ANAPHYLAXIS AND ANAPHYLACTIC SHOCK

ANAFILAKSJA I WSTRZĄS ANAFILAKTYCZNY

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Анотації

Anaphylaxis is a set of symptoms that appear as a result of exposure to the triggering factor. The cause of anaphylaxis can be virtually all foreign substances, and its course is very dynamic and individual for each body. The most common triggers are Hymenoptera venom, food (peanuts, seafood, citrus, fish), medicines, latex, tree pollen, grasses pollen, parenteral proteins, animal fur. Symptoms of anaphylaxis may be respiratory disorders such as shortness of breath, hypoxia, auscultatory wheezing, and respiratory arrest. Symptoms of cardiovascular origin may include tachycardia, hypotension, ischemic changes in ECG, pallor of the skin, and sudden cardiac arrest. In contrast, skin lesions may appear as erythema, urticaria, and angioedema. There may also be airway obstruction such as swelling of the throat and tongue, laryngeal edema, laryngeal whistling and hoarseness. Anaphylaxis may be life-threatening for the patient. Treatment of anaphylactic shock is primarily based on the removal of the allergen, the collection of detailed medical history and treatment to prevent the further development of symptoms. Medicines that can be given in anaphylactic shock are oxygen, epinephrine, clemastine, hydrocortisone, salbutamol and glucagon. The most important treatment factor is the rapid delivery of adrenaline. If it does not help, take the patient to the hospital as soon as possible to implement further treatment to prevent cardiac arrest. The patient should be transported in an anti-shock position or, if it is impossible, in a sitting position so that no further life-threatening symptoms can develop. The basis for preventing anaphylaxis is to reduce the

Anafilaksja to zespół objawów pojawiających się na skutek ekspozycji na czynnik wyzwalający. Przyczyną anafilaksji mogą być praktycznie wszystkie obce substancje, a jej przebieg jest bardzo dynamiczny i indywidualny dla każdego organizmu. Najczęstszymi czynnikami wyzwalającymi to: jad owadów błonkoskrzydłych, jedzenie (orzeszki ziemne, owoce morza, cytrusy, ryby), leki, lateks, pyłki drzew, traw, białka podawane pozajelitowo, sierść zwierząt. Objawy anafilaksji mogą być zaburzenia ze strony układu oddechowego takie jak: duszność, hipoksja, osłuchowo świsty, zatrzymanie oddechu. Objawami pochodzenia z układu krążenia mogą być: tachykardia, hipotensja, zmiany niedokrwienne w ekg, bladość skóry, nagłe zatrzymanie krążenia. Natomiast zmiany skórne mogą się przejawiać jako: rumień, pokrzywka, obrzęk naczynioruchowy. Może także wystąpić niedrożności dróg oddechowych w postaci obrzęku gardła i języka, obrzęk krtani, świst krtaniowy oraz chrypka.

Anafilaksja może zagrażać życiu pacjenta. Leczenie wstrząsu anafilaktycznego polega przede wszystkim na usunięciu alergenu, zebraniu szczegółowego wywiadu oraz leczeniu zapobiegającemu dalszemu rozwojowi objawów. Lekami, które może podać ratownik medyczny pacjentowi będącemu we wstrząsie są: tlen, adrenalina, klemastyna, hydrokortyzon, salbutamol i glukagon. Najważniejszym czynnikiem leczenia jest szybkie podanie adrenaliny. W przypadku nieadekwatnej odpowiedzi organizmu, należy jak najszybciej przewieźć pacjenta do szpitala, aby wdrożyć dalsze leczenie, zapobiegające zatrzymaniu krążenia. Pacjenta należy transportować w pozycji

Анафілаксія – це сукупність симптомів, які з'являються внаслідок впливу тригера. Причиною анафілаксії можуть бути практично всі сторонні речовини, а її перебіг дуже динамічний та індивідуальний для кожного організму. Найпоширеніші тригери: отрута гіменоптери, їжа (арахіс, морепродукти, цитрусові, риба), наркотики, латекс, пилок з дерев, трав, парентеральні білки, шерсть тварин. Симптомами анафілаксії можуть бути порушення дихання, такі як задишка, гіпоксія, аускультативні хрипи та зупинка дихання. Симптомами серцево-судинного походження можуть бути тахікардія, гіпотонія, ішемічні зміни на ЕКГ, блідість шкіри та раптова зупинка серця. Навпаки, ураження шкіри може проявлятися як еритема, кропив'янка, ангіоневротичний набряк. Також може бути непрохідність дихальних шляхів, наприклад, набряк горла та язика, набряк гортані, свист гортані та хрипота.

Анафілаксія може бути небезпечною для життя. Лікування анафілактичного шоку полягає насамперед у видаленні алергену, зборі детального анамнезу та лікування для запобігання подальшого розвитку симптомів. Препарати, які працівник швидкої допомоги може дати пацієнту з шоком: це кисень, адреналін, клемастин, гідрокортизон, сальбутамол та глюкагон. Найважливішим фактором лікування є швидке введення адреналіну. У разі неадекватної реакції організму пацієнта необхідно якомога швидше доставити до лікарні, щоб здійснити подальше лікування, щоб запобігти зупинці серця. Хворого слід транспортувати в протишоковому

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risk of exposure to factors that cause it. Immunotherapy is also used, which consists in gradually getting the patient accustomed to the substance to which he is sensitized.

Key worlds: anaphylaxis, anaphylactic shock, triggers of anaphylaxis, treatment of anaphylaxis

przeciwwstrząsowej lub jeśli jest to niemożliwe, to w pozycji siedzącej. Podstawą zapobiegania anafilaksji jest zmniejszenie ryzyka narażenia na czynniki ją wywołujące. Stosowana jest również immunoterapia, która polega na stopniowym przyzwyczajaniu pacjenta do substancji, na którą jest uczulony.

Słowa kluczowe: anafilaksja, wstrząs anafilaktyczny, czynniki wyzwalające anafilaksję, leczenie anafilaksji

положенні або, якщо це неможливо, у сидячому положенні. Основою для запобігання анафілаксії є зниження ризику впливу збудників. Також застосовується імунотерапія, яка передбачає поступове звикання пацієнта до речовини, на яку він має алергію.

Ключові слова: анафілаксія, анафілактичний шок, тригери анафілаксії, лікування анафілаксії.

Introduction. The most important thing in treating shock is its quick diagnosis and action. For anaphylaxis, this is a difficult task because the symptoms are not obvious to predict and are individual to each organism. The main role is played by thorough examination and often repeated assessment of the patient's condition. Anaphylaxis is in most cases associated with allergic reactions, most commonly IgE-dependent, but may also be associated with non-allergic hypersensitivity, in which immune mechanisms do not participate. In about one-third of the cases, the trigger for anaphylaxis cannot be identified. Regardless of the pathomechanism of the anaphylactic reaction, the treatment is identical. First aid and public education on how to respond properly in the event of contact with a person experiencing shock symptoms plays a key role. The knowledge of students from various universities about anaphylaxis and the ability to deal with it were examined.

Definition of anaphylaxis, pathogenesis of anaphylaxis and anaphylactic shock. Anaphylaxis is a severe systemic allergic reaction that can be fatal. Its characteristic feature is the rapid development of life-threatening problems related to circulation and/or breathing and/or patency of the airways. Usually associated with skin lesions within the mucous membranes. Anaphylaxis is caused by the release of inflammatory mediators, e.g. histamine. It causes vasodilation, bronchospasm, edema and increased capillary permeability. Anaphylaxis is a reaction in the form of urticaria, erythema, Quinckie's edema, bronchospasm and diarrhea. Anaphylaxis is anaphylaxis with hypotension, i.e. a decrease in blood pressure and thus a decrease in tissue flow. Anaphylaxis and anaphylactic shock are a set of symptoms and not a disease entity, therefore their treatment is primarily symptomatic[1,2].

Trigger factors for anaphylaxis.

The most common cause of anaphylactic reaction and anaphylactic shock is food intake (e.g. nuts, fish, crustaceans, chicken eggs, cow's milk), medication (e.g. antibiotics, non-steroidal anti-inflammatory drugs), insect stings (wasps, bees, hornets), bumblebees) as well as local anesthetics and radiological contrast agents, exposure to other factors (e.g. latex, cold, physical exertion). The risk of anaphylaxis increases when the causes are added together, e.g. with simultaneous exposure to food allergens and exercise.

The shock organs in anaphylaxis include skin and mucosa, respiratory system, digestive system and cardiovascular system[3].

The causes of anaphylaxis can be divided into: allergic and non-allergic.

1. Allergic:

- Hymenoptera stings
- Drugs – the most common are antibiotics – aspirin, cytostatics, lactam
- Foods: nuts, fish, seafood, citrus

[1] R. Depukat, M.Chyrchel, L.Rzeszutko, D. Dudek, ST-*segment elevation myocardial infarction due to anaphylactic shock triggered by contrast medium*. Kardiol Pol. 2010; 68(9): 1047–50; discussion 1051

[2] M. Kurek . Anafilaksja (w) red. Fal A. *Alergia, choroby alergiczne, astma.* Wydawnictwo Medycyna Praktyczna, Krakow 2011: 483–508.

[3] JK Lee, Vadas, P. *Anaphylaxis: mechanisms and management.* „Clinical and experimental allergy: journal of the British Society for Allergy and Clinical Immunology". 41 (7), s. 923–938, lipiec 2011. PMID: 21668816 (ang.).

- Proteins administered parenterally – enzymes, serum, hormones
- Latex
- Inhalative allergens – cat, horse, dog hair.

2. Non-allergic:

- Immunological preparations such as blood, immunoglobulins, animal sera and vaccines
- The presence of mediators in foods (histamine, tyramine)
- Skeletal muscle relaxants, opioids, colloid solutions, exercise[4].

The course and symptoms of anaphylactic shock

Symptoms of anaphylaxis are the result of a rapidly increasing tissue inflammatory response in response to a specific stimulus, associated with the release of a number of proinflammatory mediators from skin mast cells and mucous membranes and peripheral blood basophils.

Anaphylactic reaction mediators include histamine, leukotrienes, prostaglandins, kallikrein. The main mediator of the anaphylactic reaction is histamine, which leads to the widening of peripheral vessels and an increase in their permeability, causes spasm smooth muscles of the respiratory tract, gastrointestinal tract and uterus, and rapid heart rate and coronary artery spasm.

As a result of vasodilatation and the increase in vascular permeability, there is a decrease in peripheral resistance, plasma escape to the extravascular space and, as a result, a decrease in blood pressure. Also histamine increases airway resistance due to smooth muscle contraction and an increase in the secretion of highly viscous mucus by goblet and glandular cells, which it may result in respiratory failure. The influence of histamine on the heart is also important – it increases the heart rate, the strength of the heart muscle contraction, which increases oxygen demand also leads to coronary artery spasm. As a result of this action in the course of anaphylactic reaction, especially in people with diseases cardiovascular disease, acute coronary syndrome and arrhythmias may occur. In addition, mast cell stimulation has also been reported recently in the vicinity of the atherosclerotic plaque can lead to rupture and the development of a heart attack.

The first symptoms of anaphylaxis usually appear several to several dozen minutes after the triggering stimulus. In the event of anaphylactic reactions to food, anaphylaxis may appear up to several hours after meals. Symptoms of anaphylaxis develop rapidly and their peak is usually seen up to 30 minutes after the first symptoms appear. Symptoms of anaphylaxis can be mild, moderate or severe, and the course of anaphylaxis can be one- or two-phase[5,6].

According to the European Resuscitation Council, the symptoms of anaphylaxis can be divided into three groups depending on the system:

1. Respiratory tract disorders:
- Swelling of the throat and tongue
- Laryngeal edema
- Hoarseness
- Laryngeal whistle.

2. Respiratory disorders:
- Increasing dyspnea
- Auscultation wheezing
- Hypoxia
- Breathing arrest.

3. Circulatory disorders:
- Pale, moist skin
- Tachycardia
- Hypotension
- Ischemic ECG changes
- Sudden cardiac arrest.

4. Skin and/or mucous membrane changes – they occur in 80 % and are often the first symptoms of an anaphylactic reaction that is beginning. They can occur anywhere on the patient's body and their severity can be different:

- Rash
- Nettle-rash
- Angioedema (eyelids, lips, mouth, throat)[7].

[4] J. Kruszewski: *Interna Szczeklika, Anafilaksja i wstrząs anafilaktyczny*, Medycyna Praktyczna, Kraków 2012, s. 1956.

[5] o*p cit.* Depukat R I inni, ST-*segment elevation…….*

[6] op. cit JK Lee, Vadas, P. *Anaphylaxis: mechanisms…….*

[7] op. cit Kruszewski J: *Interna Szczeklika…..*

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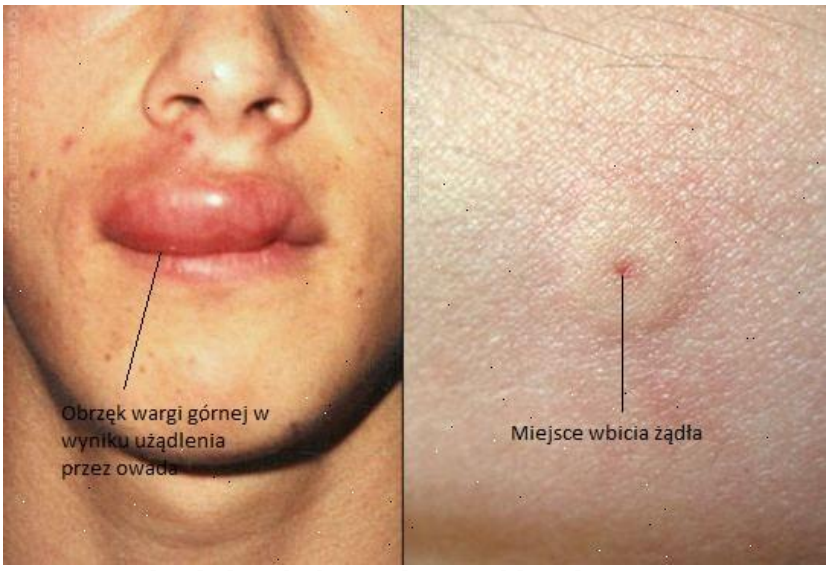

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Pre-hospital, hospital and hospital management in the event of anaphylactic shock

Emergency medical team proceedings:

1. Removal of allergen exposure:

- Interruption of drug supply
- Insect sting removal
- f you cannot remove the allergen exposure, do not delay treatment!

2. ABCDE diagram and SAMPLE interview:

- A- (airway patency)
- B- (breathing)
- C- (circulation)
- D- (assessment of the central nervous system)
- E- (evaluation of a suitably undressed patient)
- S- (Symptoms)
- A- (Allergies)
- M- (Medicines)
- P- (Past diseases)
- L- (Last meal)
- E- (Which led to injury, illness)[8,9].

3. Pharmacotherapy:

- Adrenaline – used as a first line treatment for patients with life threatening symptoms given intramuscularly. We give it when there is a direct threat to life, i.e. hypotension, bronchospasm and laryngeal edema. Benefits of using adrenaline there is a large safety margin (side effects are extremely rare), no need for intravenous access (there is time to get a peripheral line after the initial treatment), ease of injection technique. The subcutaneous and inhalational routes are less effective than the intramuscular routes. Dosage: adults and children> 12 years of age 0.5 mg; children 6–12 years of age 0.3 mg; <6 years 0.15 mg Subsequent doses may be repeated at 5-minute intervals.
- Oxygen therapy – initially a flow of 15 L/min through a face mask with oxygen reservoir. Then the oxygen supply depends on the saturation level of the injured party.
- Fluid therapy – due to circulatory disorders a rapid infusion of infusion fluids (children 20 ml / kg, adults 500–1000 ml) should be started by intravenous or intramedullary route. The next infusion depends on the patient's vital signs.
- Second-line drugs (antihistamines and steroids):

Antihistamines (anti-vasodilatation and bronchospasm) – Clemastine (Latin clemastinum) 2 mg or iv. For children 0.025 mg/kg intramuscularly. When choosing an intravenous route, the drug should be diluted 1: 5 in 0.9 % NaCl. For a 2 mg supply, the medicine should be drawn into a 10 ml syringe and supplemented with 8 ml NaCl.

Hydrocortisone (Latin cortex) used for adults 100–500 mg or 5 mg/kg intravenously, in children under 6 years of age – 50 mg, 6–12 years of age – 100 mg, and over 12 years of age – 100–500 mg intravenously or intramuscularly.

[8] op cit Depukat I inni, *ST-segment elevation*…….

[9] op cit. Kurek M. *Anafilaksja* ……..

Glucocorticosteroids may be helpful in the treatment of anaphylaxis. They work late and are of major importance in preventing relapses. Although the optimal dose has not yet been determined, the dosage may be similar to asthma.

Glucagon is given when there is no reaction to adrenaline and in patients treated with β-blockers. Adults – 1–2 mg intramuscularly or intravenously, children under 25kg – 0.5 mg i.m, over 25 kg – 1 mg intramuscularly[10,11].

4. Endotracheal intubation:

In the event of large laryngeal edema, early endotracheal intubation should be performed. When intubation is impossible, we perform a conjunction, which is an invasive method of clearing the respiratory tract in the case of a sudden threat to the health or life of the victim[12].

5. Transport to the hospital.

Patients with respiratory or hemodynamic failure should be transported to the Hospital Emergency Department. Thermal and mental comfort should be maintained during transport. If the patient's transport through the basic team will be shorter than the waiting time for the help of a specialist team, you should immediately decide to transport the patient to the nearest SOR (hospital emergency department), so you should consider calling a specialist team for the so-called «Meeting», or handing over a patient on the way to the hospital. It is important to remember the «one stretcher» principle, which means that the doctor transfers to the basic team and not the patient is transferred to the specialist team[13].

Hospital management and prevention of anaphylaxis

After controlling the symptoms with outpatient treatment, the patient should still be observed in hospital for a period of at least 48 hours due to the possibility of a two-phase reaction, as well as shock complications, including respiratory failure, renal failure, intravascular coagulation syndrome (DIC) or organ damage.[14]

The basis for preventing anaphylaxis is to avoid factors that can cause a strong allergic and anaphylactic reaction. Therefore, it is important to correctly diagnose the type of allergies and allergens threatening health, to be aware of the consequences that they can cause, and to act appropriately.

After determining the risk of an anaphylactic reaction, the physician should issue an appropriate certificate, prescribe medication and inform the patient how to behave in the event of an anaphylactic shock. In the case of some allergens (e.g. medicines, insect venom), it is possible to treat by using desensitization (immunotherapy), which consists in giving the patient gradually increasing doses of the vaccine with the allergen. The purpose of this method is to cause tolerance to a specific factor in the body. Her success depends, however, on the doctor's experience and willingness to cooperate with the patient. It does not always bring the expected result, as well as there are numerous contraindications to it, e.g. allergy to a group of allergens or concomitant diseases. It is recommended that desensitization be carried out in a hospital setting to avoid the risk of an anaphylactic reaction[15].

The strategy for avoiding allergens or immunotherapy does not always work. In addition, anaphylaxis sometimes has unrecognized causes, so it is difficult to prevent in such a situation. Therefore, any person who suffers from a severe allergy or has experienced an anaphylaxis episode in the past should take care to prevent anaphylactic shock to protect his health and life[16] [6].

Study of students' knowledge about anaphylaxis

Subject, purpose of research, tools, methods and research techniques

The aim of the study was to check the level of knowledge about anaphylaxis represented by a group of students. 87 students from various universities were tested.

The study used the diagnostic survey method using a research tool – a questionnaire. The

[10] http://www.anafilaksja.pl/strony/leczenie_ anafilaksji.php

[11] Worm M. *Epidemiology of anaphylaxis. „Chemical immunology and allergy*". 95, s. 12–21, 2010. PMID: 20519879 (ang.).

[12] ibidem

[13] http://ratunek24.pl/wszystko-o-anafilaksji-i-astmie

[14] op cit. R.Depukat I inni. ST-*segment elevation*……..

[15] op. cit.K Lee, Vadas, P. *Anaphylaxis*….

[16] op. cit. Kruszewski J: *Interna*…

survey was original. The survey consisted of 13 questions. It used 11 closed questions and 2 open questions. In the first part, the survey contained sociological data that enabled obtaining information on: age, sex, education, type of study, marital status. In the second part, the questionnaire included questions regarding: assessment of students' knowledge of anaphylaxis, skills in dealing with patients, knowledge and skills related to dealing with patients acquired in the course of studies and whether they survived anaphylactic shock. However, open questions concerned: what substance they are allergic to (if any) and how being allergic hinders a person's normal functioning.

Research issues. The research problems that have been undertaken are aimed at determining the students' knowledge of anaphylaxis. The specific problems that had to be presented to answer the above question are:

– Are students able to provide necessary help to victims in anaphylactic shock?

– Do medical universities comprehensively prepare students with anaphylaxis?

Three hypotheses were made:

– Students from medical universities have more knowledge about anaphylaxis than those from non-medical universities

– Medical anaphylaxis students' knowledge is at least sufficient

– More knowledge of students concerns anaphylaxis and less, knowledge of how to deal with it.

Analysis of research material.

1. Analysis of research material.

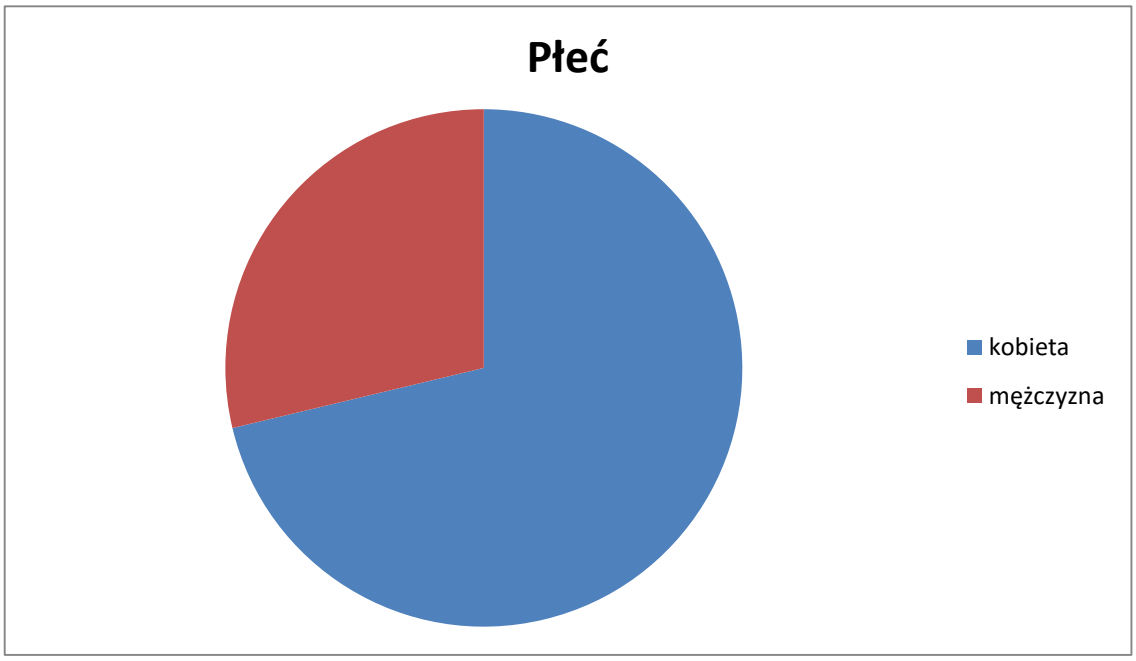

Fig. 1. Sex structure

Tab. 1

Sex structure

Sex	Woman	Man
Answers	62	25
Percentage	71.3	28.7

The first question in the survey concerned the sex of the respondents. Out of 87 respondents, 62 are women (71.3 %) and 25 – men (28.7 %).

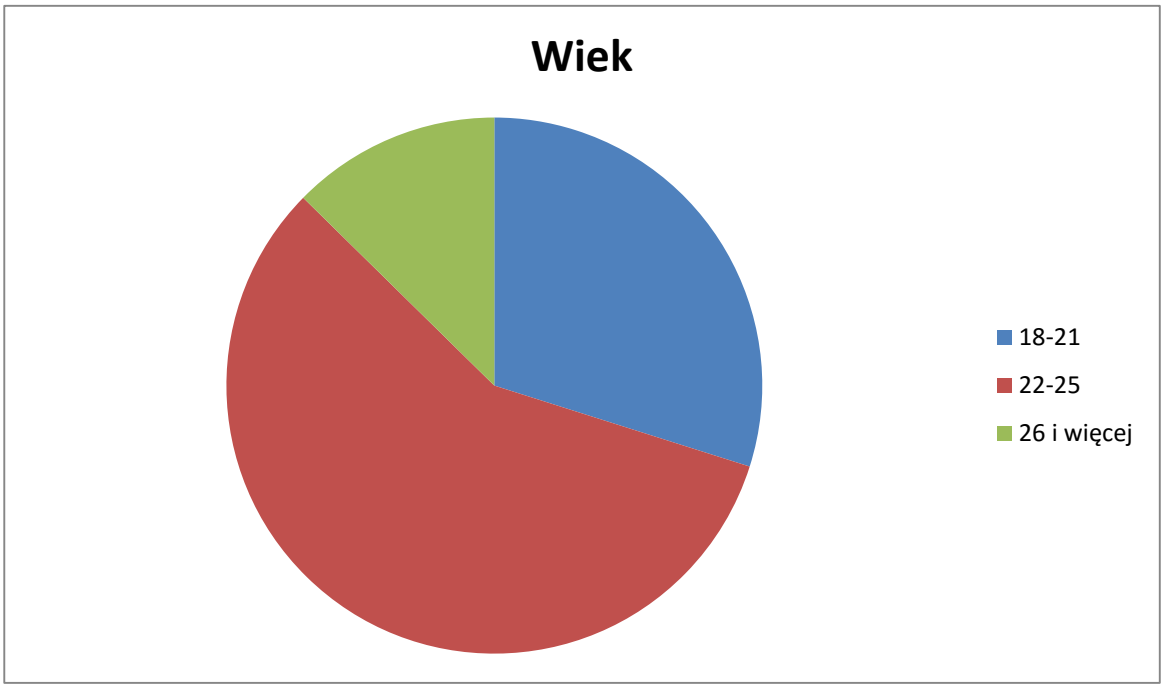

Fig. 2. Age

Tab. 2

Age

Age	18–21	22–25	26 and more
Answers	26	50	11
Percentage	30	57	13

The second question concerned the age of the respondents. Age from 18–21 marked 26 people. 50 people marked the age of 22–25. The age of 26 and more marked 11 people. This means that in percentage terms age: 18–21 was marked by 30 % of respondents. The age of 22–25 was marked by 57 % of respondents. On the other hand, 13 % of respondents marked age 26 and more.

Fig. 3. Place of residence

Tab. 3

Place of residence

Place of residence	City	Village
Answers	72	15
Percentage	83	17

The third question was about the place of residence. There were two answers to the election – the city and the village. Out of 87 respondents, 72 people (83 %) declared that they lived in the city, and 15 people (17 %) declared that they lived in the countryside.

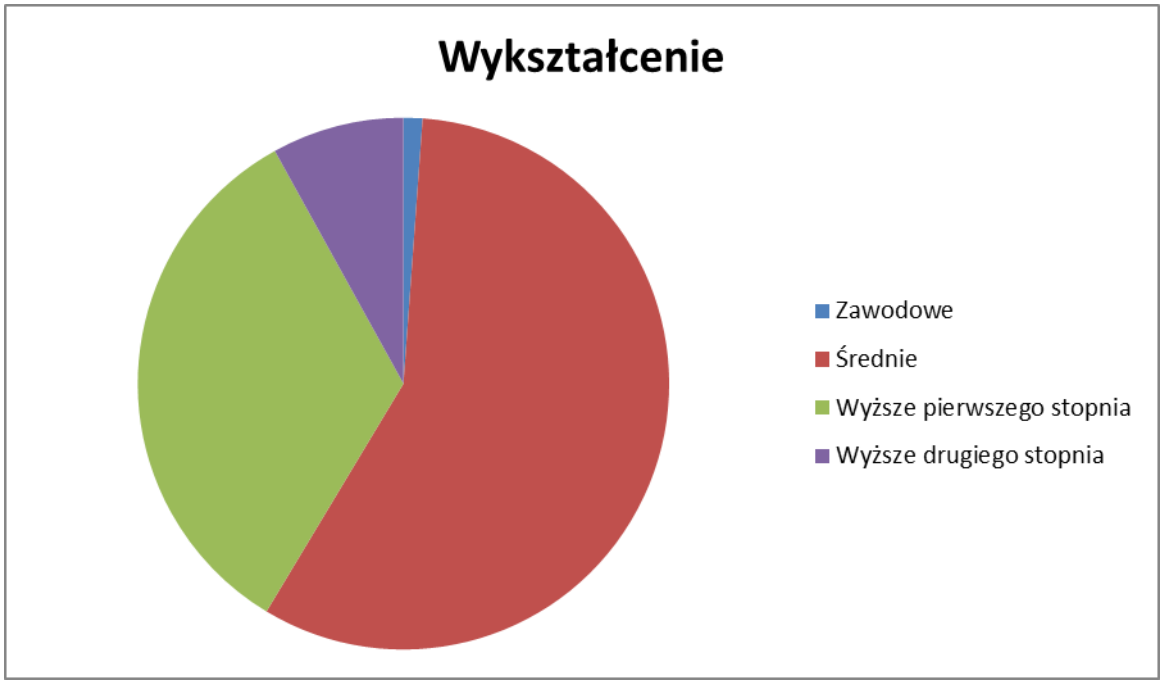

Fig. 4. Education

Tab. 4

Education

Education	Professional	Medium	Higher first degree	Higher second degree
Answers	1	50	29	7
Percentage	1.1 %	57.5 %	33.3 %	8 %

In the survey I also included the question about the education of the respondents. Most respondents have secondary education, as many as 50 people out of 87 respondents, which gives us a percentage of 57.5 %. 29 people have a first-cycle higher education, which gives us a 33.3 % share. 7 people have second-level higher education, which gives us a percentage of 8 %. One person has vocational education, which gives us a percentage of 1.1 %.

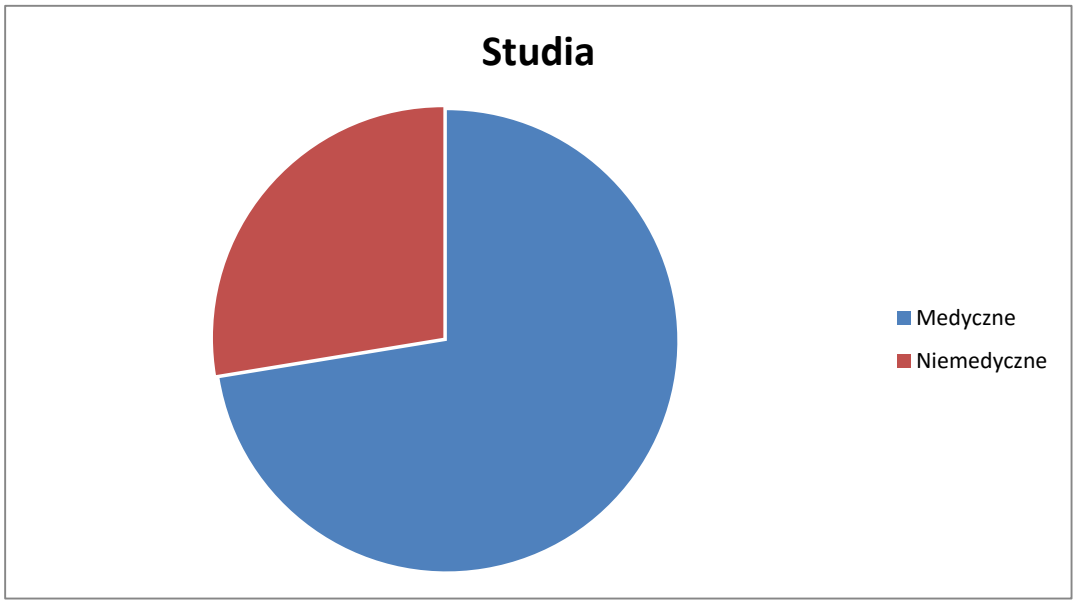

Fig. 5. Studies

Tab. 5

Studies

Studies	Medical	Non-medical
Answers	63	24
Percentage	72.4 %	27.6 %

The next question concerned the type of study. 63 students study medical medicine (72.4 %). 24 respondents study in non-medical studies (27.6 %).

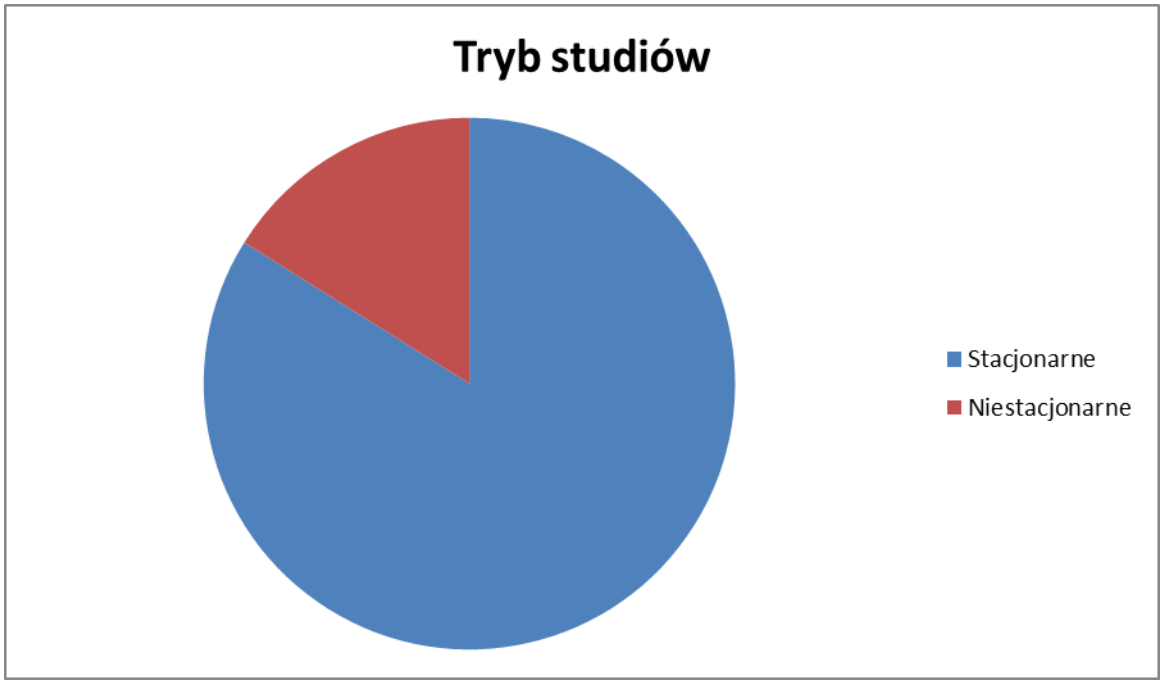

Fig. 6. Study mode

Tab. 6

Study mode

Study mode	Stationary	Part-time
Answers	73	14
Percentage	83.9 %	16.1 %

73 respondents attend full-time studies (83.9 %), and 14 respondents study part-time (16.1%).

Fig. 7. Subjective knowledge of anaphylaxis

Tab. 7

Subjective knowledge of anaphylaxis

Subjective knowledge of anaphylaxis	Lack of knowledge	Moderate knowledge	Sufficient knowledge	Very good knowledge
Answers	13	29	31	14
Percentage	14,9 %	33,3 %	35,6 %	16,1 %

In the question about the subjective knowledge of students about anaphylaxis, 13 respondents (14.9 %) answered that they had no knowledge. 29 students (33.3 %) declared sufficient knowledge. 31 respondents (35.6 %) declared good knowledge. Only 14 respondents (16.1 %) declared very good knowledge.

Fig. 8. Subjective assessment of ability to deal with anaphylaxis

Tab. 8

Subjective assessment of ability to deal with anaphylaxis

Subjective assessment of anaphylaxis skills	Lack of knowledge	Moderate knowledge	Sufficient knowledge	Very good knowledge
Answers	18	23	37	9
Percentage	20.7%	26.4%	42.5%	10.3%

In the question about the subjective assessment of the skill of dealing with anaphylaxis, 18 students (20.7%) indicated a lack of knowledge. 23 respondents, or 26.4%, have sufficient knowledge. 37 respondents (42.5%) have good knowledge. 9 students (10.3%) have very good knowledge.

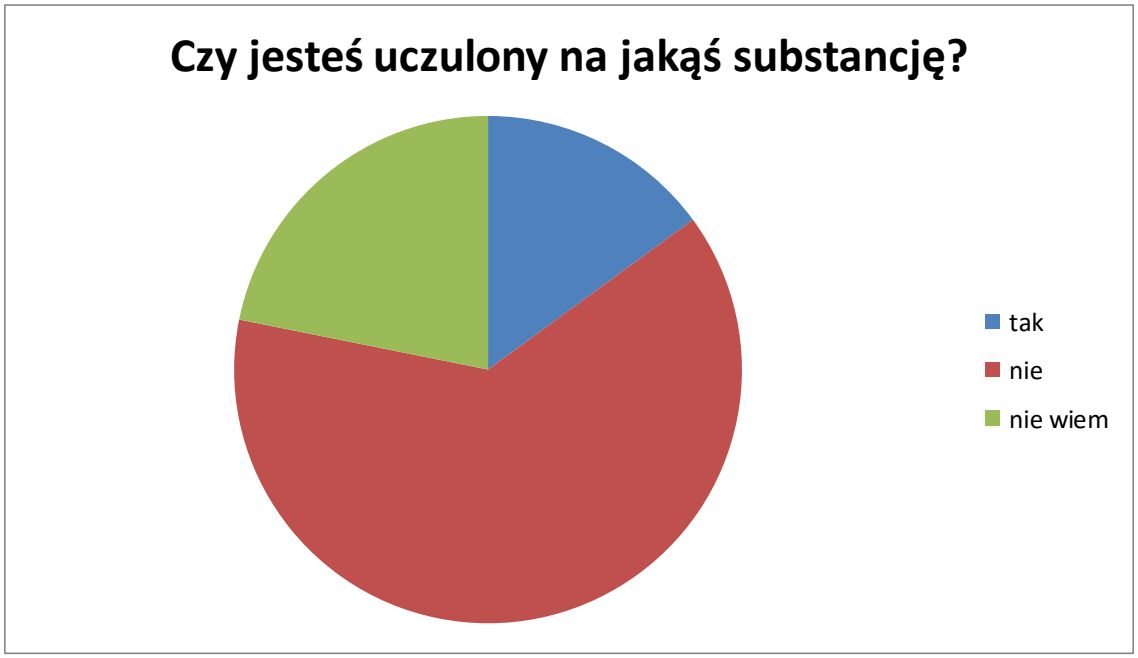

Fig. 9. Occurrence of allergy in the examined students

Tab. 9

Occurrence of allergy in the examined students

Are you allergic to the substance?	Yes	No	I do not know
Answers	13	55	19
Percentage	15 %	63.2 %	21.8 %

13 students are allergic (15%). 55 respondents (63.2%). is not allergic. 19 students (21.8%) do not know if they are allergic.

Tab. 10

Factors causing symptoms of anaphylaxis in allergic students

What substance are you allergic to?	Preservatives	Grass and tree pollen	Gluten	Medicines	Dust mites, dust	Hymenoptera venom	latex
Answers	1	5	1	1	1	2	2
Percentage	7.7 %	38.4 %	7.7 %	7.7 %	7.7 %	15.4 %	

Of the 87 subjects, 13 are allergic. One person (7.7 %) is allergic to preservatives. 5 students are allergic to tree and/or grass pollen (38.4 %). One person (7.7 %) is allergic to gluten. One respondent (7.7 %) is allergic to drugs. 1 person (7.7 %) is allergic to dust and mites. 2 people (15.4 %) are allergic to hymenoptera venom. 2 people (15.4 %) are allergic to latex.

Fig. 11. Occurrence of anaphylactic shock in the subjects

Tab. 11

Occurrence of anaphylactic shock in the subjects

Have you ever experienced anaphylactic shock?	Yes	No
Answers	2	85
Percentage	2,3%	97,7%

Of the respondents, anaphylactic shock occurred in two people (2.3%). The remaining 85 respondents (97.7%) have not experienced anaphylactic shock yet.

Fig. 12. Does being exposed make it more difficult for you to be allergic?

Tab. 12

Does being exposed make it more difficult for you to be allergic?

Does allergies make your life difficult?	**Yes**	**No**
Answers	8	79
Percentage	9.2%	90.8%

When asked whether allergies make your life difficult, 8 respondents (9.2%) answered in the affirmative. 79 students (90.8%), sensitization does not hinder life, or they are not allergic.

Tab. 13

How does allergy manifest itself?

How does allergy make your life difficult?	**hay fever**	**Watery, itchy eyes**	**Difficulties with cleaning**	**Limited time outdoors**	**Sneezing**
Answers	4	2	1	3	3
Percentage	30.7%	15.4%	7.7%	23.1%	23.1%

Of the 13 surveyed allergic students, 4 students (30.7 %) have a problem with hay fever, 2 subjects (15.4 %) have a problem with watery eyes and itchy eyes. One respondent (7.7 %) has difficulties in cleaning (housekeeping). 3 respondents (23.1 %), spend a limited time outside. In three subjects (23.1 %), the problem of sensitization is manifested by sneezing.

Summary and Conclusions. Most respondents, 31 out of 87, marked their subjective assessment of knowledge about anaphylaxis as good. However, as many as 13 people do not have any knowledge about anaphylaxis, which gives an unsatisfactory result. To the question: Are students able to provide the necessary assistance to the injured party in anaphylactic shock?, one can cautiously answer in the af-

firmative, assuming that the basic skills in anaphylaxis procedures that allow to save an allergic life are students who have marked sufficient, good and very good knowledge. In this case, 69 out of 87 students are able to help with anaphylaxis. However, the question: Do medical universities comprehensively prepare students in the issues of anaphylaxis? In the light of the conducted research, one can also answer in the affirmative. No student from a medical school did not mark the answer «lack of knowledge» in the question about the subjective assessment of knowledge about anaphylaxis. Hypothesis: Students from medical universities have more knowledge about anaphylaxis than those from non-medical universities and the knowledge of medical students is at least sufficient, has been verified positively. Third hypothesis: Greater knowledge of students concerns anaphylaxis itself than the ability to deal with it, also verified positively. In this case, 74 people have knowledge of anaphylaxis, while 69 people out of 87 respondents have skills in dealing with anaphylaxis.

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