

INVESTIGATION OF DISTINCTIVE SKIN ALTERATIONS IN MENOPAUSAL WOMEN AFFECTED BY HYPOTHYROIDISM

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Abstract: *This article presents findings from a study examining age-related skin changes in 62 women experiencing a pathological menopause and 60 women experiencing a physiological menopause. Each group was further divided into subgroups: the first subgroup included women with latent and manifest hypothyroidism ($TSH > 4.0 \mu IU/ml$), and the second subgroup included women with normal thyroid function. Significant differences were observed in the skin aging process among these women. The most pronounced involutinal skin changes were found in women with a pathological menopause and reduced thyroid function. These changes included a predominance of dry skin, peeling, alterations in skin color and tone, marked gravitational ptosis, deep deforming wrinkles, and a decrease in both dermal thickness and acoustic density.*

Keywords: *pathological menopause; physiological menopause; skin aging; hypothyroidism.*

Since the latter half of the twentieth century, there has been a noticeable shift in the demographic structure, marked by an increase in the number of older women. Currently, postmenopausal women make up 10% of the global population. During menopause, the progression of skin involutinal changes impacts social adaptation, self-esteem, and quality of life. Many women in this age group are active in the workforce and often hold leadership positions, making the maintenance of an attractive appearance particularly relevant during postmenopause. The pathological course of menopause occurs in 10-75% of women, frequently accompanied by severe psycho-emotional stress, which exacerbates skin deterioration and contributes to persistent astheno-neurotic conditions. The impact of pathological menopause on skin aging has not been thoroughly studied. It is known that skin condition is influenced not only by the decrease in estrogen levels during menopause but also by changes in thyroid function. Hypothyroidism often results in dermopathy, with the skin becoming dry, rough, pale, waxy or yellowish, and cold to the touch; keratoderma, small papular elements, and dense edema on the extremities may also occur. With aging, decreased thyroid function becomes more common, especially in endemic areas.

Materials and methods

The study involved 122 women in early postmenopause, divided into two groups. Group I consisted of 62 women with mild to moderate menopausal syndrome, with an

average age of 51.4 ± 1.1 years. Group II included 60 women with physiological menopause, with an average age of 51 ± 1.5 years. Each group was further divided into subgroups: the first subgroup comprised women with latent and manifest hypothyroidism ($TSH > 4.0 \mu IU/ml$), and the second subgroup included women with normal thyroid function. The groups were comparable in terms of social and family status. None of the women in either group used special anti-aging cosmetic procedures such as peelings, Botox injections, biorevitalization, contour plastic surgery, photorejuvenation, or plastic surgery; they only used home care cosmetics. Exclusion criteria included severe extragenital pathology, severe pathological menopause, oncological diseases, smoking, and alcohol abuse.

To determine the nature of the menopausal period, the modified menopausal index (MMI), originally proposed by Kupperman et al. in 1959 and modified by E.V. Uvarova, was calculated. This index takes into account neuro-autonomic, metabolic-endocrine, and psycho-emotional symptoms, with each symptom rated on a scale from 0 to 3. The total score formed the MMI value: up to 10 points indicated a physiological course of menopause, 10-34 points indicated a mild degree of pathological menopause, 35-58 points indicated a moderate degree, and 58 points or more indicated severe pathological menopause.

To objectively assess skin condition, the study measured the facial skin aging symptom scale index, skin type, turgor and elasticity, as well as structural and functional features. The facial skin aging symptom scale index was calculated based on characteristics such as dryness and tightness, peeling, wrinkle severity, changes in color and tone, telangiectasia, and hirsutism. Each symptom was rated on a 4-point scale from 0 to 3 (0—no symptom; 1—mild; 2—moderate; 3—severe). Skin type was diagnosed using a Wood's lamp and an analog color scale (blue—normal skin, brown—hyperpigmentation, orange—oily skin, lilac—dry skin, white—hyperkeratosis, yellow—acne). Turgor and elasticity were analyzed with a caliper by measuring the thickness of a skin fold in the chin area held for 50 seconds, followed by timing the skin's return to its original state with a stopwatch. Structural and functional diagnostics of the skin were performed using ultrasound to assess the thickness and acoustic density of the epidermis and dermis.

Results and discussion

In the observation group, hypothyroidism was found in $46.8 \pm 3.2\%$ of women, while $53.2 \pm 3.6\%$ had normal thyroid function. In contrast, the comparison group had significantly fewer women with hypothyroidism ($13.3 \pm 1.9\%$) and a higher percentage with normal thyroid function ($86.7 \pm 3.7\%$) ($p < 0.05$).

There were significant differences in the severity of facial deformation and wrinkles between women with pathological menopause and hypothyroidism versus those with physiological menopause and normal thyroid function (Table 1). In cases of

physiological menopause without hypothyroidism, most women ($65.4\pm 6.6\%$) showed minimal changes, primarily fine superficial wrinkles. Conversely, pathological menopause combined with hypothyroidism was characterized by pronounced changes such as ptosis of the upper and lower eyelids, drooping cheeks, a double chin, folds in the anterior ear and cervicomenal area, and wrinkles from the corners of the mouth to the chin ($64.5\pm 8.5\%$) ($p < 0.05$). In pathological menopause without hypothyroidism and physiological menopause with decreased thyroid function, there were mainly radial folds at the corners of the eyes, longitudinal forehead folds, and deepened nasolabial folds, with pronounced changes being much less frequent.

Differences were also found in the facial skin aging symptom scale (Fig. 1). Women with climacteric syndrome and hypothyroidism had a significantly higher prevalence of dry skin ($83.9\pm 7.1\%$, $p < 0.05$), peeling ($71.0\pm 6.8\%$, $p < 0.05$), and changes in skin color and tone—such as yellowness, pallor with a waxy tint, uneven color, and hyperpigmented spots ($83.9\pm 7.1\%$, $p < 0.05$). These symptoms were less common in women with pathological menopause and normal thyroid function, and in those with physiological menopause and hypothyroidism. Women with physiological menopause and normal thyroid function showed minimal signs of facial skin aging. There was no significant difference in the presence of telangiectasia across groups.

A comparative assessment of facial skin aging signs in women, depending on the type of menopause and thyroid condition, revealed significant findings (%).

Note: (statistically significant differences from the “physiological menopause without hypothyroidism” subgroup) * $p < 0.05$

Skin turgor and elasticity were notably reduced in women with pathological menopause combined with hypothyroidism, with the skin fold straightening time at 11.03 ± 0.3 seconds ($p < 0.05$). In pathological menopause without hypothyroidism, the time was 10.10 ± 0.2 seconds ($p < 0.05$); in physiological menopause with hypothyroidism, it was 9.04 ± 0.2 seconds ($p < 0.05$); and in physiological menopause with normal thyroid function, the shortest time was recorded at 8.11 ± 0.2 seconds.

An objective examination of the skin using ultrasound determined the greatest decrease in the thickness and acoustic density of the dermis in pathological menopause in combination with hypothyroidism - up to $1105 \pm 19.3 \mu\text{m}$ ($p < 0.05$); in women with pathological menopause without hypothyroidism and with physiological menopause in combination with hypothyroidism, the corresponding changes were less pronounced (Table 2). With physiological menopause and normal thyroid function, the highest values of dermal thickness and acoustic density were observed.

Conclusions

1. The occurrence of hypothyroidism is approximately 3.5 times more frequent with a pathological menopausal course than with a physiological one.
2. The most significant skin changes occur during pathological menopause combined with reduced thyroid function, characterized by a higher prevalence of dry

skin type ($83.9 \pm 7.1\%$), peeling ($71.0 \pm 6.8\%$), skin discoloration and tone alterations ($83.9 \pm 7.1\%$), pronounced gravitational ptosis, and deep wrinkles ($64.5 \pm 8.5\%$). Additionally, there is a decrease in dermal thickness ($1105 \pm 19.3 \mu\text{m}$) and acoustic density (3.4 ± 0.3 arb. units).

3. Skin condition changes are also observed in pathological menopause without hypothyroidism and physiological menopause with decreased thyroid function, albeit to a lesser extent than in pathological menopause with hypothyroidism.

4. Women with a physiological menopausal course without hypothyroidism exhibit minimal age-related skin changes, including a lower incidence of dry skin type ($38.4 \pm 5.8\%$), peeling ($28.8 \pm 6.3\%$), alterations in skin color and tone ($19.2 \pm 5.5\%$), and a predominance of fine superficial wrinkles ($65.4 \pm 6.6\%$). The dermal thickness measures at 1336 ± 31.2 microns, with an acoustic density of 10.0 ± 0.7 arb. units.

5. Skin involutinal changes are multifactorial and associated with various bodily dysfunctions, particularly a decline in ovarian and thyroid hormone levels.

6. A comprehensive approach involving gynecologists, endocrinologists, and dermatocosmetologists is essential for effectively addressing accelerated menopausal skin aging and achieving optimal healing and anti-aging outcomes.

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