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Review Article

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Alopecia: introduction and overview of herbal treatment

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ABSTRACT

Alopecia areata is a prevalent autoimmune skin disease resulting in the loss of hair on the scalp and elsewhere on the body. It usually starts with one or more small, round, smooth patches on the scalp and can progress to total scalp hair loss (alopecia totalis) or complete body hair loss (alopecia universalis). The scalp is the most commonly affected area, but the beard or any hair-bearing site can be affected alone or together with the scalp. Alopecia areata occurs in males and females of all ages, but onset often occurs in childhood. Over people 147 million worldwide have, had or will develop alopecia areata at some point in their lives. According to Ayurveda, pitta dosha is the primary cause of hair loss. Pitta dosha could be reversed through diet and lifestyle modifications. Ayurvedic medicine for hair loss contains herbs that can arrest hair fall and improve hair growth.

Keywords: *alopecia areata, alopecia totalis, alopecia universalis*, ayurvedic medicine for hair loss

INTRODUCTION

Hair is one of the vital parts of the body derived from ectoderm of the skin, is protective appendages on the body and considered accessory structure of the integument along with sebaceous glands, sweat glands and nails [1]. They are also known as epidermal derivatives as they originate from the epidermis during embryological development [2-4].

Each hair grows in three cyclic phases:
➢**Anagen (Growth phase**) – The anagen phase can be short as 2 years to as long as 8 years. Approximately 80 % of hair is usually in anagen phase.
➢**Catagen (Involution)** – In the catagen phase, the growth activity increases and hair moves to the next phase, catagen phase is between 10-14 days.
➢**Telogen (Resting phase)** – The telogen phase is a state at which the hairs move into resting state. This phase lasts for 90-100 days. In general, 50-100 hair at random is shed every day. An increase of more than 100 hair per 6-constituents a state of hair loss or alopecia, albeit it could be temporary [5-6].

1.1 Androgenetic Alopecia

Androgenetic alopecia (AGA) is the most common form of hair loss. When it affects women, it leads to diffuse alopecia over the mid-frontal scalp (female pattern hair loss) [7]. This disorder is induced by androgens in genetically susceptible persons. These patients present hair follicles with increased 5 alpha reductase activity and dihydrotestosterone (DHT) levels. In these genetically susceptible hair follicles, the DHT binds to the androgen receptor and the hormone-receptor complex, activating the genes responsible for the transformation of the normal hair follicle in miniaturized follicles [8, 9]. The reduction in the number of terminal fibers per follicular unit will produce a diffuse alopecia [10]. The impact of androgenetic alopecia is predominantly psychological. While men anticipate age-related hair loss, the same process in women is usually unexpected and unwelcome at any time [11, 12].

Alopecia areata (AA) is a nonscarring autoimmune, inflammatory scalp, and/or body hair loss condition affects up to 2% of the population and it is characterized by patchy hair loss. It can affect the entire scalp (alopecia totalis) or cause loss of all body hair (alopecia universalis) [13].

Many factors are under investigation to clarify the pathogenesis of AA. Nonspecific immune and organ-specific autoimmune reactions and genetic constitution are possible causes [14-15].

1.2 Telogen Effluvium

Telogen effluvium (TE) is an increased loss of normal club hairs that occurs by a perturbation of the hair cycle [16]. It was first described by Kligman in 1961 and his hypothesis was that whatever the cause of hair loss, the follicle tends to behave in a similar way, causing premature termination of anagen [16-17]. The true incidence is unknown because many cases are subclinical [18].

1.3 Male pattern hair loss

Hair loss resulting in thinning is known as *alopecia*. When it is related to hormones (androgens) and genetics, it is known as *androgenetic alopecia*. When androgenetic alopecia denudes an area of the scalp it is called baldness. Male pattern hair loss is characterized by a receding hairline and/or hair loss on the top and front of the head.

Fig. 1- male pattern hair loss

Male pattern hair loss is an inherited condition, caused by a genetically determined sensitivity to the effects of dihydrotestosterone, or DHT in some areas of the scalp. DHT is believed to shorten the growth, or anagen, phase of the hair cycle, from a usual duration of 3–6 years to just weeks or months. This occurs together with miniaturization of the follicles, and progressively produces fewer and finer hairs. The production of DHT is regulated by an enzyme called 5-alpha reductase.

Several genes are involved, accounting for differing age of onset, progression, pattern and severity of hair loss in family members. The susceptibility genes are inherited from both mother and father. At this time, genetic testing for prediction of balding is unreliable [19].

1.4 Female Pattern Hair Loss

The most common type of hair loss seen in women is androgenetic alopecia, also known as female pattern alopecia or baldness. This is seen as hair thinning predominantly over the top and sides of the head. It affects approximately one-third of all susceptible women, but is most commonly seen after menopause, although it may begin as early as puberty. Normal hair fall is approximately 100-125 hairs per day. Fortunately, these hairs are replaced. True hair loss occurs when lost hairs are not regrown or when the daily hair shed exceeds 125 hairs. Genetically, hair loss can come from either parent's side of the family [20].

2. TYPES OF ALOPECIA

2.1 Alopecia Areata *(*primary stage*)*- Alopecia areata is a common autoimmune disease that results in the loss of hair on the scalp and elsewhere. It usually starts with one or more small, round, non-scarring smooth patches.

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

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

2.4 Ophiasis Alopecia Areata - Ophiasis type 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.

2.5 Alopecia Totalis - Loss of hair from entire Scalp.

2.6 Alopecia Universalis - Loss of hair from entire body including eyebrows and eyelashes.

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

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

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

2.10 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.

2.11 Diffuse Alopeica- Excessive Loss of hair all over the scalp without creating a patch [21].

3. NATURAL PRODUCTS IN FORM OF HERBAL FORMULATION USED FOR ALOPECIA

Natural products in the form of herbal formulations are used as hair tonic, hair growth promoter, hair conditioner, hair-cleansing agent, antidandruff agents, as well as for the treatment of alopecia and lice infection [22]. A number of herbal products have been acclaimed with hair growth promoting activity [23].

3.1 *Hibiscus rosa-sinensis Linn (Malvaceae)*

Parts used: Leaves & Flowers

Chemical constituents: Flavonoids; Anthocyanins and Cyaniding-3, 5-diglucoside, Cyaniding-3-sophoroside-5-glucoside, Quercetin-3,7-diglucoside, Quercetin-3-diglucoside[24] . Adhirajan et al. reported that the leaf extract of Hibiscus rosa-sinensis has a potential effect on maintaining the hair growth in-vivo and in-vitro methods [25].

3.2 *Cuscuta reflexa Roxb (Convolvulaceae*)

Part used: Stems

Chemical constituents: Cuscutin, Cuscutalin, -Sitosterol, Luteolin, Bergenin & Kaempferol. Dixit et al reported hair growth activity of Cuscuta reflexa Roxb. Stem through the periodic transformation of hair follicle from telogen to anagen phase [26].

3.3 *Asiasari radix (Aristolochiaceae)*

Parts used: Roots & Rhizomes

Chemical constituents: Safrole (18.4%), Methyl eugenol (18%), methoxytoluenes & 3-benzodioxole derivaties. Rho et al. suggested that the Asiasari radix extract has hair growth promoting potential, and this effect may be due to its regulatory effects on both cell growth factor gene expressions [27].

3.4 *Ocimum gratissum Linn (Lamiaceae)*

Part used: Leaves

Chemical constituents: Essential oil: Eugenol, Carvacrol, Nerol & Eugenol methyl ether [28]. Orafidiya et al. investigated the efficacy of the leaf essential oil of Ocimum gratissum Linn. (Ocimum oil) in promoting hair growth in cyclophoshamide-induced hair loss and concluded that ocimum oil may be capable of enhanced normal hair growth and promoting follicular proliferation in cyclophosphamide-induced hair loss [29].

3.5 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 [31].

3.6 *Ginkgo biloba (Ginkgoaceae)*

Part used: Leaves

Chemical constituents: Lactones (6%): Diterpenoids, Ginkgolides A, B, C, Bilobalide-A, Flavonols (24%). Kaempferol, Quercetin, Isorhamnetin[32] . Kobayashi et al. investigated that Ginkgo biloba leaf extract promote hair regrowth, through combined effects on proliferation and apoptosis of the cells in the hair follicule thus suggesting potential as a hair tonic [33].

3.7 *Tridax procumbens L. (Compositae)*

Part used: Leaves

Chemical constituents: Flavonoid: Procumbenetin [34], 1.7% Fumaric acid, -sitosterol, Alkalodies, Tannin [35] , Luteolin, Glucoluteolin, Quercetin, Isoquercetin [36]. Pathak et al. investigated hair growth promoting activity of Tridax procumbens promotes the growth of hair [37].

3.8 *Sophora flavescens (Leguminous plants)*

Part used: Roots

Chemical constituents: Alkaloids: Oxymatrine, Matrine, Losmatrine, Sophoranol, Sophocarpine, Bio flavones: Norkurarinone, Kuraridinol, Sophoraflavanone, Formoronetin & Fatty acids [38]. Roh et al. found that the extract of dried roots Sophora flavescens has outstanding hair growth promoting effect. Sophora flavescens extract induced mRNA levels of growth factors such as IGF- 1 and KGF in dermal papilla cells, suggesting that the effect of Sophora flavescens extract on hair growth may be mediated through the regulation of growth factors in dermal papilla cells. In addition the Sophora flavescens extract revealed to possess potent inhibitory effect on the type II 5 Y-reductase activity [39].

3.9 *Citrullus colocynthis Schrad (Cucurbitaceae)*

Part used: Fruits

Chemical constituents: Resinous Glycosides (Colocynthin & Colocynthitin), Phytosterol Glycoside, Citrullol, Pectin, Albuminoides, Cucurbitacins-Cucurbitacin E & I [40] . Dixit et al investigated of Citrullus colocynthis promotes the growth of hairs. Also found least hair growth initiation and completion time, maximum numberof hair follicles in anagenic phase. 5-Reductase has been implicated as one of the major causes of hair loss. It may be rewarding if studies tounfold the mechanism of action of herbal extracts are undertaken using this bed [41].

3.10 *Emblica officinalis (Euphorbiaceae)*

Part used: Fruits

Chemical constituents : Alkaloids (Phyllantidine, Phyllantine), VitaminC, Gallotannis (5%), Carbohydrates (14%), Pectin, Minerals, Phenolic acid, Gallic acid, Ellagic acid, Phyllemblic acid, Emblicol, Amino acid (Alanine, Aspartic acid, Glutamic acid, Lysine, Proline) [42]. Gupta et al investigated increase in hair growth acivity of Emblica officinalis. It holds the promise of potent herbal alternative for minoxidil. Also suggest excellent results of hair growth in formula prepared by cloth pouch boiling method {Emblica officinalis (Euphorbiaceae), Bacopa monnieri (Scrophulariaceae), Trigonella foenumgraecum (Leguminosae), Murraya koenigii (Rutaceae).

3.11 ***Nordostachys jatamansi (Valerianaceae)***
Parts used: Rhizomes & Roots
Chemical constituents: Volatile Essential Oil (0.5-2%): Jatmansone, Sesquiterpenoid (0.02-0.1%), Spirojatamol, Patchouli alcohol, Jatamol A & B, Jatamansic acid, Nardostachone, Nardol [43] . Ali et al reported that Nordostachys jatamansi having hair growth acitivity [44].

3.12 ***Eclipta alba (L) Hassak (Asteraceae***)

Part used: Whole plant

Chemical constituents: Flavonoids & isoflavonoids : Wedelolactone, Desmethylwedelolactone, Triterpene ,glycosides & Saponins : Eclalbasaponins I-VI, -amyrin [45] . Thakur at al investigated that -sitosterol and wedelolactone responsible for hair growth acitivity. 5-reductase inhibiton contributes in treatment of androgenic alopecia. 5-reductase inhibition by -sitosterol has been well documented in this study [46].

Table 1: Herbal components of Marketed herbal formulations [47]

Sr. No.	Product Name	Manufacture	Formulation	Content
1	Chirayu Herbal	Chirayu	Oil	Amla, Bhringgraj, Brahmi
2	Hairbac	Bacfo	Tablets	Amla, Bhringgraj, Guduchi
3	Hairich	Capro	Capsule & Oil	H. roseus, E. alba, Osantum
4	Hairvit	Millennium	Oil	Brahmi,Bhringgraj,L.innermis
5	Hibril	Vital Care	Oil	S.indicum, Bhringgraj, Brahmi
6	K-7 Taila	Ajmera	Oil	Amla, Jatamansi
7	Kesh Rakshe	JRK	Oil	Amla, Bhringgraj
8	Kesh Vardan	Ratan	Capsule	Ashwagandha, Shatawari
9	Keshmitra	Anjani	Tablets	Vacha, Jevanti
10	Keshamrit	Ajmera	Oil	Amla, Bhringgraj
11	Medhavi	Ajmera	Oil	Amla, Bhringgraj, Brahmi
12	Nutrich	Ayulabs	Capsule	Bhringgraj, Godanti
13	Shyamla	Vasu	Shampoo	Amla, Heena
14	Saini Herbal Hair Conditioner	Saini	Conditioner	Amla, Bhringgraj
15	Regrow	Avolado	Massage Oil	Chamomile, Rosemary
16	Sidha Shampoo	Surya labs	Shampoo	Tulsi, Neem

CONCLUSION

Alopecia, a dermatological disorder, it is common problem that has affected men and women. It is investigated through many treated are on offered including natural or synthetic based products. Natural products are continuously gaining popularity and the use of plant extract in formulation. Synthetics based product may cause human health hazard with several side effects. In the future it is possible that many new plants extract of commercial significance will be identified.

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