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*The care of the child with atopic dermatitis*

Atopic dermatitis (AD) is a chronic, recurrent skin condition whose main symptom is acute pruritus accompanying the skin lesions. Pathogenesis of AD is complex and multifactorial (1, 2, 3, 9, 12, 15). Genetic factors are considered to play a crucial role in the development of this disease. Literature review indicates that the risk of developing AD is 60%, if one parent or his/her family suffers from this condition. In the case when both parents have hereditary susceptibility to atopy, the risk of AD reaches 75% (1, 3, 13). Allergy on the part of mother is much more heritable than on the part of father (9). The important role in the development of AD is also ascribed to environmental factors, among which the following should be enumerated: irritants such as detergents, washing and cleaning substances; aeroallergens: dust mites, animal danders, pollens; food allergens: cow's milk, eggs, peanuts, citrus fruit, small-stone fruit, chocolate, cacao, fish, preservatives, artificial flavours; climatic factors: particularly detrimental is the influence of wind, low air humidity and high temperature of the surrounding; pollution of environment by carbon dioxide, nitric oxide, sulphur dioxide and car fumes (2, 9, 10, 11, 13).

Exacerbations of AD can also be precipitated by psychological factors. Stress has been shown to induce release of opiate peptides and significantly increase skin pruritic sensitivity to histamine (1, 2, 12). The pathogenesis of AD involves two immune mechanisms, namely type 1 allergic IgE-dependent mechanism and type 4 delayed cellular response in which lymphocytes Th2 take part (2, 3). In provoking AD relapses a significant role is played by bacterial, fungal, yeast and viral superantigens. The mechanism of superantigens involves stimulation and maintenance of skin inflammation by numerous bacterial, fungal and viral strains penetrating through damaged epidermis to deeper skin layers (2, 9).

In pathogenesis of AD a considerable role is played by dryness of skin resulting from the so-called "ectodermal defect" which is expressed by insufficient barrier function of epidermis. It leads to increased loss of water through epidermis as a consequence of the disruption in formation of corneocytes' lipid coat and disordered lipid synthesis in the corneal layer (1, 2, 3, 6, 8, 9).

Three periods can be distinguished in the course of the disease: infancy AD – affects children up to 2 years of age, childhood AD – affects children before 12 years of age, AD in adolescence and adulthood (2, 9, 13). In 60% of cases AD develops during the first year of life, and in 90% – during the first five years of life. Literature review suggests that the earlier skin lesions appear, the worse the prognosis is. This includes: longer duration of the disease, severity of inflammation, area of erythematous-exudative lesions, increased susceptibility to infection and co-occurring bronchial asthma. Bronchial asthma co-occurs more frequently in those patients whose first skin symptoms appeared before the sixth month of life (3, 13).

## CLINICAL SYMPTOMS

The disease starts suddenly, when the child is in good health, in the second or third month of life. At the beginning, the lesions are located on cheeks, later they spread to forehead, ears, extensor surface of extremities and trunk. The lesions take on the form of erythematous flares. Over the course of the disease they become prominent and take the form of oozing vesicles on erythematous base and after some time they change into blisters and crusts.

Cutaneous eruptions are accompanied by acute pruritus leading to habitual scratching and hyperactivity in the child. In older children lesions are usually located on flexor surfaces of major joints, around neck, on the dorsum of hands and feet. Within the areas of lesions, the skin is thickened, darkened, scaly, dull and prone to ruptures (1, 2, 9, 13).

The diagnosis of AD is based on criteria worked out by Hanifin and Rajka. The criteria are divided into major and minor ones. Major criteria include: pruritus, typical, distribution, chronic or chronically relapsing course and personal or family history of atopy. Minor criteria include: dryness of skin, raised IgE level, early age of onset, susceptibility to recurrent cutaneous infections, proneness to non-specific hand and foot eczema, cheilitis, recurrent conjunctivitis, ichthyosis, follicular keratosis, periorbital pallor and white dermographism. The occurrence of three or more major symptoms and three or more minor symptoms allows diagnosis of AD (1, 2, 3, 9, 10).

## CARE AND PROPHYLACTICS

The care of the child must be adjusted to individual needs and depends on the child's age and severity of the disease. Care and treatment should start from elimination of provoking factors. In early infancy, AD is most frequently connected with food allergy. Allergy is caused by inappropriate, excessive reaction of the organism to a specific diet ingredient, usually proteins of cow's milk, therefore the best relevant prophylactics is breast-feeding. Observations confirm that exclusive breast-feeding during the first year of life provides the infant with the best protection from allergy or significantly delays and reduces its symptoms. Breast-feeding is strongly indicated for children with positive family history of atopy (1, 2, 5, 9).

It should be noted that mother's milk is the source of immune agents such as immune peptides and probiotics. The probiotics present in mother's milk in a natural fashion stimulate the development of probiotic bacteria found in the gastrointestinal tract and therefore they aid maintenance of desirable intestinal microflora which enhances the child's natural immunity (2).

In the case when the symptoms of AD occur in the child despite breast-feeding, introducing eliminatory diet for mother is necessary. Products known to be potent allergens should be excluded from the diet, namely: cow's milk and its products, veal, beef, eggs, fish, peanuts, cacao, soybeans, citrus fruit and strawberries. Food containing preservatives and artificial flavours is also contraindicated.

When introduced to the diet in children who are not breast-fed, these products can significantly exacerbate the existing cutaneous symptoms. In this case, it is also necessary to follow the diet with exclusion of the products which are responsible for precipitating cutaneous symptoms. The composition of the diet should be established on the basis of the thoroughly conducted interview and prick tests (10, 11). Optimal eliminatory diet for the child contains such products as: milk replacements (e.g. Nutramigen), rice pap, corn gruel and neutral liquids. The diet should also include: potatoes, rice, corn bread, rabbit meat. The kind of food that is provided as a part of treatment strictly depends on the child's developmental period. This way of feeding is to be continued until the improvement in the child's clinical state is achieved.

Allergy is usually induced by a limited number of foods. Therefore, in order not to restrict the diet unnecessarily, it should be gradually extended by single products in the way which allows monitoring

the child's cutaneous reactions to them. Each new food should be given in small amounts, separately, with a break of several days due to the delayed immune response involved in the mechanism of inducing cutaneous pathology (2, 4).

If exacerbation of the skin condition does not occur after introducing a new food, it can be considered safe and remain in the diet. Observing these principles allows establishing an individualized diet. It is worth noticing that appropriately chosen eliminatory diet can result in almost completely clearing of the skin. It is also recommended that the diet should be verified periodically since the child may gain tolerance to certain foods over time. This allows preventing possible undernutrition or vitamins deficiencies which pose serious hazards for the developing organism. Such tests should be done for each product that was once eliminated from the diet.

In the care provided for the child, the appropriate skin care is crucial, namely moisturizing, lubricating, supplementing natural lipid coat and avoiding irritants. Dryness of skin is associated with the dysfunction of epidermis as a protective barrier. It is the characteristic feature of AD which is particularly intense in winter. The cause of this symptom can be contributed to, among others, disordered metabolism of fatty acids in damaged corneal layer, and lipid and ceramide deficiencies in the skin (13). Corneal layer loses elasticity, its cells contract and move away from each other, which renders skin scaly, rough, dull, reddened and prone to disruption (8). Therefore, using common soaps for everyday hygiene is contraindicated. They have alkaline pH and contain many irritants in their composition. Recommended products should have neutral or mildly acidic pH, should be scentless, additives-free and possess softening properties for skin. In everyday skin care, tap water should be avoided because the chlorine that it contains irritates skin and can exacerbate lesions. It is recommended to wash the child in pre-boiled water with addition of starch.

In AD positive effects are observed for baths with addition of emollients. These products are made on the basis of natural oils, have antipruritic and moisturizing properties, and soften water. Emollients build up a protective layer on skin consisting of substances similar to natural lipids. Additionally, they can increase the permeability of epidermis for therapeutic agents applied topically as creams, emulsions or ointments.

Emollient baths combined with moisturizing have the fundamental significance for the skin care in AD. The temperature of the bath water should be 36°C. It has been proved that cool water has softening effect on irritated skin. Optimal time for the bath should not exceed 10 minutes. The bath is a simple therapeutic procedure for the child; it relieves itching, reduces inflammation and removes pathogenic bacteria (*Staphylococcus aureus*) from the surface of skin. Such bath should be taken two or three times a week.

Following bath, the child's skin should be dried very gently with a soft towel, through touching rather than rubbing, so that the skin could remain slightly moist. Moisturizing to be effective, necessarily requires application of moisturizing and lubricating emollients in the form of ointments, creams, emulsions, lotions or magisteries, e.g. cholesterol ointment (2, 6, 9). Particular attention is required in the care for visible areas of the child's body, such as face and hands, since they have direct contact with external environment. Therefore, it is necessary to lubricate these body areas several times a day.

In the care of the child with AD it is crucial to cure, even the smallest foci of skin infections because bacterial (*Staphylococcus aureus*) and fungal (*Pityrosporum ovale*) superantigens considerably increase the activity of lymphocytes T and other cells taking part in inflammatory reactions (2, 9, 13). In periods when skin lesions exacerbate, administration of antihistamine drugs is necessary. These medication agents are essential for treatment of the acute phase of inflammation because they reduce exudate and tighten blood vessels which diminishes erythema and relieves pruritus. General treatment should be complemented by topical drugs. Most frequently corticosteroids, sometimes with addition of antiseptics, are applied to lesional skin. For exudative lesions lotions and creams are recommended.

Ointments are most effective for chronic conditions when the skin is scaly and dry. The majority of these drugs are applied once or twice a day because of their long-term action potential and possibility of the occurrence of local side-effects when used frequently. Potent corticosteroids can cause thinning of the skin, striae, teleangiectasiae or depigmentation (3, 4, 7, 13, 15).

Another problem in the care of the child with AD is habitual scratching resulting from chronic pruritus. Therefore, frequently cutting nails for the child is necessary. This is of considerable significance in preventing skin infections. It is clear that maintenance of relatively stable temperature and humidity parameters of the surrounding as well as frequent airing rooms prevents sweating and therefore reduces pruritus in the patient. Efforts should be made to prevent the child from getting hot. The presence of the child in nicotine smoke is also forbidden since it aggravates AD symptoms. Humid rooms are also hazardous because they create conditions convenient for development of mould.

From the child's surrounding the following objects should also be eliminated: carpets, down cushions and quilts, upholstery furniture, plush toys, fur-bearing animals and birds since all of them are the source of aeroallergens. The number of dust mites can be successfully reduced by frequently wet-cleaning, using water vacuum-cleaner, or applying anti-mite agents.

Skin lesions can become aggravated after contact with wool and synthetic fabrics. The child's clothes can be made only from white, soft cotton and must be loose and comfortable. It should also be mentioned that common washing powders are generally irritating for susceptible skin, therefore soap flakes are preferable for washing, and washed clothes, bed-linen and towels should be rinsed very carefully. Another important issue in the care is protecting the child from various infections since the proneness to viral, bacterial and fungal infections often exists. Each infection can provoke exacerbation of skin lesions.

AD, being a chronic and relapsing condition, constitutes significant psychological stress both for the child and his/her close ones. Acute itching is often able to induce changes in the child's behaviour. The child may become capricious, uneasy, hyperactive and reveal sleep disturbances with frequent awakenings during the night or vigilant and light sleep. Sleep disturbances and bothersome skin symptoms are often the cause of oversensitivity to pain and reduced ability to concentration (7, 12). All of this can contribute to the child's school problems and his/her parents may have to face difficult educational challenges. Therefore, during the periods of exacerbations low doses of sedative medication can prove helpful as well as psychotherapy aimed at reducing stress severity. Stress has also an important role in precipitating symptoms in AD. On the other hand, the condition of the skin can also be viewed as the picture of the child's psychological state (2, 7, 9, 12).

In conclusion, it should be emphasized that quality of life in children with AD is related to the severity of the symptoms. The efficacy of treatment therefore, depends on elimination of provoking factors from the child's environment, applying pharmacological medication and systematic compliance with the principles of skin care in periods of both exacerbation and remission. Everyday adequate care for skin which is sensitive, susceptible to irritation and dry, should result in the improvement in its moisture, lubrication and rebuilding of damaged epidermis barrier. Appropriate care and treatment of the child with AD allows achieving and maintaining satisfactory condition of the skin in the majority of patients.

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#### SUMMARY

Atopic dermatitis (AD) is one of the most common skin conditions in children. Its course is chronic and recurrent. The main symptom of AD is acute pruritus accompanying eczematous skin lesions. Care for the atopic child is an important element of complex therapy and the essential support for the pharmacological treatment. The aim of the care of the children with AD is to eliminate irritants and reduce such symptoms as dryness of skin, itch and sleep disturbances.

#### Pielęgnacja dziecka z atopowym zapaleniem skóry

Atopowe zapalenie jest jedną z najczęstszych chorób skóry u dzieci. Schorzenie ma przewlekły i nawrotowy przebieg. Głównym objawem AZS jest nasilony świąd towarzyszący wykwitom skórny. Opieka nad dzieckiem atopowym jest ważnym elementem kompleksowego leczenia i w znacznym stopniu wspomaga wyniki leczenia farmakologicznego.