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Concept And Management of Androgenetic Alopecia (AGA) in Unani System of Medicine: A Review

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ABSTRACT

Background: Androgenetic alopecia (AGA) is a progressive condition characterized by patterned hair loss, affecting both males and females, often leading to psychological distress. The etiology of AGA is primarily attributed to genetic predisposition and hormonal influences, particularly androgenic activity. Within the Unani system of medicine, AGA is classified under the term Sula, with pathophysiological factors including Imtela-e-balgham (excessive accumulation of phlegm), Takhalkhul-e-Jild (scalp laxity), Yaboosat-e-Jild (dry scalp temperament), Nuqs-e-Taghziya (nutritional deficiencies), and the presence of morbid material beneath the skin. While conventional medical interventions primarily focus on controlling hair loss, Unani medicine emphasizes not only controlling hair loss but also restoration through a holistic therapeutic framework aimed at addressing the underlying humoral imbalances.

Objective: This review explores the Unani concept and management of AGA, highlighting classical treatment approaches including pharmacotherapy, dietary interventions, and regimenal therapies.

Methods: A comprehensive analysis of Unani classical texts and contemporary scientific literature was conducted to identify etiopathogenesis and therapeutic interventions for AGA. Unani management principles such as *Ilaj bil Dawa* (Pharmacotherapy), and *Ilaj bil Tadbeer* (regimenal therapy), *Ilaj bil Ghiza* (Dieto-therapy) were reviewed.

Conclusion: Unani medicine offers a holistic, natural, and effective approach to managing androgenetic alopecia (AGA), prioritizing humoral balance and follicular rejuvenation. By offering a safer alternative with minimal adverse effects compared to conventional treatments, these interventions hold significant promise. However, further scientific validation is essential to establish standardized protocols and enhance the clinical applicability of Unani therapies for AGA.

Keywords: Hair growth, Hair loss, Hair cycle, Etiopathogenesis, Traditional medicine, Inteshaar e-Shaar

INTRODUCTION

The loss of hair is a common cosmetic issue [(1)] and is typically linked to a number of psychological disorders, such as depression, stress, and low self-esteem [(2)]. The term androgenetic alopecia (AGA) refers to hair loss that is thought to be caused by androgens [(2, 3)]. It affects an equal number of men and women and is the most prevalent type of hair loss among all of them [(1,2)]. It is clinically defined by progressive baldness [(1)]. Approximately 30% of white males over 30 and 50% of people over 50 are affected worldwide [(4)]. AGA affects 58% of men in India between the ages of 30 and 50 (3). AGA is likely to impact one-third of people with a strong family history of the condition [(1)].

Androgenetic alopecia (AGA) is a complex condition primarily driven by the miniaturization of hair follicles due to androgen hormone activity [(5,6)]. This process results in a progressive reduction in hair shaft length and diameter over a shortened anagen phase [(1)]. AGA is characterized by the presence of miniaturized hairs [(2)], with hair thinning typically beginning between the ages of 12 and 40. By the age of 50, approximately half of the population experiences some degree of hair thinning [(1)]. Hair loss can manifest in various patterns and forms [(5,6)].

Classical Unani literature describes hair loss disorders under various terms, including Sula, Inteshar-e-Shaar, Daaul Saalab, and Daaul Haiyyah. Inteshar-e-Shaar, Daaul Saalab, and Sula correspond to diffuse non-scarring alopecia, Alopecia Areata, and androgenetic alopecia (AGA), respectively. The causes and management strategies for Inteshar-e-Shaar and Sula [(7)] are considered identical. Commonly cited etiological factors include Imtela-e-Balgham (Accumulation of phlegm), Takhakhul-e-Jild (scalp laxity), Yaboosat-e-Jild (Dry temperament of scalp), Nuqs-e-Taghziya (Nutritional deficiencies), and the accumulation of morbid material beneath the skin [(7,8)]. In all cases, inadequate formation of Bukharaat-e-Dukhaniyah (the substance responsible for hair matrix synthesis) is recognized as the primary pathological factor underlying hair loss [(9)].

A buildup of morbid material beneath the skin reduces the synthesis of Bukharaat-e-Dukhaniyah, which in turn restricts hair growth and eventually causes hair loss [(8,10)]. Takhakhul-e-Jild caused the hair shaft's stability and health to deteriorate because Bukhraat-e-dukhaniya was unable to build up in the hair follicle [(8,11)].

TYPES OF HAIR LOSS [(1)]

There are three types of hair loss:

- Non cicatrical (potentially reversible)
- Cicatricial
- Due to hair shaft abnormalities

NON CICATRICIAL ALOPECIA

Non-cicatricial alopecia, has several subtypes:

Telogen effluvium (hair shedding), Androgenetic alopecia (common baldness)

Alopecia areata (patchy hair loss)

Traction alopecia (caused by pulling hair) and trichotillomania (compulsive hair-plucking) [(1)].

Understanding of Hair Cycle:

Human hair grows in recurrent cycles rather than continuously. The biological clock of each hair follicle regulates the hair cycle. [(12)] The phases of hair follicles are anagen (growth), catagen (regression), and telogen (resting).

Anagen Phase: It refers to the phase of active hair growth. This phase often lasts three to six years; sometimes it can be shorter or longer (2-10 years) [(3, 12)]. The hair matrix cells exhibit extremely high mitotic activity during this phase, and the hair follicle reaches its maximal size. The maximum length of hair is determined by the length of the anagen phase [(12)].

Catagen Phase: At the end of the anagen phase, the hair undergoes a brief, one- to two-week regression period known as the catagen phase [(3, 12)]. It is characterized by a large number of precisely regulated apoptosis. The follicles of hair shrink to

roughly one-third of their original length [12].

Telogen Phase: The duration of this phase is roughly two to four months. The hair shaft is completely keratinized and devoid of metabolic activity. The cuticle, matrix, and root sheaths that are characteristic of hair growth are absent from telogen hair follicles. Towards the end of the telogen phase, the subsequent anagen hair may already be in the same hair channel, beneath its precursor. Anagen hair makes up over 80% of a typical scalp, while telogen hair makes up less than 20% [12].

The majority of patients with hair problems have disruption in hair follicle cycling, underscoring the clinical significance of understanding this process. Anagen hair loss occurs when drugs or diseases such as alopecia areata impair the mitotic activity of anagen follicles [2,13]. Conversely, injuries that trigger premature follicle telogenization can lead to telogen hair loss [2,13]."

Etiopathogenesis

AGA is characterized by progressive miniaturization of the hair follicle, resulting from changes in dermal papilla and growth factors. Due to progressive deaminization of dermal papilla and decreased growth factors, anagen phase become shorter leading to transformation of terminal hair into villus hair [6].

Androgenetic alopecia (AGA) is a multifactorial complex disease [14], with genetic predisposition believed to play a major role in its onset. However, the precise mechanisms through which genetic factors contribute to the development and progression of AGA remain unclear [5,6,13,14].

Factors responsible for AGA includes:

- **Genetic factors:** Genetic factors are the primary etiological contributors to androgenetic alopecia (AGA), which is a polygenic, autosomal dominant, and inherited condition [1,4,5,14]. The onset of alopecia and the specific hair follicles affected are genetically determined. Each terminal hair follicle on the scalp has a genetically programmed lifespan during which it remains protected from the harmful effects of androgens. However, throughout life, the hair follicles of occipital region continue to exhibit resistance to androgenic influence [12].
- **Hormones:** The role of androgen and enzyme 5-α-reductase which converts testosterone to the more potent dihydrotestosterone (DHT) is well stablished. Dihydrotestosterone is the androgen that is responsible for the development of alopecia (miniaturization of hair follicle) [6,14,15].
- **Environmental factors:** Oxidative stress caused by various environmental factors influence dermal papilla cells and inhibits proliferation of hair matrix [6,16]. The complicated regulation of hair development and regeneration has recently seen some interesting progress, with a focus on the interactions between multiple cell types in the skin and environmental factors. For example, it has been demonstrated that cold temperatures affect hair follicles stem cells (HFSCs) via a neuroendocrine mechanism; in particular, sympathetic nerve norepinephrine stimulates HFSC activation and, thus, hair regeneration [13].
- **Dietary factors:** Through an oxidative mechanism, dietary fat reduces the activity of HFSCs and affects the hedgehog signaling pathway, which may connect obesity with alopecia [6,13,17].
- **Loss of contact between arrector pili muscle and bulge:** Degradation of arrector pili muscles (APM) and its lost contact with bulge has some relation with AGA [13]. According to the research on APM health and its relationship to bulge, it is found that APM remains connected to the bulge of follicles in telogen effluvium and alopecia areata but not in AGA [5,7].

In androgenetic alopecia (AGA), the telogen phase is prolonged while the anagen phase gradually shortens. Since the duration of the

anagen phase determines hair length, each successive anagen hair grows to a shorter maximal length than its predecessor. This progressive reduction leads to follicular miniaturization, eventually resulting in a bald appearance [6].

Etiopathogenesis of hair loss described in Unani Classical literature:

In Unani Classical literature *Inteshar-e-shar, Sula, Daaul haiyy'ah and Daaul saa'lab* are commonly described disorders related to hair loss. Poor production of *bukharat-e-dukhaniya* (Hair matrix) is the primary pathogenic reason causing hair loss in all these cases [10]. The production of this substance, or *bukharaat-e-dukhaniya*, diminishes when some morbid material builds up beneath the skin, which eventually leads to hair loss [10]. A similar pathological process happens in *tkhalkhul-jild*, where the hair shaft's integrity and health are compromised due to the inability of *bukharaat-e-dukhaniya* (Hair matrix) to accumulate in the hair follicle [10]. Reduced skin cellular regeneration is the main cause of *tkhalkhul-jild*, which can result in poor health and APM adhesion to the bulge. Numerous studies have shown that a healthy APM connection to the bulge is essential for maintaining the hair cycle [18]. The ability of the erector pili muscles to contract is directly linked to the enforcement of hair in the hair follicle [19]. It is also needed to revert hair follicle miniaturization [1,5].

Diagnosis

Diagnosis of androgenetic alopecia (AGA) is typically based on clinical evaluation, which includes documenting patient and family history of hair loss, assessing gradual reduction in hair density, and examining scalp skin and hairs. A thorough clinical examination helps to identify the characteristic features of AGA, such as hair thinning, hair loss pattern, and scalp skin changes [20].

Physical Examination

The patient should be thoroughly evaluated after their history has been recorded. The physical examination of a person with AGA involves assessing the pattern and extent of hair loss. Male pattern baldness is often classified using the Norwood-Hamilton scale and female pattern baldness is classified using the Ludwig scale. These scales aid in classifying the degree of hair loss and directing the choice of treatment [21]. While examining the scalp note the color of the scalp, presence and distribution of hair follicles, scaling or evidence of scarring. The hair density should also be noted if it is normal or decreased [20].

Pull Test: To evaluate the severity of hair shedding, the "pull test" can be performed. The degree and ongoing activity of hair loss can be ascertained with this simple test. Between the thumb, index and middle fingers, about 60 hairs are held in place. After that, the hairs are firmly but gently pulled away from the scalp. Clearly active hair loss is indicated by a positive test result (more than six hairs or 10% extracted) while normal shedding is suggested by a negative test result (six or less hairs/less than 10% extracted). A pull test that is diffusely positive indicates the potential of other diagnoses, such as telogen effluvium [3]. It is crucial to obtain a hair sample for microscopic examination. For many conditions affecting the scalp and hair, such as genodermatoses and other syndromes, light microscopy of the hair is a crucial tool [21].

Investigation

Investigation of AGA involves the use of various diagnostic tools and laboratory tests to confirm the diagnosis and rule out underlying conditions. Diagnostic tools such as dermoscopy, global photography, trichogram, phototrichogram and biopsy are used to evaluate hair growth, density, and scalp skin changes. Laboratory tests, including thyroid function testing, serum iron and ferritin may be necessary to

identify underlying hormonal imbalances, nutritional deficiencies, or other conditions that may be contributing to AGA. Laboratory tests for women are mostly performed to rule out any underlying hormonal abnormality, particularly polycystic ovarian disease. Prolactin, dehydroepiandrosterone (DHEAS), and the free androgen index test are the tests that are recommended. Congenital adrenal hyperplasia is one of the rarer disorders that may need to be ruled out with additional testing [3, 12].

Management

Contemporary Management

Minoxidil

Nowadays, minoxidil, an antihypertensive medication, is utilized in trichology for a wide range of purposes. Minoxidil works by hyperpolarizing cell membranes and opening potassium channels. Other more important actions of minoxidil on the hair follicles have been suggested including - increased expression of vascular endothelial growth factor (VEGF) mRNA in the dermal papillae, activation of cytoprotective prostaglandin synthase-1, an enzyme that stimulates hair growth and increased expression of hepatocyte growth factor (HGF) m-RNA which is another hair growth promoter. Topical 2% and 5% minoxidil solution, 1 ml applied twice daily is effective to prevent progression and improve AGA Hypertrichosis is the most frequent adverse reaction to topical minoxidil. Additionally, irritant and allergic contact dermatitis may develop [3].

5-alpha reductase inhibitors

Finasteride and dutasteride are two medications that inhibit the 5-alpha-reductase involved in AGA. Oral finasteride 1 mg a day is recommended to improve or to prevent progression of AGA with mild to moderate AGA. The response to treatment should be assessed at 6 months. Oral dutasteride 0.5 mg a day is another option, but sufficient studies are not available which compare its efficacy to finasteride. During pregnancy, finasteride should not be taken. Gynecomastia, decreased libido, and erectile dysfunction are uncommon side effects that have been documented [3,22].

Hormone

Typically, an oral contraceptive such as estradiol is administered in conjunction with cyproterone acetate (25–50 mg daily, days 1–10). Alfatradiol is a topical estrogen which results in deceleration or stabilization of hair loss. (20) The FDA has approved spironolactone (50-100 mg daily) as a medication for hyperandrogenism. Headaches, electrolyte imbalance, postural hypotension, and menstruation changes are among the possible side effects [23].

Unani Management

The Usūli ‘Ilaj (the principles of treatment) wa ‘Ilaj (treatment) have been documented by Unani scholars in their ancient books. In the management of Intithār al-Sha‘r, Unani physicians employ a multifaceted approach that encompasses risk factor modifications, *‘Ilāj bi’l Dawa* (pharmacotherapy), by use of advia with particular qualities of Quwwat Qābiḍa, Quwwat Jādhibā, Muqawwī wa Muṣawwīd Sha‘r, Munbit-i-Sha‘r and Taṭwīl-al-Sha‘r, Muqawwī Dimāgh, *‘Ilāj b’il Ghiza wa Tadbīr* (dietotherapy and regimen therapy) [24,25].

I. Ilāj bil-Dawa [10,26,27,28,29,30]

- Unani medicine uses a variety of herbs that are well-known for their positive benefits on hair health. Amla (Emblica officinalis), Brahmi (Bacopa monnieri), Bhringraj (Eplita alba), Jatamansi (Nardostachys jatamansi), and Azadirachta indica (Neem) *M*aghz badam (Prunus Amgdalus), Maghz tukhm Kaddu (Cucurbita Moschata Duch), Maghz tukhm-e-Khyarain (Cucumis Sativa), Suboos gandum (Wheat), Tukhme khashkash (Papaver Somniferum), Dana ilaichi khurad (Elettaria Cardammum) and Misri (Sugar) are a few of them. These herbs' anti-inflammatory, nourishing, and rejuvenating qualities strengthen hair

follicles, encourage hair growth, and enhance scalp health [31].

- Oral - Mu awwī Dimāgh (Brain Tonic) drugs like Itrifal Ustukhudoos, Itri al Sagh r, Itri al Mu awwī Dimāgh should be used.

II. Ilāj bil - Tadbīr - [10,26,27,28,29,30]

- *Ghasūl Sha'r* (hair wash): Lesdar (mucilaginous) and Jādhib (absorptive) medications, such as Āb khatmi (Althaea officinalis Linn), Asapghol (Plantago ovata), and Barge Baid (Salix Caprea), Nora (lime), Kafe daryah (Sepia officinalis), and Samandar Jhaag (cuttle fish bone) should be used. These drugs will be beneficial both in case of Defective mādda as well as in khuskhi wa kasafat-e-jild (Compactness and dryness of skin)
- Dalk (Massage): Roghane Nilofer (Nymphaea Alba Linn), Roghane Banafsha (Viola Pilosa Blum), Roghane Babuna (Anthemis Nobilis), Roghan-e-Gul (Rose oil), Roghan-e-Badam (Almond oil), Roghan-e-Zaitoon (Olive oil) and Roghan-e-Zarareeh. should be used for massaging the scalp.
- *Tila:* Hulba (Trigonella Foenum-Graecum), Mazu (Quercus Infectoria), Kishneez (Coriandrum Sativum), Sumbul-utteeb (Nardostachys Jatamansi), Laadin, Aqaqia (Acacia Arabica), Javitri (Myristica Fragrance) and Khabsul Hadeed (Iron rust) are powdered together, then mixed with Osara to form Qurs. Use three times in every month as tila, in hair loss caused by Mutkhalkhul-e-jild (Abnormal dilatation of pores).
- Employ the following medications as tilā to the scalp to open the skin pores, or masamaat: khardil (Brassica nigra) and Safsiya, khardil (Brassica nigra), Suddab (Ruta Graveolans), Bora (Boric Powder) and Payaz (Urginea Scilla)
- Pachne: The ancient Unani medical academics recommended injuring the scalp and using mechanical stimulation to treat baldness. Pachne are the traditional techniques that use tiny needles or surgical blades to cause microinjuries [6].

III. Ilāj bil Ghidha [10,27,28,29,30]

- Utilization of Latī Jayyid al-kaymūs Ghidhā (Good Chyme Foods), such as Bhuna Hua Gosht (Meat) and Zardi Baiza Murgh (Egg yolk), in hair loss caused by malnutrition.
- The use of Ma-al-Jubn or the cheese water (whey) is effective for obstructed skin pores.
- Khushk (dry), namkeen (salty), hirrī Ghidhā (spicy dishes), and ghalīz (greasy) ghidha should be avoided.
- In narrow skin pores, it is advised to consume spices and dry foods like camel meat, goat and fresh fish, darchini (Cinnamomum zeyanicu) and siyah mirch (Piper nigrum) and avoiding foods that generate balgham (phlegm).

DISCUSSION

Androgenetic Alopecia (AGA) is a prevalent cosmetic concern affecting both men and women equally. Clinically, it is characterized by progressive baldness, influenced by multiple factors, with the miniaturization of hair follicles due to androgen hormones being the primary cause. Genetic predisposition plays a crucial role, particularly in individuals with a family history of AGA. Additionally, dietary habits, environmental influences, and the loss of contact between the erector pili muscle and hair follicle bulge contribute to its development.

In Unani medicine, AGA is described under the heading of Sula. Key contributing factors include poor production of Bukharat-e-Dukhaniyya, Tkhalkhul-Jild, and the accumulation of morbid materials beneath the skin. Diagnosis involves a comprehensive clinical history, physical examination, diagnostic tests, laboratory assessments, and scalp biopsy.

Despite advances in treatment—such as PRP therapy and laser interventions—AGA remains a significant health concern, often

leading to psychological distress, frustration, embarrassment, and reduced self-esteem. The Unani system of medicine not only addresses the underlying causes of hair loss but also emphasizes optimizing the body's humors. Given its multifactorial nature, Unani medicine adopts a holistic approach through Ilaj bil Dawa, Ilaj bil Tadbeer, Ilaj bil Ghiza.

Integrating these Unani regimens with modern scientific principles may enhance patient outcomes and treatment adherence, offering a comprehensive and effective strategy for managing AGA.

CONCLUSION

The Unani system of medicine offers a wealth of literature on the etiology, pathogenesis, and management of Androgenetic Alopecia (AGA). In Unani medicine, AGA is categorized under Sula, with key contributing factors including poor production of Bukharat-e-Dukhaniyya, Tkhalkhul-Jild, and the accumulation of morbid materials beneath the skin.

By addressing these causative factors and embracing holistic healing, Unani medicine provides valuable insights into understanding and treating AGA. Integrating Unani principles with modern medical perspectives enhances our comprehension of this complex condition. Future research should focus on bridging traditional therapies with advanced medical interventions to improve treatment outcomes for AGA.

Declaration by Authors

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