SOME ASPECTS OF THE PATHOGENESIS OF ALLERGIES IN HYPERTENSIVE PREGNANCY SYNDROME

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Abstract*. In the pathogenesis of cell damage in hypertensive conditions of pregnant women, there are significant allergic reactions and anaphylactic cytotoxicity. Two variants of allergy have been established for hypertension of pregnant women: a clear clinical picture of allergy; latent (latent) sensitization. It was revealed that with hypertension of pregnant women, allergic diseases are more common in repeatedly and multiparous women. It has been determined that with a combination of allergy and hypertension, a more severe clinical course is more often observed. improving the quality of early diagnosis, treatment and prevention.*

Keywords*: hypertensive conditions during pregnancy; preeclampsia; eclampsia; allergy; sensitization.*

Introduction

Preeclampsia of pregnant women continues to be one of the urgent problems of modern medicine. They complicate the outcome of pregnancy and childbirth, are one of the causes of maternal and perinatal morbidity and mortality. Preeclampsia is especially difficult in pregnant women permanently residing in ecologically unfavorable regions. [1] According to world statistics, every year about half a million women die from causes associated with pregnancy and childbirth. [2,3]

According to [7, 10], in 1999–2004 in the United States, about 1–4% of women aged 18–29 years and about 5–15% of women aged 30–39 years suffered from chronic arterial hypertension. Along with this, in 2004, compared with 1998, the number of complications in the course of pregnancy caused by pre-existing arterial hypertension increased by 50% and reached 1.7% of the total number of complications [10]. At the same time, the number of preterm births and newborns with low gestational age weight, as well as perinatal mortality rates in such pregnant women were 2–3 times higher than in normotensive women. [7,8,10]

The incidence of gestational hypertension increased from 10.7 to 30.6 per 1000 births, and 17% of pregnant women with gestational hypertension subsequently developed preeclampsia [9, 10]. However, it should be added that maternal risks associated with gestational hypertension, as a rule, are less than 2 times compared with those in women suffering from chronic arterial hypertension or moderate preeclampsia.

According to the WHO, in the structure of maternal mortality, the share of hypertensive syndrome is 20-30%, annually around the world more than 50 thousand women die during pregnancy due to complications associated with arterial hypertension in the mother. Arterial hypertension increases the risk of abruption of a normally located placenta, massive coagulopathic bleeding as a result of placental abruption, and can also cause eclampsia, cerebrovascular accident, retinal detachment [11].

The incidence of preeclampsia differs in different countries and depends to a large extent on the criteria used for its diagnosis. Although the problem of preeclampsia has been studied from different perspectives, many of its aspects remain poorly understood. [4] Among them, in our

opinion, the question of the influence of allergy, or rather the allergic reactivity of the organism, in the etiology, pathogenesis, clinic of preeclampsia and its complications is of no small importance. [5,7,8]

The prevalence of hypertensive conditions during pregnancy is 7–30%. This pathology worsens the prognosis in the mother and children, and is also the main cause of perinatal mortality. With arterial hypertension, complications develop, such as placental insufficiency, premature detachment of a normally located placenta, eclampsia, cerebral hemorrhage, acute heart failure, acute renal failure, disseminated intravascular coagulation syndrome [6].

The introduction of specific, clinical and allergological examinations of pregnant women with preeclampsia into the complex of clinical and laboratory studies: collecting an allergic history, clinical and functional studies, setting allergic tests in vitro (test of indirect degranulation of mast cells, an indicator of neutrophil damage, determination of the functional activity of neutrophils by methods of restoring tetrazolium dye and phagocytosis) will contribute to the early detection of the presence of allergic diseases in pregnant women, which is of great diagnostic, therapeutic and prophylactic importance.

The study of regional features of the prevalence of pre-eclampsia of pregnant women in different regions of Uzbekistan using the method of epidemiological studies under the international ISAAC program allows us to clarify the true incidence of the population [3].

Purpose of the study

To determine the allergic reactivity of the organism of pregnant women suffering from hypertensive disorders and, on the basis of the allergological concept, to develop practical recommendations that improve the quality of early diagnosis of this serious ailment. To determine the significance of the combination of allergy with hypertensive conditions in pregnant women. Using tests of indirect degranulation of mast cells and allergic alteration of neutrophils, to determine the role of regional pollen factors in the development of immediate allergy in the pathogenesis of cell damage in preeclampsia of pregnancy.

Material and methods

168 persons were under observation, including pregnant women with an obvious clinical allergy, uncomplicated preeclampsia (30), pregnant women with a mild degree of preeclampsia, having latent sensitization (30), pregnant women with preeclampsia in combination with an obvious clinical allergy (30), conditionally healthy pregnant women (30) - control number 1, practically healthy non-pregnant women (23) - control number 2, practically healthy men (25) - control number 3. The age of pregnant women ranged from 17 to 39 years. The age of non-pregnant women and practically healthy men is 20-35 years. We studied pregnant women in the gestation period from 19 weeks to 40 weeks of pregnancy. Among them, primary pregnant women -42 (35%); re-pregnant 44 (36.7%); multiparous 34 (28.3%).

Among the allergic diseases in the studied pregnant women there were: allergic rhinitis, sinusitis, conjunctivitis-24 (20%); urticaria, Quincke's edema, neurodermatitis-15 (12.5%); drug allergy 8 (6.7%); food allergy 6 (5%); bronchial asthma 6 (5%); anaphylactic shock 1 (0.8%).

The obtained research results in all pregnant women with allergic diseases were approximately the same. The numerical differences between the indicators were not significant. Therefore, we have combined them into one group: pregnant women with hypertension combined with an obvious clinical picture of allergic diseases.

The following standard non-infectious regional allergens were used: pollen (wormwood, quinoa, plane tree, kenaf, ailanthus), household (house dust), epidermal (hair of cats, dogs, feathers of birds). Tissue allergens (placenta, kidney) were prepared in a generally known manner. The following methods were used in their studies: clinical and allergic examination of patients, general blood, urine, feces tests, indirect degranulation test of mast cells, neutrophil alteration test.

Allergy in the examined women manifested itself in the form of allergic rhinoconjunctivitis, allergic dermatoses and even anaphylactic reactions. In those cases when pollen allergens were important in the etiology of allergy, a clear seasonality of the disease was observed (mainly in spring and summer). When sensitized by household and epidermal allergens, the seasonality of the disease was not observed. When sensitizing to food allergens, the patients indicated a connection between the exacerbation of the symptoms of the disease with the intake of certain food products. With the elimination of causally significant food products, remission of the disease was observed. Specific diagnostics of allergies was carried out on the basis of a comprehensive clinical and allergic examination of patients, as well as the setting of allergic tests in vitro. The complex principle of specific diagnostics favorably differs in that it allows detecting specific allergic antibodies, establishes the specificity of sensitization of the body to a particular allergen, and conducts differential diagnostics. Allergic history was collected on the basis of a specially designed questionnaire. Allergic test for indirect degranulation of mast cells (tDTC) was performed according to generally accepted methods. Anti-tissue antibodies were determined by a conventional photometric method. Phagocytic activity of peripheral blood neutrophils of patients was determined according to A. Shtelzner. Allergic neutrophil alteration test was performed according to V.A. Fradkin. To determine the functional activity of neutrophils, the tetrazolium dye reduction test (NBT-test) was used.

Result and discussion

In all control groups examined (conditionally healthy pregnant women, practically healthy non-pregnant women and practically healthy men), the frequency of positive reactions to the tested pollen, household and epidermal allergens was below 10% and ranged from 4.4 + 0.2 - 3, 6 + 0.23. These indicators are non-specific and indicate the absence of sensitization of the body, since there are no specific IgE in the blood serum of the examined.

In all pregnant women with an obvious clinical picture of allergy, complicated or uncomplicated preeclampsia, as well as in pregnant women with preeclampsia with latent sensitization, the values of mast cell degranulation in comparison with controls were significantly higher by 4.5-8.6 times and were within 30.2 + 0.92 - 38.0 + 0.44 ($p < 0.05$)

In general, among 90 examined pregnant women, positive reactions of indirect mast cell degranulation were observed in 204 cases, including pollen allergens - in 115 (56.4 ± 3.4%), household (house dust) - in 50 (34.5 ± 4.9%), epidermal - in 39 (19.1 ± 2.7%).

The degree of mast cell degranulation in the majority of pregnant women (92.1 ± 3.8 - 94.5 ± 10.1%) with an obvious clinical allergy, regardless of the presence or absence of preeclampsia, was expressed by ++ and +++, while as in the majority of pregnant women with preeclampsia (91.7 ± 7.9%), with latent sensitization, the degree of mast cell degranulation was weak (+).

In the overwhelming majority of pregnant women with a clear allergy clinic, cases of combined polysensitization prevailed, that is, simultaneous hypersensitivity to several unrelated allergens, for example, pollen + household, pollen + epidermal, etc. In pregnant women with latent sensitization, only monosensitization to one or another allergen was observed. Indicators of

neutrophil damage in conventionally healthy pregnant women (control 1) and practically healthy non-pregnant women (control 2) were in the range of 0.019 ± 0.001 - 0.002 ± 0.001 (when using placental antigen) and 0.035 ± 0.003 - 0.04 ± 0.002 (when using renal antigen). The difference between the digital data of these two control groups is unreliable (p> 0.05). This fact indicates that in the examined control groups of women, the blood serum contains a minimum amount of anti-tissue antibodies. However, these antibodies do not cause serious tissue damage. In pregnant women with obvious allergies, uncomplicated preeclampsia, there was an increase in the neutrophil damage index up to 0.04 ± 0.003 - 0.10 ± 0.03, which is 2-2.5 times more than the control values (p <0.05). In pregnant women with preeclampsia, the indicators of neutrophil damage are also 3-4 times higher than in pregnant women with latent sensitization (0.08 ± 0.004 - 0.13 ± 0.004), and in pregnant women with obvious allergies - 4-5 times (0 , 10 ± 0.002 - 0.19 ± 0.004). These facts indicate the development of autosensitization of the body of pregnant women, complicated by preeclampsia to the tissues of the placenta and kidneys.

First of all, we were interested in the question of the presence of an immediate allergy. To clarify this issue, we used a methodological technique that allows detecting specific allergic antibodies belonging to the IgE class. All pregnant women with allergies, regardless of the presence or absence of symptoms of hypertension, had specific allergic antibodies to the tested allergens in the blood serum. The frequency of positive reactions to the studied allergens in pregnant women with allergies without hypertension and in pregnant women with allergies combined with hypertension was approximately the same, respectively, 15.5-73.0 and 25.6-80.0%. The frequency of positive reactions in pregnant women with latent sensitization combined with hypertension to pollen allergens was 8.6%, domestic - 13.3%, epidermal - 6.7 (on average, 0.6 ± 2.0). The results of studies of this category of patients indicate that in pregnant women with latent (latent) sensitization, the titer of allergic antibodies, in comparison with pregnant women with an explicit allergy clinic, is significantly lower (p <0 05).

However, they are all potential allergy sufferers, that is, allergy symptoms can appear at any time. In addition, these data allow us to conclude that the presence of hypertension cannot serve as an obstacle to the synthesis of specific allergic antibodies in patients.

In our opinion, in hypertensive conditions of pregnant women, there is no inhibition of the functional activity of immunocompetent cells responsible for the synthesis of specific allergic antibodies. This is evidenced by the absence of a difference in the frequency of positive reactions of indirect mast cell degranulation in two groups of pregnant women with a clear clinical picture of allergy: combined and not combined with hypertension, as well as positive reactions in pregnant women with latent sensitization combined with hypertension.

In the process of the formation and development of allergic reactivity of the body, inhibition of the functional activity of neutrophilic leukocytes is noted, which negatively affects the factors of cellular nonspecific protection of the body (i.e., the phagocytic activity of leukocytes, phagocytic number, phagocytic index, phagocytosis force decreases).

Allergy in most cases is characterized by the development of polysensitization. In this regard, it was of some interest to analyze our data from these positions. In the literature, polysensitization means the presence of hypersensitivity in the same patient to two or more types of allergens. From our point of view, "the degree of development of an allergy clinic depends on the nature, nature and types of allergens. In this regard, depending on the nature of allergens, the following variants of polysensitization should be distinguished: 1) true - when one organism is simultaneously sensitized to two or more related allergens : only pollen, or only household, or only epidermal, etc.; 2) combined - when one organism is

sensitized to two or more non-infectious allergens of different nature: pollen and household, pollen and epidermal, etc.; 3) mixed - when one organism is simultaneously sensitized to two or more allergens of non-infectious and infectious nature. According to our data, in pregnant women with an obvious clinical picture of allergy, regardless of the presence or absence of hypertension, cases of true and combined polysensitization prevailed: 93.3% and 76, respectively, 7% A similar picture was also observed in patients with latent sensitization - 90.0%.

There are at least two variants of allergy in hypertensive conditions of pregnant women: an obvious clinical manifestation of allergic diseases and latent (latent) sensitization of the body without clinical manifestations of allergic diseases.

Clinical forms of allergy manifestations are diverse: hay fever, allergic rhinitis and sinusitis, allergic dermatitis, bronchial asthma, anaphylactic shock. Hypertensive conditions combined with allergies are more common in repeatedly and multiparous women.

When hypertensive conditions are combined with allergies, cases with a more severe clinical course of the underlying disease prevail, induced, premature and delayed births are more common, and surgical interventions are also more often used.

In the etiology of allergies in pregnant women with gestosis, exogenous non-infectious allergens are essential. In the pathogenesis of cell damage during gestosis of pregnant women, there is a complex combination of mechanisms of allergy of immediate (chimergic) and delayed (cellular) types.

Thus, the studies carried out allow us to come to the following generalizations - preeclampsia often occurs and develops against the background of an allergic altered reactivity of the body. It can be assumed that the severity of the clinical course of preeclampsia and its complications depend on the presence of a latent or overt allergy. Sensitization of the body in pregnant women is confirmed by a positive reaction of indirect degranulation of mast cells, which indicates the presence of specific allergic antibodies (IgE) in the serum of the examined patients. In clinically expressed forms of allergy, sensitization of the body of pregnant women, regardless of the presence or absence of preeclampsia, is clearly polyvalent in nature. The frequency of mixed forms of polysensitization is significantly higher. With latent forms of sensitization of the body of pregnant women, only monosensitization is noted.

The introduction of specific, clinical and allergological examinations of pregnant women with hypertensive disorders into the complex of clinical and laboratory studies: collecting an allergic history, clinical and functional studies, setting allergic tests in vitro will contribute to the early detection of allergic diseases in pregnant women, which has a large diagnostic, therapeutic and prophylactic value.

Further research is needed to clarify various aspects of the pathogenesis of preeclampsia from the standpoint of modern allergology.

Conclusions

1. In the pathogenesis of cell damage in preeclampsia of pregnant women, allergic reactions of anaphylactic and cytotoxic type are of significant importance.

2. The degree of positive and sharply positive reactions of indirect mast cell degranulation in pregnant women with an obvious clinical picture of allergy complicated by preeclampsia is significantly higher than in pregnant women with preeclampsia with latent sensitization

Allergy in pregnant women is of a polyvalent nature.

4. Determination of the indices of the test for indirect degranulation of mast cells and allergic alteration of neutrophils in pregnant women complicated by preeclampsia, in combination

with other clinical and laboratory studies, makes it possible to identify the allergic state of the body, which is of great importance in improving the quality of specific diagnostics, therapy and prevention.

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