ABSTRACT

INTRODUCTION: Polycystic ovary syndrome (PCOS) is the most common endocrinopathy in reproductive-age women. Currently used diagnostic criteria, Rotterdam criteria, include clinical or biochemical hyperandrogenism, oligomenorrhoea and polycystic ovarian morphology on transvaginal ultrasound. Depending on the fulfilled criteria, PCOS patients can be divided into four phenotypes.

An important factor in PCOS pathogenesis is insulin resistance, which is associated with an increased risk of metabolic disturbances, including metabolic syndrome (MetS), and cardiovascular diseases (CVD) in comparison to healthy women. It has been demonstrated that the risk of metabolic disturbances and CVD varies between patients with different PCOS phenotypes, which indicates that individualised approach to diagnostics and treatment is necessary in this group of patients.

MicroRNAs (miRNAs) are short non-coding RNA particles, whose main role is posttranscriptional regulation of gene expression. The expression profile of miRNAs is different in patients with metabolic or endocrine diseases in comparison to healthy subjects. It has been demonstrated that miRNAs present in peripheral blood, due to the fact that they are stable and relatively easy to assess, could be used as potential biomarkers of metabolic diseases. The expression profile of circulating miRNAs in PCOS patients differs from healthy women, although miRNA profile in different phenotypes of the syndrome has not been described to date. Demonstrating the differences in circulating miRNAs might contribute to identification of PCOS phenotypes associated with an increased metabolic risk.

AIM: The aim of the present study was to assess the prevalence of metabolic disturbances, including the indices of subclinical CVD, in patients with different phenotypes of PCOS and to investigate their association with serum levels of selected miRNAs.

MATERIALS AND METHODS: The study group comprised 154 PCOS patients diagnosed with the Rotterdam criteria and 113 healthy women as a control group. The patients with PCOS were further divided into four phenotypes (I – 63 patients; II – 30 patients; III – 24 patients; IV – 23 patients). All women underwent anthropometric

measurements, oral glucose tolerance test, assessment of lipid and sex hormone concentrations, transvaginal ultrasound, and the assessment of carotid intima-media thickness (cIMT) and flow-mediated dilation (FMD). The expression level of selected miRNA in serum (miR-27a, miR-34a, miR-106b, miR-193b, miR-181a, miR-181b, miR-320, miR-518f) was assessed with real-time polymerase chain reaction.

RESULTS: Metabolic syndrome was significantly more prevalent in PCOS patients in comparison to the control group, with highest prevalence in phenotypes I and II. No differences between PCOS patients and healthy women were found regarding the values of cIMT or FMD. In women with PCOS and MetS, FMD was lower in comparison to other PCOS patients. In the whole PCOS group, significant correlations were observed between the values of FMD and all individual criteria of MetS. Patients with PCOS presented significantly higher serum levels of miR-27a, miR-106b, and miR-193b, as well as lower levels of miR-181a, miR-181b, miR-320, and miR-518f in comparison to the control group. The level of miR-106b was significantly higher in patients with phenotype I in comparison to phenotype II. In patients with PCOS, the levels of miR-27a and miR-320 correlated with the concentrations of glucose and insulin. Women with PCOS and prediabetes had higher serum levels of miR-27a and lower levels of miR-320 in comparison to PCOS patients with normal glucose metabolism. A combination of miR-27a and miR-320 was associated with the diagnosis of prediabetes only in the PCOS group.

CONCLUSIONS: The prevalence of MetS is significantly increased in PCOS patients, especially in phenotypes associated with hyperandrogenism. Higher prevalence of MetS might be associated with an increased risk of CVD development. The expression profile of serum miRNAs is different in PCOS patients and healthy women, and circulating miR-27a, miR-106b and miR-320 might serve as biomarkers of PCOS. miR-27a and miR-320 seem to be associated with glucose metabolism in women with PCOS and might be used as potential biomarkers of glucose metabolism disturbances in this group of patients.