Clinically significant and sustained weight loss is achievable in obese women with polycystic ovary syndrome followed in a regular medical practice

Lysanne Pelletier, M.D., and Jean-Patrice Baillargeon, M.D., M.Sc.

Department of Medicine, Division of Endocrinology, Université de Sherbrooke, Sherbrooke, Quebec, Canada

Objective: To determine the proportion of obese women with polycystic ovary syndrome (PCOS) losing clinically significant amounts of weight during a standard follow-up by an endocrinologist.
Design: Retrospective cohort study.
Setting: Reproductive Endocrinology Clinic of an academic center.
Patient(s): Obese patients with PCOS assessed between May 2002 and September 2008.
Intervention(s): General nonstandardized advice on weight loss and exercise.
Main Outcome Measure(s): Proportion of women losing $\geq$5% or $\geq$10% of their initial weight at each of the following time interval: 2–6 months, 6–12 months, 12–18 months, 18–24 months, 24–36 months, and beyond 36 months.
Result(s): One hundred seventeen patients with PCOS and with a mean body mass index (BMI) of 38.7 kg/m^2 and mean age of 28.5 years were followed-up for a median duration of 21.9 months (range, 2.0–61.8 months), with a median of two visits per year. More than 40% of these women lost $\geq$5% of their initial weight after >6 months of follow-up, and $\geq$20% lost $\geq$10% after 1 year of follow-up. More important, these proportions were maintained up to $\geq$3 years.
Conclusion(s): It is possible for obese women with PCOS to achieve clinically significant and sustained weight loss by following simple advices given in a regular clinical care setting. Therefore, practitioners should not underestimate their impact to facilitate weight loss in women with PCOS. (Fertil Steril® 2010;94:2665–9. ©2010 by American Society for Reproductive Medicine.)

Key Words: Polycystic ovary syndrome, obesity, weight loss, weight management, lifestyle modification

Polycystic ovary syndrome (PCOS) is a common disorder affecting 5%–10% of premenopausal women (1) that is associated with short-term and long-term major health impacts. Polycystic ovary syndrome not only causes menstrual irregularity, infertility, and hirsutism, but also increases the prevalence of metabolic syndrome and each of its components. This is in comparison with women with matched body mass index (BMI). This places women with PCOS at higher risk for the development of type 2 diabetes and cardiovascular diseases (2, 3).

Approximately 50% of women with PCOS are overweight or obese (4), depending on the population studied. Obese patients with PCOS have a more severe phenotype than lean women, with increased prevalence or severity of menstrual irregularity, infertility, biochemical and clinical hyperandrogenism, glucose intolerance or diabetes, and metabolic syndrome (5, 6). These risks are in addition to the well-known risks of obesity in general, which includes cardiovascular diseases, musculoskeletal complications, and cancer (7, 8).

Among all obese women, those with PCOS are more likely to benefit from sustained weight loss. Early lifestyle intervention in this young population should have an inestimable benefit on their general health outcomes. However, primary care physicians are usually reluctant to manage obesity of their patients because they believe that their success is limited (9). In a large survey less than one in six physicians believed that they were usually successful in helping obese patients lose weight (10). Finally, in most large weight loss studies in the general population, participants are followed by a multidisciplinary team (11–14). However, those services are not easily accessible.

The aim of this study was thus to determine the proportion of obese women with PCOS who achieve a clinically significant weight loss (i.e., at least 5%–10% of their initial weight) (8, 15–17) during a standard follow-up by an endocrinologist in a regular, real-life, medical practice, without an integrated multidisciplinary approach. A second objective was to identify predictive factors for weight loss in this context.

MATERIALS AND METHODS

Subjects

We conducted a retrospective chart study of all women with PCOS followed at the Reproductive Endocrine Clinic of the Centre Hospitalier Universitaire de Sherbrooke (CHUS) between May 2002 and September 2008. All patients fulfilled the 1990 National Institutes of Health diagnostic criteria for the diagnosis of PCOS (18): [1] history compatible with or demonstrated oligoanovulation and [2] symptoms or clinical signs of hyperandrogenism or biochemical hyperandrogenemia (total T $\geq$2.6 nmol/L or free T $\geq$50 pmol/L). These criteria are in accordance with both the 2003 Rotterdam (19) and revised 1990 National Institutes of Health diagnostic (20) recommendations. Also, other etiologies were excluded: congenital adrenal hyperplasia, androgen-secreting tumors, Cushing syndrome, hyperprolactinemia, and hypothyroidism. Inclusion criteria were: initial BMI $\geq$30 kg/m^2 and two weight measurements at least 2 months apart. Exclusion criteria were:

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Reprint requests: Jean-Patrice Baillargeon, M.D., M.Sc., Université de Sherbrooke, Sherbrooke, QC J1H 5N4 Canada (FAX: 819-564-5292; E-mail: jp.baillargeon@usherbrooke.ca).

use of a multidisciplinary team approach for obesity management. The study protocol was approved by the Institutional Review Board of the CHUS.

Intervention and Follow-up

All women with PCOS were seen by one endocrinologist (J.-P.B.). The first consultation visit usually lasted 45–50 minutes and each follow-up visits, approximately 25 minutes. During the initial consultation visit, in addition to usual clinical evaluation, each patient received general information on PCOS, its metabolic long-term consequences, and the importance of weight loss and exercise. Initially and during follow-up visits, brief verbal advices were given on healthy lifestyle, without standardization or handouts. These advices were tailored to each patient. Regarding nutritional changes, advice focused on an healthy balanced diet. These advices were based on the Canada's Food Guide (21), the healthy food plate (half of the plate with vegetables, a quarter with grain products, and last quarter with meat or alternatives), reduction in food portions, increasing vegetables and fibers, and limiting foods and beverages high in calories, fat, or sugar (such as fried foods and soft drinks). Regarding exercise, advice focused on any possible increase in physical activity, both during daily life and leisure. These advices were based on activities already acceptable to the patient. Physical activity objectives were explicit with concrete and specific targets, were realistic (considering the capacity of the patient), and were increased progressively (at the pace of the patient). Another important part of the intervention was verification of the achievement of diet and exercise targets, as well as reinforcement of lifestyle modifications at each visit. This simple and brief intervention was in accordance with published guidelines from Obesity Canada (8) and the Androgen Excess and PCOS Society (22).

Although consultation with a nutritionist was encouraged, it was not possible to determine the proportion of women with PCOS who effectively consulted one. However, we can assume that because the majority of participants had to rely on their own financial means to obtain a private consultation (no public services were available during the study), this proportion was low. The Diabetes Education Centre, which offer individual and group sessions with a nutritionist, was accessible only to diabetic women. Only 5 of the 20 women with PCOS and with type 2 diabetes included in this study were seen at this Centre for group sessions.

Data Collection

We reviewed charts for information reported in Table 1 and for current medications at each visit. Results of androgen levels and oral glucose tolerance tests (OGTT) performed within 6 months of the initial visit were recorded. Impaired glucose tolerance (IGT) and diabetes were defined based on the results of this OGTT (23). Blood tests were performed at local clinical laboratories, mainly the CHUS, and free T was calculated by the method of Sodergard et al. (24). Regarding weight measures, we recorded the initial weight and the last weight measured within these intervals: 2–6 months, 6–12 months, 12–18 months, 18–24 months, 24–36 months, and $\geq$36 months. If two or more visits for one woman were contained in the same time interval, we kept only the last visit of the interval. Finally, we excluded the weights during and less than 9 months after a pregnancy and those after a bariatric surgery, which was not the case for any of our participants.

Statistical Analyses

All variables were normally distributed as determined by the Normal Quantile Plot test, except for the number of visits. It is important to note that many subjects had multiple follow-up visits and may therefore be represented in more than one time interval. However, only one visit per woman was included within a specific time interval. Similarly, most women did not have their weight measured at each time interval, which explains why the number of subjects by intervals is less than the total. To test whether women with longer follow-up had similar initial weight loss than the others, we compared the percentage of weight loss during the first 24 months between women followed up for $\geq$24 months and those followed up for <24 months, by intervals, using a mixed-model repeated measures analysis of variance (ANOVA) test.

TABLE 1

Clinical and laboratory characteristics of the women at initial visit.

Characteristics	Result	No. of women
Age (y)	28.5 ± 7.0	117
Weight (kg)	104.0 ± 17.2	117
BMI (kg/m^2)	38.7 ± 5.7	117
Androgen levels		
Total T (ng/dL)	95.0 ± 37.0	116
Free T (ng/dL)	2.38 ± 1.24	116
DHEAS (μg/dL)	226.0 ± 107.0	102
Diabetes (known or newly diagnosed)	16.1%	112
Impaired glucose tolerance (known or newly diagnosed)	22.3%	112
Infertility	42.7%	117

Note: Results are reported as mean ± SD or proportions. BMI = body mass index. To convert values for total T to nmol/L, multiply by 0.0347; for free T to pmol/L, multiply by 34.7; and for DHEAS to μmol/L, multiply by 0.027. The normal ranges for ovulatory women are as follows: total T, <75 ng/dL, and calculated free T, <1.44 ng/dL.

Pelletier. Weight loss in obese women with PCOS. Fertil Steril 2010.

To identify factors associated with weight loss for each time interval, we correlated mean weight loss percentages and the proportions of women achieving $\geq$5% or $\geq$10% weight loss with initial results or status for age, BMI, diabetes, IGT, and infertility, as well as with initial and current medication use. Antiandrogen drugs were not considered because they were not associated with weight changes in previous publications (25, 26). Mixed forward–backward stepwise multivariable linear or logistic regressions were then performed using variables that were significantly associated with weight loss variables in univariate analyses ($P \leq .10$).

RESULTS

Subjects

Between May 2002 and September 2008, 284 women with PCOS were evaluated at the Clinic and 210 of them had at least two BMIs measured 2 months apart. Among these 210 women, 70.8% were obese (BMI $\geq$30 kg/m^2), 16.3% were overweight (BMI 25–30 kg/m^2), and 12.9% had a normal weight (BMI $\leq$25 kg/m^2). Of the 149 obese women with PCOS, 30 were excluded because a secondary cause was not properly excluded or the second weight was close to pregnancy, and two because they were followed at the CHUS Obesity Management Clinic. Thus, 117 women with PCOS fulfilled our selection criteria. Their baseline characteristics and medication use are depicted in Tables 1 and 2.

Weight Losses Observed During Follow-up

Women were followed up for a median of 21.9 months (range, 2.0–61.8 months), with a median number of three follow-up visits (range, 1–10 visits). The median number of visits per year per patient was two. Table 3 presents patients weight loss at different intervals of follow-up. The mean percentage of weight loss was already significant during the 2- to 6- month period (95% confidence interval [CI] did not include 0) and increased to a maximum of 5.5% during the 12- to 18-month period. Mean percentages of weight loss were statistically significant for all periods, up to more than 3 years.