9. Polycystic ovary syndrome

PCOS is a complex phenotypically heterogenous disorder in women of reproductive age characterized by hyperandrogenism, ovulatory dysfunction, and/or polycystic ovarian morphology. Metabolic abnormalities, primarily insulin resistance and compensatory hyperinsulinemia, are evident in many affected women (360–362).

Lipid abnormalities

9.1 In women with PCOS, we recommend obtaining a fasting screening lipid panel at diagnosis to assess CV risk. (1⊕⊕⊕O)

Technical Remarks:

- PCOS is associated with CV risk factors.
- Conduct a lipid screening both before and intermittently during hormonal therapy.
- In PCOS, hypertriglyceridemia is the most common lipid abnormality.

Evidence and discussion

Dyslipidemia is very common in women with PCOS and occurs in up to 70% of US women with this diagnosis (363). Lipid metabolism in PCOS is altered by a multitude of factors and is not fully explained by visceral obesity alone (364, 365). Several patterns of dyslipidemia have been described, but women with PCOS often exhibit an atherogenic lipid profile, similar to that in diabetes and MetS, characterized by increased TG, low HDL-C, and normal or increased LDL-C; qualitative alterations include increased small, dense LDL particles (365–375). These characteristic lipid changes occur throughout the reproductive span from early adulthood, persist after menopause, and appear to be driven by visceral adiposity, insulin resistance (374, 376, 377), hyperandrogenism (378–380), and/or genetic and environmental factors (373, 381, 382). Studies have found no alterations in apoB levels in women with PCOS, reduced apo A-1 levels (368), higher concentrations of Lp(a), especially in nonobese women with PCOS (369, 383, 384), and decreased cholesterol efflux capacity (385).

Women with ovulatory PCOS show a milder atherogenic lipid profile or normal lipids compared with those with anovulatory PCOS (384, 386). Lean women with PCOS may have only low HDL-C levels, whereas those with obesity also have elevations in TG (387). The prevalence of elevated LDL-C levels above 100 mg/dL (2.6 mmol/L) ranges between 24% and 40% (365, 388, 389) and occurs irrespective of body weight (373).

Cardiovascular risk

ASCVD risk in women with PCOS has been hard to characterize and is potentially conferred by the existence of metabolic dysfunction driven primarily by underlying insulin resistance. Women with PCOS often have ASCVD risk factors, such as abdominal obesity, and components of MetS with underlying insulin resistance. Insulin resistance may occur independently of obesity and is usually severe in women with hyperandrogenism and chronic anovulation. In the United States, up to 80% of women with PCOS are obese (390); however, outside of the United States, the prevalence of obesity is estimated to be 50% (391). MetS is also more common in women with PCOS compared with BMI-comparable women without PCOS, and has been shown to be 2- to 5-fold higher in women with PCOS than without (374). Based on the National Cholesterol Education Program Adult Treatment Panel III criteria, 34% to 46% of US Caucasian women with PCOS have MetS (392). Several studies have evaluated CVD risk factors. Early reports suggested that women with PCOS might have an increased CVD risk (393), but subsequent small studies have not confirmed this (394–396). There are no long-term prospective studies assessing CVD risk in PCOS, and evidence for increased CVD morbidity and mortality in women with PCOS remains inconclusive (397).

Based on existing data, our recommendation is to screen all women with PCOS with a lipid profile at the time of diagnosis. Additional screening for CV risk factors, such as family history of premature or early CVD, cigarette smoking, impaired glucose tolerance/T2D, hypertension, or obstructive sleep apnea is important to stratify risk in these women (389, 398).

Effect of treatment of PCOS on lipids

Lifestyle changes in women with PCOS, recommended as the first line of therapy, result in improvements in body composition, hyperandrogenism, insulin resistance, and ovulation but, overall, appears to have minimal to no impact on lipids (399–402). The effect of metformin on lipid levels in women with PCOS appears to be variable. Oral contraceptives (OCPs) containing estrogen increase TG levels. This increase may be substantial in genetically susceptible individuals who may have high TG before taking OCPs and may lead to pancreatitis. Estrogen is also associated with an increase in HDL-C and a decrease in LDL-C ranging from 5% to 20% (403).

In women who do not desire conception, statin therapy may be considered based on risk factors, with lower LDL-C