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Selected aspects of allergy nursing

Wybrane aspekty pielęgniarstwa alergologicznego

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STRESZCZENIE

WYBRANE ASPEKTY PIELĘGNIARSTWA ALERGOLOGICZNEGO

Wprowadzenie. Choroby alergiczne ze względu na dynamikę stanowią poważny problem współczesnej medycyny i zdrowia publicznego. Szacuje się, że blisko 40% ogółu polskiej populacji ma alergię. Należy pamiętać, że, choroby te nie są wysublimowaną jednostką chorobową a współistnieją lub stanowią konsekwencję innych schorzeń wielonarządowych. Budowanie i wdrażanie gotowych modeli skupiających się w głównej mierze na zasadach medycyny zapobiegawczej względem naprawczej stanowią nadrzędne zadania polityki zdrowotnej państwa w tym zakresie.

Podsumowanie. Partnerskie zespoły terapeutyczne wzmacniają potencjał pracy w środowisku pacjenta obciążonego chorobami alergicznymi. Szczególną rolę we wspomnianej strukturze odgrywa pielęgniarka alergologiczna ze względu na pełnione role zawodowe; przez diagnostykę, terapię, edukację do swoistego łącznika między pacjentem a zespołem terapeutycznym. Autorzy w swoich rozważaniach skupili się głównie na trzech istotnych elementach składowych, a mianowicie na procedurach diagnostyczno (punktowe testy skórne) – terapeutycznych (immunoterapia swoista) i na wybranych zagadnieniach z obszaru dokumentacji pielęgniarki alergologicznej.

Słowa kluczowe: choroby alergiczne, dokumentacja medyczna, immunoterapia swoista, pielęgniarstwo alergologiczne, punktowe testy skórne

ABSTRACT

SELECTED ASPECTS OF ALLERGY NURSING

Introduction. Due to their dynamic character, allergic conditions pose challenges for modern medicine and constitute a public health problem. Nearly 40% of the general Polish population is estimated to suffer from an allergy. We would like to emphasize that allergies are not some extraordinary ailments; instead, they commonly coincide with or are complications of other systemic conditions. Hence, national health policies should prioritize the development and implementation of ready-to-use protocols that focus mainly on prevention rather than treatment.

Conclusions. In an outpatient setting the care for individuals who suffer from allergies is facilitated by therapeutic teams. Allergy nurses play a special role in this framework, with the scope of their professional duties including diagnostic procedures, treatment, being a mediator for patient education initiated by the therapeutic team. This article focuses on three important types of allergy nurses' responsibilities: diagnostic procedures (e.g. skin prick tests), therapeutic procedures (allergen-specific immunotherapy), and selected aspects of medical record-keeping.

Key words: allergy, medical records, allergen-specific immunotherapy, allergy nursing, skin prick test

INTRODUCTION

Allergic conditions are a serious social and economic burden. They affect nearly 40% of the population in more developed countries. Globally, allergic conditions have assumed epidemic proportions and are becoming the disease of the 21st century. The most commonly diagnosed type of allergy is allergic rhinitis. The European Community Respiratory Health Survey (ECRHS) [1] assessing the adult population aged 20-44 years showed that the average rates of allergic rhinitis in Europe are approximately 20.9% [2]. Conversely, the International Study of Asthma and Allergies in Childhood (ISAAC) II study, conducted in children aged 6-7 years and 13-14 years demonstrated that allergic rhinitis affected nearly 42.1% of the evaluated individuals [2]. Poland places in the lead in terms of countries with the highest incidence of allergic conditions, with 40% of the general Polish population affected by an allergy, including allergic rhinitis (25%), bronchial asthma (5%; with 12% manifesting asthma symptoms), atopic dermatitis (9%), urticaria (with 2.1-6.7% of Polish children affected), and food allergies (13%) [3].

AIM OF THE STUDY

The data presented above indicates an urgent need to implement appropriate local (multidisciplinary teams, including *allergy nurses*) and nation-wide measures, in order to minimize long-term sequelae of untreated allergic conditions. The role of a nurse as a partner in patient diagnostics, treatment, care, and education is invaluable. Hence, in this manuscript (which is the first of its kind in Poland and written on the basic "Przykłady Dobrych Praktyk w Pielęgniarstwie Alergologicznym (POLA)" edited by Krzych-Fałta E and Sienkiewicz Z. Oficyna Wydawnicza Warszawskiego Uniwersytetu Medycznego ISBN 978-83-7637-486-4, Warszawa 2019) we presented those selected aspects of allergy nursing in which the nurse plays an active part.

Section I. The undergraduate and postgraduate education of nurses on allergy nursing

The education in professional nursing and midwifery in Poland is conducted within the scope of the higher education system, pursuant to the *Prawo o szkolnictwie wyższym* [Legislation on Higher Education] Act of October 30, 2017, (Journal of Laws of 2017; item 2183), the Nurses and Midwives Act of July 15, 2011 (Journal of Laws of 2016; items 1251 and 2020), and the relevant secondary legislation. The standard of first degree nursing education lacks typical learning outcomes dedicated to an allergic nursing. The implementation of specialist nursing learning outcomes – group D – is preparing students for healthcare of patients with allergic problems. The curriculum of master's degree studies in advanced nursing practice includes the subject *Opieka pielęgniarska nad pacjentem z przewlekłymi chorobami układu oddechowego* [Nursing care for patients with chronic respiratory disorders], which extensively covers diagnostic/nursing/therapeutic procedures for nurses dealing with allergy patients.

The legal basis of postgraduate education for nurses and midwifes is *Ustawa o zawodach pielęgniarki i położnej* [the Nurses and Midwives Act], which specifies the types of postgraduate education, including specialty education, qualifying courses, specialty courses, and continuing education. Apart from continuing education courses, postgraduate education is conducted based on detailed education programs approved by a minister responsible for healthcare issues. Each program is composed of modules, including curriculum content and learning outcomes, teaching methods, lists of resources, and lists of course literature. The current Polish postgraduate education system offers two specialist courses addressed to,

among others: allergy nurses. These courses are: *Wykonanie i ocena testów skórnych* [Conducting and Interpreting Skin Prick Tests] and *Wykonanie badania spirometrycznego* [Conducting Spirometry]. A team of allergy nursing experts is currently working on the syllabus for a continuing education course on Allergen-Specific Immunotherapy, which is scheduled to be implemented by November 2019.

Section II. Allergy diagnostics and the role of a nurse

The goal of allergy diagnostics is to help establish the diagnosis and determine the potential cause of patients' symptoms. Diagnostic assessments should always begin with taking a thorough **history**. Such history should include the presenting and accompanying complaints, the circumstances associated with developing the symptoms, contact with any allergens, disease duration, alleviating and exacerbating factors, the nature and seasonality of symptoms, treatment effectiveness, lifestyle, nutritional habits, and working conditions. In many cases, such a thorough history can help establish initial diagnosis and rationally plan further diagnostic assessments. The fundamental type of diagnostic tool in allergy and dermatology are **skin tests**. Skin tests are particularly useful in differentiating allergic and pseudoallergic symptoms. Skin tests are a standardized assessment of skin response to a contact with known allergens. Depending on the type of allergen, method of application, and the time of interpretation, types of skin tests include skin-prick testing (SPT), intracutaneous tests, and patch tests [4].

SPT is considered to be the gold standard in detecting IgE-mediated allergy [4-7]. SPT is the first assessment in diagnosing atopic allergy in patients with symptoms of allergic rhinitis, allergic conjunctivitis, bronchial asthma, drug allergy, and an allergy to latex or insect venom [8]. SPT is a simple, rapid, and relatively save diagnostic test, also recommended as a screening test [7].

The patient should be in a general good condition, optimally in remission of allergy symptoms. For 1-2 weeks prior to testing, the patient should discontinue systemic antihistamines, antidepressants, and glucocorticoids (if taken at doses >10 mg of prednisone equivalents per day) and topical glucocorticoids and anesthetics applied in the areas of the body where the test is to be conducted. SPT involves placing drops of allergen extracts and two control solutions (negative and positive) onto the patient's skin, subsequent puncturing of the epidermis to introduce the allergens, and reading the results 15-20 minutes later. Via the epidermis puncture the allergen penetrates into the dermis and binds to allergen-specific IgEs coating the surface of mast cells. This causes mast cell activation and release of inflammatory mediators, such as histamine. The resulting wheal-and-flare reaction suggests an existing allergy [7].

Another type of SPT for native allergens is prick-by-prick testing with the use of fresh foods it their natural form (i.e. milk, eggs, peanuts, vegetables, fruit). Such tests are performed mainly in patients with suspected food allergies. The test involves pricking the tested food and then the tested patient's skin with the same lancet. The test is read after 15 minutes (like in the case of classic skin-prick testing) [5]. The sensitivity of prick-by-prick tests reaches nearly 100%. One advantage of this type of test is the use of "fresh" allergens, as allergens from reagent sets can undergo degradation during processing, standardization, or storage, what may reduce their immunogenic properties.

In order to avoid misinterpreting SPT results, it is recommended that the same nurse conduct and read the test. Prior to the test, in order to prevent side effects, the nurse should briefly explain the nature and course of the test to the patient and take the patient's history by asking to confirm his/her good general health on the day of the test; asking about any chronic diseases; possible vaccinations within the previous two weeks; an infectious disease within the previous month; history of anaphylaxis; recent sunbathing; if he/she had a meal; current medication; what drugs were discontinued before the skin test; whether (and since when) antihistamines had been discontinued; about history of asthma, hypertension, epilepsy, or (in the case of females) possible pregnancy. One excellent method of preventing mistakes during skin test application is pre-labeling the bottles in the reagent set with the corresponding numbers from the allergen panel and clearly marking the skin test sites. One good, proven method involving marking allergen numbers with adhesive tape strips and sticking them over the test sites. In order to prevent the applied reagent drops from running together, the patient should be instructed to wash his/her forearms with water and gently blot them dry immediately prior to testing. Another method of preventing the reagent droplets from running together is making sure the applied reagent droplets are not too large. In order to ensure sufficient (>2 cm) distance between allergen drops, the allergen solutions may be applied in two rows (this method is particularly useful when conducting the test in children). It is important to remember that the size of SPT wheals depends on the area of the skin (the wheals on the back are larger than those on the forearm), patient sex (the size of the histamine wheal is larger in men), time of day (skin reactivity is highest before noon), season (the wheals corresponding to pollen allergens are larger during and immediately after the pollen season), patient's age (the response is weaker in children and the elderly), diet on the test day (histamine-rich foods potentiate the SPT response), comorbidities, such as neuropathies, kidney disease, dialysis (dialysis therapy weakens SPT responses), acute urticaria and dermographism (which potentiate the response to tested allergens) [4,5,8-10].

The differences between the guidelines published in "Standardy w Alergologii" constituting the position of the Polish Society of Allergology expert panel, and those listed above show how important it is to introduce uniform SPT standardization, technique, and reading methods to ensure reliable testing results.

Tab. 1. Indications and contraindications for skin-prick tests

Recommended uses	Contraindications
To help confirm (or exclude) suspected allergy to a specific allergen (plant pollen, house dust mites, animal dander, mold spores); • To help select suitable allergy prophylaxis methods and plan further treatment; • To qualify patients to undergo a possible allergen-specific immunotherapy [4]. The sensitivity and specificity of SPT in detecting an allergy to known allergens vary. In the case of allergies to inhalant allergens (pollen, house dust mites, animal allergens, mold spores) skin-prick tests are a very reliable diagnostic tool (specificity 70-90%; sensitivity 80-97%); in the case of food allergies, the results of SPT are not definite, and caution must be exercised with their interpretation [4,5].	Heart conditions and pregnancy (relative contraindications); Risk of an anaphylactic reaction to the tested allergen; Poorly controlled asthma, impaired lung function; Skin lesions in the location where the skin test is to be applied; Systemic use of certain drugs (antihistamines, steroids at >10 mg of prednisone equivalent); Topical steroids or calcineurin inhibitors; Dermographism, acute or chronic urticaria, and cutaneous mastocytosis may produce a false positive reaction; History of recent anaphylaxis (if SPT performed less than 4-6 weeks after an anaphylactic episode it may produce a false negative reaction); Recent history of phototherapy, sunbathing, or sun-bed use (1-2 months earlier) (immunosuppression) [9].

The conditions for conducting skin-prick-tests

Conducting SPT correctly is one of the key factors determining the reliability of the diagnostic test.

SPT should be conducted:

- in special rooms, i.e. adequately equipped and lit, with access to anaphylactic shock kit and the necessary drugs to combat adverse effects;
- by an experienced and trained nurse, under the supervision of an allergist, with the use of trade-mark, standardized, non-expired, and properly stored (refrigerated at 2-8°C) sets of allergen extracts (reagents) for SPT [4,5]. Skin testing is conducted with biologically standardized extracts, which helps assess their potency in biological units (BU/mL) or allergen units (AU/mL). The reagent set for SPT is selected based on the patient's history (which helps determine the causative allergen), allergen prevalence in the patient's environment, and the known epidemiology of allergies to specific allergens. According to the Polish Society of Allergology (PTA) experts, a screening test set should include the following allergens:
  - grass and cereal pollen allergens;
  - tree pollen (birch, alder, hazel) allergens;
  - weed pollen (Artemisia) allergens;
  - house dust mite (*Dermatophagoides pteronyssinus* and *Dermatophagoides farinae*) allergens;
  - animal dandruff (dog, cat) allergens;
  - mold spore (*Cladosporium herbarum* and *Alternaria tenuis*) allergens,
  - negative control (solution of allergen-preserving diluents) and positive control (1 mg/mL histamine).

Tab. 2. Skin-prick testing procedure

The SPT procedure

1. Aseptic and antiseptic techniques must be used, and SPT must be conducted correctly to ensure reliability of this diagnostic test.
2. Prior to conducting SPT, the nurse should take the patient's history regarding his/her general condition and current medication.
3. Skin tests should be conducted on an area of normal skin (one of the two):
   - on the ventral aspect of the forearms (5 cm proximal to the wrist and 3 cm distal to the cubital fossa),
   - on the upper part of the back (scapular regions, excluding the vertebral region).
4. The test site may be cleansed with alcohol to degrease and disinfect it, and then aired until the skin is completely dry.
5. The sites where drops of individual extracts are to be placed should be clearly marked to avoid any mistakes during test application and interpretation.
6. Isolated drops of extracts of comparable size (each drop approximately 0.05 mL in volume) should be placed onto the skin 2-5 cm apart, to prevent the droplets from flowing together and distorting the results.
7. The allergens are introduced into the dermis underneath each drop by means of puncturing the epidermis with a lancet:
   - via a classic technique – with the lancet held vertically, perpendicular to the skin surface, or
   - via a modified technique – at a 30/70 degree angle, while raising the skin.
8. The lancets used to puncture the skin underneath each drop should be standardized, optimally metal, with an approximately 1-mm-long tip, which (positioned perpendicularly to the skin) ensures puncture depth of approximately 0.4 mm. Alternatively, plastic lancets with the tip length of 1.4-1.6 mm may also be used. (Neither hypodermic needles nor lancets for capillary blood sampling should be used).
9. Each reagent droplet should be punctured with a separate lancet; although wiping the lancet thoroughly to avoid transferring allergens between puncture sites is also acceptable. Used lancets must be disposed of.
10. Skin tests should be read after 15-20 minutes.
11. Allergen droplets should be gently blotted dry with a gauze swab.
12. The reading should be conducted with a transparent ruler with a millimeter scale, by measuring the longest diameters (D) and the corresponding perpendicular diameters (d) of the resulting wheals surrounded by reddened (flared) skin and calculating their mean diameters (D+d)/2 or their surface areas. The results are presented in millimeters.
13. Any puncture-site wheal with a diameter of ≥3 mm should be interpreted as a positive result.
14. A lack of visible reaction at the positive control site indicates skin insensitivity and precludes a reliable reading of the skin test.
15. A positive result at the negative control site may make test interpretation difficult due to excessive dermographism.
16. Skin test results should be recorded on the original referral sheet. The original copy of the referral sheet should be then returned to the patient, and one copy should be filed with the patient's records.
17. After the test results have been read, the patient should continue to be closely monitored for 30 minutes.
18. Any wheals resulting from the test should be treated topically, for example with 1% hydrocortisone (Fenistil) cream, to reduce itching. If needed, the doctor may order an oral antihistamine to be administered.
19. SPT may be conducted in children aged >3 years (or younger, as long as a certain degree of cooperation can be ensured to help the nurse conduct the test correctly). The lower age limit is not strictly determined.
20. The clinical interpretation of the skin test is conducted by a physician, who also considers the information from the patient's history. A negative skin test result does not exclude an existing allergic condition; a positive skin test result does not definitely prove an allergic condition [4].

Section III. Allergen-specific immunotherapy is recommended in patients with confirmed IgE-mediated mechanism of producing symptoms to a given allergen or allergens [8,11]. "Desensitization" was demonstrated to alter effector cell reactivity. This alteration takes place in mucous membranes, primarily in the respiratory system and skin. Desensitization reduces allergen-specific reactivity of mucous membranes and skin and significantly reduces the early and late phase IgE-mediated reactions induced by the given allergen. Allergen-specific immunotherapy may detectably reduce local mediators released from effector cells and decrease reactivity of circulating cells, i.e.: basophils and platelets. There can also be a reduced influx of inflammatory cells and decreased both eosinophil chemotactic activity and inflammatory mediator release. All these conditions limit ongoing inflammatory reactions, which leads to clinical improvement. [11-13] Desensitization through allergen-specific immunotherapy involves gradual induction of clinical and immunological tolerance of the allergen in the patient who is allergic to this allergen, by administering increasing doses of the allergen in the form of an allergen vaccine. This vaccine contains standardized quantities of major allergens. Allergen-specific immunotherapy should be initiated at an early stage of the disease, although this requirement has not been supported by any scientific evidence. The doctor autonomously makes the decision on the time when desensitization should be initiated (an earlier or later phase of the disease). Currently, there is evidence showing that allergen-specific immunotherapy, both sublingual and systemic, whose main aim is symptomatic treatment, also acts as a preventive measure. For example, such therapy has demonstrated a capacity for preventing asthma in allergic rhinitis patients; it also lowers the risk of developing an allergy to another allergen; additionally, after the desensitization treatment is completed, the patients remain in remission. The patient's age may be an important qualifying criterion for desensitization. Immunotherapy may be conducted in children aged >5 years. The patient should be capable of cooperating and objectively assessing his/her own condition, including reacting to any side effects of immunotherapy and interpreting them correctly [6,14,15].

Tab. 3. Mistakes in conducting skin-prick tests

Mistakes in conducting skin-prick tests
1. Placing reagent droplets too close (<2 cm), which precludes a correct reading of the test; 2. Puncturing the skin too deeply, which induces bleeding at the puncture site; 3. Puncturing the skin too superficially, which results in an insufficient penetration of the reagent into the dermis; 4. Puncturing the same droplet twice or missing a droplet; 5. Conducting the test on an altered or irritated area of the skin; 6. A reagent droplet being wiped off or flowing off the skin prior to puncture [8,9]. For the sake of comparison, the 2013 European Standards for skin prick testing recommend: • using a metal lancet, • puncturing the skin with the classic method (with the lancet perpendicular to the skin surface), • ensuring the distance of ≥2 cm between tested allergens, • reading the test by measuring only the largest diameter of the wheal [10].

Before considering initiating allergen-specific immunotherapy in any given patient, all qualifying criteria must be met. An informed consent must be obtained following an explanation of the treatment and prior to initiating immunotherapy. The detailed scope of the information to be conveyed to the patient has been presented in the European Academy of Allergy and Clinical Immunology (EAACI) guidelines. Such patient education visits should be repeated multiple times over the course of immunotherapy, as the patient is likely to forget what was being discussed prior to their consenting to treatment. Apart from oral consent, each patient is obligated to provide his/her written informed consent to undergo allergen-specific immunotherapy (patients under 16 years of age must sign their assent form together with their legal representative).

Recent years have seen widespread use of perennial immunotherapy with seasonal allergens. Desensitization usually begins after the pollination season, and maximum doses are reached quickly. In the following season the time intervals between visits are gradually increased [4,17]. After the pollination season ends, doses are gradually increased to reach the maximum dose. With the use of perennial immunotherapy, the cumulative dose of the administered allergen can be higher; this has beneficial immunological effects, which are difficult or impossible

Tab. 4. Allergen-specific immunotherapy regimens: pre-seasonal and perennial

Pre-seasonal immunotherapy	Perennial immunotherapy
This immunotherapy regimen is used only in pollen allergies and involves vaccine administration within 2–3 months prior to the expected pollination period, to reach the maximum dose prior to the pollination season. Vaccine administration is discontinued immediately prior to the time when seasonal symptoms develop. Before the subsequent season, vaccinations are started again from the lowest doses. This form of treatment has the advantage of short duration (a period of 8-12 weeks) and the disadvantage of incremental doses having to be repeated prior to every season, which may be associated with a higher risk of side effects and more frequent allergist visits. There is also a risk that maximum doses might not be reached before the pollination season starts, due to initiating the desensitization treatment too late, increased time intervals between individual vaccines, and repeating certain doses. Despite the fact that the effects of immunotherapy may be already felt by patients after the first season, there is no evidence as to any long-term and preventive effects of this treatment.	This immunotherapy regimen is used for allergens prevalent in the patient's environment irrespective of the season, e.g. dust mites and animal allergens. Immunotherapy may be initiated at any time, and following the incremental-dose phase, the subsequent maintenance doses are administered in longer time intervals, i.e. 4-6 weeks apart. This allergen-specific immunotherapy regimen is continued for 3-5 years [16].

to achieve with a pre-seasonal regimen. Perennial immunotherapy seems to be more effective. Moreover, it poses a lower risk, as the maximum (maintenance) dose is reached only once (instead of multiple times), and it is the process of reaching the maximum dose that is characterized by the highest risk of developing side effects [16].

There are three types of allergen vaccines available in Poland, two of which can be used in specific immunotherapy: unmodified vaccines (which are not used in subcutaneous immunotherapy; instead they are only used in sublingual immunotherapy and immunotherapy with insect venom) and modified vaccines, containing allergens that are carrier-bound to achieve extended release of its allergens from the extract. The carrier-bound vaccines approved in Poland contain a carrier in the form of aluminum hydroxide (Novo-Helisen Depot, Alutard SQ) or tyrosine. Allergoid vaccines contain chemically modified allergens. This modification involves exposing the allergen extract to aldehyde, which causes allergen polymerization, alters their 3-dimensional structure, and reduces the number of B-cell epitopes, without affecting T-cell epitopes. The allergoid vaccines approved in Poland are modified with formaldehyde (Allergovit, Purethal) or glutaraldehyde (Pollinex) [10].

The vaccination schedule begins with the initial, incremental-dose phase, which involves regular administration of gradually increasing doses of the allergen extract (increasing doses of the allergen) until reaching the maintenance dose, which exerts the desired immunological effect. During the initial, incremental-dose phase, the patient returns for vaccination visits every 7–14 days; during the second phase, the patient receives maintenance doses every 4–6 weeks. The dose used during the maintenance phase should be optimal, i.e. the maximum tolerated dose that does not induce complications. In Europe, vaccine manufacturers establish the maintenance dose based on clinical trial results. However, allergists may modify this dose in individual cases [4,11]. Vaccine injections should be administered by an allergy specialist or an allergy nurse under physician supervision, and under conditions that ensure patient safety [5,7].

Tab. 5. Contraindications for allergen-specific immunotherapy [18,19]

Contraindications for allergen-specific immunotherapy
A lack of informed consent and lack of patient cooperation;
Autoimmune, neoplastic, or uncontrolled cardiovascular (hypertension, unstable coronary heart disease) comorbidities;
Necessity of using beta-blockers;
Pregnancy (immunotherapy should not be initiated during pregnancy);
Age under 5 years;
Severe allergic condition (e.g.: asthma with FEV 1 <70% of predicted normal value);
Severe atopic dermatitis [18-20].

Tab. 6. General recommendations on the safety of immunotherapy

Prior to immunotherapy	During immunotherapy
Verify the patient's name (against the patient's records); Minors should be always accompanied by an adult (mother, father), any other person should have a written authorization from a legal guardian; this authorization should be enclosed with the patient's records; Assess the patient's general condition and well-being; Ask the patient about the extent of reaction to the previous vaccine (whether or not there was local reaction i.e., redness, swelling, itching at the injection site or vaccination-associated symptoms of rhinitis or asthma); Ask the patient about any allergy symptoms; Ask the patient about exposure to the allergen; Ask the patient about any recent vaccinations with other vaccines; Check for viral diseases (labial herpes) that could compromise immunity; Ask about any drugs recently prescribed by another doctor (cardiologist, ophthalmologist); Check the previous dose in the patient's records and order the present one; Record the present dose in the patient's records: (past medical history, personal immunotherapy card); Check the labeling on the allergen extract vial (family name, first name, batch number, and expiration date); Prior to drawing the vaccine from the vial, gently shake the vial (to mix its contents); Inject the vaccine deep, subcutaneously, into the outer arm halfway between the shoulder and elbow, into the groove between the deltoid and triceps muscle, making sure that the needle is not inside a blood vessel; if blood is aspirated, withdraw the needle and discard the syringe; draw a new dose of the vaccine from a vial into a new syringe and make another attempt at injection a new site. The patient should not rub the injection site to avoid accelerating absorption of the allergen extract. Following vaccine administration, the patient should remain in the outpatient clinic for 30 minutes, advised to immediately report any side effects. After 30 minutes, re-assess the injection site for any injection-site reaction; if there is no injection-site reaction, the patient may leave the clinic; if there is, enter this fact into the patient's medical records. [21]	Patients should avoid physical exertion and long hot baths; Patients must not consume alcohol (including beer, wine, vodka, champagne); Patients suffering from asthma should additionally carry an inhaler with a bronchodilator; Foods that may exhibit cross-reactivity with the inhalant allergens relevant to the given patient should be eliminated from the patient's diet (for birch pollen allergy these foods include apples, pears, plums, peaches, apricots, kiwi, carrots, celery roots, tomatoes, nuts, and fresh fruit and vegetable juices; for grass pollen allergy these foods include melons, kiwis, green peas, potatoes, celery roots, tomatoes, flour, peanuts; for Artemisia pollen these foods include carrots, celery roots, chamomile, spices (anise, black pepper, coriander); for dust mite allergens these foods include escargots, crabs, lobsters, shrimp (seafood)); On the vaccination day, the patient should minimize ingesting foods rich in histamine, biogenic amines, and "histamine liberators" e.g., cheese, eggs, cure meats, fish (tuna, herring, sardines, canned fish), cocoa, chocolate, canned fruit and vegetables, sauerkraut, tomatoes, strawberries, coffee, tea; In case of a local, injection-site reaction, the wheal should be measured, and the allergist should be informed about its diameter at the next visit;

Tab. 7. Management of side effects

Treatment options in case of injection-site reactions	Treatment options in case of systemic reactions
• Applying an ice pack to the injection site for 5 minutes • Applying 1% hydrocortisone ointment onto the site • Administering an antihistamine drug at the doctor's discretion [21]	• Minimizing allergen penetration (by applying a tourniquet proximal to the injection site) • Laying the patient flat, with the feet raised • Securing a venous access • Administering oxygen via a mask or nasal cannula • Monitoring blood pressure, pulse, respiratory rate, and oxygen saturation • Calling a resuscitation team [5,10,11,22]

A systemic anaphylactic reaction following administration of an allergen-specific immunotherapy vaccine is a life-threatening condition and requires immediate treatment by any suitable means [6,7,22].

Section III. Records kept by an allergy nurse

Each entry into the patient's records should indicate the person making the entry. The healthcare provider, including a physician referring the patient for further assessments, a consultation, or hospital admission should be identified by the following data: full name, professional title, specialty, license number (in the case of physicians, nurses and midwives), and signature. The records kept at allergy outpatient clinics include: individual patients' medical records (internal documents – past medical history, authorization statement for the collection of data and documents, a card listing immunotherapy regimen records, informed consent for immunotherapy; external documents – issued to the patient: referral slip for skin prick testing, patch testing, spirometry, lab tests, immunotherapy diary, patient information on immunotherapy and skin testing) and collective medical records (these contain information on all allergy clinic patients and include admission register, procedure register, and diagnostic assessment register). Providing healthcare often requires obtaining the patient's informed consent for undergoing a diagnostic assessment, procedure, or treatment administration. The patient should be informed of the purpose, type, course, risks, and possible complications of a given procedure. The subsequent giving of his/her consent, understandably, does not mean that the patient accepts doctors' or nurses' mistakes resulting from inattention or carelessness in performing their duties. Patient's consent to receive healthcare must be expressed in a written form, pursuant to Ustawa o prawach pacjenta i Rzeczniku Praw Pacjenta [the Act on patients' rights and the Commissioner for Patients' Rights] of November 6, 2008. A medical assessment or procedure may be conducted without a written consent only in situations where the patient, who is at risk of death or severe bodily harm, requires immediate medical intervention (due to his/her condition or age) but is uncommunicative and neither his/her legal representative nor guardian can be reached. In such cases, the decision to perform the intervention is made by two doctors and the patient's legal representative, guardian, or guardianship court is notified immediately afterwards.

CONCLUSIONS

Due to a lack the relevant administrative or legal regulations for allergy nursing, this specialty needs creating a theoretical foundation, on the basis of which local and systemic protocols could be introduced. This paper is an attempt to systematize selected aspects of allergy nursing and we recommend our book (based on which this article was created).

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