

Effect of Puberty on Polycystic Ovary Syndrome Presentation

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Background

- Polycystic ovary syndrome (PCOS) occurs in 5-20% of women globally.
- PCOS is associated with insulin resistance (IR).
- Puberty induces IR that peaks mid-puberty then wanes.
- Combined effects of pubertal and PCOS IR have not been well studied.

Methods

- Secondary analysis of data from:
NCT02157974 (APPLE, n=36)
NCT03041129 (PLUM, n=17)
NCT03717935 (ORANGE, n=22)
NCT03919929 (TEAL, n=41)

- Girls with NIH-defined PCOS and obesity, untreated.
- Categorized by age:
 - Early: 12-15 years
 - Late: 16-21 years

- Demographics, physical exam including Ferriman-Gallwey score (FGS) for hirsutism, fasting laboratory measurements, 4-hour oral sugar tolerance test (OSTT, 75g glucose + 25g fructose) and MRI of the liver were performed.

- Group comparisons performed using Student's t-tests or Mann Whitney U and Chi-squared for categorical data.
- OSTT curves compared with mixed effect modeling.

Participants

	Early n=49	Late n=67
Age (years)	14.8±1.0***	17.4±1.1
Race (% group)		
White/Black/Other	88/10/2	82/10/8
Ethnicity (% group)		
Hispanic/Non-Hispanic	56/44	45/55
BMI (kg/m ²)	34.9±6.3	36.2±5.6
Waist-Hip Ratio	0.89±0.06	0.89±0.07
Systolic BP (mmHg)	122±12	120±9
Diastolic BP (mmHg)	70±9	71±9
Menarche Age (yrs)	11.2±1.4	11.8±2.1
Menses interval (% group 1/2/3/4/5/6/7/8)	2/9/26/16/7/14/5/21*	6/16/10/39/11/6/3/8
Acne Severity (% group; 1=mild, 2=mod, 3=sev)	55/30/11	52/33/8
Hirsutism (FGS)	3.5 (1.0, 6.5)	4.0 (1.0, 8.0)
Liver Fat by MRI (%)	7.5 (4.4, 10.2)	6.3 (4.0, 10.8)
Lean Mass by DXA (%)	53.5±4.7*	51.2±4.5
Cholesterol (mg/dL)	152±34	148±30
HDL (mg/dL)	38±7	37±7
LDL (mg/dL)	87±26	86±25
Triglycerides (mg/dL)	121 (104, 182)	115 (95, 149)
ALT (U/L)	33 (24, 38)	30 (21, 38)
AST (U/L)	35 (27, 45)	35 (28, 42)

Data are mean±SD or median (25,75th percentile). Menses interval, 1=<4weeks, 2=4-6wk, 3=1-2mo, 4=3-4mo, 5=5-6mo, 6=7-9mo, 7=10-12mo, 8=>1yr

Results

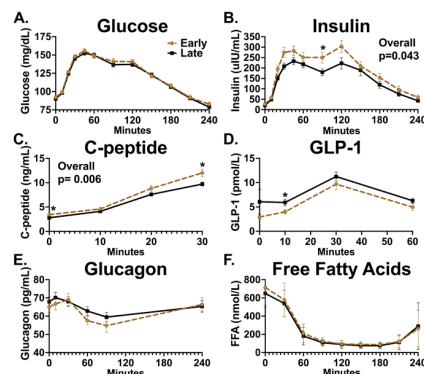


Figure 1. OSTT Mixed-Effect Modeling Curves. OSTT responses shown as mean±SEM. P-values listed for overall curve differences between Early and Late groups. Asterisks at statistically different timepoints.

Results

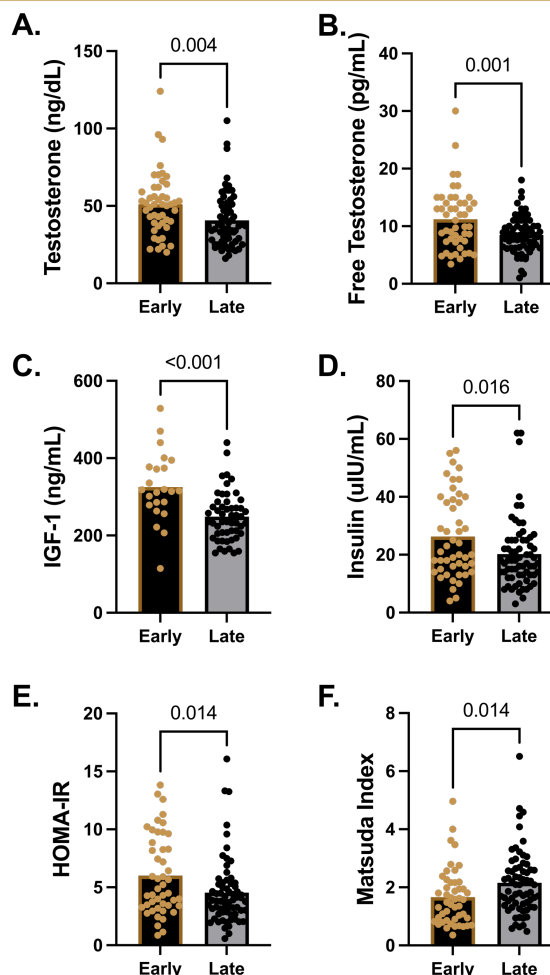


Figure 2. Differences between Early and Late groups for IGF-1, testosterone and IR-related measures. Data are mean±SD. Analysis with t-test or Mann-Whitney U.

*p<0.05, **p<0.01, ***p<0.005

Results Summary

Girls in early adolescence with PCOS have higher IGF-1, more severe IR and worse PCOS: higher testosterone and longer menstrual intervals.

Dermatologic symptoms and metabolic co-morbidities were not different between ages.

Conclusions

PCOS in early adolescence is associated with worse IR and PCOS, suggesting that the IR of puberty is additive to the IR of PCOS.

Future Directions

More data needed to determine if age should be a factor in IR treatment decision-making.

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