6. Orth G, Favre M, Breitburd F et al. Epidermodysplasia verruciformis — a model for the role of papilloma viruses in human cancer. In: Essex M, ed. Viruses in naturally occurring cancers. Cold Spring Harbor, 1980: 259–282.
7. Tanigaki T, Endo H. A case of epidermodysplasia verruciformis (Lewandowsky-Lutz 1922) with skin cancer: histopathology of malignant cutaneous changes. Dermatologica 1984; 169: 97–101.
8. Pinkus H, Rogin JR, Goldman P. Eccrine poroma: tumors exhibiting features of the epidermal sweat gland unit. Arch Dermatol 1956; 74: 511–521.
9. Hashimoto K, Kanzaki T. Appendage tumors of the skin: histogenesis and ultrastructure. J Cutaneous Pathol 1984; 11: 305–381.

A Preliminary Study of the Effect of 11a-Hydroxyprogesterone on the Hair Growth in Men Suffering from Androgenetic Alopecia

A. H. VAN DER WILLIGEN[1] J. D. R. PEEREBOOM-WYNIA,[2] TH. VAN JOOST[1] and E. STOLZ[1]

[1]*Department of Dermato-Venereology, University Hospital Rotterdam-Dijkzigt, Rotterdam and* [2]*Bronovo-Nebo Foundation, The Hague, The Netherlands*

van der Willigen AH, Peereboom-Wynia JDR, van Joost Th, Stolz E. A preliminary study of the effect of 11a-Hydroxyprogesterone on the hair growth in men suffering from androgenetic alopecia. Acta Derm Venereol (Stockh) 1987; 67: 82–85.

Ten male patients suffering from androgenetic alopecia were treated during one year with a lotion containing 1% 11a-hydroxyprogesterone. Eight untreated patients served as control group. The parameters used were hair root status, hair shaft diameter of anagen hair roots and number of hairs with a diameter <40 μm. After therapy the cranial region showed an increase in the number and mean hair shaft diameter of anagen hair roots and in the number of hair roots with a diameter <40 μm. The number of hair roots in catagen/telogen decreased, the number of dysplastic/dystrophic hair roots remained unchanged. After therapy the cranial region in the controls showed a decrease in number and mean hair shaft diameter of anagen roots, and in the number of dysplastic/dystrophic hair roots. There was an increase in number of hair roots in catagen/telogen and of hair roots with a diameter <40 μm. The results warrant the conclusion that the abovementioned therapy would seem to be effective in men suffering from androgenetic alopecia. *Key words: Alopecia androgenetica; Hair roots status; Hair shaft diameter.* (Received March 3, 1986.)

A. H. van der Willigen, Department of Dermato-Venereology, University Hospital Rotterdam-Dijkzigt, Dr. Molewaterplein 40, 3015 GD Rotterdam, The Netherlands.

Androgenetic alopecia (AA) is the most common form of hair loss in men. An effective therapy for men suffering from AA has not yet been defined. In our opinion a potential therapeutic agent should fulfil the following criteria: local applicability, low toxicity and cosmetic acceptability. these criteria would seem to be met by 11a-hydroxyprogesterone, a synthetic anti-androgen (1).

The aim of our study was to establish the effect of once-daily application of a lotion containing 1% 11a-hydroxyprogesterone on the hair growth cycle in men suffering from AA, using hair root status, hair shaft diameter of anagen hair roots and number of hairs with a diameter <40 μm as parameters.

PATIENTS AND METHODS

Eighteen patients were chosen at random on the basis of a trichogram consistent with AA (more than 20% telogen and/or dysplastic/dystrophic hair roots in the cranial region). Ten patients (mean age 24

Table I. *Hair root status (%) before and after one year in treated (N=10) and untreated (N=8) patients with androgenetic alopecia*

Standard error of the mean (SEM) of the initial values and values at follow-up after one year

	Treated				Unterated			
	Cranial		Left temporal		Cranial		Left temporal	
	Before	After	Before	After	Before	After	Before	After
Mean, %								
Anagen	45	51	67	62	53	46	64	62
SEM	7.3	6.3	8.3	6.0	7.4	8.4	10.0	9.9
Catagen/telogen	46	40	21	30	23*	32*	20	18
SEM	6.4	5.5	4.1	4.7	4.1	5.9	6.6	4.8
Dysplastic/dystrophic	9	9	12	8	24	22	16	20
SEM	2.4	1.7	4.8	4.3	6.4	8.8	5.0	6.6

* $p=0.02$.

(range 18–31) years) with a mean duration of hair loss of 2.7 years were treated with a lotion containing 1% 11a-hydroxyprogesterone. Eight patients (mean age 23 (range 16–29) years) were left untreated and served as controls. The mean duration of hair loss was 2.6 years. Every day before retiring to sleep, the lotion was applied to the affected cranial and/or occipital scalp region. The patient fulfilled the following criteria: no endocrinological disorders, concurrent diseases and/or medication.

Before the start of the study and again after one year the hair roots were obtained in a standardized way from two fixed locations: the left temporal and the cranial scalp (2). The hair root status was assessed at a magnification of 40x. The hair root diameter was measured at 100x magnification using an ocular with screw micrometer. Only the diameter of the hair roots epilated from the cranial region was measured. This was done immediately above the hair root sheaths, where the shaft thickness is constant. A single measurement proved to be sufficient (3, 4). All measurements were performed by the same person. The parameters used were hair root status, hair shaft diamter of the anagen hair roots from the cranial region and number of hairs with a diameter <40 μm. Student's *t*-test was used in statistical analysis.

RESULTS

Hair root status

Table I presents the hair root status of the treated and untreated patients with the standard error of the mean (SEM) of the initial values and the follow-up values after one year. In the treated group the follow-up after one year showed an increased number of hair roots in anagen and a decreased number of roots in catagen/telogen in the cranial region; the number of dysplastic/dystrophic forms remained unchanged. The left temporal region showed a decreased number of anagen and dysplastic/dystrophic hair roots and an increased number of roots in catagen/telogen. In the untreated group the follow-up after one year showed a decreased number of anagen and dysplastic/dystrophic hair roots and an increased number of roots in catagen/telogen in the cranial region. The left temporal region showed a decreased number of anagen as well as catagen/telogen hair roots and an increased number of dysplastic/dystrophic forms. Only the increase in the number of catagen/telogen hair roots in the cranial region in the controls was statistically significant ($p=0.02$) as compared with the initial value a year earlier.

Hair shaft diameter of hair roots in anagen

In the treated group this diameter increased from a mean of 69.6 μm to one of 71.6 μm. Corresponding values in the control group were 70.1 μm and 68.1 μm. Both in the treated group and in the untreated control group the differences between the initial values and those at the follow-up after a year were not statistically significant. The SEM of the differences between initial values and values after a year was 4.3% in the treated group and 3.8% in the control group.

Number of hairs with a diameter <40 μm from the cranial scalp

In both groups the number was found increased at the follow-up after a year: from 12% to 17% in the treated group and from 9% to 14% in the control group. In both groups the differences between the initial and the follow-up values were not statistically significant. The SEM of the differences between initial and follow-up values was 4.1% in the treated and 4.8% in the control group.

DISCUSSION

The results show that improvement occurred only on the cranial scalp in the treated group. This was the location to which 11a-hydroxyprogesterone was applied. No side effects were observed in this group of patients. Only one patient in the treated group saw no improvement. In the control group the hair loss worsened in seven out of eight patients; in one patient the hair loss had stopped. It can be deduced from the hair root status that AA should be regarded as a diffuse process.

Evaluation was done after a year in order to eliminate seasonal influences (5). Orfanos & Vogel (6) did a similar study with 17a-Estradiol. They evaluated after six months, and used the telogen-ratio as the most important parameter. We think that a period of six months is too short and that the hair shaft diameter instead of the telogen ratio is the best parameter to evaluate therapy studies in this field. Although the differences of the results were not significant, hair root status and hair shaft diameter showed a positive tendency in response to this therapy. In this set-up it remains uncertain whether an increase in the number of hairs with a diameter of 40 μm in the treated group can be interpreted as hair growth.

In the untreated controls the process of AA continued as demonstrated by the statistically significant increase in catagen/telogen hair roots on the cranial scalp as compared with the initial values obtained a year earlier, as an indication of this slowly progressive process.

The results warrant the conclusion that the above-mentioned therapy would seem to be effective in men suffering from androgenetic alopecia. Studies in larger series of patients will be required for definitive evidence of the efficacy of local treatment with 11a-hydroxyprogesterone in androgenetic alopecia. At the same time the side effects have to be monitored carefully.

REFERENCES

1. Tamm J, Seckelmann M, Volkwein U, Ludwig E. The effect of the anti-androgen 11 alpha-hydroxyprogesterone on sebum production and cholesterol concentration of sebum. Br J Dermatol 1982; 107: 63–70.
2. Peereboom-Wynia JDR. Hair root characteristics of the human scalp hair in health and disease. Thesis, Rotterdam 1982.
3. Peereboom-Wynia JDR. Comparative studies of the diameter of hairshafts in anagen and in telogen phases in male adults without alopecia and in male adults with androgenetic alopecia. In: Orfanos CE, Montagna W, Stüttgen G, eds. Hair research. Berlin, Heidelberg, Springer-Verlag, 1981: 294–302.

4. Jackson D, Church RE, Ebling FJ. Hair diameter in female baldness. Br J Dermatol 1982; 87: 361–367.
5. Orentreich W. Hairgrowth. In: Montagna W, Dobson RL, eds. Advances in biology of the skin. Oxford: Pergamon, 1980; 9: 99.
6. Orfanos CE, Vogels L. Lokaltherapie der Alopecia androgenetica mit 17a-Östradiol. Dermatologica 1980; 161: 124–132.

Thioguanine Treatment in Psoriasis

LARS MOLIN[1] and KRISTIAN THOMSEN[2]

[1]*Department of Dermatology, University Hospital, Linköping, Sweden and* [2]*Finsen Institute, Copenhagen, Denmark*

Molin L, Thomsen K. Thioguanine treatment in psoriasis. Acta Derm Venereol (Stockh) 1987; 67: 85–88.

The efficacy of thioguanine in the treatment of severe cases of psoriasis is demonstrated. This treatment is valuable in selected cases of severe psoriasis in whom other treatment is ineffective or impossible due to side effects. The effect of thioguanine on psoriasis lesions appears to run parallel with depression of the bone marrow. The bone marrow toxicity has to be considered. Patients previously treated with methotrexate are very sensitive to thioguanine and close follow up is mandatory with adjustment of the thioguanine dose according to blood white cell and thrombocyte levels. *Key word: Bone marrow depression.*
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L. Molin, Department of Dermatology, University Hospital, S-581 85 Linköping, Sweden.

Thioguanine, which is closely related to 6-mercaptopurine, is an antimetabolite in the synthesis of purine, chiefly guanine. The mechanism of action is, however, not fully defined. Thioguanine is administered orally and maximal plasma concentration is reached in 8 to 10 hours. It is metabolized in the liver and 35% of a given dose is excreted in the urine within 24 hours (1). The main indication for thioguanine is acute leukemia where it usually is used at initial dosages of 400 mg a day as part of a chemotherapeutic regimen.

Demis et al. (2) reported that thioguanine had an effect in two cases of psoriasis, one of whom also suffered from an active arthritis. A good response was obtained on both the skin and joint lesions. Since that thiogunanine was used in isolated cases of severe psoriasis with good effect, but the drug has not gained wide use.

Zackheim et al. (3, 4) recently presented 20 years of experience with thioguanine therapy for psoriasis mostly in cases, in whom methotrexate was contraindicated due to liver damage or gastrointestinal intolerance. Their results prompted us to use thioguanine in similar cases of severe psoriasis, in whom the use of methotrexate or retinoids had been associated with problems.

MATERIALS AND METHODS

Nine patients were treated with thioguanine (Table I). One patient had widespread plaque type of psoriasis combined with chronic active psoriatic arthritis, five patients had total or subtotal involvement of the body surface by psoriasis lesions, two patients had widespread pustular psoriasis and one patient pustular psoriasis mainly on palms and soles. The duration of psoriasis varied between 10 and 34 years. All of the patients had been treated with methotrexate, some of them with etretinate and PUVA.