Is There a Relationship between Androgenic Alopecia and Benign Prostatic Hyperplasia?

Ladan Dastgheib[1], Mehdi Shirazi[2], Iman Moezzi[1], Saber Dehghan[3], and Maryam-Sadat Sadati[1]

[1] *Department of Dermatology, Molecular Dermatology Research Center, Shiraz University of Medical Sciences, Fars, Iran*

[2] *Department of Urology, School of Medicine, Shiraz University of Medical Sciences, Fars, Iran*

[3] *Department of Medicine, School of Medicine, Shiraz University of Medical Sciences, Fars, Iran*

Received: 11 May 2013; Received in revised form: 17 Apr. 2014; Accepted: 17 May 2014

Abstract- Androgenic alopecia as a physiologic process and benign prostatic hyperplasia (BPH) as a pathologic process in the older population are androgen-dependent processes influenced by 5-alpha reductase enzyme which converts testosterone to dihydrotestosterone. This cross sectional study was done to evaluate the relationship between androgenic alopecia and BPH. 150 men older than 50 years old, who presented to the free prostate screening clinic, were included. They were asked about urinary symptoms. PSA level, prostate volume with sonography and alopecia grading using Hamilton-Norwood classification (grade I to VII) were evaluated. Analysis was done by SPSS statistical method. 59.6% of men had mild alopecia (grade I, II, III), 34.1% had moderate alopecia (grade IV, V) and 6.3% had severe alopecia (grade VI, VII).The mean PSA level was 1.37 ± 1.48 ng/ml. The minimum PSA level was 0.1 ng/ml, and the maximum level was 6.8 ng/ml. The mean prostate volume was 37.85 ± 21.85cc. The minimum prostate size was 10 ml, and the maximum volume was 173 ml. The mean international prostate symptom score (IPSS) was 7.6 ± 6.11 with the minimum score 0 and the maximum score 27. However, no relationship between these parameters and androgenic alopecia was detected. This study showed that there is no relationship between androgenic alopecia, PSA level, IPSS, and prostate volume. Occurrence of alopecia in younger age and a positive family history correlated with a higher grade of alopecia.

Acta Medica Iranica, 2015;53(1):30-32.

Keywords: Androgenic alopecia; Benign prostatic hyperplasia; Dihydrotestosterone

Introduction

Androgenic alopecia in men is caused by the androgenic hormones in genetically predisposed individuals. It happens in 30% of men older than 30 years, and 50% of men older than 50 (1).

Testosterone is an important androgenic hormone and its effect on the hair follicle is via its metabolite dihydrotestosterone (DHT). 5-alpha reductase enzyme is the converter of testosterone to the potent androgen, DHT (1). This enzyme has two forms in the skin, type I is in the sebaceous glands and type II in the hair follicle, prostate, and epididymis.

DHT binds to the androgenic receptor on the hair follicle and transforms the terminal hairs to vellus hairs in the human scalp hair of androgenic alopecia patients and it shortens the anagen phase (2).

When free plasma testosterone reaches the prostate, it enters the cells via diffusion. 90% of testosterone converts to DHT via prostate 5-alpha reductase enzyme (3).

DHT regulates the prostate function in adult men. It is assumed that DHT and other androgenic hormones regulate the balance between the cell synthesis and apoptosis.

There is an increase in cell number in the pathologic prostate, which occurs through an increase in the production and decrease in the destruction (4).

There are few studies done to evaluate the relationship between BPH and androgenic alopecia, with conflicting results (1,6-8).

To the best of our knowledge there is no study evaluating the BPH symptoms and androgenic alopecia, so this study was performed to determine the

Corresponding Author: M.S. Sadati
Department of Dermatology, Shiraz Skin Research Center, Shiraz University of Medical Sciences, Fars, Iran
Tel: +98 917 3371943, Fax: +98 711 88964009, E-mail address: msadati63@yahoo.com

relationship between androgenic alopecia, the BPH symptoms, PSA level and the prostate volume.

Materials and Methods

This cross-sectional study was performed on 150 men older than 50 years, who visited Shiraz University of medical sciences free prostate screening clinic held at Shahid Motahhari polyclinic during a 5-month period. The number of patients was calculated by One-way ANOVA, which is a statistical method, and it was estimated based on previous similar studies.

The questionnaire about below information was filled for the entire participant after informed consent form;

1-The main parameters of the study; the age, urinary retention history, renal failure, urinary incontinence and International prostate symptom score (IPSS).

2-PSA level and the prostate volume by sonography.

3-Clinical exam is recording their androgenic alopecia grading based on Hamilton-Norwood classification (I to VII).

4-Family history of androgenic alopecia and the age of its occurrence.

The alopecia grades were categorized as mild (grade I, II, III), moderate (IV, V) and severe (VI, VII).

In the first visit PSA level (IEMA WELL kit with the normal range of lower than 4 ng/ml) and pelvic sonography for determining prostate volume were requested for all the patients. In the second visit, the data were recorded and treatment according to their lab data was started.

Collected data were analyzed with one-way ANOVA and Mann-Whitney U test methods. The SPSS version 15 Statistical method was used (with a focus on past month history of incomplete emptying, frequency, intermittency, urgency, weak stream, straining & nocturia). A *P*.value less than 0.05 were considered as significant.

Results

This study was performed to determine the relationship between androgenic alopecia, prostate volume, PSA level, and IPSS. 150 men with a mean age 59.69 ±7.29 were serially entered the study. The minimum age was 50, and the maximum age was 83.

59.6% of men had mild alopecia (Grade I, II, III), 34.1% had moderate alopecia (Grade IV, V) and 6.3% had severe alopecia (Grade VI, VII).

In this study, the mean PSA level was 1.37 ±1.48 ng/ml. The minimum PSA level was 0.1 ng/ml, and the maximum level was 6.8 ng/ml. The mean prostate volume was 37.85 ± 21.85 cc. The minimum prostate size was 10 ml, and the maximum volume was 173 ml. The mean IPSS score was 7.6 ± 6.11 with a minimum score 0 and the maximum score 27.

Different parameters that were analyzed are shown in table 1.

Table 1. the result of the different parameter that were analyzed in this study

Variables	Yes%	No %
Family history of androgenic alopecia	57.3	42.7
History of urinary retention	92.7	7.3
Urinary incontinence	16.7	79.3
Renal failure	7.2	97.3

Pearson correlation formula was used to evaluate the relation between these three factors (IPSS, prostate volume, and PSA level) and the grade of androgenic alopecia.

Data analysis showed that there is no relation between the score of androgenic alopecia with IPSS, prostate volume, and PSA level.

The mean score of alopecia in the men with the family history of alopecia was 3.94 ± 1.92.Those with no family history had the mean score of 2.57 ± 1.56. T-test showed a strong relation between the alopecia score and the family history of alopecia.

The mean score of alopecia of men with urinary retention was 3 ± 1.94 comparing with the mean of 3.38 ± 1.89 in those with no history of urinary retention. It showed no statistical relation between the score of alopecia and urinary retention.

The mean score of the men with urinary incontinence was 3.32 ± 1.92 comparing to the men with no history of it with the mean of 3.36 ± 1.88. T- test showed no relation between the score of alopecia and urinary incontinence.

In order to compare the score of alopecia according to the renal failure, we used Mann-Whitney-U test that showed no relation between both mentioned factors.

In order to compare the mean and the standard deviation of score of alopecia with IPSS subgroups, we divided IPSS to three subgroups: mild (IPSS<7), moderate (7 <= IPSS <=19) and severe (IPSS>19). Then we compared the score of alopecia in different subgroups by using one-way ANOVA statistical analysis method. The results showed there is no relation between IPSS and the score of androgenic alopecia (Table 2).

Table 2. The mean and the standard deviation of the score of alopecia in different subgroups of IPSS

IPSS subgroups	Number cases	The mean score of alopecia (standard deviation)
Mild	85	3.38 (1.92)
Moderate	57	3.17 (1.74)
Severe	8	4.37 (2.50)
Total	150	3.39 (1.89)

Discussion

Androgenic alopecia in genetically susceptible males is induced by androgens and their metabolites. The enzyme 5-alpha reductase converts testosterone to DHT that causes progressive thinning of the hair shaft and vellus change of terminal hairs in the vertex, frontal and temporal areas of the scalp (5). By the time the hair follicles become miniaturized and atrophic in these patients and recognizable variable degree of hair loss is seen.

BPH occurs in middle age men due to high level of DHT that forms by 5-alpha reductase enzymatic conversion of testosterone to DHT. The effect of DHT on the prostate is hyperplasia followed by the urinary symptoms. According to this, both the androgenic alopecia and BPH are caused by 5 alpha reductase enzymatic pathways. We tried to evaluate the relation between androgenic alopecia and BPH in men who referred to Shahid Motahari Clinic, a free screening prostate clinic, by recording the urinary problems and determining the grade of alopecia.

Despite a few studies performed for determining the relation of androgenic alopecia and BPH, there are some discrepancies in the result of these studies. For example one study in South Korea showed that there is a strong relation between both, because there was a higher prevalence of androgenic alopecia in a patient with BPH comparing to control the group (6). Arias-Santiago *et. al*., showed that androgenic alopecia can be an early marker of BPH (7,8). This is in contrast to what our present study has demonstrated in Iran.

In agreement with our study, it was recently shown that there is no difference regarding androgenic alopecia in 152 patients, 108 of them with BPH and 44 with prostate cancer, in a urology clinic in turkey. There was also no correlation between baldness and serum androgen levels (9).

Chen *et al.,* from Taiwan reported that there is no relation between androgenic alopecia and BPH but there is a relation between alopecia and prostate volume. (1) This result was not concluded in our study which may be due to the racial difference of Iran from Taiwan, there is higher prevalence of BPH in Iran and the numbers of patients included in our study were 150 individuals, which is three times of the study in Taiwan.

In conclusion according to this study, there is no relation between androgenic alopecia and PSA level, IPSS, prostate volume, and the urinary symptoms like the frequency, the urgency and the renal failure which is similar to the two aforementioned studies, however it was shown that positive family history of alopecia and the younger age of beginning of alopecia were related to the grade of alopecia.

Limitation of our study was the sample of men that were collected from a prostate screening clinic. Although they were all healthy men only presenting for screening BPH, it might not be possible to attribute the data to all the population.

References

1. Chen W, Yang CC, Chen GY, et al. Patients With a large prostate show a higher prevalence of androgenic alopecia. Arch Dermatol Res 2004;296(6):245-9.
2. Habif TP, editor. Clinical dermatology, a color guide to diagnosis and therapy. 4th ed. London: Mosby Company; 2002: p. 310-5.
3. Veltri R, Rodrigez R. Molecular biology/endocrinology and physiology of the prostate. In: Wein AJ, Kavoussi LR, Novick AC, et al, editors. Campbell's urology. 8th ed. Philadelphia. Saunders; 2003: p. 2749-843.
4. Carson C 3rd, Rittmaster R. The role of dihyrotestosterone in benign prostatic hyperplasia. Urology 2003;61(4 Suppl 1):2-7.
5. Simpson NB, Cunliffe WJ. Disorders of hairs. In: Burns T, Breathnach S, Cox N, et al, editors. Rook's textbook of dermatology. 7th ed. Oxford: Blackwell Publishing; 2004: 1-220.
6. Oh BR, Kim SJ, Moon JD, et al. Association of benign prostatic hyperplasia with male pattern baldness. Urology 1998;51(5):744-8.
7. Arias-Santiago S, Arrabal-Polo MA, Buendía-Eisman A, et al. Androgenetic alopecia as an early marker of benign prostatic hyperplasia. J Am Acad Dermatol 2012;66(3):401-8.
8. Kaplan SA. Re: Androgenetic alopecia as an early marker of benign prostatic hyperplasia. J Urol 2012;188(5):1846-7.
9. Faydaci G, Bilal E, Nece mettin P, et al. Baldness, benign prostate hyperplasia, prostate cancer and androgen level. Aging Male 2008;11(4):189-92.