Alopecia Areata (AA, Patchy Hair Loss) — Causes and Treatment

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Alopecia areata is a non-scarring hair loss disorder that can occur in any part of the body, ranging from a small patch to complete loss of hair, without significant age or sex predisposition. Although the exact etiology is unknown, several patient-specific genetic, immunological, and environmental factors have been implicated. The underlying pathology is probably peribulbar infiltration of CD4+ and CD8+ cells around the hair follicles. No universally effective treatment exists, although topical or intralesional steroids and other medications, such as minoxidil and anthralin, are usually administered. Psychological distress of the patient should also be addressed by counselling and/or other measures.

Epidemiology of Alopecia Areata

Alopecia areata affects 1% of the population (although this figure varies from 0.1% to as much as 2%). There is no sex predisposition, but men seem to be more frequently affected with severer forms of the disease than do women. It starts more commonly in children and young adults, and has a sudden onset. Inter-ethnic variation is not
Etiology of Alopecia Areata

The etiology of alopecia areata remains unclear, but it may be related to genetic, immunological, and environmental factors.

- **Genetic factors**: About 20% of the patients with alopecia areata have at least one parent or sibling affected, who are affected. The concordance among **monozygotic twins** is 55%. Some **HLA class II genes** are shown to be associated with **alopecia areata**: DQ3, DQ7, DR11, DR4, DR5, and DPW4, with the former three predisposing to more severe forms. One study also reported that eight genomic loci are associated with this disease.

- **Immunological factors**: Many patients with alopecia areata have other autoimmune disorders, such as *lupus erythematosus*, *scleroderma*, *thyroiditis*, *celiac disease*, etc. Also, the fact that steroids and immunomodulators are effective against this disease further suggests an autoimmune pathology.

- **Environmental factors**: Stress (physical or emotional), infections (e.g., cytomegalovirus), and hormones (e.g., corticotropin-releasing hormone) predispose to autoimmunity.

Pathology and Pathophysiology of Alopecia Areata

Alopecia areata is essentially an autoimmune disease affected by a genetic predisposition and/or environmental factors. The loss of immune privilege by the hair follicle (perhaps due to attack by the natural killer cells) and the subsequent changes in the cytokine/chemokine profile leads to the infiltration of T-lymphocytes around the bulb.

In Alopecia areata, due to various inflammatory and autoimmune reactions, hairs don’t progress beyond the anagen phase. The hair enters the anagen phase (don’t complete this phase properly) and then quickly enters the telogen phase (dying phase). This cycle continues in alopecia areata.

Important: One of the two hallmarks of alopecia areata is peribulbar infiltration of **CD4+** and **CD8+ cells** around anagen follicles. (The other is the presence of exclamation mark hair.)

Symptoms of Alopecia Areata

There is a sudden onset of non-scarring patch or patches of hair loss on any hair-bearing area, most commonly the scalp and also the beard area. Rarely, the eyebrows can also be affected.

Most patients have only a single patch, but two or more than two patches aren’t rare. The multiple patches may coalesce into a large area of alopecia. The patches themselves are asymptomatic; however, some patients may experience itching or burning.

Alopecia, although normally uni-or multifocal, can come in various forms:

- **Alopecia totalis**: Complete loss of hair on the scalp.
- **Alopecia universalis**: Complete loss of hair on the entire epidermis.
- **Ophiasis**: A band of hair loss on the occipital scalp.
- **Sisapho** (ophiasis spelled backwards): the opposite of ophiasis, i.e., the band of hair loss is more frontal.
- **Diffuse alopecia areata** (also known as alopecia areata incognita): A very rare form characterized by the absence of typical patches of hair loss, but rapid progression to alopecia totalis or universalis; predominantly in young women.

The severity of the disease is classified as follows:

- **Mild**: Three or fewer patches or < 3 cm.
- **Moderate**: More than 3 patches or at least one patch > 3 cm
- **Severe**: Alopecia totalis or universalis.

### Diagnosis of Alopecia Areata

The diagnosis of alopecia areata is mainly clinical; an excisional biopsy is rarely needed. Some of the clinical tests that can be performed are:

- **Pull test**: Considered positive if > 10 hairs are pulled out.
- **Pluck test**: Examination of the root of the plucked out hair.
- **Trichoscopy**: Examination using a dermoscope. Findings include hyperkeratotic plugs, *exclamation mark hair* (considered to be pathognomic of alopecia areata), and destroyed hairs.

### Differential diagnoses

Other skin diseases can also have patchy hair loss:

- **Tinea capitis**: There is inflammation and *Wood light and KOH examination* can reveal the presence of fungus.
- **Trichotillomania**: Incomplete hair loss with negative pull test (*epilation test*).
- **Cicatricial alopecia** (e.g., *lichen planopilaris, chronic discoid lupus erythematosus*) - patchy erythema and hyperkeratosis is present; excisional biopsy can help differentiate.
- **Androgenic alopecia** - genetic predisposition and family history.

**Diffuse alopecia areata** must be differentiated from the following conditions:

- **Syphilis** - serological testing; other clinical signs and symptoms.
- **Telogen and anagen effluvium** - lack of exclamation mark hairs; history of intake of a causative drug.
- **Loose anagen hair syndrome** - anagen hairs on *trichogram*; mainly young children with blond hair; autosomal dominant inheritance.

### Management of Alopecia Areata

At present, there is no cure for alopecia areata, nor is there any effective agent that universally induces remission. The treatment includes *topical, intralesional*, and/or *systemic agents*, and varies with patient age and disease severity.

**Important**: The first-line therapy usually is *high-potency corticosteroids* (e.g.,
betamethasone lotion or clobetasol gel) or intralesional (e.g., multiple 1-mL injections of 2.5–10 mg/mL triamcinolone acetate) because of their anti-inflammatory effects.

Some prefer intralesional steroids over topical steroids, especially for small patches of alopecia. Redness and spots are possible at the site of injection. Systemic corticosteroids are not preferred because of high side effects and also high relapse rates; however, short-term therapy, such as pulse methylprednisolone or oral mini-pulse therapy, is reported to be effective.

Minoxidil (usually as 5% lotion for men and 2% for women; twice daily, not more than 25 drops twice a day) is another agent that is used in the treatment of alopecia areata. It works by stimulating hair growth, especially follicular proliferation. It may be given alone or combined with anthralin. Skin irritation may occur, manifesting as itching, rash, spots, etc., at the site of application.

Short-contact or overnight treatment of anthralin (usually as 0.5 – 1% cream) has irritant properties, as well as immunosuppressive and anti-inflammatory properties. It has reported to be effective, and recommended in children. The adverse effects of anthralin are scaling of the skin, folliculitis and lymphadenopathy. Anthralin preparations can stain the clothes.

Topical immunomodulators (e.g., dinitrochlorobenzene, diphenyl-cyclo-propenone, or squaric acid dibutylester) work by inducing allergic contact dermatitis. Another therapy with reported efficacy is psoralen with ultraviolet A (PUVA); however, it has a high relapse rate. Other drugs include topical tacrolimus, topical cyclosporine and methotrexate.

Important: Young patients (age < 10 years) are given topical corticosteroids or minoxidil or anthralin. Patients older than 10 years of age with < 50% of scalp involvement are given topical or intralesional corticosteroids or minoxidil or anthralin. Patients in whom > 50% of the scalp is affected should be given topical immunomodulators as the first-line therapy; if the response is poor, however, topical corticosteroids or minoxidil should be tried.

Therapies of uncertain efficacy in the treatment of alopecia areata include aromatherapy (massage of certain essential oils every day for 2 minutes on the patches).

There is a lot of psychological distress among these patients. Counseling and psychotherapy may be advised, as well as wigs may be prescribed to such patients.

### Progression and Prognosis of Alopecia Areata

Data regarding progression are limited. There is a high spontaneous remission rate for mild cases. Patients with moderate diseases have lower rates of spontaneous remission, and those with severe diseases can, in fact, have a high relapse rate. The prognosis is especially poor in those with alopecia totalis or universalis.

### Exam Questions on Alopecia Areata

The correct answers can be found below the references.

1. An 8-year-old boy is brought in by his parents for a small patch of no hair on the left eyebrow. Examination reveals it to be alopecia areata. Which
of the following treatment would be the first choice?
   A. Intralesional steroids
   B. Methotrexate
   C. Dinitrochlorobenzene
   D. Cyclosporine
   E. Minoxidil

2. A 25-year-old man presents with a patch of hair loss on the beard area, which can sometimes be itchy. There is no hyperpigmentation on the patch, and the hair at the margin is easily pluckable. What is the diagnosis?
   A. Telogen effluvium
   B. Tinea capitis
   C. Alopecia areata
   D. Androgenic alopecia
   E. Anagen effluvium

3. Which of the following is the mechanism of action of minoxidil used to treat alopecia areata?
   A. Follicular proliferation
   B. Collagen production
   C. Increased production of epidermal cell
   D. Prolongation of telogen phase

References
Rook’s textbook of dermatology. Chichester, West Sussex: John Wiley & Sons Inc. PP 89.30-89.34.


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Correct answers: 1E, 2C, 3A

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