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Comparison of Metabolic Abnormalities between PCOS Phenotypes ----- A Hospital-based study

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Objective(s): To estimate differences in metabolic abnormalities among different polycystic ovary syndrome (PCOS) phenotypes, and to explore the main factors that affect the metabolic abnormalities of patients with first diagnosis of PCOS.

Design: Hospital-based observational study.

Methods: Hospital-based observational study. PCOS phenotypes were recorded according to the 2003 Rotterdam criteria, including the polycystic ovary morphology (PCO), hyperandrogenism (HA) and ovulation dysfunction (OD) phenotype (PCO+HA+OD); the ovulation phenotype (PCO+HA); the non-PCO phenotype (HA+OD); and the non-HA phenotype (PCO+OD). The prevalence of metabolic abnormalities among different PCOS phenotypes, including diabetes mellitus (DM), metabolic syndrome (MS), pre-diabetes mellitus (pre-DM), insulin resistance (IR) and dyslipidemia were compared.

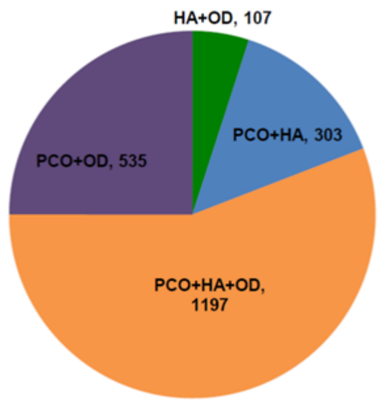

Figure 1 Distribution of PCOS phenotypes in adults (age≥18 years old)

Results:

1. A total of 2436 women who were ≥18 years old and who were hospitalized in Sun Yat-Sen University affiliated hospital from Jan. 1998 to Aug. 2015 in GuangZhou, China were included in this study.
2. 1197 cases (56%) had the classic phenotype (PCO+HA+OD), 303 cases (14%) had the phenotype (PCO+HA), 107 cases (5%) had the phenotype (HA+OD), 535 cases (25%) had the phenotype (PCO+OD).
3. There was no significant difference in the prevalence of metabolic abnormalities or the distribution characteristics of the metabolic abnormalities among these four PCOS phenotypes (P> 0.05).
4. Patients with HA in PCOS had significantly increased obesity (P = 0.014) and pre-DM (P = 0.024) compared with non-HA group.
5. There were significant differences in DM, IFG, IGT, pre-DM, MS, IR, dyslipidemia and central obesity in the PCOS women with obesity (BMI≥23kg / m2) comparing with those without obesity (P <0.001).
6. PCOS patients were divided into four groups according with obesity and HA or not. Metabolic abnormalities was the worst in the group with obesity + HA, followed by obesity + non-HA group. The prevalence of glucose metabolic disorders in the group with non-obesity + HA was slightly elevated comparing with non-obesity + non-HA, however, the prevalence of hyperlipidemia and MS in the group with non-obesity + non-HA was slightly higher than that of the group with HA + non-obesity.

Figure 2 Distribution of metabolic abnormality in PCOS phenotypes

DM: diabetes mellitus, IFG: impaired fasting glucose, IGT: impaired glucose tolerance, IR: insulin resistance, MS: metabolic syndrome, pre-DM: pre-diabetes mellitus, including IFG and IGT.

Table 1 Comparison of metabolic disorders between HA vs non-HA, obesity vs non-obesity

	HA-PCOS	Non-HA-PCOS	P value	Obesity-PCOS	Non-Obesity-PCOS	P value
Obesity	610(37.6%)	237(32.4%)	.014			
DM	67(4.3%)	19(3.0%)	.158	68(8.5%)	17(1.3%)	.000
IFG	221(14.3%)	70(11.2%)	.054	169(21.2%)	119(8.8%)	.000
IGT	295(20.2%)	101(17.1%)	.106	243(31.9%)	152(12.0%)	.000
Pre-DM	438(28.4%)	148(23.6%)	.024	345(43.2%)	238(17.6%)	.000
central obesity	542(38.0%)	228(35.0%)	.199	653(82.8%)	119(9.2%)	.000
IR	512(33.6%)	183(29.8%)	.087	462(58.6%)	230(17.3%)	.000
hypertension	260(19.6%)	99(17.5%)	.279	226(31.2%)	130(11.2%)	.000
MS	220(16.8%)	77(14.3%)	.181	272(37.5%)	23(2.1%)	.000
hyperlipidemia	598(48.0%)	234(45.3%)	.319	466 (69.1%)	363(33.8%)	.000

Conclusions:

1. There is no statistically significant difference in the metabolic abnormality among the PCOS phenotypes advocated by NIH. PCOS phenotypes can not predict the metabolic abnormalities on first visiting. Therefore, it is necessary to assess metabolic abnormalities comprehensively, regardless of the PCOS phenotypes under NIH advocacy.
2. Obesity is the major adverse factor in PCOS patients with metabolic abnormalities. Obese PCOS patients require special attention to metabolic status, regardless of whether they have HA.
3. HA might worsen the abnormal glucose metabolism in PCOS patients, particularly in obese PCOS patients. The effects of HA on lipid metabolism in PCOS patients are different between obesity and non-obesity, which worsen lipid metabolism in obese PCOS patients, but not in non-obesity.

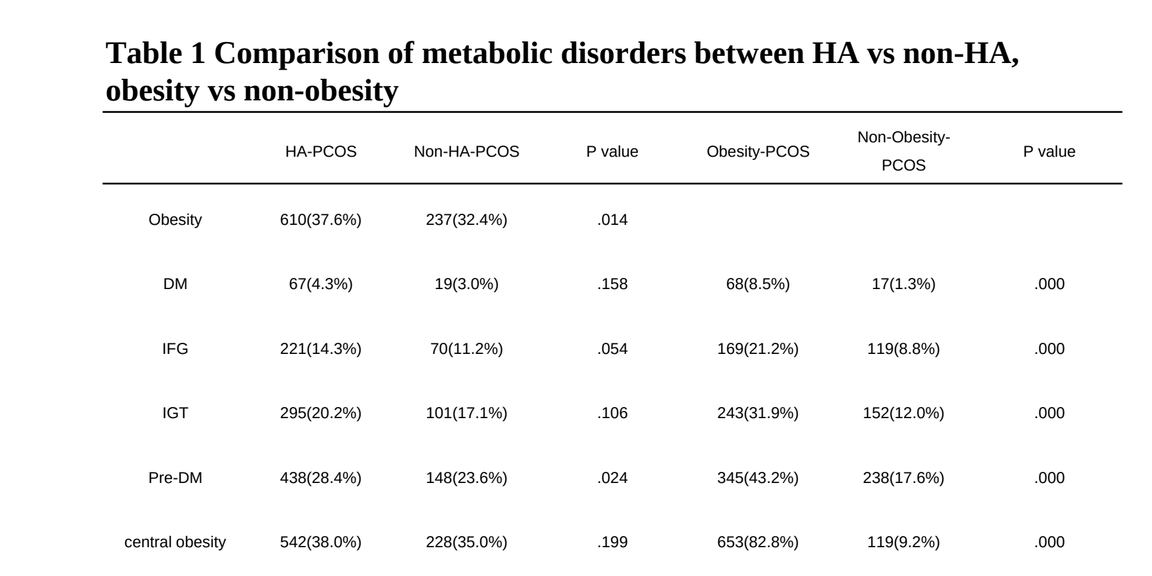

Figure 3 Comparison of metabolic disorders in the four subgroups: obesity+HA, obesity+non-HA, non-obesity+HA, non-obesity+non-HA.

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