An Overview about Alopecia Areata; Clinical Presentation and Diagnosis

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Abstract

Background: Alopecia areata (AA) is a nonscarring hair loss disorder with a 2% lifetime risk. Most patients are below 30 years old. Clinical types include patchy AA, AA reticularis, diffuse AA, AA ophiasis, AA sisiapho, and perinevoid AA. Besides scalp and body hair, the eyebrows, eyelashes, and nails can be affected. The disorder may be circumscribed, total (scalp hair loss), and universal (loss of all hairs). Atopy, autoimmune thyroid disease, and vitiligo are more commonly associated. The course of the disease is unpredictable. However, early, long-lasting, and severe cases have a less favorable prognosis. The clinical diagnosis is made by the aspect of hairless patches with a normal skin and preserved follicular ostia. Exclamations mark hairs and a positive pull test signal activity. Dermoscopy may reveal yellow dots. White hairs may be spared; initial regrowth may also be nonpigmented. The differential diagnosis includes trichotillomania, scarring alopecia, and other nonscarring hair loss disorders such as tinea capitis and syphilis.

Keywords: Alopecia areata

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Introduction

AA is an autoimmune condition that attacks the hair follicles, causing nonscarring hair loss. Population studies from the Rochester Epidemiology Project estimate a lifetime incidence of AA of 2.1%, in a population in Olmsted County, Minnesota, with no difference in incidence between genders. A systemic review of the epidemiology of AA indicated a similar worldwide lifetime incidence of around 2%. Some smaller studies indicate a slight female-to-male gender bias, but this may be due to higher female concern regarding hair loss and subsequent treatment. The disorder can occur at any age and the lifetime incidence appears to increase at an almost linear rate.The median age at diagnosis is 33.Male patients may be more likely to be diagnosed in childhood, while females are more likely to present in adolescence and have greater concomitant nail involvement or concomitant autoimmune diseases. **(1) .**

Alopecia areata seems to have a genetic basis. A 55% concordance rate between identical twins has been observed. Recent genome-wide association studies (GWAS) metanalysis have localized the HLA signal of AA mostly to the HLA-DRB1. One locus harboring the genes that encode the natural killer cell receptor D (NKG2D) was implicated in AA and not in other autoimmune diseases, which suggests a key role in pathogenesis. Therefore, CD8+ NKG2D T cells have been a subject of study and found to be the major effectors in AA **(1).**

The overall incidence is approximately 20.2 per 100,000 person-years.The lifetime risk of presenting AA in the general population is approximately 2%.**(2).**

The prevalence of AA ranges from 0.1 to 0.2%, depending on the geographic location and ethnic background. The prevalence of adult patients with a family history is estimated to be between 0 and 8.6%. **(2).**

Alopecia areata incidence appears to increase almost linearly with age, but the mean age of onset appears to be between 25 and 36 years. Early onset AA (between 5 to 10 years-old) predominantly presents as a more severe subtype.Data shows no demonstrable sex predilection. **(2).**

It carries associations with an increased overall risk of other autoimmune diseases (16%), including lupus erythematosus, vitiligo, and autoimmune thyroid disease. Additionally, an association with atopic dermatitis exists in 39% of cases. **(2).**

A significant feature of the hair follicle is its relative immune privilege, this mainly established by suppression of surface molecules required for presenting autoantigens to CD8+ T lymphocytes (i.e., MHC class I) and by the generation of an inhibitory local signaling environment.The breakdown of the immune privilege of the hair follicle has been thought to be a significant driver of AA. **(3)**.

Alopecia areata is a disorder of hair follicle-cycling, where inflammatory cells attack the hair follicle matrix epithelium that is undergoing early cortical differentiation (anagen hair follicles), which are then prematurely induced into the catagen phase. However, since no destruction of hair-follicle stem cells occurs, the hair follicle retains its capacity to regenerate and continue cycling. Thereby, follicles re-enter the anagen phase normally but do not develop beyond the anagen III/IV phase. **(3)**.

Presumably, alopecia areata develops in a previously healthy hair follicle because its immune privilege collapses. Therefore, it could occur in a genetically predisposed person only when proinflammatory signals (i.e., IFN gamma, substance P) known to upregulate MHC class Ia in human hair-follicle epithelium expose previously unrevealed follicle-associated autoantigens to preexisting autoreactive CD8+ T cells. **(3)**.

Since only anagen hair follicles undergo attack, those autoantigens may generate and then be presented only during anagen. **(3)**.

The precise event that precipitates alopecia areata is unknown. Some triggers have been reported, most commonly emotional or physical stress, vaccines, viral infections, and drugs. **(3)**.

Clinical presentation:

According to **Rivitti, (4),** AA is clinically classified into several types:

1. Classic forms:

a-Alopecia areata in single or unifocal patch **(Figure 1):**

Characterized by a single, round or oval, smooth bald patch, with normal skin color and normal hair appearance in the periphery of the patch. **(5).**

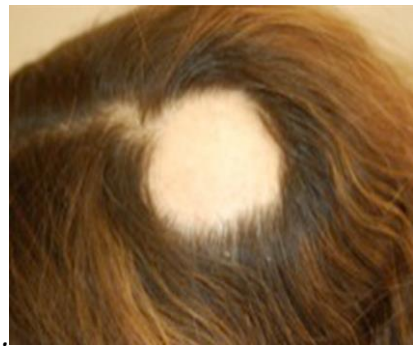


Figure (1) Single patchy alopecia (5).

b - Alopecia areata in multiple or multifocal patches **(Figure 2)**:

Like unifocal type but with multiple affection of scalp or any hair bearing sites.

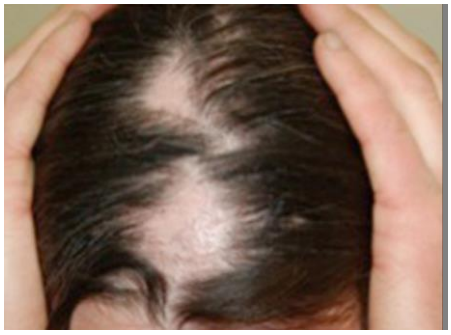


Figure (2) Multiple patchy alopecia (5).

c - Ophiasic alopecia areata **(Figure 3)**:

In this presentation, the hair loss occurs along the line of temporo-occipital implantation, leading to an extensive alopecic area, in a band that reaches the inferior margins of the scalp.

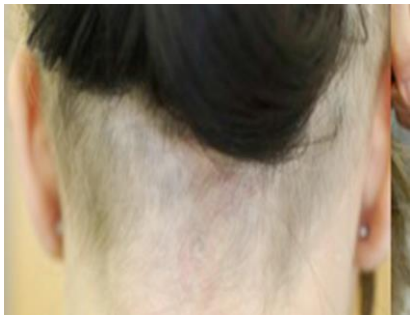


Figure (3): Ophiasis (5).

d - Alopecia totalis **(Figure 4):**

There is a total loss of terminal hair of the scalp without affecting of other body hair.

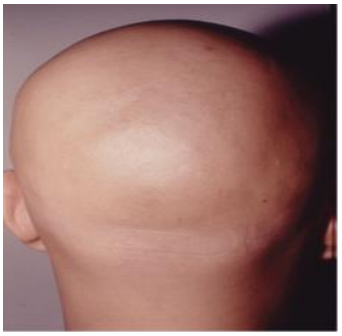


Figure (4): Alopecia totalis (4)

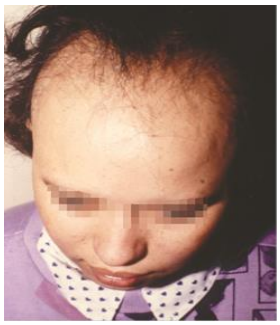
e - Alopecia universalis:

There is total loss of body hair, involving the scalp, eyelashes, eyebrows, beard and mustache and genital areas.

2. Atypical forms

a- Sisaifo type alopecia areata (inverse ophiasis) **(Figure 5)**:

In this form, the hair loss involves the entire scalp except for the lower margins, along the line of temporo-occipital implantation. It is the inverse clinical image of the ophiasis form.



Figure(5):Sisaifo alopecia areata (4)

b - Reticular alopecia areata **(Figure 6)**:

In this form, multiple alopecic patches occur separated by narrow bands of preserved hair, conferring a reticulated aspect to the picture.

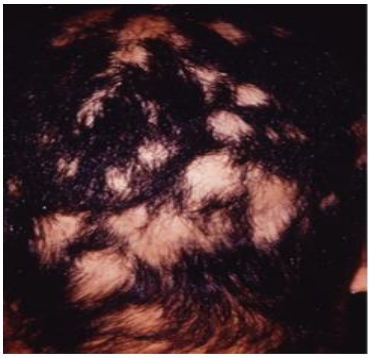


Figure (6) : Reticular alopecia areata (4)

c - Diffuse alopecia areata **(Figure 7)** :

In this form, the hair loss is acute and widespread. It can be the initial form, mainly among children and adolescents. Most of these cases develop into the more serious alopecia totalis or alopecia universalis forms. It is the most difficult form to vdiagnose. **(6) .**

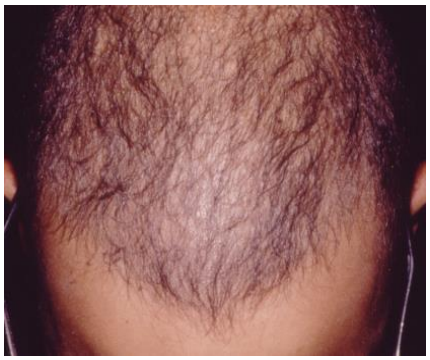


Figure (7): Diffuse alopecia areata (4)

Associated nail abnormalities

The most common nail changes associated with AA in adults are pitting (11.4–0.6%) and trachyonychia (8–14%). Other reported changes include longitudinal ridging, Beau's lines, onycholysis, punctate leukonychia, red spotted lunulae **(6).**

Comorbidities in alopecia areata:

Alopecia areata is associated with various systemic and psychiatric diseases such as alexithymia, anxiety, and depression **(7)**. Systemic diseases as atopic diseases particularly atopic dermatitis, allergic rhinitis and allergic conjunctivitis, connective tissue disorders as systemic lupus erythematosus, vitiligo and psoriasis **(8),** audiologic and ophthalmic abnormalities in form of fundus changes, lens opacities, retinal pigment epithelium changes and dry eye, but all these findings don't affect visual acquity **(9)**.

Thyroid disorders may be present also at the time of diagnosis or develop later in the course of disease. Factors associated with increased risk for this disorder are: a personal history of Down syndrome or atopy and a family history of thyroid disease or clinical findings (goiter) in AA patient **(10). There** have been also several reports of a higher rate of thyroid autoantibody positivity in patients with AA. Metabolic syndrome, vitamin D deficiency, iron deficiency anemia, *Helicobacter pylori* infection are seen to be present in some AA patients **(11).**

Course and prognosis:

The course of the disease is unpredictable. In most cases, AA takes a chronic but mild course with episodic patches. In up to 50% of patients with patchy AA, spontaneous regrowth occurs within 12 months, in 66% of patients within 5 years. However, the risk of recurrence is 85%. **(12) .**

The prognostic factors for AA include the type and extent of hair loss, duration of hair loss, age at onset, family history, nail changes, and atopy. The first two indicators (type and extent of hair loss and duration of hair loss) are the most important factors **(13)**.

Diagnosis:

The evaluation of AA patient involves full (personal, present, past, family) history , medical examination of full body (scalp , face , nail) , hair pull test , dermoscopic examination , scalp biopsy and serology tests for assosciated autoimmune diseases. In most cases, clinical examination is sufficient for diagnosis. Alopecia areata is suspected in patients with the following characters: smooth, separate areas of hair loss, affected skin may be slightly red and exclamation point hairs at the margins of patches.They are short broken hairs extracted easily with minimal traction , may be difficult to be seen but their absence does not exclude AA **(14) .**

Pull test:

This test is done by gentle traction of a bundle of 50-60 hairs whether from the periphery of the patches in localized forms, or from several areas of the scalp in diffuse forms. This test is positive with epilation of > / = 10% of pulled hairs. In acute stage, this test is positive (the hair is plucked easily). In the most chronic stage, the test is negative **(15).**

Dermoscopy:

Dermoscopy is an easy and noninvasive method that is used for diagnosis of AA, evaluating its activity and follow up. Dermoscopic findings reported are yellow dots, short vellus hairs, black dots, exclamation mark hairs, tapering hairs, pigtail hairs and broken hairs. Dystrophic hair fibers with monilethrix-like constrictions also may be seen **(Figure 8) (16).**

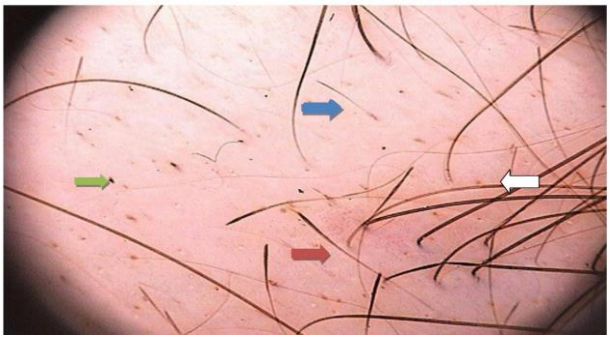


Figure (8): Trichoscopic features of AA shows multiple exclamation mark hairs (blue arrow), tapered hairs red arrow), black dots (green arrow), and yellow dots (white arrow). This image indicates an active phase of the disease **(17).**

Histopathological findings:

The scalp biopsy is taken from the edge of the lesion and away from sites susceptible to androgenetic alopecia **(18).** The pathologic findings in AA differ according to the stage of the disease:

In acute and subacute stage, there are peribulbar and intrabulbar inflammatory infiltrates (CD4+, CD8+ T- cells, macrophages and foreign body giant cells), edema, microvesiculation and apoptosis surrounding

anagen follicles. These infiltrates resemble swarms of bees. There is also a shift from the catagen phase to the telogen phase, with follicle miniaturization. In the chronic stage, there are increase in catagen or telogen hairs, pigmentary incontinence and the inflammation may or may not resolve. In the recovery stage, there is minimal inflammation and anagen hair count increases **(19).**

Differential Diagnosis

The possibility of other disorders should be considered in patients presenting with non cicatricial patchy or diffuse hair loss. Patchy non scarring hair loss includes tinea capitis, nervous hair pulling (trichotillomania), tractional alopecia and triangular alopecia. Diffuse hair loss includes female pattern hair loss, male pattern hair loss, telogen effluvium and anagen effluvium ***(*5).**

Scoring systems of alopecia areata:

There are many tools that are used for evaluation the severity of AA.They are helpful for determining the appropriate line of treatment and predicting the disease prognosis. "Severity of Alopecia Tool score" (SALT score) is considered one of these tools that estimate the extent of AA of the scalp **(13).**

Accorrding to SALT score, scalp is divided into 4 areas namely, Vertex-40% (0.4) of scalp surface area; right profile of scalp-18% (0.18) of scalp surface area; left profile of scalp-18% (0.18) of scalp surface area; posterior aspect of scalp-24% (0.24) of scalp surface area. Percentage of hair loss in any of these areas is percentage of hair loss multiplied by the percent of surface area of the scalp in that area. The total score is the sum of percentage of hair loss in all above mentioned areas **(20)**.

Subgrouping of scalp hair loss is divided into the following subclasses: S0 = no hair loss, S1 = 25% hair loss, S2 = 25-49% hair loss, S3 = 50-74% hair loss, S4 = 75-99% hair loss (a = 75-95% hair loss b = 96-99% hair loss) S5= 100% hair loss **(13)**.

Using the doctor and patient insights, the AA Investigator Global Assessment (AA-IGA) was developed. It is an ordinal measure that can give clinical evaluation of AA treatment outcomes. It can be used also to determine clinically meaningful treatment success for AA, with success defined by patients and doctors as reaching < 20% scalp hair loss. The key levels of that scale are: the first level (none 0%) = absence of scalp hair loss, the second level (limited) = 1-20% hair loss, the third level (moderate) = 21-49 % hair loss, the fourth level (severe) = 50-94% hair loss and the fifth level(very severe) = 95-100% hair loss **(21).**

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