

Review

Epidemiology and Treatment of Male Androgenetic Alopecia

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Abstract

Hair loss affects self-image and is a significant contributor to anxiety and depression in some men, despite the fact that male androgenetic alopecia is frequently thought of as a relatively minor dermatological problem. Male androgenetic alopecia is also considered a risk factor for several other diseases including cardiovascular diseases. It affects 30-50% of men by the age of 50. Male androgenetic alopecia is a genetically transferred disease. Midfrontal scalp, vertex and temples are the commonly affected areas. Follicular shrinkage, inflammation, and altered hair development are the main pathophysiological characteristics the disease. The anagen phase gets shorter with each cycle whereas the telogen phase stays the same length or gets longer during the course of the disease. The purpose of this research is to review the available information about the epidemiology and treatment of male androgenetic alopecia. Male androgenetic alopecia shows variable prevalence among different ages and ethnicities. Caucasians have much high reported prevalence than Asians. The prevalence of male androgenetic increases with age. Minoxidil and finasteride are the drugs of choice and most commonly used in practice for the treatment. Even while the existing therapies for androgenetic alopecia are effective in slowing the disease's progression, they only allow for partial hair restoration. Early treatment leads to the most ideal outcome. Hair transplantation remains the option if medical treatment fails. Further research can aid in developing new treatment strategies.

Keywords: *male, androgenetic, alopecia, prevalence, treatment*

Introduction

Male androgenetic alopecia (MAA), which affects 30–50% of men by the age of 50, is the most prevalent kind of male hair loss. MAA predominantly affects the midfrontal scalp, vertex, and temples in a very consistent way. Hair loss affects self-image and is a significant contributor to anxiety and depression in some men, despite the fact that MAA is frequently thought of as a relatively minor dermatological problem. As a risk factor for arterial stiffness and cardiovascular disease, MAA is becoming more widely recognized. There is a well-known familial predisposition to MAA and racial heterogeneity in the prevalence, with heredity making up around 80% of the predisposition. In those with certain genetic predispositions, normal androgen levels are sufficient to result in hair loss. Modifications to the hair cycle's development, follicular shrinkage, and inflammation are the main pathophysiological characteristics of MAA (1).

In MAA on the scalp, pre-programmed follicles change from having lengthy growth cycle also referred as anagen and short rest which is telogen cycles to having long rest and short growth cycles along with progressive follicle miniaturization. The inheritance of multiple genes is necessary for these androgen-dependent alterations. It has been determined which gene codes for the androgen receptor. MAA has reportedly been linked to the androgen receptor gene, *EDA2R*, in recent times. The progression of baldness starts with hair thinning in the temporal areas, which results in a reshaping of the frontal portion of the hairline which is referred as temporal recession, and then moves on to hair loss in the vertex area. With the aid of Hamilton and Norwood's classification system, the grade of MAA can be determined (2). Age and ethnicity affect the incidence and prevalence of MAA differently. By the age of 70, MAA affects between 50–70% of Caucasian males; however, incidence rates are lower among Chinese, Japanese, and African American men. MAA affects about 30% of Caucasian males in their 30s, and it affects 40% of Caucasian men over the age of 50 (3). MAA patterns are diagrammatically represented in (Figure 1).



Figure 1: Androgenic alopecia patterns in men (1)

Men who have hair loss experience reduced self-esteem, diminished confidence, and worry. Male-pattern hair loss is another term used for MAA, is a progressive hereditary disorder that results in the gradual transformation of terminal hair into vellus hair. The prevalence rises with age, although the onset age and rate of advancement are unpredictable. The severity of MAA varies from individual to individual and is primarily psychological. The current treatments for androgenetic alopecia only permit partial regrowth of hair, despite the fact that they are helpful in halting the disease's progression. The best desirable outcome is attained with early treatment. (4). Even though the onset age recorded for MAA is 40, there are indications that alopecia starts as early as 30 (5). Oral finasteride and topical minoxidil solution are the medicinal interventions with the highest degree of evidence classification for efficacy and safety for MAA. Some frequently used therapeutic non-FDA-approved choices, such as oral and topical anti-hormonal therapies, are the medical interventions that match to the next level of evidence quality. Although there is a wide range of results, surgical follicular unit hair transplantation is an alternative in circumstances where medical treatment has failed (6). The purpose of this research is to review the available information about the epidemiology and treatment of MAA.

Methodology

This study is based on a comprehensive literature search conducted on August 11, 2022, in the Medline and Cochrane databases, utilizing the medical topic headings (MeSH) and a combination of all available related terms, according to the database. To prevent missing any possible research, a manual search for publications was conducted through Google Scholar, using the reference lists of the previously listed papers as a starting point. We looked for valuable information in papers that discussed the information about the epidemiology and treatment of MAA. There were no restrictions on date, language, participant age, or type of publication.

Discussion

About 50% of men experience male pattern hair loss or MAA which is an androgen-related disorder that affects people with certain genetic predispositions. MAA cannot be fully reversed in its advanced stages, however the majority of patients with mild to moderate MAA can stop the progression and partially reverse it with pharmacological treatment such as finasteride, minoxidil, or a combination of the two. In the case of

qualified patients, a combination with hair restoration surgery yields the best results (7). MAA is a kind of alopecia that develops progressively after puberty. Alopecia is a physiological issue, but because it has a significant impact on aesthetics, it also has a significant impact on quality of life. Effective oral and topical medicines for the control of male patterned hair loss have been developed recently, and they are currently being utilized more frequently in dermatological treatments. In spite of this, many patients continue to employ therapies that have no scientific support and are completely ineffective from a dermatological standpoint. Topical 5% minoxidil, dutasteride 0.5 mg, and finasteride 1 mg are the recommended first line of treatment (8).

Epidemiology of MAA

Severi et al. reported that vertex and complete MAA were more common as people aged, rising from 31% during age of 40–55 years to 53% during age of 65–69 years. While the number of men who solely had frontal MAA (31–33%) was quite consistent throughout all age cohorts (9). Agaoglu et al. reported 19.2% of cases of early onset of MAA. The authors further stated that every year over the age of 18, there is a higher risk of developing early-onset MAA due to factors like a favourable family history, unhealthy vegetable-fruit and red meat consumption, the presence of another hair illness than MAA, and smoking (10). A Singaporean community study reported a prevalence of 63% and the prevalence of the illness rose with age, from 32% in young adults between the ages of 17 and 26 to 100% in those over the age of 80. Indians (87%) were disproportionately more affected than Chinese (61%). Because they did not regard MAA as a concern, 81% of the respondents with the condition did not ask for assistance, 74% of individuals who sought treatment employed non-medical strategies with questionable efficacy (11). Pathomvanich reported that when compared to Caucasians, the prevalence of aesthetically significant male patterned baldness with Norwood III–VII class was 38.52%, and it increased significantly with age. Other forms of androgenetic alopecia were found to be 0.6%, while variant male patterned baldness was reported to be 0.67% among the Asian men (12).

A study among Turkish community reported a prevalence of 47.6% for MAA (13). Indian population-based study reported MAA was present in 58% of males between the ages of 30 and 50. With age came an increase in grade. In contrast to the 44.1% of males with grades I to III who could potentially benefit from medical treatment, 12.9% of males with grades IV to VI would

benefit from hair transplantation (2). Chinese population-based study reported MAA affected 21.3% of men overall, including 2.8% of men aged 18 to 29 years, 13.3% of men aged 30 to 39 years, 21.4% of men aged 40 to 49 years, 31.9% of men aged 50 to 59 years, 36.2% of men aged 60 to 69 years, and 41.4% of men aged 70 and over. Hair loss on the front and vertex was the most prevalent form (14). Korean study reported MAA with Norwood III or above class was 14.1% more common at all ages. It progressively rose with age but was lower than that of Caucasians: 2.3% in the third decade, 4.0% in the fourth, 10.8% in the fifth, 24.5% in the sixth, 34.3% in the seventh, and 46.9% beyond the age of 70. From the third to the seventh decade, type III vertex involvement was the most prevalent form; over 70 years, type VI predominated. While 11.1% of cases had female pattern baldness (15).

Treatment of MAA

Chin et al. stated that first-line treatments of MAA include Minoxidil topical 2%–5%, finasteride 1 mg or 1 mL twice daily and HairMax or LaserComb which has received FDA clearance recommended for those who do not react to these treatments (16). Although minoxidil has been referred to as a hair growth booster for more than 30 years, the exact mechanism of action is still unclear. Minoxidil shortens the telogen phase, speeds up the telogen-exogen phase, and causes resting hair follicles to enter the anagen phase too soon. Additionally, minoxidil expands the size of hair follicles. The effectiveness of topically administered minoxidil in humans is confirmed by a significant portion of scholarly literature on hair treatment. Patients receiving minoxidil in particular demonstrated a marked rise in the number of non-vellus hairs beginning at the baseline. Molecular stability and solubility are necessary for the production of minoxidil. To create preparations with a higher level of aesthetic acceptance and dermatological safety, minoxidil-based formulations with low concentrations of propylene glycol are currently in the market. The weight of the evidence suggests that minoxidil continues to mark a turning point in the management of androgenetic alopecia (17).

Adil et al. reported in his meta-analysis hair loss therapies were investigated in five sets of studies: low-level laser light therapy, 5% minoxidil, 2% minoxidil, 1 mg finasteride in men and 2% minoxidil in women. Each group underwent a separate meta-analysis. In all 5 meta-analyses, therapies outperformed placebo ($P=0.00001$). Due to a lack of pertinent data, other therapies were excluded. Author concluded that Minoxidil, finasteride,

and low-level laser light therapy appear to be highly beneficial for encouraging hair growth in males with androgenetic alopecia (18). Goren stated that the only topical medication approved to treat male and female pattern hair loss is minoxidil. A maximum concentration of 5% of minoxidil is permitted for over-the-counter use (19).

Finasteride matches the biochemical profile of hereditary type 2, 5 alpha-reductase insufficiency in men because it is a type 2, 5 alpha-reductase inhibitor. Finasteride has been shown to be effective in treating MAA, but not in women, in numerous clinical trials. For males with mild to moderate alopecia, it can result in apparent hair growth in as many as 66% of cases, but more crucially, it can stop hair loss in 91% of patients. Patients who received a placebo experienced considerable and progressive hair loss in long-term finasteride experiments. Finasteride actually keeps growing enough hair to maintain scalp coverage, which is how it stops future hair loss. The hair loss that occurs in these situations after stopping finasteride is proof of this. Finasteride's demonstrated preservation effect, in addition to its restorative effect, is a compelling argument in favour of prescribing it in the early stages of androgenetic alopecia before significant hair loss has occurred (20).

When medical therapies for MAA patients are unsuccessful, surgical procedures are needed. These include scalp reduction and hair transplantation, or a combination of the two. The most common of these is hair transplantation since it is less invasive, whereas scalp reduction with flap can only be done effectively by a qualified surgeon. Regarding publications, hair replacement surgery for MAA is deemed to have insufficient evidence in both sexes because of variations in study outcomes caused by various procedures, subject characteristics, and surgical team and surgeon competence levels. Another drawback of hair restoration surgery is that it is ineffective at stopping MAA from progressing. Consequently, it has been recommended that long-term combined therapy for male patients using oral finasteride 1 mg daily and hair transplantation (21-23).

Wessagowit et al. stated that a concentrated Serenoa repens product may need to be used for longer than 4 weeks in order to have maintained efficacy in treating male pattern baldness in patients who do not want or are unable to tolerate the adverse effects of traditional drugs. Study results of Serenoa repens showed that in comparison to baseline, both the average and terminal hair counts rose at weeks 12 and 24 among men. Some

of these encouraging outcomes appeared to plateau at week 24, most likely as a result of the discontinuation of the concentrated topical treatment containing Serenoa repens extract after 4 weeks. The products were well-liked by the patients, and the negative effects were few (24). Literature reveals that MAA is a disease of variable prevalence according to age and ethnicity although data from recent times is lacking and there is need of further research including population surveys to study epidemiological profile of the disease also further clinical research can aid in defining new therapeutic strategies.

Conclusion

MAA remains a disease of concern among men and prevalence increases with the age. Minoxidil and finasteride remains the most prevalent treatment in practice however future research can significantly contribute to developing new treatment modalities.

Disclosure

Statement

The authors declare no conflict of interest.

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Ethical consideration

Non-applicable.

Data availability

Data that support the findings of this study are embedded within the manuscript.

Authors' contribution

All authors contributed equally to the drafting, writing, sourcing, article screening and final proofreading of the manuscript.

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