



Association of polycystic ovarian syndrome (PCOS) phenotypes with pregnancy complications

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Objectives

To determine whether certain phenotypes of PCOS are associated with increased risk of pregnancy complications in Arab women.

Background

PCOS is an endocrine disorder that affects women of reproductive age. It is commonly diagnosed using the Rotterdam criteria. PCOS should be considered a high-risk condition in pregnancy with women identified and monitored as per the 2023 International evidence-based guideline for the assessment and management of polycystic ovary syndrome. PCOS phenotype presentations have recently suggested a diversity of etiological factors, however, there are few studies that have explored distinct phenotypes of PCOS and their association with pregnancy complications in women of Arab ethnicity.

Study Design

Prospective case-control study.

Materials and Methods

We conducted a study on 50 PCOS cases and 50 control Omani females from the Gynecology clinic at a tertiary care hospital in Oman. Cases fulfilled Rotterdam criteria for PCOS. Cases were divided into 4 phenotypes (A,B,C,D). Phenotype A: infrequent or absent ovulation, clinical and/or laboratory evidence of elevated androgens, and polycystic ovaries on sonogram. Phenotype B: Clinical and/or laboratory evidence of elevated androgens as well as irregular or absent ovulation. Phenotype C: Elevated androgens with the sonographic appearance of polycystic ovaries. Phenotype D: Includes irregular or absent ovulation and the sonographic appearance of polycystic ovaries. Pregnant women, those with congenital adrenal hyperplasia, androgen secreting tumors, Cushing syndrome and hyperprolactinemia were excluded. Clinical and biochemical data was collected over the period of the last 5 years. Statistical analysis was performed using SPSS to compare pregnancy complications and neonatal outcomes as well as their correlation with PCOS phenotypes.

Results

37 (74%) PCOS cases achieved pregnancy and 38 (76%) controls. PCOS cases had significantly higher intrauterine growth restriction (IUGR) (N=7, 18.9%) than controls, (N=1, 2.6%) CI 1.00-37.83, P 0.02. 85.7% of IUGR cases had insulin resistance. Gestational diabetes mellitus (GDM) was slightly more in cases (N=16, 43%) than controls (N=13, 34%), CI 0.58-3.64, P 0.42. There was no difference in preterm deliveries among cases (N= 10, 27%) vs controls (N=7, 18%), CI 0.55-4.66, P 0.37.

Congenital anomalies were observed only in phenotype A cases (N=3, 8.1%), none in controls. Neonatal mortality was higher in Phenotype A cases (N=2, 5.4%) compared to controls (N=1, 2.6%). Among pregnant cases 28 (75%) were Phenotype A, 2 (5%) C and 6 (16%) D. Phenotype A had higher dyslipidemia (23.1%) and DM type 2 (12.8%). There were more GDM cases in phenotype A (N=12, 41%) than C (N=2) and D (N=2). IUGR was most common in phenotype A (N=4, 13.8%), compared to C (N=1) and D (N=2).

Table 1: Pregnancy Complications and Outcomes in Pregnant Women with PCOS (Cases vs. Controls)

pregnancy complications & outcomes	Cases (n=37) N (%)	controls (n=38) N (%)	OR	CI (95%)	p-value
Ectopic pregnancy			2.25	0.52-9.79	0.30
Yes	6(16.2)	3(7.9)			
No	31(83.8)	35(92.1)			
Pregnancy induced hypertension (PIH)			0.32	0.03-3.26	0.61
Yes	1(2.7)	3(7.9)			
No	36(97.3)	35(92.1)			
Pre-Eclampsia			0.64	0.16-2.50	0.73
Yes	4(10.8)	6(15.8)			
No	33(89.2)	32(84.2)			
Gestational diabetes mellitus (GDM)			1.46	0.57-3.72	0.42
Yes	16(43.2)	13(34.2)			
No	21(56.8)	25(65.8)			
Intrauterine Growth Restriction (IUGR)			8.63	1.01-6.10	0.02*
Yes	7(18.9)	1(2.6)			
No	30(81.1)	37(97.4)			
Spontaneous delivery			1.2	0.47-3.01	0.70
Yes	23(62.2)	22(57.9)			
No	14(37.8)	16(42.1)			
Assisted delivery			0.75	0.30-1.89	0.55
Yes	15(40.5)	18(47.4)			
No	22(59.5)	15(40.5)			
Preterm delivery			1.64	0.54-4.90	0.37
Yes	10(27.0)	7(18.4)			
No	27(73.0)	31(81.6)			
Macrosomia			1.02	0.06-17.06	1.00
Yes	1(2.7)	1(2.6)			
No	36(97.3)	37(97.4)			
Low birth weight			1.82	0.53-6.19	0.33
Yes	8(21.6)	5(13.2)			
No	29(78.4)	33(86.8)			
Neonatal Intensive Care Unit (NNICU)			1.41	0.29-6.802	0.71
Yes	4(10.8)	3(7.9)			
No	33(89.2)	35(92.1)			
Congenital anomalies			—	—	0.11
Yes	3(8.1)	0(0.0)			
No	34(91.9)	38(100.0)			
Neonatal Mortalities			2.11	0.18-24.36	0.61
Yes	2(5.4)	1(2.6)			
No	35(94.6)	37(97.4)			

*Significant P-value (≤ 0.05)

Table 2: Pregnancy Complications and Outcomes Among PCOS Phenotypes in Pregnant Women

pregnancy complications & outcomes	PCOS phenotypes (pregnant cases)					
	A ^a N=28 N (%)	P-value	C ^b N=2 N (%)	P-value	D ^c N=6 N (%)	P-value
Ectopic pregnancy		0.59		1.00		0.24
Yes	4(13.8)		0(0.0)		2(33.3)	
No	25(86.2)		2(100.0)		4(66.7)	
Pregnancy induced hypertension (PIH)		1.00		1.00		1.00
Yes	1(3.4)		0(0.0)		0(0.0)	
No	28(96.6)		2(100.0)		6(100.0)	
Pre-Eclampsia		1.00		1.00		0.52
Yes	3(10.3)		0(0.0)		1(16.7)	
No	26(89.7)		2(100.0)		5(83.3)	
Gestational diabetes mellitus (GDM)		0.70		0.18		0.68
Yes	12(41.4)		2(100.0)		2(33.3)	
No	17(58.6)		0(0.00)		4(66.7)	
Intrauterine Growth Restriction (IUGR)		0.16		0.34		0.31
Yes	4(13.8)		1(50.0)		2(33.3)	
No	25(86.2)		1(50.0)		4(66.7)	
Spontaneous delivery		0.21		0.13		0.65
Yes	20(69.0)		0(0.0)		3(50.0)	
No	9(31.0)		2(100.0)		3(50.0)	
Assisted delivery		1.00		1.00		1.00
Yes	12(30.8)		1(50.0)		2(33.3)	
No	17(58.6)		1(50.0)		4(66.7)	
Preterm delivery		0.40		1.00		1.00
Yes	9(31.0)		0(0.0)		1(16.7)	
No	20(69.0)		2(100.0)		5(83.3)	
Macrosomia		0.21		1.00		1.00
Yes	0(0.0)		1(50.0)		0(0.0)	
No	29(100.0)		1(50.0)		6(100.0)	
Low birth weight		0.65		1.00		1.00
Yes	7(24.1)		0(0.0)		1(16.7)	
No	22(75.9)		2(100.0)		5(83.3)	
Neonatal Intensive Care Unit (NNICU)		0.55		1.00		1.00
Yes	4(13.8)		0(0.0)		0(0.0)	
No	25(86.2)		2(100.0)		6(100.0)	
Congenital anomalies		1.00		1.00		1.00
Yes	3(10.3)		0(0.0)		0(0.0)	
No	26(89.7)		2(100.0)		6(100.0)	
Morbidities		—		—		—
Yes	0(0.0)		0(0.0)		0(0.0)	
No	29(100.0)		2(100.0)		6(100.0)	
Neonatal Mortalities		1.00		1.00		1.00
Yes	2(6.9)		0(0.0)		0(0.0)	
No	27(93.1)		2(100.0)		6(100.0)	

Conclusion

IUGR and GDM were higher in PCOS cases (mainly phenotype A) than controls. These findings suggest the need for studies on phenotype specific and metabolic targeted interventions in managing pregnancies in PCOS patients.

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