Polycystic ovary syndrome (PCOS) is associated with insulin resistance (IR), as is the process of puberty. The combined effects of pubertal and PCOS IR have not been well-studied.
Data from girls with NIH-defined PCOS and obesity enrolled in previous studies were pooled then categorized into early (12-15 yo) and late (16-21 yo) adolescence. Demographics, physical exam, fasting laboratory measures, 4-hour OSTT (75g glucose+25g fructose) and MRI liver scans were performed. Group comparisons were performed using Student's t-tests. OSTT curves were compared with mixed effect modeling.
Data from 116 participants were included (early n=49, age 14.8±1.0, BMI 34.9±6.4 kg/m2; late n=67, age 17.4±1.1, BMI 36.2±5.6). Menarche was at similar ages, with a longer duration between menses in early vs. late ($p=0.037$). Testosterone (T) was higher in early: total T ($p<0.005$) and free T ($p<0.005$), while SHBG was similar ($p=0.66$). Clinically, acne severity was similar ($p=0.68$) as was hirsutism score ($p=0.11$). IGF-1, a marker of growth hormone, was higher in early ($p<0.01$). Early had significantly worse measures of IR (fasting insulin $p<0.005$; HOMA-IR $p<0.05$; Matsuda $p<0.005$). Metabolically, SBP ($p=0.31$), WHR ($p=0.99$), total cholesterol ($p=0.49$), LDL ($p=0.80$), TG ($p=0.08$) and ALT ($p=0.43$) were similar. Early had a greater proportion of muscle mass ($p<0.05$) and less fat mass ($p<0.05$), although hepatic fat ($p=0.98$) content was similar. OSTT glucose curves were nearly identical between groups ($p=0.42$), but in early, insulin was significantly higher ($p<0.05$), as was C-peptide ($p=0.04$), while GLP-1 was significantly higher in late ($p=0.04$).
Girls in early adolescence with PCOS have evidence of IR related to pubertal development, manifest as increased insulin secretion. This is accompanied by increased T. However, dermatologic symptoms and metabolic co-morbidities were not different between the ages. Further data are needed to determine if age should be a factor in treatment decision-making.