ALLERGY IN GENERAL PRACTICE AND AS A SPECIALITY IN DERMATOLOGY*

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To understand the importance of allergic reactions in general pathological processes, it is necessary to know their components. The allergic organism differs from the normal organism in that it has developed an antigen to a certain substance which has penetrated into the body. This substance may have been brought into the body either artificially or traumatically, e. g. by injection, by absorption of chemical substances through the skin or the mucous membranes of the respiratory or alimentary tract, or it may have got into the body as infectious agent, as it may be the case in chronic infections, in certain virus infections or in fungus infections. After renewed contact with the respective substance, the sensitized body will react to it according to the qualities of the antigen, e. g. with either hyperergic reactions such as asthma, eczema, urticaria, or with immunity. These two types of reactions cannot be distinguished from each other, as in both cases a specific antibody reacts to a respective antigen.

In the following I will only speak of the hyperergic processes and not include the immunity reactions. The doctor is mostly interested in those hyperergic processes which are accompanied by rapidly developing, acute symptoms, while the reactions of the delayed type have been investigated less systematically. It is these anaphylactic symptoms which are most important to the general practitioner because of their often life threatening character.

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As already mentioned, the mechanism of the anaphylactic reaction consists in the meeting of an antigen with a specific antibody, produced through a former contact with the respective substance. The various substances may act as antigens :

Drugs : such as Penicillin, Sulfonamides, Blood serum etc.,

Animal substances : such as the white of eggs or other proteins,

Vegetable substances : such as Cotton seed oil, Pollen, Soya oil,

Chemicals : such as Formalin, Chromium, Nickel, Mercury etc.

The antibody, which is produced, is to be found in the gamma-globuline-fraction. We distinguish two kinds of antibodies, the cell-bound ones and the ones to be found in the blood serum. The antibodies have protein character and as such seem to be of various sizes, which may explain the fact that for the various antibodies one has to use quite different methods of detection, e. g. the Prausnitz–Kustner reaction for the transmission of the so called reagines in the serum, the Agar Gel Diffusion method, the precipitation test, the complement fixation test, the Coombstest etc. For the moment the allergic reaction of the immediate type may be reproduced theoretically as follows :

The anitgen combines with the specific antibody, which is believed to be localized in the cell walls. Thus a complex is formed, which brings about an alteration in the formation of the cell walls. Consequently the cell walls become more permeable for water and water soluble substances. Water now penetrates into the cells, while pharmacodynamically active substances (such as histamine, acetyl choline, heparine, serotonine, the slow reacting substance, the bradykinine) and other not yet identified substances escape. On the one side this fluid exchange produces an oedema of the antibody containing cells, manifesting itself e. g. in eczema. On the other side, the pharmacological effects of the escaped substances act on the whole organism, giving rise to various symptoms, e. g. increased secretion of gastric juice, disturbances in blood coagulation, changes in the autonomic nervous system, asthma etc.

From these theoretic conceptions may be deduced, that the allergic reaction very rarely affects only one body organ, but manifests itself on the whole organism, which is the reason for the fact that allergology has to deal with the whole body and may not be restricted to a single organ.

After this theoretical introduction, I wish to enter into a few practical problems of allergy research :

1) Bronchial asthma
2) Hypersensitivity to penicilline
3) Dermatological problems

1. Bronchial asthma

That dermatologists occupy themselves with bronchial asthma has a special reason, namely that the generalized neurodermatitis or the atopic dermatitis is in many cases combined with asthma. Asthma plays an important role in practical medicine, as a great part of the population suffers from this disease, the number of affected people varying greatly from country to country and occupation to occupation. The incidence of asthma in Middle Europe amounts to 0.5%. Bakers suffer in approximately 10–15% of asthma, in certain regions of America 90% of the population suffer from asthma during the summer.

Our investigations, carried out on hundreds of patients, have led us to the following conclusions:

(a) Asthma starts more often in childhood and youth than in grown-up life. It is very interesting that twice as many boys are affected than girls.

(b) The search for allergens by means of skin tests, exposure and elimination shows that the allergic asthma is the most common type in children and young people, whereas in grown-ups, whose first asthma attack occurred after the twenty-fifth year, other causes, such as chronic infectious bronchitis, psychogenic influences, disturbances of the autonomic nervous system, are more often responsible.

(c) The most frequent cause of allergic asthma in Middle Europe is house dust, then pollen. In approximately 10% only occupational allergens are responsible.

(d) The antigenic property of dust varies in different dust specimens. It is most frequently found in samples from mattresses, blankets, less frequently in carpets and housedust from other sources. It is missing from the house dust in the asthma free mountain regions.

(e) The dust allergen is not identical with the material the mattresses are made of, e. g. feathers, kapok, horse hair, cotton wool, as all these substances yield negative results in the skin tests. It does not correspond to moulds, either. On the other hand, relations seem to exist between mould products and the house dust allergen, as chemical and biological investigations have shown.

The allergic asthma now is the ideal case for a specific desensitization, as the dust allergen, like the pollen, is easily brought into a watery solution, which may be administered in exact doses. 70% of allergic asthma may be cured with this method, in children the results are even better. For children under ten years, we use an oral desensitization with house dust extracts. Children allergic to pollen we desensitisize with honey.

2. The allergy to Penicilline

Besides the increasing resistence of bacteria to penicilline, the allergy to this antibiotic constitutes a reason for the more and more frequent use of broad

spectre antibiotics, e. g. Tetracycline or Chloramphenicol. According to American statistics, approximately 5% of the population are allergic to penicilline. Deaths or long lasting illnesses due to hypersensitivity reactions to penicilline are reported again and again. At our clinic, we continually see quite severe cases of penicilline urticaria, which seem to be more frequent in our region than elsewhere, for reasons which cannot be explained.

The clinical picture of the allergy to penicilline will be known to you all. We distinguish 3 types.

(1) The eczema type through external contact with penicilline ointment, spray or lozenges containing penicilline.

(2) The urticaria type with the local Arthus phenomenon.

(3) The type ressembling the serum sickness with involvement of the skin, the mucous membranes, the joints and occasionally even the kidneys, with high temperatures and shock symptoms.

Early in the Penicillin era already was observed that a special kind of hypersensitivity to penicilline exists, namely the eruption of dysidrosis-like vesicles on the hands, as they are often seen in hypersensitivity reactions to epidermophytes. This may suggest that the penicilline as a product derived from the mould fungus Penicllium notatum has an allergen in common with other mould fungi. Our investigations have given us a few hints that this theory may be right.

(1) In the first place statistical investigations have shown that the number of allergies to penicilline goes parallel with the grade of activity of mycoses: More allergies are seen during the warm season, as the fungus infections are most active during the summer and the patients have to consult the dermatologist for it.

(2) In experiments on guinea pigs by means of the Schultz-Dale method cross sensitization has been found between trichophytine, a mould fungus extract, between yeast extracts and between house dust extracts.

(3) The examination for fungous infections of patients allergic to penicilline has shown that these patients suffer 5 time more often from mycoses than patients without any hypersensitivity to penicilline. We must conceive the mechanism of sensitization to penicilline thus that the fungus infection sensitizes the body on a low threshold against penicilline and other fungus products, and that then the sensitization manifests itself when large doses of similar allergens are brought into the body. That this process takes about 10 days, corresponds to the general time of sensitization to any strong allergen.

3. The usefulness of patch tests.

The usefulness of patch tests in dermatologic practice is undeniable, provided that the technique is correct and carried out with the proper substances. I wish

to point here to 2 problems, which have been solved by the systematic application of patch-tests;

(a) By means of the patch tests one has been able several times to find allergens in complex substances, whose presence was not suspected. So it could be proved that cement contains chromium and that the cement eczema constitutes in fact a hypersensitivity to chromium.

When about 10 years ago the synthetic detergents were introduced, it struck us that eczema seemed to increase considerably. The patch tests showed that many housewives who came to us for testing of soaps and detergents were also allergic to nickel and chromium. Even clinically an increase of eczema due to nickel was obvious. The analysis of those synthetic detergents then demonstrated that as a result of the chemical synthesis of polyphosphates traces of nickel and chromium are present in the synthetic detergents.

(b) A further important use for patch tests is the elimination of hypersensitive people working in factories with strong allergens. So we had to test for example the workers in a chemical factory producing synthetic resin, as it was noted that many of the workers suffered increosingly from eczema. It resulted that especially the hardening substance acted as strong allergen and that not all workers reacted with eczema to this substance, but only those who were allergic to other substances, too, which means that constitutional allergics were more sensitiv to it. It was a very interesting fact that the duration of contact had no influence. We succeeded in diminishing the cases of eczema due to this hardener by the following measures:

(1) Through better ventilation of the rooms in which the men worked with responsible substance.

(2) Through prophylactic testing of newly employed workers. Persons who already previously had suffered from eczema or who yielded positive results to 10 routine substances, known as common allergens such as local anaesthetics, mercury, nickel, chromium, terpentine, formaline etc.—were not employed in the respective Department.

These 3 examples will show you the importance of a thorough investigation of allergological problems. It will not only throw light on theoretical hypotheses, but also give practical hints. Allergology is still in its beginnings, but it is growing more and more important, as through the increasing consumption of powerful drugs and active chemical substances people are more exposed to allergies in daily life.