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Structural changes in the hair associated with neuroendocrine disorders

Iryna Babak¹, Orysya Syzon¹, Marianna Dashko¹, Hennadiy Astsaturov¹, Iryna Chaplyk-Chyzho¹, Iryna Vozniak¹

¹Danylo Halytsky Lviv National Medical University, Department of Dermatology, Venereology, Lviv

Introduction & Objectives: The hair texture changes and hair loss are often the first symptoms of diseases of internal organs. **The aim** - to study the changes in hair structure, which are reflected in the quality and appearance of hair, to monitor structural changes in the hair and to evaluate the impact of diseases of internal organs in patients in order to improve therapy.

Materials & Methods: Over the course of one year, 40 patients were examined who complained of excessive hair loss and 25 persons, which constituted a control group of apparently healthy people. To determine the structural changes in the root and shaft of the hair, macro- and microscopic examination was used, which was carried out on MBI-3 microscope with an AU-12 binocular attachment (600x magnification). During the examination, the root and the surface of the shaft were carefully examined for cracks or other damage.

The pyruvate and pyruvate dehydrogenase tests and antithyroid antibody titer tests were used to detect latent diabetes and autoimmune thyroiditis.

Results: With the help of the macro- and microscopy, the changes in the hair roots were found in 78% of patients, which had the shape of a hook or a rounded spear with remnants of the sheaths. The ridges and grooves, the absence of a tile pattern and cracks in the structure of the shaft were observed in 83% of cases.

The preclinical disorders of glucose tolerance were diagnosed in 20 persons, 16 patients had a high antithyroid antibody titer, it exceeded 1:80 (the norm being less than 1:20).

Pyruvate dehydrogenase hypertolerance was found in 10 patients; enzyme activity in such cases was in the range of 14.05-30.20 $\mu\text{kat/L}$ (19.41 $\pm$ 1.75 $\mu\text{kat/L}$). According to the pyruvate test at the 120th minute, impaired glucose tolerance was observed in 20 patients (8 patients with potential and 12 patients with actual impaired carbohydrate metabolism).

The patients with the detected neuroendocrine disorders were treated and supervised by an endocrinologist in order to improve their condition.

As external therapy, all patients with excessive hair loss were prescribed lotion and shampoo containing dimethylsilanediol salicylates and organic silicon. The lotion, in addition to the main active ingredient, which activated the dermal papilla, stimulated the hair follicles and improved blood circulation, contained vitamin B6, a necessary element for hair growth. The effectiveness of its action was enhanced by restoring and strengthening plant components: lily family extract and soy proteins. At the beginning of treatment, the lotion was applied using an applicator bottle daily for 4 weeks, then 3-4 times a week for two months.

To obtain a positive result and prevent an increase in hair loss, the shampoo was used, which, in addition to the main active ingredient, contained such protective components as oat lipoproteins and fruit acids to improve cellular renewal of the scalp. The shampoo was used several times a week as additional care to the lotion.

Conclusion: The effect of using lotion and shampoo with dimethylsilanediol in comprehensive treatment was obtained starting from the second month of therapy, which was confirmed by microscopic examination of the hair: hair roots were covered with sheaths, a tile pattern was observed along the entire length of the hair shaft, there were no ridges or grooves. A complete structural restoration of the hair was observed in 70% of patients.