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Outcome of Dutasteride 0.5mg in Androgenic Alopecia

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Abstract **Original Research Article**

Introduction: Androgenetic alopecia (AGA) is an androgen-mediated condition that is characterized by a progressive decline in visible scalp hair density. Genetically predisposed hair follicles are the target of dihydrotestosterone (DHT), which leads to the progressive miniaturization of hair follicles and hair thinning. Dutasteride inhibits conversion of testosterone to dihydrotestosterone, which significantly improves hair growth. ***Objective*:** To assess the outcome of dutasteride in androgenic alopecia. ***Methods*:** This study was carried out at Dermatology and Venereology Department, Enam Medical College Hospital, Savar, Dhaka, Bangladesh from January2022 to July 2022. From the outpatient clinic fifty (50) patients were recruited who fulfilled the inclusion and exclusion criteria. Dermatologist observe every patients hair changes before, during &after treatment with dutasteride for 24 week. ***Results*:** Out Of the 50 patients, 60% patients were female. 40% patients noticed hair loss first at the age of 16-25 years of their lifetime. 44% patients had this disease from 1 to 6 months duration. After 6 months of therapy with dutasteride 0.5mg 20% patients were improved markedly, followed by 24% improved moderately, 16% improved mild. Besides that, six months after dutasteride treatment, there was significant improvement in both hair density and thickness. And during treatment libido decreased in 24% cases and ejaculatory disorder seen in 14% cases. After 6 months therapy in patients where 20% improved markedly, followed by 24% improved moderately, 16% improved mild. ***Conclusion:*** It is concluded that dutasteride at a dosage of 0.5 mg/d clinically improve hair growth after six months of therapy in patients with AGA but there was a higher prevalence of sexual dysfunction. Large number of studies are required to recommend dutasteride 0.5 mg/d as the alternative therapeutic option for AGA.

Keywords: Outcome, Dutasteride 0.5mg, Androgenic Alopecia.

INTRODUCTION

Androgenetic alopecia (AGA) is a genetic condition affecting 58% men & 21% women, characterized by patterened hair loss [1]. This condition can start as early as a person's teens and risk increases with age [2]. Conventional drug therapy for AGA targets decreasing dihydrotestosterone (DHT) and stimulating hair follicles through the use of 5-alpha reductase (5AR) inhibitors or minoxidil both of which require at least a 4- to 6-month for better improvement and must be used regularly to maintain a response [3]. Other therapies include laser therapy, scalp micro needling, hair mesotherapy, and hair transplantation. However, new and experimental therapies are exploring Janus kinase inhibitor (JAKI) and platelet-rich plasma (PRP) [4].

Dihydrotestosterone (DHT), which is the principal androgen involved in the pathogenesis of AGA. Which converts from testosterone by 5AR9 [5]. 5AR have 3 isoenzymes in which type I isoenzyme is mainly present in the hair follicle and sebaceous glands [6, 7], whereas type II is mainly found in the male genitalia, including the prostate and the inner root sheath of hair follicles in the scalp, face, chest [8-10].

5α-Reductase inhibitors (5-ARIs), also known as dihydrotestosterone (DHT) blockers, are a group of drugs with antiandrogenic effects which are used primarily in the treatment of benign prostatic hyperplasia , lower urinary tract symptoms, hirsutism in women & feminizing hormone therapy for transgender women to reduce body hair growth and prevent scalp hair loss [11-13].

Dermato-trichologists recommended two popular oral 5-alpha reductase inhibitors (Dutasteride and Finasteride) for patients suffering from male pattern hair loss [14]. Whereas finasteride only block Type II isoenzyme, Dutasteride inhibits both Type I and Type II isoenzymes. Dutasteride is 3 times more powerful at blocking Type I 5-aplha reductase when compared to Finasteride and 100 times more potent at blocking Type II 5-aplha reductase. Finasteride can inhibit DHT by 70% but Dutasteride can block DHT by 90+% [15]. Dutasteride has long half –life about 4weeks, whereas finasteride has 6-8 hours [16, 17]. Some evidence shows dutasteride even acts towards growth of new and old hair but finasteride is less effective in growing new hair [18].

Dutasteride is an FDA approved drug developed by GlaxoSmithKline and was patented in 1996. The Dutasteride dosage prescribed to fight against hair fall is 0. 5mg [19]. Intake of Dutasteride 0.5 mg has shown positive results in terms of reducing hair loss by 96% [20].

MATERIALS & METHOD

This study was carried out at Dermatology and Venereology Department, Enam Medical College Hospital, Savar, Dhaka, Bangladesh from January to July 2022. Fifty (50) patients complaining of pattern hair loss was enrolled for this study. Who fulfilled the inclusion and exclusion criteria. Patients were counselled by the primary investigator regarding the side effects of the medications prior to enrolment in the study. Safety assessment of every patient was performed through history taking, clinical examination, routine laboratory Investigations (CBC, FBS, LFT, RFT) & special tests like - semen analysis & serum DHT before starting therapy and one week after therapy. Follow-up visits were scheduled every four weeks. Sexual function was evaluated by specifically asking about pt's sexual lyfe. High-resolution digital photographs and phototrichograms were taken at every visit. Clinical assessment was performed by dermatologists using photographs with a standardized vertex and frontal view. They independently reviewed the paired photographs of scalp at the baseline, and 24 weeks using a 7-point scale, using a seven-point scale as follows: greatly improved (score of +3); moderately improved (+2); slightly improved (+1) [21].

Inclusion criteria:

- Age: 18-65 years.
- Free from clinically significant condition.
- Not seeking pregnancy.
- Baseline semen analysis within normal range.
- Baseline serum DHT level within normal range

Exclusion criteria:

- Patients using the following medications: inhibitors of CYP3A4 (verapamil) or drugs with antiandrogen effect (finasteride) or hair growth promotors (minoxidil) in the last six months.
- Patients suffering from ejaculatory or erectile dysfunction.

Statistical analysis:

Statistical analysis was performed using SPSS version 18. The significance of changes in the global photographic assessments and hair density and thickness was determined using the Mann –Whitney U-test. Differences among the results obtained from the baseline and post-dutasteride treatment were analyzed using the Wilcoxon signed rank test. Statistical significance was accepted for P-values of less than 0.05.

RESULTS

A total of 50 patients men & women with mild to moderate AGA were enrolled in the study. Baseline characteristics of enrolled patients are summarized in Table 1.

Table-1: Demographic distribution of the patients, (N=50)

Age group	N %
20-25 years	10 (20%)
26-30 years	20 (40%)
31-35 years	16 (32%)
36-40 years	4 (8%)
Mean age	30±235.9
Gender distribution	**N, %**
Male	20, (40%)
Female	30, (60%)

Table-1 shows demographic distribution of the patients where 40% belong to 26-30 years age group. Followed by 32% belong to 31-35 years age group and 20% belong to 20-25 years age group. Besides that, 60% were female and 40% were male.

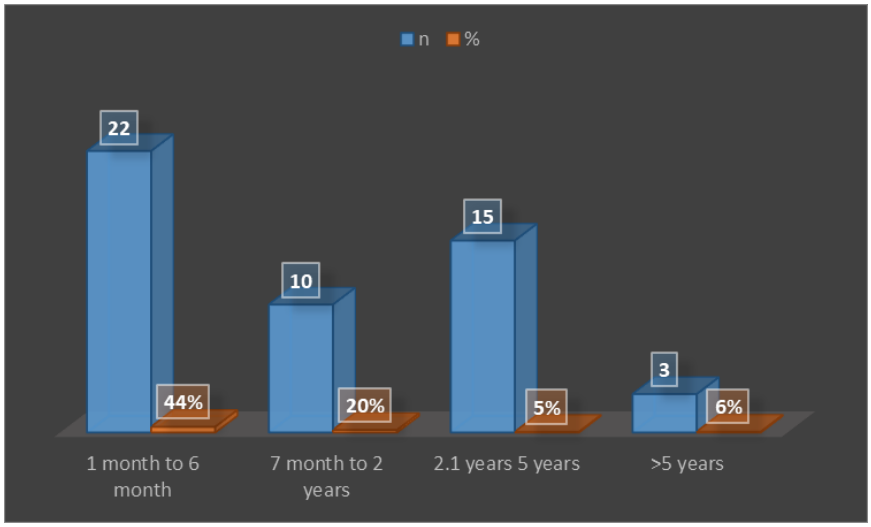

Figure-1: Duration of the diseases

Figure-1 shows duration of the diseases where 44% had this disease from 1 month to 6 month.

Table-2: The age of the patients noticed hair loss

Age of the patients noticed hair loss	N, %
16-25 years	20 (40%)
26-35 years	12 (24%)
36-40 years	18 (36%)

Table-2 explains the age of the patients noticed hair loss where about 40% patients noticed hair loss first at the age of 16-25 years. Followed by 36% patients noticed hair loss first at the age of 36-40 years and 24% patients noticed hair loss first at the age of 26-35 years.

Table-3: AGA type

Hamilton-Norwood type	N %
II	10(20%)
II vertex	15(30%)
III	15(30%)
III vertex	10(20%)

Table-3 shows AGA type where majority had II vertex and III level of AGA type.

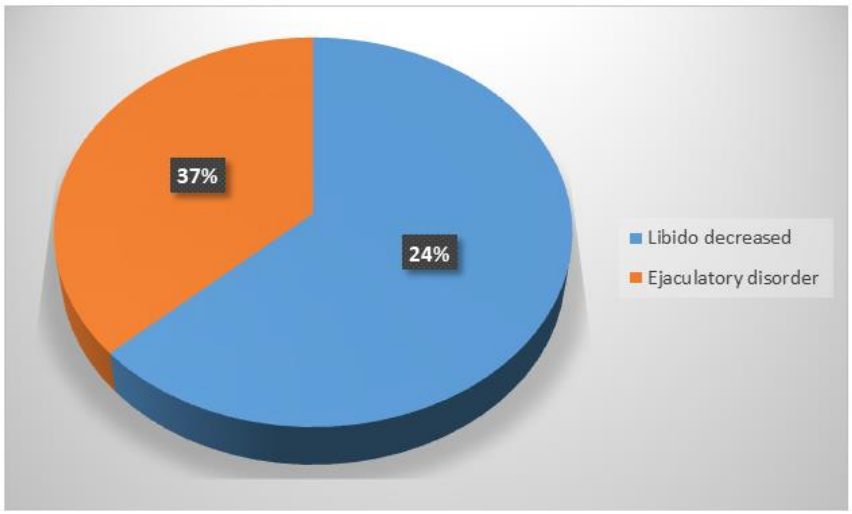

Figure-2: Sexual dysfunction of the patients while treatment

Figure-2 shows sexual dysfunction of the patients while treatment where libido decreased in 24% cases and ejaculatory disorder seen in 14% cases.

Table-4: Response after 6 months therapy in patients

Response after 6 months of therapy	N, %
Markedly improved	10 (20%)
Moderately improved	12 (24%)
Mild improved	8 (16%)
Quite	7 (14%)
Lost	5 (10%)
No change	8 (16%)

Table-4 shows response after 6 months therapy in patients where 20% improved markedly, followed by 24% improved moderately, 16% improved mild.

Fig-3 Patient with AGA, At baseline (A), during dutasteride treatment (B)

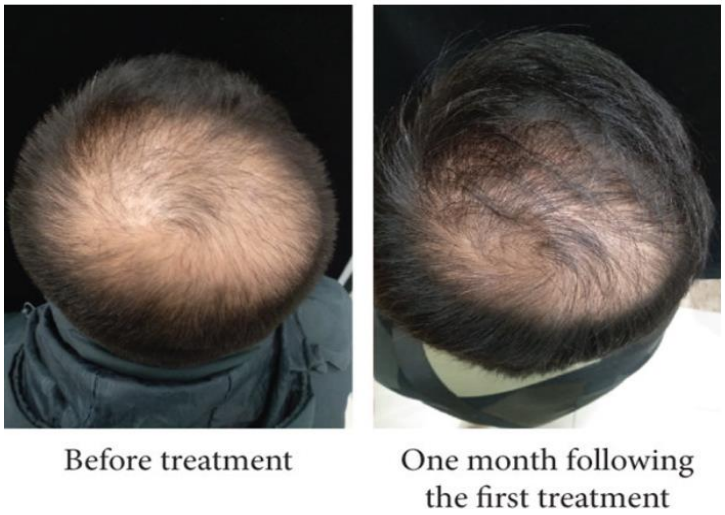

Fig-3: Patient with AGA, At baseline (A), during dutasteride treatment (B)

Table-5: Hair density and hair thickness

Hair density and thickness (mean±SD)	Baseline	Post dutasteride
Hair density (hair counts/cm2)	83±14	97±13†
Hair thickness (lm)	51±12	62±11†

Table-5 shows hair density and hair thickness (mean±SD) assessed at the baseline, after dutasteride treatment. Six months after dutasteride treatment, there was significant improvement in both hair density and thickness.

DISCUSSION

Androgenetic alopecia or pattern hair loss (PHL) does not improve without treatment. Finasteride and dutasteride -type II 5 alpha reductase inhibitors arrest progression of androgenetic alopecia in over 90% of men and partially reverse it in over 65% [21]. A small number of studies have been conducted on dutasteride for the treatment of MPHL due to its sexual side effects including impotency & ejaculatory disorders, with its long half-life about 4 weeks [22]. It significantly decrease the semen volume as well as decrease the sperm count & motility [23]. There are some studies which shows finasteride at a dose of 1 mg/d has been proved to stimulate new hair growth in patients with AGA [23-25]. McClellan KJ *et al*., &Whiting DA *et al*., reported that there was a significant amount of vertex hair improvement of AGA patients successively after 12 months and after 24 months treatment. Furthermore, no further vertex hair loss was reported in many patients receiving finasteride for 24 months. In another study Kawashima M *et al*., & Leyden J *et al*., reported that finasteride with the same dose, 39% of the patients showed significant hair growth in the vertex compared with the control group from six months after initiating the treatment to the end of the 2-year study [26-28]. In this case 56% patients shows no further vertex hair loss but 8% patients showed slight decrease in their vertex hair in 24 months. However, 30–50% of patients with AGA treated with finasteride have been reported to present no improvement in their hair count and density [29-31]. A total of 50 patients' men with mild to moderate AGA were enrolled in the study. Baseline characteristics of

enrolled patients are summarized in Table 1. The patient age ranged from 16 to 40 years (mean±SD, 30±235.9 years). Which was quite consistent to other study where mean age was 33.7 ± 7.9 years. Besides that, researcher found that, 10 cases had III and IV level of AGA type [16]. Whereas in our study majority had II vertex and III level of AGA type.

The fact that patients' expectations from the treatment is improvement in their hair count and density rather than alopecic appearance, an alternative treatment is necessary. Dutasteride, an inhibiting agent of both type I and type II 5 alpha reductase, is originally approved for the treatment of symptomatic BPH at a dose of 0.5 mg/d. It is approximately three times more potent than finasteride in inhibiting type II 5 alpha-reductase [17]. In addition, dutasteride also inhibits type I 5 alpha-reductase 100 times more effectively compared with finasteride. As a result, dutasteride at a dose of 0.5 mg/d was proved to reduce serum DHT levels by more than 90%, while finasteride at a dose of 5 mg/d decreases serum DHT by 70% in four weeks and 24 weeks [18].

In our study, after 6 months therapy in patients 20% improved markedly, followed by 24% improved moderately, 16% improved mild. Which was quite similar to other study where 42 patients (84%) showed no change, and three patients (8%) reported even more hair loss despite the finasteride administration. Of the 46 patients who completed the six months of dutasteride treatment, 39 patients (78%) were improved (29) were slightly, 8 moderately, and 2 markedly improved). There was no significant change in 11 patients (22%). No aggravation was reported [16].

Figure 3 presents clinical photographs that illustrate typical improvements of hair loss. Also, dutasteride increased hair growth significantly in patients with AGA in a dose-dependent manner in a phase II, double-blinded, placebo-controlled, 24- week study [19]. This study proved that dutasteride at a dose of 0.5 mg/d increased hair growth significantly after 12 and 24 weeks compared with the control. Percentage of dutasteride-related sexual dysfunction was similar to the frequency with finasteride reported in lots of articles.

Besides that, during treatment libido decreased in 24% cases and ejaculatory disorder seen in 14% cases. Which was quite similar to another study where dutasteride-related sexual dysfunction including decreased libido (14%) also increased compared with dutasteride at a dose of 0.5 mg/d (2%) and with finasteride at a dose of 5 mg/d (6%). Three patients (6%) complained of transient decreased libido while taking finasteride. The sexual dysfunction disappeared in one of the patients and was relieved in the other after alternating medication to dutasteride. Transient decreased libido was also reported in 9 patients (18%) receiving dutasteride. This includes the one patient who showed sexual dysfunction to a high degree while taking finasteride. Two of the eight patients discontinued the treatment because of that reason.

Our study showed that the treatment with dutasteride at a dose of 0.5 mg/d was effective in improving the appearance of scalp hair by increasing hair density and thickness in Bangladeshi men who had previously shown clinically no improvement in hair growth to the conventional treatment.

LIMITATIONS

Study limitations include small sample sizes, short duration of the study period, international variations in reporting, biasness during evaluation of patients, lack of diversity among participants, and loss of patients to follow-up. Further study with a large population & long duration of study is needed to establish the therapeutic efficacy & safety level by dutasteride therapy.

CONCLUSION

Now a days Androgenetic alopecia is the most common dermatological condition with its increasing incidence. Patients suffer from anxiety, depression, and diminished self-esteem & also with overall body image dissatisfaction. A safe & effective therapeutic option is in strong demand for this disease condition. Dutasteride has overall been found to be well tolerated for both men and women with minimal effects. It causes reduction of hair loss & improvement in hair growth after six months of therapy with dutasteride at a dosage of 0.5 mg/d. With overall scenario Dutasteride is suggested to be an alternative therapeutic option for patients with AGA if there is no clinically significant improvement in hair growth with the conventional treatment for six months.

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