

## MR Imaging Evaluation of PCOS in Adolescents

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**Purpose:** Diagnostic criteria for polycystic ovary syndrome (PCOS) based on magnetic resonance (MR) imaging have not been established. This study compares MRI appearance of the ovary in adolescent girls with and without PCOS.

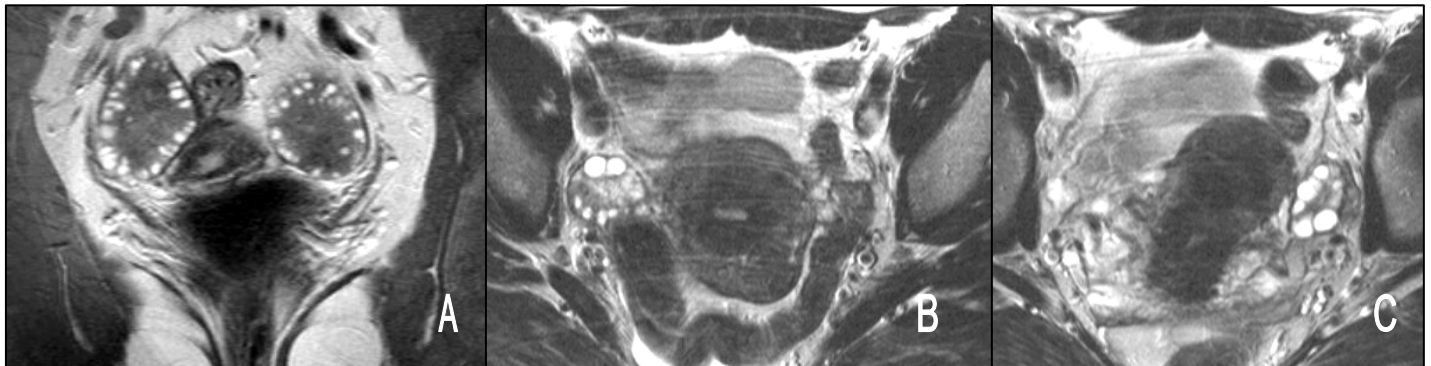
**Background:** Polycystic ovary syndrome (PCOS) is the most common reproductive endocrinopathy in women of childbearing age, affecting 5-10% of the female population. Primary clinical features include hirsutism, irregular bleeding, and infertility. The disorder also leads to health risks resulting from insulin resistance and prolonged unopposed estrogen, such as obesity, diabetes, cardiac disease, and endometrial cancer. Early diagnosis is important to treat primary symptoms and prevent long-term complications.

While ovarian morphology alone is neither necessary nor sufficient for the diagnosis of PCOS, imaging evidence of typical ovarian morphology is an important part of current diagnostic algorithms. Accepted criteria are based on transvaginal ultrasound, but in adolescent girls, transvaginal ultrasound may be contraindicated. Given the high prevalence of obesity in this population, transabdominal ultrasound may be non-diagnostic. Therefore, MR imaging could play an important diagnostic role in this patient population if precise diagnostic criteria, including follicle count threshold, were to be established for MR imaging.

**Materials and Methods:** Subjects were 32 girls between the ages of 12 and 19 years, including 16 girls with clinical and biochemical evidence of PCOS and 16 girls without PCOS. MR imaging was performed at 1.5 T or 3 T and axial or angled-axial single-shot echo-train spin echo images of 6 mm slice thickness were acquired. In a subset of subjects, 2 mm slice thickness images were also obtained. Two radiologists independently recorded ovarian volume, follicle count per ovary, and follicle size in a blinded manner based on 6 mm images. PCOS and non-PCOS groups were compared using mixed effects regression, a regression-based version of a t-test that accounts for within-patient dependence. Follicle count was also compared between 6 mm and 2 mm slice thickness images. In addition, inter-observer agreement was assessed.

**Results:** Average follicle count per ovary was 36.2 (+/- 9.4) in PCOS subjects compared to 21.4 (+/-8.2) in non-PCOS subjects ( $p < .01$ ) using pooled data from both readers. Ovarian volume was 16.4 (+/-5.8) cm<sup>3</sup> in PCOS subjects compared to 8.2 (+/-3.8) cm<sup>3</sup> in non-PCOS subjects ( $p < .01$ ). Mean follicle size did not differ significantly between the groups, however follicles exceeding 10mm were seen in 2/16 PCOS subjects versus 9/16 non-PCOS subjects. Consistently higher follicle counts were obtained on evaluation of images obtained at 2 mm compared to 6 mm slice thickness. Interobserver agreement between the 2 blinded readers was approximately 0.8 for both follicle count and ovarian volume.

**Conclusions:** MR imaging appearance of the ovary differs between adolescent girls with and without PCOS. MR imaging may help evaluate young patients in whom transvaginal ultrasound is contraindicated.



**Figure 1.** T2-weighted echo-train spin echo in girls with PCOS (A) and without PCOS (B,C).