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SERUM-CONCENTRATIONS OF DEHYDROEPYANDROSTERONE-SULFATE IN MEN WITH ANDROGENETIC ALOPECIA

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ABSTRACT

Androgenetic alopecia (AA) is considered as a genetically determinate androgen (DHT)-dependent disorder. Theoretically Dehydroepyandrosterone-sulfate (DHEA-S) is the first main metabolite in the androgen metabolism.

The aim of the study was to determine the serum-levels of DHEA-S (DHEA-S(s)) in patients with AA and the possible correlation between clinical stage of AA and DHEA-S(s).

Forty-four men (37 with male pattern baldness and 7 healthy controls) aged 19 to 55 had DHEA-S(s) measured. Determination of the hormone was performed by standard radioimmunoassay. Only nine of the men with AA showed high levels of DHEA-S(s). In 3 of the patients were detected a boundary high levels of DHEA-S(s). No correlation between the clinical stage of AA and DHEA-S(s) -levels was established. There was relationship only between increase of the age and decrease of the concentrations of DHEA-S(s).

In contrast to previous studies, in our investigation, no elevation of DHEA-S(s) in men with AA was found. Our results indirect support the current understanding of the importance of some follicular enzymes (STS, 3-beta-HSD, 17-beta-HSD etc.) that could increase the amount of the alternative DHT-sources in AA, as well as the theory for the "endocrinology of hair follicle".

Key Words: androgenetic alopecia, male pattern baldness, serum-levels of DHEA-S.

INTRODUCTION

According to the recent statements the Androgenetic alopecia (AA) is genetically determined [11], androgen (5бDHT) dependent disease [5]. On the basis of the different researches it is established that the disease is not only induced but its chronic course is maintain by the increased local concentration of potent androgens (DHT), increased amount of the metabolizing enzymes (5б-reductase2, STS, 3в-HSD1, 17в-HSD3, etc.) (Figure 1.), increased affinity of the androgen receptors etc.

The purpose of the study was to determine the serum concentrations of the DHEA-S in men with AA as the possible correlation between the DHEA-S levels and the range of AA.

PATIENTS

In the study have been involved men volunteers with AA, as well as patients treated by therapy with finasterid-1mg, in the range of the routine hormonal examinations made with them, including the DHEA-S.

The total number of the patients was 44, 37 of them with the signs of AA and 7-healthy (controls). The examined were at the age of 19 to 55. Although the main subject of the examination were young men with AA, with the purpose establishment of the eventual correlation between the range of AA and the levels of DHEA-S in to the study were included also older men with AA (respectively) with the higher range of AA. Persons with data for hormonal disbalance and other system diseases were excluded from the examined group. The distribution of the examined persons by age and range of AA is presented in table 1. and 3.

METHODS

The blood samples of the patients were taken at similar conditions. Two measurements were made upon the serum samples of each patient. Determination of the concentrations of the serum DHEA-S was made by standard radioimmunoassay with ^{125}I DHEA-S (Orion Diagnostica, Espoo, Finland).

The results received were compared with referent values of the serum-DHEA-S for the relevant age group (Table 2.) The range of distribution of AA in every patient was determined according to the classification of Hamilton-Norwood (Figure 2.).

RESULTS

We are presenting the results of the examination on the serum-concentration of the DHEA-S in men with AA and healthy controls. Only in 9 among the examined 44 samples it has been determined elevations from the referent values for the relevant age (Table 3.). Eight of the measured high values of the serum DHEA-S were of the patients with AA (entering

the 2. and 3. age group). In 3 of examined ones were measured limit high concentration of the DHEA-S in the serum - two of them were patients with AA. The third limit value is of the healthy control.

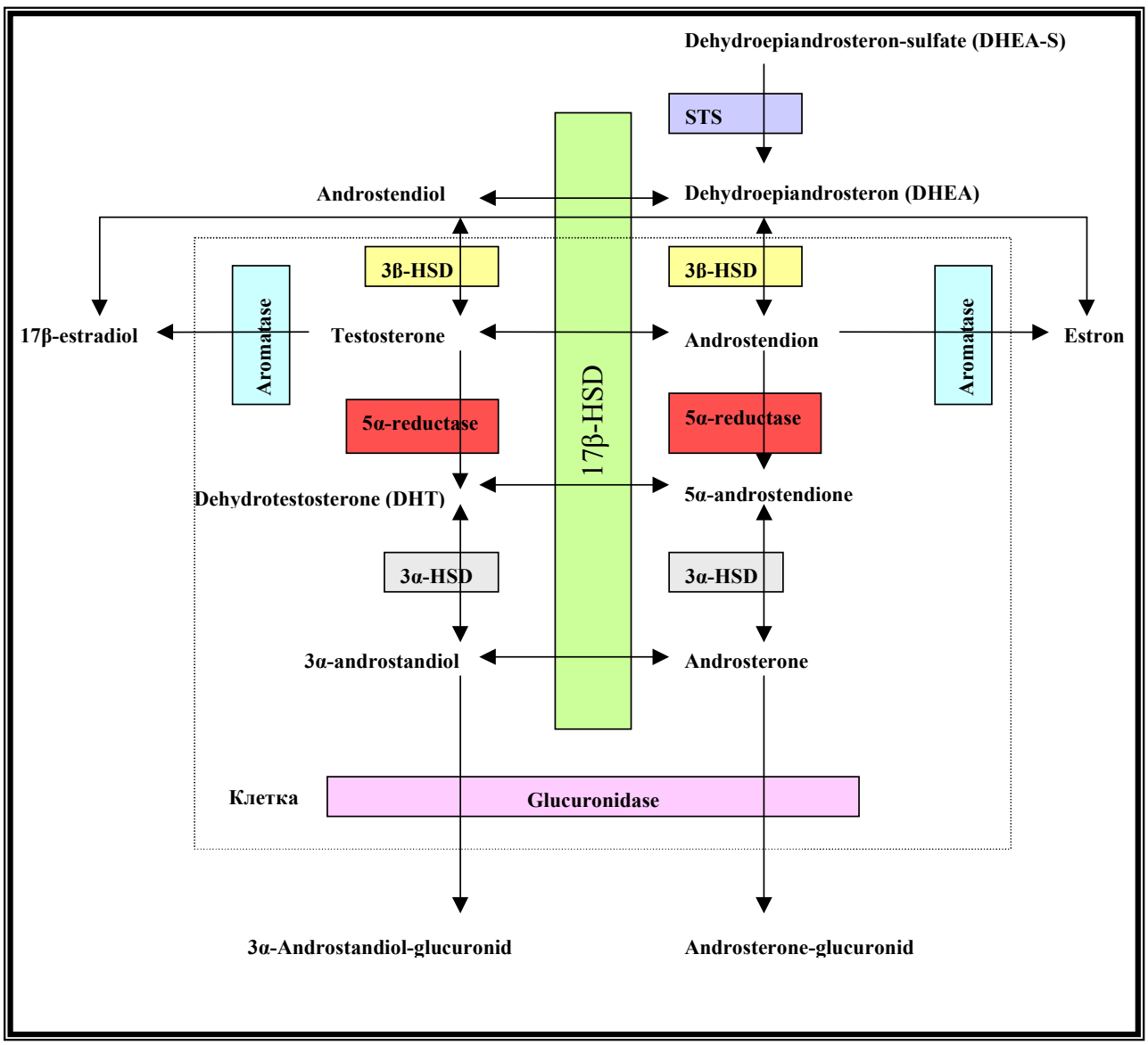
DISCUSSION:

Determinations of hormone serum levels are useful diagnostic measures and the basis for a successful treatment in hormone-dependent dermatoses such as androgenetic alopecia, hirsutismus etc. In contrast to the previous studies [16, 19], the present ones don't show important difference between the serum levels of DHEA-S in patients with AA and healthy controls. It has not been determined also correlation between DHEA-S (in patients, it was increased) and range of AA. The measured high and limited high values of serum DHEA-S were mainly in the age group 27-35, nevertheless of the presence or lack of the AA.

The skin is the largest organ in the human body. The historical picture of the endocrine system as a set of discrete hormone-producing organs has been substituted by organs regarded as organized communities in which the cells emit, receive and coordinate molecular signals from established endocrine organs, other distant sources, their neighbors, and themselves. In this wide sense, the human skin and its tissues are targets as well as producers of hormones [1, 23].

According to the recent conception for the so called "intracrinology" [13, 12], the skin, especially the pilosebaceous unit, can synthesize androgens de novo from cholesterol or by locally converting circulating weaker androgens to more potent ones. They exert their action on the cell

Figure 1. Pathways of cutaneous androgen metabolism and the converting enzymes [7]



themselves without release in the extracellular space and in the general circulation. The rate of formation of each sex steroid thus depends upon the level of expression of each of the specific androgen- and estrogen-synthesizing enzymes, as well as the specific gene expression in each cell type [2, 14, 21, 22] .

On the other hand, the distribution and activity of the six androgen-converting enzyme systems (Figure 1.) shows local variations, particularly in androgen-dependent diseases [6, 8] such as acne vulgaris, androgenetic alopecia, where is established increasing of the steroid sulfatase levels in the follicular dermal papilla [9] and of 5б-reductase 1 in the sebocytes and 5б-reductase 1 and 2 in hair follicle [3, 17, 18], as well as decreasing of aromatase in hair follicle [10, 8].

Although DHEA-S is a weak but most abundant circulating androgen [4], we consider, in line with previous observations [20], that its serum levels could not be a "mirror" of the peripheral metabolism in the hair follicle, especially in men with AA. Most probably high levels of DHEA-S could be a precondition, but not an obligatory condition in the genesis of AA.

Figure 2. Classification of Hamilton-Norwood (1974г) [15].

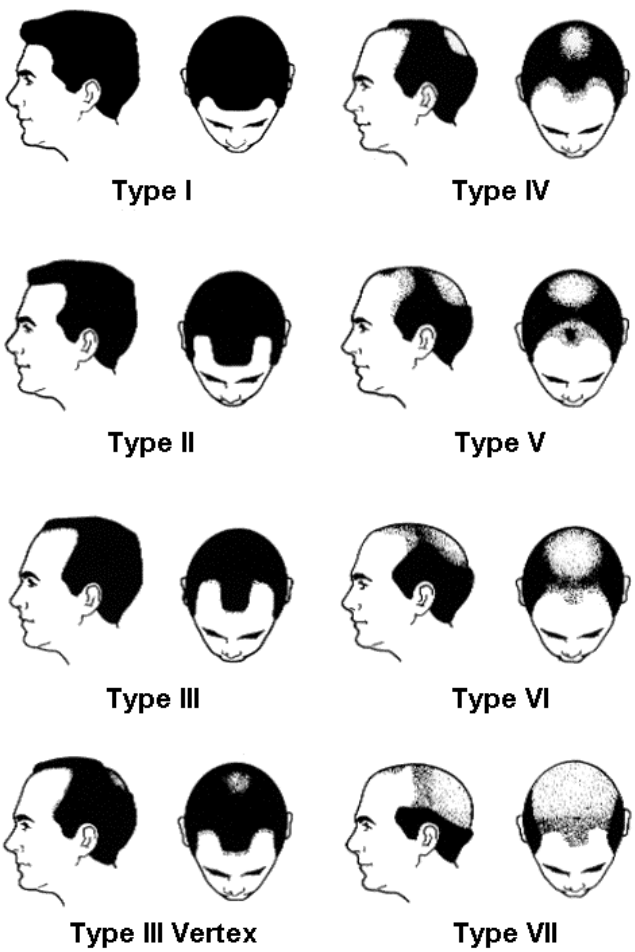


Table 1. Grades of androgenetic alopecia in the examined persons.

Hamilton/Norwood pattern of hair loss	Patients *n*
II	**12**
III	**8**
IIIv	**6**
IV	**5**
V	**2**
VI	**4**
VII	**7**

Table 2. Referent values of the serum DHEA-S levels in men, distributed by age groups

Age (years)	Reference Interval **(μmol/l)**
16-20	1.84 - 7.93
21-30	3.24 - 14.3
31-40	1.99 - 13.7
41-50	2.32 - 11.2
51-60	1.03 - 8.53

Table 3. Values of the serum DHEA-S in patients with AA according to the total number of patients, distributed by age groups

Age		Patients n	Patients with AA n	Patients with AA and increased [DHEA-S] - serum levels
1.	**16-20**	**2**	**1**	**1**
2.	**21-30**	**19**	**14**	**3**
3.	**31-40**	**13**	**13**	**3**
4.	**41-50**	**7**	**7**	**1**
5.	**51-60**	**3**	**3**	**0**

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