Androgenetic alopecia as an early marker of benign prostatic hyperplasia

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Background: Androgenetic alopecia (AGA) and benign prostatic hyperplasia are both androgen-dependent entities that respond to the blocking of 5-alpha-reductase.

Objectives: The objective of this study was to determine whether prostatic volumes and urinary flow changes were higher in patients with early-onset AGA than in healthy control subjects.

Methods: This was an observational case-control study of 87 men: 45 with early-onset AGA diagnosed in the dermatology department and 42 control subjects. End-point variables were prostatic volume, measured by transrectal ultrasound, and urinary flow, measured by urinary flowmetry. A hormone study was performed on all participants, and the International Prostate Symptom Score and International Index of Erectile Function score were determined.

Results: The groups did not significantly differ in mean age (cases, 52.7 years vs control subjects, 49.8 years; $P = .12$). Patients with AGA had significantly higher mean prostate volume (29.65 vs 20.24 mL, $P < .0001$), International Prostate Symptom Score (4.93 vs 1.23, $P < .0001$), and prostate-specific antigen value (1.53 vs 0.94 ng/mL, $P < .0001$) and significantly lower maximum urinary flow (14.5 vs 22.45 mL/s, $P < .0001$) versus control subjects. Binary logistic regression analysis showed a strong association between the presence of AGA and benign prostatic hyperplasia after adjusting for age, urinary volume, urination time, International Prostate Symptom Score, abdominal obesity, glucose levels, systolic blood pressure, insulin levels, fibrinogen, and C-reactive protein (odds ratio = 5.14, 95% confidence interval 1.23-47.36, $P = .041$).

Limitations: The study of larger sample sizes would facilitate stratified analyses according to the Ebling type of androgenetic alopecia.

Conclusion: There is a relationship between the presence of AGA and prostate growth-associated urinary symptoms, likely attributable to their pathophysiological similarity. This study suggests that early-onset AGA may be an early marker of urinary/prostatic symptomatology. Future studies may clarify whether treatment of patients with AGA may benefit the concomitant benign prostatic hypertrophy, which would be present at an earlier stage in its natural evolution. (J Am Acad Dermatol 2012;66:401-8.)

Key words: androgenetic alopecia; androgens; benign prostatic hyperplasia; maximum urinary flow; prostate volume.

Male androgenetic alopecia (AGA) is the most prevalent form of alopecia and is largely determined by genetic factors and the peripheral action of androgens. Various authors have reported a relationship between AGA and cardiovascular involvement.[1-3] The aim of the

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Presented as a pilot study at the 68th Annual Meeting of the American Academy of Dermatology in Miami, Florida, in March 2010 and received the First Award: "Urinary symptoms in patients with androgenetic alopecia."

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current study was to analyze the relationship between AGA and urinary symptoms associated with prostate growth.

Benign prostatic hyperplasia (BPH) is highly prevalent among elderly men but infrequent in those younger than 40 years. Its prevalence progressively increases above the age of 60 years. The two most important factors implicated in BPH have been patient age and androgenic function.

Both AGA and BPH are androgen-dependent diseases in which testosterone and dihydrotestosterone (DHT) are involved and in which the enzyme 5-alpha-reductase, which transforms testosterone into DHT, plays a key role. In the scalp, the DHT responsible for follicular miniaturization is largely produced by the action of 5-alpha-reductase type 2 on testosterone. In the prostate, DHT derived from the action on testosterone of both isoenzymes (5-alpha-reductase types 1 and 2) is implicated in the growth and development of the prostate gland.

CAPSULE SUMMARY

- Androgenetic alopecia (AGA) and benign prostatic hyperplasia are both androgen-dependent entities that share a common pathogenesis. AGA, which manifests some decades before the onset of benign prostatic hyperplasia, may serve as an early marker of prostate symptoms.
- Patients with AGA had significantly higher mean prostate volume, International Prostate Symptom Score, and prostate-specific antigen values and significantly lower maximum urinary flow versus control subjects.
- Early-onset AGA behaved as an early marker of urinary symptoms, in that these patients had a larger prostate and incipient urinary flow changes.

Some authors reported increased DHT concentrations in the prostate tissue of patients with BPH versus healthy tissue,[4] whereas others found no differences.[5] Nevertheless, the activity of 5-alpha-reductase and number of androgenic receptors are still considered to be higher in patients with BPH than in control subjects. Scalp biopsy specimens of patients with AGA have shown increased DHT concentrations and 5-alpha-reductase activity.[6,7]

Because both entities share a common pathogenesis and AGA manifests some decades before BPH onset, AGA may serve as an early marker of prostate symptoms. The main objective of this study was to determine whether early-onset AGA behaves as an early subclinical marker of prostate signs and symptoms in patients with no history of urinary/prostate symptoms. Study end-point variables were the prostate volume, measured by studio transrectal ultrasound, and the maximum urinary flow in patients with AGA and healthy control subjects. Secondary variables were hormone study results, International Prostate Symptom Score (IPSS), and International Index of Erectile Function (IIEF) score.

METHODS

Study subjects and design

This case-control study included 87 Caucasian participants aged 35 to 65 years: 45 with AGA consecutively examined in the outpatient clinic of San Cecilio University Hospital, Granada, Spain, and 42 without AGA. Control subjects were recruited among workers at the hospital (guards, security guards, health care workers). Study inclusion criteria for the patient group were: early-onset (age <35 years) type III, IV, or V AGA on the Ebling scale; age between 35 and 65 years; and written informed consent for study participation. Exclusion criteria were: history of prostate disease; prostatitis; neurogenic bladder; previous consultation with urologist or family physician for prostate problems; and treatment with minoxidil (in previous 6 months), α-blockers, testosterone, 5-alpha-reductase inhibitors, or any other hormone therapy. The study was approved by the Ethics Committee of San Cecilio University Hospital.

Clinical parameters

The AGA diagnosis was based on clinical findings: pattern of increased hair thinning on frontal/parietal scalp with greater hair density on occipital scalp; the presence of miniaturized hairs and diversity of hair diameter (measured by dermatoscopy); and the Ebling type. Patients were asked about any family history of AGA or BPH, personal history of cardiovascular disease, alcoholism (>40 g/d), smoking (>5 cigarettes/d), or sedentary lifestyle (physical exercise <30 min/d), diet (sodium intake), and drug intake (antihypertensives, diuretics, hypocholesterolemics, and oral antidiabetics). Data were collected by a single examiner.

Total testosterone, follicle-stimulating hormone, luteinizing hormone, prolactin, estrogen, albumin, prostate-specific antigen (PSA), sex hormone–binding globulin (SHBG), triglycerides, high-density lipoprotein cholesterol, low-density lipoprotein cholesterol, glycemia, insulin levels, fibrinogen, and C-reactive protein (CRP) were studied in samples drawn between 8 AM and 9 AM after a 12-hour