

## EXTENSIVE CLINICAL EXPERIENCE

# Relative Prevalence of Different Androgen Excess Disorders in 950 Women Referred because of Clinical Hyperandrogenism

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**Context:** We undertook this study to estimate the prevalence of the various androgen excess disorders using the new criteria suggested for the diagnosis of polycystic ovary syndrome (PCOS).

**Setting:** The study was performed at two endocrine departments at the University of Palermo (Palermo, Italy).

**Patients:** The records of all patients referred between 1980 and 2004 for evaluation of clinical hyperandrogenism were reevaluated. All past diagnoses were reviewed using the actual diagnostic criteria. To be included in this study, the records of the patients had to present the following available data: clinical evaluation of hyperandrogenism, body weight and height, testosterone (T), free T, dehydroepiandrosterone sulfate, 17-hydroxyprogesterone, progesterone, and pelvic sonography. A total of 1226 consecutive patients were seen during the study period, but only the scores of 950 patients satisfied all criteria and were reassessed for the diagnosis.

**Results:** The prevalence of androgen excess disorders was: PCOS, 72.1% (classic anovulatory patients, 56.6%; mild ovulatory patients, 15.5%), idiopathic hyperandrogenism, 15.8%; idiopathic hirsutism, 7.6%; 21-hydroxylase-deficient nonclassic adrenal hyperplasia, 4.3%; and androgen-secreting tumors, 0.2%. Compared with other androgen excess disorders, patients with PCOS had increased body weight whereas nonclassic adrenal hyperplasia patients were younger and more hirsute and had higher serum levels of T, free T, and 17-hydroxyprogesterone.

**Conclusions:** Classic PCOS is the most common androgen excess disorder. However, mild androgen excess disorders (ovulatory PCOS and idiopathic hyperandrogenism) are also common and, in an endocrine setting, include about 30% of patients with clinical hyperandrogenism. (*J Clin Endocrinol Metab* 91: 2-6, 2006)

**D**URING THE LAST two decades, the criteria for making the diagnosis of hyperandrogenic syndromes have changed several times, and it has influenced the classification and the relative prevalence of the various androgen excess disorders. Until the 1980s, based on diagnostic tests of blocking or stimulating adrenal or ovarian androgen secretion, adrenal and ovarian hyperandrogenism were common diagnoses (1). However, these tests showed little specificity, and in 1990, at a National Institutes of Health (NIH) meeting, a majority of experts agreed to consider affected by polycystic ovary syndrome (PCOS) all patients presenting clinical or biological hyperandrogenism and chronic anovulation (2). The search for the source of hyperandrogenism was not considered important, and only a few well-characterized hyperandrogenic syndromes (Cushing's syndrome, androgen-secreting tumors, and nonclassic adrenal enzymatic deficiencies) had to be excluded to make the diagnosis of PCOS

(2). During the following years, more strict criteria for making the diagnosis of idiopathic hirsutism (normal androgens and normal ovulatory cycles in the presence of hirsutism) were adopted (3), and a form of nonclassic adrenal hyperplasia (NCAH; 3 $\beta$ -hydroxysteroid dehydrogenase deficiency) almost disappeared because, in adult subjects, no genetic alterations were found, and the patients with this steroid abnormality were considered to have a variant of PCOS (4).

As a consequence, the number of diagnoses of PCOS has increased greatly, and PCOS has become almost synonymous for hyperandrogenism. In a recent large study including 878 women with clinical hyperandrogenism, a diagnosis of PCOS was made in 82% of patients, and the other most common hyperandrogenic syndromes (hyperandrogenism plus ovulatory cycles and idiopathic hirsutism) were diagnosed in only 6.75% and 4.47% of the patients (5).

More recently, in 2003, a meeting of experts suggested new criteria for making the diagnosis of PCOS (6, 7). With these new criteria, PCOS can be diagnosed in patients with two of these three elements: clinical or biological hyperandrogenism, chronic anovulation, and polycystic ovaries. Although these new criteria are quite reasonable, and in particular, several studies have shown that hyperandrogenic ovulatory patients share many characters of PCOS (defined according to NIH criteria) (8), it has increased the number of

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Abbreviations: BMI, Body mass index; DHEAS, dehydroepiandrosterone sulfate; HAIR-AN, hyperandrogenic, insulin-resistant acanthosis nigricans; NCAH, nonclassic adrenal hyperplasia; 17OHP, 17-hydroxyprogesterone; P, progesterone; PCOS, polycystic ovary syndrome; T, testosterone.

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hyperandrogenic patients with a diagnosis of PCOS, adding the ovulatory patients who have clinical or biological hyperandrogenism associated with polycystic ovaries.

The inclusion of pelvic sonography in the criteria to diagnose PCOS has influenced the definition of other androgen excess disorders as well. In fact, idiopathic hirsutism was previously diagnosed on the basis of clinical hyperandrogenism, but normal ovulatory cycles and normal serum androgen levels, regardless of ovarian morphology. However, some of these patients may have polycystic ovaries and may now be classified as having PCOS.

During the last 25 yr, we have evaluated in two successive endocrine settings 1226 women referred with clinical hyperandrogenism. According to the time of the patient evaluation, different diagnostic criteria were used. We decided to review all past diagnoses and to assess the prevalence of the different forms of androgen excess disorders using the actual diagnostic criteria. To be included in this study, the records of the patients had to present the following available data: clinical evaluation of hyperandrogenism, body weight and height, testosterone (T), free T, dehydroepiandrosterone sulfate (DHEAS), 17-hydroxyprogesterone (17OHP), progesterone (P), and pelvic sonography. In total, the records of 950 patients satisfied all criteria and were reassessed for the diagnosis. We present in this report the results and the diagnostic criteria that we followed.

## Subjects and Methods

Between 1980 and 2004, 1226 women were studied in two endocrine settings: the Endocrine Department of the University of Palermo and the Endocrine Unit, Department of Clinical Medicine of the University of Palermo. All of these women were referred because of clinical hyperandrogenism. No patient had received any medication for at least 3 months before this study, and all patients gave informed consent to the evaluation protocol that was approved by both institutions.

Clinical hyperandrogenism was defined as the presence of hirsutism, acne, or androgenic alopecia. Hirsutism was assessed by Ferriman-Gallwey-Lorenzo scores (9) (patients with scores of 6 or greater were considered hirsute), whereas acne was graded by a scoring system from 0–3 (10), and alopecia was evaluated by the Ludwig scoring system (11).

Independently of the diagnosis made at the time of the evaluation, all records of the patients were reevaluated by the same author (E.C.). Only the records that contained at least the following studies were considered useful for reevaluation of the diagnosis: clinical data [including assessment of clinical hyperandrogenism, body mass index (BMI), age and characters of menstrual cycles]; serum levels of T, free T, DHEAS, 17OHP, and P; and pelvic sonography. Menstrual cycles shorter than 25 d and longer than 34 d were considered abnormal.

Serum androgen and 17OHP levels were determined during the follicular phase (d 5–8) of a spontaneous or progestin-induced cycle. Serum P was determined on d 21–24 of a spontaneous or induced menstrual cycle.

Serum hormone levels were quantified by well-established methods that had been validated previously in our laboratory. In both endocrine settings, the same methods were used. All steroids were measured by specific RIAs after extraction using previously described methods (12). In all assays, intra- and interassay coefficients of variation did not exceed 6% and 15%, respectively.

Anovulation was defined as serum P levels below 3 ng/ml (<9.54 nmol/liter). In patients with normal menses, at least two consecutive menstrual cycles were studied, and a finding of low levels of serum P (<3 ng/ml) in both cycles indicated the presence of chronic anovulation.

Biochemical hyperandrogenism was defined as serum T levels above 60 ng/dl (>2.08 nmol/liter), free T levels of 3 pg/ml ( $\geq 10.34$  pmol/liter) or more, and/or serum DHEAS levels of 3000  $\mu$ g/liter ( $\geq 7.8$   $\mu$ mol/liter)

or more. These values of hyperandrogenism have been previously calculated in our population with the same assays (13).

Increased serum 17OHP was defined as serum 17OHP levels above 3  $\mu$ g/liter (>9.1 nmol/liter). In patients with mildly increased serum 17OHP (<10 and >3  $\mu$ g/liter), an increased 17OHP response to ACTH administration (1 mg, iv, with blood samples at 0, 30, and 60 min) was required for diagnosis of nonclassic 21-hydroxylase deficiency (14).

Pelvic ultrasound was used to determine ovarian size (by measurement of the main three ovarian diameters in both ovaries) and the presence, size, and number of ovarian microcysts. Both data obtained by abdominal and transvaginal ultrasounds were considered useful for the diagnosis.

The presence of polycystic ovaries was established by the presence of 10 or more peripherally oriented cystic structures in one ultrasonographic plane, each of which measured 2–10 mm in diameter, arranged around a dense stroma (15). Ovarian volume was calculated by the formula  $\pi/6 (DB_1 \times DB_2 \times DB_3)$ , where the dimensions (D) of length, width, and thickness were used. The sizes of both ovaries were assessed, and mean ovarian size was calculated. According to our data from normal women, increased ovarian size indicates that the mean ovarian size was larger than 7.5 cc<sup>3</sup> (16).

Over this long period of time, ovarian sonography was performed by several different experienced observers. However, all ultrasound records were reviewed by the same author (E.C.), and patients with incomplete or unclear sonographic records were not included in this study.

In some patients, because of clinical suspicion, urinary free cortisol and serum prolactin and TSH were measured by commercial RIA methods. No diagnosis of Cushing's syndrome or primary hyperprolactinemia was performed in this group of patients, whereas in four patients (all with classic PCOS), TSH serum levels were mildly elevated.

## Differential diagnosis of hyperandrogenic syndromes

These distinct types of androgen excess disorders were identified:

**PCOS.** At least two of the following three abnormalities were present: chronic anovulation, clinical or biochemical hyperandrogenism, and polycystic ovaries on ultrasound (6, 7).

**Idiopathic hirsutism.** The patient had normal serum androgen levels (T, free T, and DHEAS) in the presence of normal ovulatory cycles and normal ovaries on ultrasound.

**Idiopathic hyperandrogenism.** The patient had clinical hyperandrogenism, increased serum androgen levels in the presence of normal ovulatory cycles, and normal ovaries on ultrasound (17)

**NCAH.** The patient had clinical hyperandrogenism and increased serum 17OHP (>10  $\mu$ g/liter; >30.3 nmol/liter) or mildly increased serum 17OHP (>3 and <10  $\mu$ g/liter) with an increased response to ACTH (change in 17OHP, >5  $\mu$ g/liter with a 17OHP peak >10  $\mu$ g/liter).

**Androgen-secreting tumors.** This was diagnosed by the finding of an androgen-secreting tumors (ovarian or adrenal) in women with very high serum androgen levels (total T, >150 ng/dl; or serum DHEAS, >8000  $\mu$ g/liter).

## Statistical analysis

Two-group comparison of continuous variables was performed using a two-sample *t* test with adjustment for nonconstancy of variance when necessary. More than two group means were compared using ANOVA with *post hoc* least squares means pairwise comparisons. For comparing the percentages of obesity, increased body weight, and increased ovarian size,  $\chi^2$  tests were used. All data are presented as the mean  $\pm$  sd.

## Results

In total, the records of 950 patients referred for clinical hyperandrogenism satisfied all criteria and were reassessed for the diagnosis. The main causes of exclusion were absent or unclear ovarian sonography (176 patients) and lack of information on ovulatory status (52 patients). Forty-eight

**TABLE 1.** Prevalence of different androgen excess disorders in 950 women referred because of clinical hyperandrogenism

	No. of patients	% of total no. of patients
Classic PCOS	538	56.6
Ovulatory PCOS	147	15.5
Idiopathic hyperandrogenism	150	15.8
Idiopathic hirsutism	72	7.6
NCAH	41	4.3
Androgen-secreting tumors	2	0.2

patients were excluded because of incomplete clinical or hormonal data.

#### Clinical features

The mean age of the patients was  $24.3 \pm 5$  yr (range, 18–44 yr), and the mean BMI was  $26.7 \pm 9$  kg/m<sup>2</sup>. One hundred ninety-one patients (20.1%) were obese (BMI,  $\geq 30$  kg/m<sup>2</sup>). Nine hundred two patients (95%) were hirsute, whereas 44 patients (4.6%) had only acne, and four had only alopecia. Hirsutism was associated with acne in 76 patients and with alopecia in 26. In total, 120 patients (12.6%) had acne, and 30 (3.2%) had alopecia. Four hundred twenty-nine patients (45.2%) had normal menses; irregular menses were reported in the remaining 521 (54.8%) women.

#### Prevalence of elevated serum androgen levels

One hundred sixty-six patients (17.5%) with clinical hyperandrogenism had normal values of all studied androgens. Total T was the most commonly elevated androgen (70.2%) whereas free T was elevated in 67.4% of the patients, and serum DHEAS was elevated in 44.3% of the patients.

#### Prevalence of various hyperandrogenic syndromes

PCOS was diagnosed in 685 patients (72.1%). Of these, 538 (56.6% of the total number of patients) were anovulatory and were considered to be affected by classic PCOS (NIH criteria), whereas 147 (15.5% of the total number of patients) were ovulatory and were considered affected by mild ovulatory PCOS. One hundred fifty patients (15.8%) presented increased androgen levels, but did not meet the criteria for diagnosis of PCOS. In fact, they had ovulatory cycles and normal ovaries. In these patients a diagnosis of idiopathic hyperandrogenism was made. Seventy-two patients (7.6%) had normal androgen levels, normal ovulatory cycles, and normal ovaries. These patients were considered to have idiopathic hirsutism. NCAH was diagnosed in 41 patients (4.3%) Finally, two patients (0.2%) presented with androgen-

secreting tumor. One patient presented a small, T-secreting ovarian carcinoma; the other patient had an adrenal androgen-secreting tumor. Both patients were operated on, and the diagnosis was confirmed by histopathology. In Table 1, the relative prevalence of the various hyperandrogenic syndromes is indicated.

#### Comparison of different hyperandrogenic syndromes

Because of their small number, patients with androgen-secreting tumors were not included in the following comparisons. Clinical features of the different androgen excess disorders are indicated in Table 2. NCAH patients were younger ( $P < 0.05$ ) and more hirsute ( $P < 0.05$ ) compared with the other groups of hyperandrogenic patients. There were no differences in age or severity of hirsutism (calculated by Ferriman-Gallwey-Lorenzo scores) between the other androgen excess disorders. The distribution of acne and alopecia was similar in the various hyperandrogenic syndromes.

Patients with classic PCOS were more obese than other hyperandrogenic patients ( $P < 0.01$ ), and the prevalence of obesity (28.4%) was higher ( $P < 0.01$ ) than in other androgen excess disorders. Calculating overweight patients also, increased body weight was found in 60.9% of patients with classic PCOS vs. 36.6% in NCAH, 37.4% in ovulatory PCOS, and 36.7% in idiopathic hyperandrogenism. The difference between patients with classic PCOS and all other hyperandrogenic disorders was statistically significant ( $P > 0.01$ ). Patients with idiopathic hirsutism had a lower body weight compared with patients with all other androgen excess disorders ( $P < 0.01$ ), and 89.4% of these patients had normal body weight. In Table 3 androgen and 17OHP levels (mean  $\pm$  SD) are indicated.

Patients with NCAH had significantly higher ( $P < 0.01$ ) levels of T, free T, and 17OHP than patients with other hyperandrogenic syndromes. Androgen and 17OHP levels were similar in patients with classic PCOS, mild ovulatory PCOS, and idiopathic hyperandrogenism and in all these syndromes were significantly ( $P < 0.01$ ) higher than those in patients with idiopathic hirsutism.

In Table 4, the prevalence of polycystic ovaries and increased ovarian size in patients with NCAH and PCOS are indicated. Polycystic ovaries were very common in all groups of patients (in patients with ovulatory PCOS, the presence of polycystic ovaries was a selection criterion), whereas increased ovarian size was present in 50% of patients with classic PCOS, 41% of patients with NCAH, and 33% of patients with mild ovulatory PCOS. Increased ovarian

**TABLE 2.** Some clinical data (mean  $\pm$  SD) in 950 patients with clinical hyperandrogenism

	Age (yr)	BMI (kg/m <sup>2</sup> )	Prevalence of obesity (%)	Prevalence of overweight (%)	FGL scores
NCAH	$21.5 \pm 7.4^a$	$26.3 \pm 6^b$	12.2	24.4	$15.7 \pm 6.7^a$
Classic PCOS	$24.5 \pm 4.7$	$28 \pm 6^c$	28.4	32.5	$11.9 \pm 4.7$
Ovulatory PCOS	$24.3 \pm 4.5$	$24.6 \pm 4^b$	6.8	30.6	$10 \pm 4$
Idiopathic hyperandrogenism	$24.0 \pm 4.1$	$25.2 \pm 6.7^b$	12.0	24.7	$12.1 \pm 5$
Idiopathic hirsutism	$24.5 \pm 5.5$	$23.7 \pm 2$	5.3	5.3	$10.1 \pm 3$

FGL, Ferriman-Gallwey-Lorenzo.

<sup>a</sup>  $P < 0.05$  vs. other androgen excess disorders.

<sup>b</sup>  $P < 0.05$  vs. idiopathic hirsutism.

<sup>c</sup>  $P < 0.01$  vs. other androgen excess disorders.

**TABLE 3.** Serum androgen and 17OHP levels (mean  $\pm$  SD) in patients with clinical hyperandrogenism

	Total T (ng/dl)	Free T (pg/ml)	DHEAS ( $\mu$ g/liter)	17OHP ( $\mu$ g/liter)
NCAH	112 $\pm$ 30 <sup>a</sup>	4.4 $\pm$ 1.3 <sup>a</sup>	3200 $\pm$ 1400 <sup>b</sup>	15.1 $\pm$ 9 <sup>a</sup>
Classic PCOS	83 $\pm$ 35 <sup>b</sup>	3.4 $\pm$ 2 <sup>b</sup>	3000 $\pm$ 1400 <sup>b</sup>	1.4 $\pm$ 0.8 <sup>b</sup>
Ovulatory PCOS	73 $\pm$ 17 <sup>b</sup>	2.7 $\pm$ 1 <sup>b</sup>	2600 $\pm$ 1000 <sup>b</sup>	1.3 $\pm$ 0.9 <sup>b</sup>
Idiopathic hyperandrogenism	76 $\pm$ 20 <sup>b</sup>	3.1 $\pm$ 1.4 <sup>b</sup>	3000 $\pm$ 1000 <sup>b</sup>	1.3 $\pm$ 0.6 <sup>b</sup>
Idiopathic hirsutism	33 $\pm$ 13	1.7 $\pm$ 0.4	1900 $\pm$ 700	0.6 $\pm$ 0.3

Variables: total T conversion factor to Systeme International (SI) units (nanomoles per liter) is 0.03467; free T conversion factor to SI units (picomoles per liter) is 3.47; DHEAS conversion factor to SI units (micromoles per liter) is 0.0026; 17OHP conversion factor to SI units (nanomoles per liter) is 3.03.

<sup>a</sup>  $P < 0.01$  vs. other androgen excess disorders.

<sup>b</sup>  $P < 0.01$  vs. idiopathic hirsutism.

size was significantly more common ( $P < 0.01$ ) in patients with classic PCOS than in women with the other androgenic disorders.

### Discussion

This is probably the first large report assessing the prevalence of different hyperandrogenic syndromes using the new Rotterdam criteria for diagnosis of PCOS (6, 7). This consensus meeting had an important impact on the relative prevalence of the different hyperandrogenic syndromes, because modifying the diagnostic criteria for the most common androgen excess disorder, PCOS, at the same time made important changes in the diagnostic criteria of the other hyperandrogenic syndromes.

In fact, patients with hyperandrogenism (clinical or biological) and polycystic ovaries are now included in the PCOS group although they have normal ovulatory menses. Because of this, the diagnosis of mild androgen excess disorders that we have called idiopathic hyperandrogenism (clinical hyperandrogenism, increased androgen levels, and normal ovulatory cycles) (17) and idiopathic hirsutism (hirsutism, but regular androgen levels and normal ovulatory cycles) (3) necessarily requires the exclusion of polycystic ovarian morphology.

At the same time, the differences between idiopathic hyperandrogenism and idiopathic hirsutism should be discussed again. In fact, in the diagnosis of PCOS, no difference is made between biological and clinical hyperandrogenism; therefore, both syndromes could be considered the same entity. However, we have preferred to maintain the separation between these two disorders and to delay a more detailed discussion on these mild forms of hyperandrogenism to additional studies and analyses.

Using Rotterdam criteria, PCOS is by far the most common diagnosis in patients with clinical hyperandrogenism; 56.6% of all patients had PCOS according to NIH criteria, and the Rotterdam criteria added an additional 15%, bringing the total number of patients with PCOS to a total of 72.8%.

It is interesting to compare our data with those obtained

in a recent report that included a similar number of women with probable androgen excess disorders (5). Although in both studies PCOS is by far the more common androgen excess disorder, several differences may be noted. In the report by Azziz *et al.* (5) using the NIH criteria, the prevalence of PCOS was higher than that in our study using Rotterdam criteria; 82% of patients had classic PCOS vs. 58% of our hyperandrogenic women. Because of this, the number of patients with mild hyperandrogenism (including patients that we have classified as mild PCOS and idiopathic hyperandrogenism) was much lower (6.75% vs. 31.3%) (5).

Several factors may explain these differences. Probably the most important is the setting. The Azziz *et al.* (5) experience comes from an Obstetrics and Gynecology Department, whereas our study was performed in two Endocrine Departments. It is probable that there is a different selection of patients, with a larger number of patients referred to the Obstetrics and Gynecology Department because of fertility and/or menstrual problems and a larger number of patients referred to the Endocrine Departments because of hirsutism only. Moreover, in the two studies, the selection criteria of the patients were different. Although our study included only patients with clinical hyperandrogenism (hirsutism, acne, or alopecia), the Azziz study (5) also included patients referred because of menstrual disturbances or ovulatory dysfunction independently of clinical hyperandrogenism.

It is clear that only epidemiological studies may permit us to determine what is the real prevalence of PCOS and mild hyperandrogenic syndromes in the general female population. However, the mild androgen excess disorders should not be underestimated. Because about 5% of young female women have classic PCOS (18), it may be calculated that about 2–3% have milder forms of hyperandrogenism. Our recent data have shown that it may be important to distinguish patients with mild ovulatory PCOS from other mild hyperandrogenic syndromes, because even in ovulatory patients, the finding of PCOS is associated with an increased risk of metabolic and cardiovascular disorders (17).

Our data confirm that even in an endocrine setting, the

**TABLE 4.** Prevalence of polycystic ovaries and increased ovarian size in patients with NCAH and patients with classic and ovulatory PCOS

	Polycystic ovaries (%)	Polycystic ovaries (no. of patients)	Increased ovarian size (%)	Increased ovarian size (no. of patients)
NCAH	77	31	41	17
Classic PCOS	91	490	50	269
Ovulatory PCOS	100	147	33	49

prevalence of idiopathic hirsutism is relatively low. Only 7.6% of our patients with clinical hyperandrogenism were affected by idiopathic hirsutism, a finding consistent with our previous report of a 6% prevalence (13).

The prevalence of NCAH in our population was relatively high (4.3%) and quite similar to that we reported many years ago (19). In contrast, an androgen-secreting tumor was a very uncommon finding.

In this study no diagnosis of hyperandrogenic, insulin-resistant acanthosis nigricans (HAIR-AN) syndrome was reported. In fact, in many initial patients, serum insulin was not measured; because of this, the exact prevalence of HAIR-AN syndrome in our population could not be determined. In our most recent patients, only three had evidence of HAIR-AN syndrome (fasting serum insulin,  $>80 \mu\text{U}/\text{ml}$ ) (5). These patients were clinically quite similar to those with classic PCOS and were included in this group. We believe that the diagnostic criteria for HAIR-AN syndrome should be discussed and validated in large studies.

Clinical and hormonal differences among the various androgen excess disorders were small. As a mean, patients with NCAH were younger, a finding that may be related to their more severe hirsutism and their higher androgen levels. Probably, the most important difference was in body weight. In fact, although body weight was increased in all hyperandrogenic syndromes (it was normal only in patients with idiopathic hirsutism), anovulatory patients with PCOS (classic PCOS) had increased body weight compared with women with all other androgen excess disorders, including patients with mild ovulatory PCOS. Although in our population, obesity was present in only about 30% of women with PCOS (20), 61% of our patients with classic PCOS had increased body weight. We have recently suggested that increased body weight may be the most important modifier of PCOS phenotype, not only raising metabolic and cardiovascular risk, but also determining anovulation, at least in some patients (17).

In conclusion, using new diagnostic criteria, PCOS is by far the most common androgen excess disorder. Almost 60% of women referred because of clinical hyperandrogenism had the classic (anovulatory) form of PCOS, and the new Rotterdam criteria added about another 15% of ovulatory patients. The remaining 25% of the patients include mostly women with mild hyperandrogenism and no risk of the metabolic and cardiovascular disorders that we have distinguished (imperfectly) in patients with idiopathic hyperandrogenism and idiopathic hirsutism. Probably, these two mild hyperandrogenic syndromes create only psychological problems. A small number of patients had NCAH (often clinically undistinguishable from PCOS patients), and very few patients (only two in 25 yr) had an androgen-secreting tumor.

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