WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

A Brief Study on Alopecia Areata

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ABSTRACT:

Alopecia areata (AA) is a complex autoimmune condition that causes nonscarring hair loss of scalp or/and body.It commonly presents with sharply demarcated round patches of hair loss and may present at any stage of life. Atopy and autoimmune thyroiditis are most normal related conditions. Treatment is mainly focused to contain the disease activity. Current medicines and treatments including topical, systemic and injectable mediations show different reaction and persistent relapses reflecting the neglected clinical need. The etiology of AA is complicated and includes genetic and environmental factors, with significant advancements in genetic research occurring in recent years. This disease commonly presents as round or patchy uncovered spots without scarring.Treatment choices for alopecia areata include topical corticosteroids, immunotherapy, and minoxidil, among others. In some cases, it can also affect the nails, making them weak or pitted. At times, the condition might advance to total hair loss on the scalp (alopecia totalis) or even the whole body (alopecia universalis).

KEYWORDS: Alopecia Areata, Coorticosteroid, Trichoscopy, Dermoscopy, Immunotherapy and Minoxidil.

INTODUCTION:

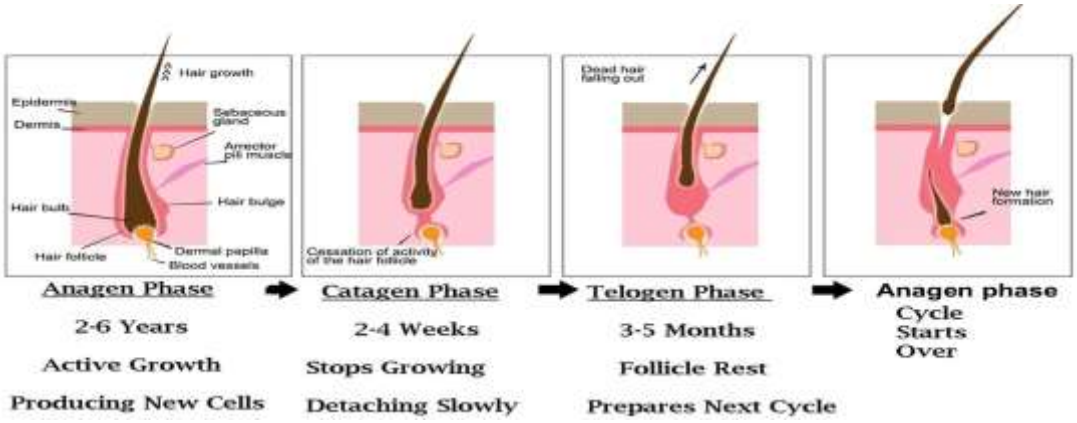
Alopecia areata (AA), an immune system, nonscarring type of alopecia, creates an internal conflict for many patients, often leading to feelings of rejection and relatively high rates of depression and anxiety. Alopecia including the scalp or/and body, characterized by hair loss without any clinical inflammatory signs. It is one of the most well-known type of hair loss seen by dermatologists and accounts for 25% of all the alopecia cases.[1]

The term alopecia comes from the Greek alopex, 'fox', originally referring to mange in foxes, and can be associated with a wide variety of conditions such as genetic, autoimmune, infectious and environmental. Sometimes, it is not necessary to apply any treatment to grow hair again, but sometimes, it is an obligation to treat hair loss. Manytimes, hair will not re-grow.[2]

Twenty percent of cases were children, and 60% of AA patients had their first patch before 20 years of age. It represents 2-3% of the new dermatology cases in UK and USA, 3.8% in China, and 0.7% in India. In overall population, the prevalence was assessed at 0.1-0.2% with a lifetime hazard of 1.7%. Both males and females are similarly impacted. Family members are impacted in 8.7-20% of cases [3].

Hair is a derivate of the epidermis. Hair has two distinct parts: one of them is the hair shaft and the other is the follicle. The age of hair depends upon the follicle. Cortex, cuticle cells and a medulla for few kinds of hairs are the parts of the hair shaft. The range of hair development depends upon numerous endocrine, neural stimuli and vascular stimuli. Different factors, for example, age, localization of the hair and dietary habits have an impact on the nature of hair. Almost there are 5 million hair follicles in people, and scalp has 100,000 of them. Mainly terminal hairs are on scalp, eyelashes and eyebrows, while vellus hairs cover the remain of the body.[4]

Hair growth cycle consists of growth (anagen), regression (catagen), rest (telogen) and shedding exogen); mature folicles go through all of these process. The location of the hair, .no.hormonal balance, personal nutrition and age can affect the duration of the phases.{fig.1}



{FIG:1-HAIR GROWTH CYCLE}

Androgenetic alopecia happens ordinarily in males and it is a male-type hair loss. This disease is known as the most well-known type of hair loss; it is progressed by alopecia areata, tineacapitis, telogen effluvium and scarring alopecia. The most essential point of this course is hereditary and hormonal reasons. It has been found that middle-aged white men are mostly exposed to this disease. This problem generally affects 30% of white men at age of 30,50 and 80% at 70.[5]

HISTORICAL BACKGROUND:

The first use of the phrase alopecia area is attributed to Polish physician John Jonston (1603–1675) in his book "MedicinaPractica," written in 1664. The term alopecia areata (AA) was introduced by French physician Sauvages de Lacroix (1706–1767) in "NosologiaMethodica," published in 1763. The original clinical description of AA comes from "A Practical Synopsis Of Cutaneous Disease" written in 1817, by Thomas Bateman (1778–1821), apprentice to renowned dermatologist, Robert Willan.Bateman described "bald patches, mainly circular," with hair regrowth that "is softer and lighter in color than before." However, rather than AA, he named it "porrigodecalvans," meaning depilating scalp disease. He recommended treatment with oil of mace.In 1929, French dermatologist and mycologist, Raymond Sabouraud (1864–1938), collated information from over 200 cases, noting positive family histories in 20% and strong associations with diseases, later understood to be autoimmune.[6]

TABLE:1) A timeline of treatment development development in AA history.[7]

YEAR	DESCRIPTION
1500 BCE	The Ebers papyrus is written by an unknown scribe, the first known historical record of AA as "bite alopecia."
30 CE	Cornelius Celsus, in De Medicina, describes "Alopekia," bald areas, which occurred in both the scalp and the beard; and "Ophiasis," bald areas that spread like the windings of a snake.
600 CE	Chao Yuanfang, in his script Treatise on the Origin and Symptoms of Diseases, presents the first attempt to explain AA pathogenesis as an invasion by the evil wind spirits.
980 CE	Hali Abbas (Ali Abbas al-Majusi), in his script Liber regalis (al-Kitab al-Maliki), categorizes AA as a form of leprosy and likens the nature of AA to snakes casting their skin
1170	The belief that AA is a form of leprosy persists and it is described as the "fox disease" by Roger Frugard.
1664	Johannes Jonston, in his text MedicinaPractica, first uses the term "alopecia area."
1763	François BoissierSauvages de Lacroix, in his book NosologiaMethodica, first uses the phrase "alopecia areata."
1847	Pierre Louis AlphéeCazenave publishes the first description of an association between AA and vitiligo; at the time thought to be of nervous origin.
1881	Collier and other colleagues publish case reports describing physical trauma causing AA onset.

1886	Max Joseph presents the first investigation with an animal model of AA suggesting that patchy hair loss could be induced by cutting the spinal ganglia of the second cervical nerve in the necks of cats. SébastienGiovannini identifies focal inflammation in and around AAaffected hair follicles and hypothesizes an inflammatory mechanism of AA development.
1950	A clinical data study by Anderson identifies increased psychosomatic stress in relation to AA onset.
1971	Billingham and Silvers identify hair follicle "immune privilege" after observing that melanocyte allotransplants to anagen hair follicles avoided immune rejection.
1998	Gilhar and colleagues show AA can be promoted by injection of T cells.
2010	Petukhova and colleagues publish genome-wide association studies (GWAS) identifying multiple susceptibility loci related to both the adaptive and innate immunity in AA patients.

TYPES OF ALOPECIA:

1.Alopecia Areata (primary stage): Alopecia areatais a typical autoimmune illness that outcomes in the loss of hair on the scalp and elsewhere. It usually begins with one or more small, round, non-scarring smooth patches.

2.Mild Transient Alopecia Areata: Patient with repeated transient alopecia areata but never converts into alopecia totalis or universalis.

3.Transient Alopecia Areata: Patient with Alopecia areata in progressive phase and some of them converts into Alopecia totalis/Alopecia universalis.

4.Ophiasis Alopecia Areata: Ophiasistype of alopecia areata shows a band like hair loss. It occurs mostly in the temporal or the occipital regions of the scalp, and therefore it is more difficult to treat, as most medicines have a delayed action on these areas.

5.Alopecia Totalis: Loss of hair from entire Scalp.

6.Alopecia Universalis: Loss of hair from entire body including eyebrows and eyelashes.

7.Scarring Alopecia: Any inflammatory process (burns, bacterial infections, ringworm, injury) sufficient to cause permanent loss of follicles, affected area known as scarring alopecia.

8.Tricotilomania: This type of hair loss is known as compulsive pulling or repetitive self pulling by a patient himself/herself.

9.Traction Alopecia: Hair style that ties hairs so tight can cause much traction at the root of hairs, and can develop traction alopecia.

10.Chemotherapy and hair loss: Chemotherapy is exclusive treatment for cancer patients but it affects normal cells and hair follicles too. This causes hair loss and known as anagen effluvium type of alopecia. [8]

EPIDEMIOLOGY:

Alopecia areata is an immune-mediated condition prompting non-scarring alopecia of the scalp and another hair-bearing region of the body. It influences up to 2% of the worldwide population.[9]

1. Epidemiology: family history of AA

Patients with AA reporting a family history of the disease have been estimated between 0% and 8.6%.[10] In children, rates of family history of AA have been reported to be between 10% and 51.6%[11,12,13]. One study found that males were more likely to have a family history than females were.[14]

2. Epidemiology: distribution by sex

Ten different hospital-based studies from across the world, however, have cited a female predominance, ranging from a ratio of 2.6:1 to 1.2:1.[15,16]. In children, there was a male predominance at 1.4:1 in two studies, with one citing boys as having more severe involvement; a third study reported girls as having more severe disease.[17]Male patients were reported as receiving a diagnosis of AA at an earlier age than female patients. Females were found to have a greater likelihood of extensive AA than males[18].

3. Epidemiology: distribution by age and body site

AA has historically been more common in the more youthful age groups. The biggest age group introducing for care was 21-40-years of age, followed by the 1-20-year age group, the 41-60-year age group, lastly the 61-80-year age group.[19]Most literature proposes that there is no remarkable difference in frequency rates between males and females. A few studies have recommended higher frequency in females, but this may be due to greater awareness and attention to hair loss and subsequent treatment in females.[20]

CLINICAL FEATURES:

AA is most generally seen incidentally by the patient, a relative, or hairdresser. The disease is asymptomatic although a few patients may report pruritus, burning sensation, or pain.Nail pitting is the most well-known nail irregularity seen in AA.[21] Dermoscopic highlights that are seen in AA involve yellow dots, black dots, broken hairs, short vellus hairs, and tapered hairs. Nail irregularities are related with the disease with a frequency estimated in the middle of 7% and 66%.[22] For a proper scalp and hair examination, patients should be positioned on a chair rather than on an examination table. The patient's scalp must be examined 3608, including the back, front, top, and sides. In addition, a decent lighting source and an amplifying lens or a dermatoscope should be available. Any hair pieces, extensions, or hair pins should be eliminated if possible.[23,24]

TRICHOSCOPY:-

Trichoscopy is dermatoscopy of the hair and scalp.Trichoscopy allows for magnified observation of the following:-

(1) hair shafts, (2) hair follicle openings, (3) the perifollicular epidermis, and (4) blood vessels. Abnormalities in the appearance of these structural components of the scalp aid in the differential diagnosis of hair loss.[25]

DERMOSCOPY:-

Dermoscopy is a simple and helpful strategy to notice hair loss. Dry dermoscopy, additionally called trichoscopy, is ideal because it has the blocking filter against light reflection from the skin surface and it can be done directly without application of the gel. Presence of black dots, broken hair, and tapering hair suggest active disease. Black dots and yellow dots are proportional to the seriousness of AA, and tapering hair does not have any correlation with severity. Yellow dots are also seen in androgenetic alopecia. [26]

The scalp is the most usual site affected by AA (90%).The affected skin seems normal with no epidermal adjustment grossly apparent like scaling or follicular abnormalities.The affected hairs go through a sudden transformation from anagen to telogen, clinically seen as localized shedding. characteristic hairs, known as "exclamation point hairs," may be seen within or around the areas of alopecia.[27]

The skin of the affected patches is generally ordinary and smooth, rarely a slightly pinkish coloration can be notsiced. A soft, cushion-like infilteration may rarely be felt. Normally, the patches are symptomless. But occasionally, patients describe some tingling, itching, or dysesthesia, at times preceding the hair loss.[28]

PATHOPHYSIOLOGY:

There is unusual hair cycling in AA. Anagen follicles may enter telogen prematurely, or some may survive for some time in a dystrophic anagen state.[29] Evidence in support of IP and its collapse in AA is obtained from both human and rodent studies. Sadly, there are restricted relative data on HF IP between the two species. The central mechanisms of immune tolerance control that influence skin and HFs are likely comparable between rodents and humans.[30]

Assuming we compared to IL-1 and TNF-α , IFN-γ offers the most potent cytokine stimulus for ectopic MHC class I expression in murine pelage hair follicles in vivo. It is tempting to speculate that these very same variables are also recruited by the anagen hair follicle to maintain and its IP. IP can be obtained locally in various tissues, either constitutively or in response to inflammation.[31]

Androgens are an important regulator for hair growth with paradoxical effects on HFs in various body regions. Androgens can stimulate the change of little vellus HFs into huge terminal HFs after adolescence such as facial hair, pubic hair and axillary hair.[32] The reason isn't yet clear; nonetheless, it has been proposed that melanocyte-associated T-cell epitopes can function as autoantigens that could potentially trigger autoimmunity and IP 8`collapse.[33]

PROGNOSIS:

In the current series the basal metabolic rate was normal in 32 out of 40 patients. From the age of 10 to the age of 20 he continuosly grew little patches of alopecia on the scalp, in which hair promptly regrew. At the age of 20 one of these attacks advanced to the point of total alopecia of the scalp and body[34]

Duration of AA at time of first consultation was less than 2 years (mean 17 months) in all patients. : S0: no hair loss; S1: \25% hair loss; S2: 26%-50% hair loss; S3: 51%-75% hair loss; S4: 76%-99% hair loss; S5: total scalp hair loss, alopecia totalis (AT); S5B2: total scalp and body hair, alopecia universalis (AU). Mild AA was defined as S0, S1, or S2, with severe AA defined as S3, S4, S5, or S5B2. At initial visit, 60 patients had S1 disease, 68 patients had S2 disease, 11 patients had S3 disease, 14 patients had S4 disease, 11 patients had S5 disease, and 27 patients had S5B2 disease.[35]

The recovery from hair loss may be complete, partial, or none. In the majority of patients, hair will regrow entirely within 1 year without treatment. A less favorable prognosis is seen with childhood onset alopecia areata and ophiasis.[36].Current data propose 34%-50% of patients recover within 1 year, while 14%-25% of patients will progress to AT or AU, at which point patients rarely fully recover.[37]

DIAGNOSIS:

It is often easy and simple to detect AA. Signs of inflammation, scaling, and cervicallymphadenopathy are present in tineacapitis, in contrast to smooth, non-scaly surface of AA. In doubtful cases, a scalp biopsy may be of help. Side pins, which are used by women to keep the hair in place, may cause pressure alopecia, resembling AA[38]

*The main confounders in diagnosis are the other varieties of non scarring alopecias.They are:-

1)Trichotillomania: This condition probably causes most confusion and it is possible that it coexists with alopecia areata in some cases. The incomplete nature of the hair loss in trichotillomania and the fact that the broken hairs are firmly anchored in the scalp are distinguishing features.

2)Tineacapitis: The scalp is inflamed in tineacapitis and there is often scaling but the signs may be subtle.

3)Early scarring alopecia.

4)Anagen effluvium (drug-induced) may mimic diffuse alopecia areata.

5)Telogen effluvium.

6)Systemic lupus erythematosus.

7)Secondary syphilis.

8)Loose anagen hair syndrome: This is a disorder of abnormal anagen hair anchorage. It is commonly found in children and has an autosomal dominant inheritance .[39]

9)ADTA: Acute diffuse and total alopecia (ADTA) is a new subtype of alopecia areata with favorable prognosis. ADTA has been reported to have a short clinical course ranging from acute hair loss to total baldness, followed by rapid recovery, sometimes even without treatment .

10)SISAPHO: This is an unusual form of Alopecia, in which a band-like pattern is found on the frontal hairline. This can be clinically confused with frontal fibrosing alopecia. The opposite of ophiasis type, where hairs are lost centrally and spared at the margins of the scalp, is called sisiapho..[40,41]

CURRENT TREATMENT AND MANAGEMENT:

It is very important what subjects think of their overall response to treatmentSome patients do respond well to currently available treatments, but the response rate in those with severe alopecia areata types (alopecia totalis, alopecia universalis or a combination) remains90 low. A high level of immune reactivity is present in patients with alopecia totalis and alopecia universalis than in normal controls. Not all patients need or wish for active treatment.[42]

CORTICOSTEROID:-

- TOPICAL CORTICOSTEROID - A potent topical steroid delivered in a lotion, foam or shampoo formulation can be used for limited patchy alopecia areata and may speed recovery of hair growth in mild degrees of alopecia areata. Treatment should be continued for at least 3 months, but should be stopped after 6 months if there is no response.
- SYSTEMIC CORTICOSTEROID -. Long-term daily treatment with oral corticosteroids might result in regrowth of hair. A small, partially controlled study showed that 30–47% of patients with mild-to-extensive alopecia areata who were treated with a 6-week tapering course of oral prednisolone showed >25% hair regrowth 144. However, in most patients, continued treatment is needed to maintain hair growth and the response is usually insufficient to justify the adverse effects.

IMMUNOTHERAPY:-

Immunotherapy is an effective treatment for some patients with patchy alopecia areata. The application of a potent allergen to a small area on the scalp sensitizes the patient. Contact allergens used in this treatment include dinitrochlorobenzene, squaric acid dibutylester and diphenylcyclopropenone, with diphenylcyclopropenone being most commonly used.[43]

All local treatments may help the treated area, but do not prevent further spread of the condition. In addition, any mode of treatment may need to be used for long periods because of the chronic nature of AA.[44]Extensive AA is more difficult to treat and more resistant to conventional modalities such as topical steroids, topical sensitizer, PUVA therapy, minoxidil, and immunomodulators.Local or systemic application of corticosteroids induces regrowth of hair in alopecia areata[45]

SOME HERBAL PREPRATION USED IN THE TREATMENT OF ALOPECIA:

1.Ginkgo biloba (Ginkgoaceae):-

Chemical constituents: Ginkgolides A, B, C, J, M, bioflavin, sitosterol,lactones and anthrocyanins.

Mode of Application: The drug is extracted in coconut oil and is massaged for at least 2 minutes.

Reason: The drug is known to improves cerebral microcirculation and hence increases oxygen supply.[46]

2.Phyllanthus embelica (Euphorbeaceae):-

Constituents: Vitamin C, phyllemblin, tannin, phosphorous, iron, calcium.

Mode of Application: Indian gooseberry oil, prepared by boiling dry pieces of Indian gooseberry in coconut oil, is considered a valuable hair tonic for enriching hair growth. A mixture of an equal quantity of fresh Indian gooseberry juice and lime juice, used as a shampoo also stimulates hair growth and prevents hair loss.

Reason: Iron is involved in the oxygenation of your body's red blood cells. It is essential for normal hair growth and maintaining healthy hair. If the amount of iron can not be replaced with food intake, iron deficiency will cause hair loss because of oxygen deficiency.[47]

3.Rosmarinus officinalis (Labiatae) and LavandulaangustifoliaMiller (Labiatae):-

Constituents: Rosmary constitutes 1-2% volatile oil containing 0.8-6% ofesters and 8-20% of alcohols, The principal constituents are 1, 8-cineole, borneol, camphor, bornyl acetate and monoterpene hydrocarbons. The chiefconstituents of lavender oil are Lavenanlol, linalyl acetate, linalol, lavendulylacetate, terpineol and cineol.

Mode of Application: These oils were massaged into the scalp for a minimum of 2 minutes daily for seven months.

Reason: The essential oils enter your system through the olfactory system(inhalation) and/or through your skin and reach your circulatory system (the blood) where they bind to receptors and change the chemical composition. Topical herbal therapy stimulates hair follicles and it is proved as safest way to cope up with different type of hair loss (alopecia), however perfect pharmacological actions of these herbs and oils are yet not known.[48]

4.Aloe vera L. (Liliaceae):-

Part used: Leaves

Chemical constituents: Barbaloin (15-40%), Hydroxyaloin (3%), Mucilage(Glucose, Galactose, Mannose, Galacturonic acid), Aloe-emodin, Aloesone, Alocutin A and B [30]. Aloe vera L. or A. barbadensis gel is used traditionally for hair loss and for improvement in hair growth following alopecia. Inaoka et al. reported that aloenin is the major constituent responsible for promoting hair growth without irritating the skin.[49]

EFFECT OF COVID-19 ON ALOPECIA:

During the pandemic, AA relapse was reported in 42.5% of the participants who also declared COVID-19 infection, confirmed by nasopharyngeal swab or hematological analysis. The relapse was reported about 2 months later COVID19 infection (median of 2.14 months) and 74.0% of these participants continue to experience AA symptoms when the survey was proposed. Only 12.5% of participants reported AA relapse in the absence of COVID-19 infection.[50]

CONCLUSION:

AA is a convoluted multifactorial disease with a variable prognosis. While various patients will well spontaneously, other patients may have chronic disease. There are no FDA approved treatments, although corticosteroids are considered as first line. Hereditary research play an important role in understanding the pathogenesis and etiology of AA .There is scarcity of controlled studies regarding effective treatments of AA. Alopecia areata extraordinarily affects the appearance and psyche of the afflicted individual. Besides, no uniformly dependable treatment is known. Corticosteroids are the main stay in the treatment of AA. This review article given how prevalent AA is in the general population and its potential effects on quality of life, continuation of these research efforts are needed to define optimal approaches to evaluation and management of those impacted by this condition. Hair loss is in many cases experienced in essential consideration and it can be very distressing to patients. Family doctors are well positioned to distinguish AA, counsel patients, and initiate treatment.

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