Cam type Femoroacetabular Impingement associated with Marker for Hyperandrogenism in Women

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• I have the following financial relationships to disclose:

  – Consulting: Arthrex, Pivot medical
Etiology of Cam Type FAI

• Remains undefined, but evidence shows:
  – Develops during adolescence\(^1,2,3\)
  – More common in males\(^4\)
  – Associated with vigorous sporting activities\(^3\)
  – Can be result of silent slipped capital femoral epiphysis\(^5,6\)
    • More common in males\(^5,6\)
    • Associated with endocrine disorders\(^7\)
Polycystic Ovary Syndrome

- Polycystic Ovary Syndrome (PCOS)
  - Important cause of androgen excess in women
  - Affects 6.5 - 8 percent of women
  - Associated with menstrual irregularity, hirsutism, obesity, glucose intolerance, dyslipidemia, obstructive sleep apnea
Polycystic Ovary Syndrome

• Polycystic Ovary Syndrome (PCOS)
  – Characterized and diagnosed in part by increased number and size of antral follicles on imaging\textsuperscript{8,9}

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Cam-type FAI and PCOS

• Both develop in the peri-pubertal period
• Both associated with or defined by endocrine dysfunction
• Cam-type FAI seen more in men than in women
• PCOS characterized by hyperandrogenism
Hypothesis

• Cam-type FAI will be associated with marker for PCOS (hyperandrogenism)
Methods

• Prospective cohort of reproductive aged women who were indicated for arthroscopic hip surgery were assessed.

• Presence or absence of cam morphology was determined by measurement of alpha angles on 45 degree Dunn lateral radiographs.
  - Cam FAI was defined as an angle of >55 degrees$^{10}$
Methods

• Antral follicles were assessed by MRI.

• As only one ovary was frequently seen on MRI, the average number of antral follicles per ovary were recorded.
Results

- Fifteen women with cam FAI and 13 without were found to have median alpha angle of 62 (range 56-72) and 46 (range 40-54), respectively (P<0.0001).
- Average ages were similar between groups (27.7+7.2 vs 24.1+10.8, P=0.30).
- Antral follicle counts per ovary were significantly higher in women with cam FAI than controls, respectively (13.7±5.3 vs 8.5±2.9, P=0.004).
- Univariate analysis revealed a statistically significant correlation between alpha angle measurements and antral follicle counts per ovary (R=0.30, P=0.03), indicating that cam type FAI appears to be more consistent with a continuum rather than cut-point with respect to antral follicle counts.
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Discussion and Conclusion

- Cam-type FAI was found to be strongly associated with increased antral follicle numbers—a marker for PCOS and hyperandrogenism.

- Further study is needed to assess hormonal influence such as PCOS and hyperandrogenism on development of the proximal femur during adolescence.
2. The cam-type deformity of the proximal femur arises in childhood in response to vigorous sporting activity. Siebenrock, KA et al. *CORR* 2011