

ASSOCIATION BETWEEN POLYCYSTIC OVARY SYNDROME, STEATOTIC LIVER DISEASE IN PREGNANCY, AND ADVERSE PREGNANCY OUTCOMES: RESULTS FROM THE PROSPECTIVE FATTY LIVER IN PREGNANCY COHORT

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Introduction

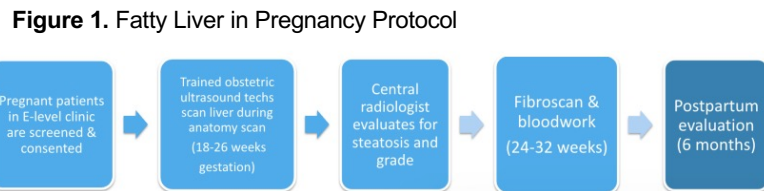
- Polycystic Ovary Syndrome (PCOS) is the most common endocrine metabolic disorder in women of reproductive age
- Insulin resistance (IR) affects up to 70% of the PCOS population
- PCOS is one of the strongest predictors of steatotic liver disease (SLD) in women
- SLD has been independently associated with adverse pregnancy outcomes (APOs) such as gestational diabetes (GDM) and preeclampsia

Aim

- To evaluate the relationship between PCOS and SLD in pregnancy, and the role of IR
- To assess the influence of PCOS with and without insulin resistance, as well as SLD, on APOs and adverse neonatal outcomes (ANOs)

Method

- We leveraged the prospective “Fatty Liver in Pregnancy” (FLIP) cohort to evaluate the prevalence of PCOS by medical record and SLD by liver ultrasound performed between 18-26 weeks gestation from 2018-2024 (figure 1)
- PCOS patients were then stratified by evidence of IR, defined as history of diabetes mellitus (DM) or gestational diabetes (GDM) in a prior pregnancy
- History of pre-pregnancy SLD, SLD during pregnancy, and prevalence of APOs were compared between those with PCOS with and without evidence of IR and to a control population without PCOS using appropriate statistical tests



Results

- Of 1,148 participants screened, 73 had PCOS (figure 2) and 211 had SLD (figure 3)
- The PCOS group had higher rates of prior GDM as well as DM (17% vs 5%, p = 0.01; 9% vs 3%, p = 0.01), as did those with SLD (13% vs 6%, p = 0.00; 8% vs 3%, p = 0.00)
- In those with both SLD and PCOS, rates were higher than in either group alone compared to controls (36% p = 0.00; 19% p = 0.00)

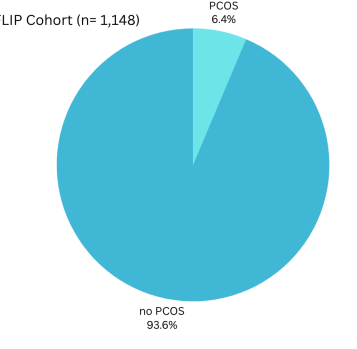


Figure 2. Prevalence of Polycystic Ovary Disease (PCOS) in the FLIP cohort

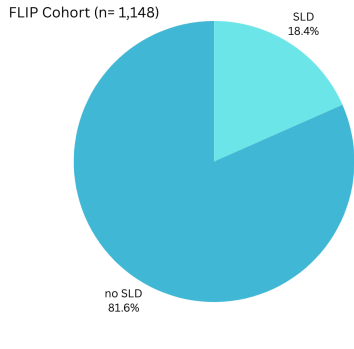


Figure 3. Prevalence of Steatotic Liver Disease (SLD) in the FLIP cohort

Table 1. Demographic features in non-PCOS and PCOS groups

	Control	PCOS	P value
Average age	29.0	30.8	0.01*
Hispanic ethnicity	53.5%	60.0%	0.04*
Hypertension	8.4%	20.0%	0.00*
Diabetes	3.4%	8.8%	0.01*
Pre-pregnancy BMI	28.2	31.4	0.00*
Prior Metformin use	0.29%	4.3%	0.00*
Aspirin during pregnancy	35.4%	50.0%	0.02*
Prior gestational diabetes	4.8%	16.7%	0.01*

p ≤ 0.05 was considered statistically significant. Asterisks () denote significant p-values when compared to controls



Figure 4. PCOS group by IR and SLD

Table 2a. Steatotic liver disease in PCOS patients with and without insulin resistance

Control	PCOS			PCOS without IR**		PCOS with IR***	
	Prevalence	Prevalence	P value*	Prevalence	P value*	Prevalence	P value*
History of steatotic liver disease	0.81%	3.75%	0.010	3.95%	0.007	13.33%	0.000
Steatotic liver disease on ultrasound	19.63%	26.38	0.186	23.19%	0.49	42.86%	0.031

p ≤ 0.05 was considered statistically significant. Asterisks () denote significant p-values when compared to controls **no history of GDM in a prior pregnancy or DM ***history of GDM in a prior pregnancy or DM

- The PCOS cohort had a higher prevalence of diagnosed pre-pregnancy SLD (higher in those with PCOS and IR) (Table 2a)
- Those with PCOS and IR also had an increased incidence of SLD in pregnancy (Table 2a)
- In a multivariate analysis adjusted for age and BMI, PCOS with IR was associated with SLD in pregnancy

Table 2b. Adverse pregnancy outcomes + adverse neonatal outcomes in PCOS patients with and without insulin resistance

Control	PCOS		PCOS without IR**		PCOS with IR***	
	Prevalence	P value*	Prevalence	P value*	Prevalence	P value*
Preeclampsia	12.60%	0.045	17.6%	0.252	46.7%	0.000
Gestational hypertension	14.20%	0.727	16.67%	0.567	15.38%	0.908
Preterm birth	13.35%	0.094	21.05%	0.115	33.33%	0.026
Gestational diabetes	11.14%	0.285	16.18%	0.200	28.57%	0.042
Large for gestational age neonate	4.03%	0.289	8.33%	0.208	11.11%	0.301
Small for gestational age neonate	11.64%	0.523	11.11%	0.893	22.22%	0.330

p ≤ 0.05 was considered statistically significant. Asterisks () denote significant p-values when compared to controls **no history of GDM in a prior pregnancy or DM ***history of GDM in a prior pregnancy or DM

- PCOS patients had a higher incidence of preeclampsia, which more than doubled in those with PCOS and IR (Table 2b)
- There was an increased incidence of preterm birth and current gestational diabetes in those with PCOS and IR (Table 2b)

Conclusions

- SLD was seen in over a quarter of patients with PCOS during pregnancy
- Although PCOS is a known risk factor for SLD, only PCOS with IR was associated with SLD in pregnancy
- PCOS with IR may play a role in the development of some APOs, though further investigation is needed
- PCOS phenotypes may be considered when evaluating risk of both SLD in pregnancy and pregnancy outcomes

References

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Acknowledgements

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