Correction of Diffuse Alopecia in Iron Deficiency Anemia

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Abstract: Modern ideas about the causes and trigger factors, classification, clinical picture, diagnosis and new approaches to the treatment of diffuse telogen effluvium are presented. The data of a clinical study of 60 patients with diffuse telogen effluvium that developed against the background of iron deficiency anemia are presented, a comparative characteristic of monotherapy with ferrous salts and complex therapy with ferrous salts with topical application of Quilib lotion is carried out.

Keywords: diffuse telogen effluvium; Iron-deficiency anemia; deficiency of microelements, vitamins, nutrients.

I. INTRODUCTION

Diffuse telogen effluvium (DTA) is the most common cause of hair loss, manifested by the daily loss of more than 100 hairs in the telogen phase (loss). There is no single, generally accepted classification of diffuse telogen alopecia, however, it is known that telogen baldness can occur both in acute (lasts less than 6 months, and then disappears spontaneously or during therapy) and in chronic form (from 6 months to several years).) [one]. The main causes and trigger factors leading to diffuse telogen hair loss include: malnutrition (protein-calorie deficiency, deficiency of zinc, iron, vitamin D, essential fatty acids); dysfunction of the endocrine system, postpartum alopecia, the abolition of hormonal contraceptives; exogenous and endogenous intoxications (intoxication with drugs and chemicals, dermatoses of toxic, toxic-allergic and tumor origin); infectious diseases; diffuse connective tissue diseases; stress. Hair loss begins, as a rule, 2-3 months after exposure to a provoking factor. DTA can lead to uniform hair loss over the entire scalp, as well as to the formation of a bitemporal recession. Regardless of the reason that triggered DTA, changes in the hair follicles, as a rule, will proceed in the same way. The main symptom is the loss of 100 to 1000 hairs per day. The number of affected hair follicles and, consequently, the intensity of subsequent hair loss depend both on the duration and severity of the trigger factor and on the individual susceptibility of the organism.

Protein-energy malnutrition There are protein deficiency (kwashiorkor) and energy deficiency (cachexia). Kwashiorkor (it was first described in 1935 in Ghana and means in the local dialect of Ga "a disease of a child weaned immediately after birth") is a nutritional dystrophy of young children who, after stopping breastfeeding, begin to receive vegetable and vegetable food with a deficiency of certain essential amino acids and excess carbohydrates. Hair loss begins a few months after breastfeeding is stopped, hair grows back and changes color (dark hair becomes brown or mahogany, and brown hair shades can turn to blond). A change in hair color (alternation of hypopigmented and pigmented areas of the hair shaft, reflecting periods of deterioration/improvement in nutrition) in combination with local thinning of the shaft (Paul-Pincus lines) is a pathognomonic symptom for kwashiorkor and is called the "flag" symptom. Cachexia (Greek: kachexia - kakos "bad" + hexis "condition") is a terminal condition that complicates a number of diseases and often leads to the death of the patient. Cachexia can be established in the following cases: with low body weight (less than 70% of ideal) or body mass index (BMI) less than 16–17 kg/m2; documented decrease in body weight by more than 7.5-10% of the original. Due to a decrease in the mitotic activity of matrix cells during cachexia, hair growth slows down, hair shafts become thinner and hypopigmented, and the number of hairs in the telogen stage increases. With severe alimentary dystrophy, the development of subtotal alopecia is possible [1, 5, 6].

II. ZINC DEFICIENCY

A correlation has been established between the concentration of zinc in the blood serum and the development of diffuse telogen prolapse. To date, there is no consensus on the role of zinc in hair loss, hypotheses are put forward about the effect of zinc-containing enzymes on the regulation of the hair growth cycle. Zinc is the main component of the so-called "zinc fingers", which are transcription factors (one of the main groups of proteins that bind DNA).

These amino acids interact with the zinc ion, and the polypeptide chain located between them forms a "finger" loop that can regulate hair growth through the "hedgehog" signaling pathway. It is also believed that zinc is a catagen inhibitor due to its inhibitory effect on apoptosis-inducing endonucleases [2, 5, 8]. There are enteropathic acrodermatitis and acquired zinc deficiency. Enteropathic acrodermatitis is a hereditary disease caused by impaired absorption of zinc. The disease begins in infancy and is associated with a violation of zinc adsorption on the microvilli of the intestinal brush border [5, 9]. Acquired zinc deficiency develops as a result of insufficient intake with food, prolonged parenteral nutrition, with increased catabalism (injuries, burns, postoperative period), malabsorption in the intestine (Crohn's disease with lesions of the small intestine, interintestinal anastomosis in obesity). Hair in the fronto-parietal region of the scalp gradually thins, breaks off and falls out. In severe cases, there is a total alopecia with loss of eyebrows and eyelashes. Characteristic changes in the nails are also noted: Bo lines (transverse depressions or grooves on the nails that appear at the base of the nail hole) and paronychia (inflammation of the periungual fold, one or several fingers can be affected) [1, 2, 5, 9].

III. IRON DEFICIENCY

According to the WHO [20], iron deficiency is one of the most common nutritional deficiencies in the human body, there are more than 2 billion people in the world suffering from anemia, most of them women and children. In a number of countries (USA, England, Sweden, Holland), nationwide programs for the prevention of iron deficiency have been adopted by fortifying bread, cereals, fruit juices, infant formula with inorganic iron salts, however, due to the presence of side effects, the use of iron salts for food enrichment [11]. The concentration of hemoglobin in peripheral blood is the main indicator for detecting anemia and assessing its severity. The lower limit of hemoglobin content in women of childbearing age is 120 g / l. Depending on the degree of decrease in hemoglobin content, anemia is divided into three degrees of severity: mild (91–110 g/l), moderate (81–90 g/l), and severe (less than 80 g/l). The number of red blood cells not only allows you to assess the presence of anemia, but also calculate the color index. The color index is calculated by the formula: (hemoglobin index (g / l) × 3) / the first three digits of the number of red blood cells. Color index values less than 0.85 indicate the hypochromic nature of anemia, i.e. testify to its iron deficiency genesis. The total volume of all erythrocytes is estimated by the hematocrit value. Serum ferritin is the most important indicator for assessing iron stores in the body. Normally, its concentration is about 60–140 µg/l, but not less than 40 µg/l. Values below 15 µg/l indicate an iron deficiency, even if other values are normal. Low values of ferritin in combination with reduced levels of erythrocytes or hemoglobin indicate the iron deficiency nature of anemia [14]. Dry skin, brittleness and hair loss, a decrease in the diameter of growing hair, and the formation of a bitemporal recession are noted [2, 3].

Diagnosis and treatment of DTA require a careful multidisciplinary approach (internists, endocrinologists, gynecologists and hematologists). The goal of topical therapy is to influence the hair follicle with molecules that can stimulate the "entry" of hair follicles into the anagen phase and prolong the growth phase as long as possible. One of the new products successfully used to correct diffuse telogen effluvium is Qilib/KvilibTM lotion (Galderma, Switzerland), due to the synergy of active ingredients (guarana extract, theobromine, onion, lemon fruit), which has the ability to activate regenerative processes and improve microcirculation in hair follicles. Although Quilib is a cosmetic product by its registration status, the level of its evidence base is quite high. A number of studies have demonstrated the safety of use and high clinical efficacy of Qilib / Quilib lotion: lengthening of the hair growth phase [12], increase in hair thickness (diameter) (by 38% compared with placebo) [23], increase in the density of collagen surrounding the hair follicle (by 79%), reduction of subclinical inflammation in hair follicles [15], stimulation of new hair growth (more than 8000 new hairs in the growth phase after 3 months of use). Summarizing all of the above, it can be noted that Quilib lotion, along with proven clinical efficacy in hair loss, has no contraindications, is well tolerated by patients and can be prescribed for a long time, as well as for pregnant and lactating mothers. Taking into account the high prevalence of DTA against the background of iron deficiency anemia (IDA) and the constant search for new promising means for its correction, the purpose of our study was to compare the effectiveness of monotherapy with ferrous iron preparations and therapy with ferrous preparations in combination with the external use of Quilib lotion and develop an algorithm based on the results obtained. management of patients with DTA.

IV. MATERIAL AND METHODS

The basis of this study was 60 patients with DTA that developed against the background of IDA; all patients were of active working age; the latter ranged from 20 to 45 years. The duration of the disease ranged from 2 months to 3 years. The clinical characteristics of patients with DTA included the analysis of life and disease anamnesis data, subjective and objective symptoms of hair loss, trichoscopy results, the presence of concomitant diseases. The diagnosis of diffuse alopecia was established on the basis of the patient's complaints, clinical and instrumental examination data (diffuse hair loss in the parietal and/or occipital regions, an increase in the ratio of telogen/anagen hair, a decrease in hair diameter according to trichological examination data).

To identify concomitant diseases and contraindications to treatment, the patients were consulted by a general practitioner, endocrinologist, gynecologist and other specialists (according to indications). Trichoscopic assessment of lesions in all patients was performed before treatment and after the completion of a 3-month course of correction. To do this, we used a digital video camera to analyze the condition of the scalp and hair Aramo SG (Korea), connected to a computer. The computer program Trichoscience V.1.4.Rus was used for visualization and processing of digital data. Inspection of lesions was performed using lenses that magnify the image by 60 and 200 times. In order to determine the intensity of hair loss, all patients with DTA underwent phototrichograms, for which 2 areas of approximately 1 cm in size were shaved in the frontal and occipital regions. Inspection was carried out after 48 hours using a lens that magnifies the image by 60 times; before examination, the shaved area was stained with eyebrow and eyelash dye (exposure time 10 minutes). The hairs in the growth phase (anagen) grew during this period, while those in the shedding phase (telogen) remained the same length. After counting the number of hairs in different stages of growth, the program allows you to see the percentage of hair in the growth phase and in the shedding phase. Normally, on the scalp, the proportion of anagen hair is 90%, and telogen - 10%. To determine the thickness of the hair, a lens with a magnification of 200 times was installed, the thickness of the hair in the parietal and occipital zones was determined, for which images were taken in various parts of these zones. At least 50 hairs were examined in each of the zones, since when measuring a smaller number of hairs, the standard deviation can be large. Automatic calculation of the average value of hair thickness followed by a visual representation on the graph allows you to compare the indicators not only of a particular patient with the norm, but also with each other, as well as determine the percentage of velus hair, given that the difference between the core hair and the velus hair is 30 microns. The diagnosis of iron deficiency anemia was established on the basis of clinical, anamnestic and laboratory parameters. Patients with DTA were divided into two groups, equal in age and clinical manifestations, as well as the severity of IDA. In agreement with the therapist and hematologist, as basic therapy, all patients received a ferrous iron preparation - sorbifer durules 1 tablet (100 mg of ferrous sulfate + 60 mg of ascorbic acid) 2 times a day for 3 months). In the 1st group, 30 patients with DTA that developed against the background of IDA received ferrous salt orally without prescribing any local therapy. In the 2nd group, 30 patients with DTA, which developed against the background of IDA, received bivalent iron salt orally, and Quilib lotion (Galderma, Switzerland) as a local remedy: 10 sprays on dry scalp 2 times a day (in the morning and evening) for 3 months.

V. RESULTS AND DISCUSSION

In 60 patients with DTA, according to the totality of clinical and hematological parameters, a mild form of IDA was diagnosed (Fig. 1). As is known, hemic and tissue hypoxia in IDA cause diffuse-dystrophic changes in organs and systems. The most common symptoms of anemia in patients were: weakness of varying severity, fatigue, and of the symptoms of sideropenia - drowsiness, dryness of the skin, lamination and fragility of the nail plates, perversion of taste and smell. Analysis of the main hematological parameters in patients with IDA showed a statistically significant decrease. The indicators of iron metabolism in all patients with IDA were significantly lower than the reference values, which led to an increase in iron deficiency and an increase in anemic syndrome. At the end of a 3-month course of therapy with ferrous iron preparations, it was possible to achieve normalization of hematological parameters, as well as a decrease in weakness, fatigue, daytime drowsiness, headaches, and dizziness. Therapy with iron preparations was generally well tolerated by the patients, however, in 10 (6%) patients, the development of side effects was recorded in the form of epigastric discomfort, mild nausea, and stool disorders in the form of diarrhea, which decreased when taking the iron preparation after meals.

VI. CONCLUSION

Patients included in the 2nd group noted the good cosmetic properties of Quilib lotion, its pleasant smell and ease of use (a special nozzle is included in the package), as well as good tolerance: no local adverse events were noted during the use of this remedy. Thus, Quilib lotion, having proven clinical efficacy, also has a good safety profile and is convenient to use. The results of the study allow us to recommend the inclusion of this agent in the schemes for the complex correction of natural hair loss in case of DTA against the background of iron deficiency conditions in order to achieve a cosmetically significant effect more quickly.

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