline, which is the first-line treatment, and that improvement in these areas will start with increasing awareness among health personnel.

About three-quarters of the entire population knew the place and method of adrenaline administration. However, this information is very critical, and we think that knowing it at this level is not enough. We think that adrenaline applications made to the wrong place may delay intervention, and unexpected results will be encountered. The dose of adrenaline that should be used in adults was known at a rate of 83% in the whole population, which is not at the desired level.

In our sample, when information about adrenaline use of those who had received adrenaline training and those who had not was compared, it was determined that there was a significant difference in the information regarding the way of administration of adrenaline. No significant difference was found in terms of other general information.

The main limitation of our study is that it is cross-sectional. Another limitation is that the study was conducted with a limited number of health professionals in a single center. However, this study is a good pilot study so that a quick assessment can be made.

As a result, there is still lack of knowledge and misapplications about adrenaline administration among healthcare professionals. It is an important problem that the most common cause of death due to anaphylaxis is delay in adrenaline administration. Along with doctors, allied health personnel should have the knowledge and skills to apply necessary intervention when anaphylaxis is encountered. All health personnel should be educated about the diagnosis of anaphylaxis and the use of adrenaline.

Ethics Committe Approval: This study was approved by Ankara City Hospital No: 2 Clinical Ethical Committee (Decision no: AŞH-E2-21-138, Date: 10.02.2021).

Informed Consent: Patient consent was obtained.

Peer-review: Externally peer-reviewed.

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