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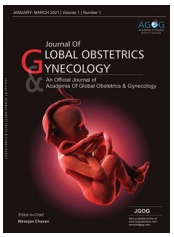

Adolescent Polycystic Ovary Syndrome

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ABSTRACT

Adolescence is a crucial stage of development defined by the World Health Organization as spanning from 10 to 19 years of age. It is marked by significant physical, cognitive, emotional, and social changes, including puberty, which is a key aspect of this phase. Diagnosing polycystic ovary syndrome (PCOS) in adolescents can be challenging because symptoms such as irregular periods, acne, and weight changes can overlap with normal hormonal changes during puberty. Irregularities in menstrual cycle and hyperandrogenism are considered for the diagnosis of adolescent PCOS. Polycystic ovarian morphology on ultrasound should not consider for the diagnosis of adolescent PCOS. Emotional well-being is a crucial but often overlooked aspect in adolescent girls with PCOS. A holistic approach is essential in managing PCOS. While pharmacotherapy plays a role, it should be integrated with education, counseling, lifestyle interventions, and other options such as cosmetic therapy. This comprehensive approach addresses the physical, emotional, and psychological aspects of PCOS.

Key words: Adolescence, Combined oral contraceptive pill, Pharmacotherapy, Polycystic ovary syndrome, Ultrasound

INTRODUCTION

Polycystic ovary syndrome (PCOS) is indeed one of the most common endocrine disorders among women of reproductive age.[1] It affects 6–18% of adolescent girls.[2,3] Adolescence is a crucial stage of development defined by the World Health Organization as spanning from 10 to 19 years of age. It is marked by significant physical, cognitive, emotional, and social changes, including puberty, which is a key aspect of this phase. Diagnosing PCOS in adolescents can be challenging because symptoms such as irregular periods, acne, and weight changes can overlap with normal hormonal changes during puberty (irregular menstrual cycles, acne, and polycystic ovarian morphology on pelvic ultrasound) with adult PCOS diagnostic criteria.[4,5] These challenges highlight the complexity surrounding the diagnosis and management of PCOS. Under-diagnosis, delayed diagnosis, and over-diagnosis can all impact the quality of care women receive. In addition, inconsistent and non-evidence-based approaches among health-care professionals further complicate matters. The lack of robust evidence exacerbates these challenges, emphasizing the need for standardized protocols and continued research to improve the understanding and treatment of PCOS.[6,7]

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CRITERIAS REQUIRED FOR DIAGNOSIS

Irregular menstrual cycles and ovulatory dysfunction

When irregular menstrual cycles are present, a diagnosis of PCOS should be considered. During adolescence, variations in menstrual cycle intervals are common, especially in the early years after menarche. Anovulation is also typical during this time. The maturation of the hypothalamic-pituitary-ovarian axis progresses gradually during adolescence, leading to differences in ovulation and menstrual cycles compared to women of reproductive age. This underscores the importance of understanding the unique hormonal dynamics during adolescence when diagnosing conditions like PCOS.[8-10] Ovarian dysfunction can occur in adolescents or women with apparently regular menstrual cycles. Measuring serum progesterone levels can indeed help confirm anovulation, which is a key aspect of PCOS diagnosis, even in those with seemingly normal menstrual cycles.

Definition of irregular menstrual cycles in adolescents according to time post-menarche

Time post-menarche	Definition of irregular menstrual cycles
<1-year post-menarche	Irregular menstrual cycles are normal pubertal transition
>1–<3-year post-menarche	<21 or >45 days
>3-year post-menarche	<21 or >35 days or <8 cycles per year

Time post-menarche	Definition of irregular menstrual cycles
More than 1-year post-menarche	>90 days for any one cycle

Hyperandrogenism

Biochemical

Assessing biochemical hyperandrogenism is an important aspect of diagnosing PCOS. Tests such as calculated free testosterone, free androgen index, or bioavailable testosterone can provide valuable information about androgen levels in the body.

Use of high-quality assays for assessing testosterone levels in PCOS, and how markers such as androstenedione and DHEAS can provide additional information. Androstenedione can help exclude other causes of hyperandrogenism, while DHEAS can reflect adrenal androgen activity, potentially indicating adrenal dysfunction or tumors. Careful interpretation of androgen levels is vital in diagnosing conditions like PCOS. Considering the reference ranges from the laboratory used and normal values based on well-phenotyped populations, while also factoring in age and pubertal-specific stages, ensures accurate assessment and diagnosis.

In cases where clinical hyperandrogenism is not evident, assessing biochemical hyperandrogenism using appropriate high-quality assays becomes even more important for an accurate diagnosis of conditions like PCOS.

Clinical

A comprehensive history and physical examination are essential for identifying symptoms and signs of clinical hyperandrogenism, particularly in adolescents, where manifestations such as severe acne and hirsutism are common indicators. The recommendation to prioritize this assessment was made due to the lack of evidence-based guidance and the understanding that certain presentations, like moderate-to-severe acne during early puberty or peri-menarcheal years, are less common and more likely to be associated with clinical hyperandrogenism. Visual scales like the modified Ferriman-Gallwey score are preferred for assessing hirsutism in nine primarily androgen-dependent areas. Each area is visually scored from zero (no terminal hair visible) to four (terminal hair consistent with a well developed (male) with a level of ≥4–6 indicating hirsutism, adjusted for ethnicity. It is worth noting that self-treatment practices are prevalent and can affect the clinical assessment.[11]

INVESTIGATIONS NOT RECOMMENDED

Pelvic ultrasound for PCOS diagnosis

Since younger individuals may naturally have multi-follicular ovaries, using pelvic ultrasound alone may not provide an accurate diagnosis of PCOS in those with a gynecological age of <8 years.

Using adult polycystic ovarian morphology criteria for ultrasound diagnosis during adolescence may lead to inaccuracies and increase the risk of over-diagnosis of PCOS. It is crucial to consider the natural variations in follicle numbers per ovary in adolescents and the potential impact on diagnostic criteria.

Anti-Müllerian hormone (AMH)

AMH has been increasingly used in the diagnosis of PCOS, particularly when pelvic ultrasound is not feasible. Since AMH is secreted by granulosa cells of the preantral and small antral ovarian follicles, it provides valuable information about ovarian reserve and follicular activity, aiding in the diagnosis of PCOS.

The significant overlap in serum AMH levels between individuals with polycystic ovarian morphology, PCOS, and those without these features underscores the complexity of using AMH as a standalone diagnostic marker. Factors such as variations in assays, life stages, and phenotypes of the populations studied, as well as different PCOS criteria, contribute to this heterogeneity. Thus, while AMH can provide valuable insights, its interpretation must be contextualized within the broader clinical picture.[12,13]

EXCLUSION OF OTHER CONDITIONS

The diagnosis of PCOS relies on excluding other potential causes of menstrual irregularities and hyperandrogenism. This approach is crucial even though certain causes may be less common in adolescents. It ensures accurate diagnosis and appropriate management tailored to the individual's specific condition. The most important cause of amenorrhea in a sexually active adolescent is pregnancy.

Menstrual irregularities due to functional hypothalamic amenorrhea or secondary deficiency due to any systemic cause could be present.

Furthermore, hypothyroidism, hyperprolactinemia, glucocorticoid excess due to Cushing's disease, glucocorticoid resistance, and androgen-secreting ovarian or adrenal tumors can cause menstrual irregularity and/or hyperandrogenism.[14]

A thorough history and physical examination are mandatory for the evaluation of the appropriate condition.

TREATMENT

Lifestyle modification

Lifestyle interventions are essential, particularly for individuals with PCOS and excess weight. Multi-component approaches, including dietary changes, increased physical activity, reduction in sedentary behavior, and behavioral strategies, can effectively target weight reduction, central adiposity, and insulin resistance. These interventions not only address the symptoms but also promote overall health and well-being in individuals with PCOS.

Pharmacological principles of treatment in PCOS

The combined oral contraceptive pill (COCP) and/or metformin are recommended pharmacological treatments for adolescents with PCOS. These medications can help manage symptoms

effectively in those with a clear diagnosis or in adolescents deemed "at risk" of PCOS. COCPs can regulate menstrual cycles and reduce androgen levels, while metformin can improve insulin sensitivity and help with weight management in adolescents with PCOS.

These practice points underscore the importance of personalized care when considering pharmacotherapy for adolescents with PCOS:

1. Individual characteristics, preferences, and values should be taken into account when recommending pharmacotherapy, ensuring a patient-centered approach
2. Both the benefits and potential adverse effects of medications, both in PCOS and in general populations, should be carefully considered
3. It is important to discuss with adolescents and their families that medications such as COCPs, metformin, and other pharmacological treatments are generally "off-label" for PCOS treatment. This discussion should include evidence and potential side effects to make informed decisions together.

A comprehensive approach is crucial in managing PCOS. Integrating pharmacotherapy with education, counseling, lifestyle adjustments, and even cosmetic therapy can significantly improve outcomes for individuals with PCOS.

ANTIANDROGENS

When COCPs are contraindicated or not well tolerated, and effective contraception is ensured, antiandrogens can be considered for treating conditions like hirsutism or androgen-related alopecia.

EMOTIONAL WELL-BEING

Healthcare providers should be vigilant about the increased risk of anxiety and depressive symptoms in individuals with PCOS. Implementing appropriate screening measures and offering management strategies can significantly improve the overall well-being and quality of life for those affected by PCOS. Early detection and intervention are key in addressing these mental health concerns effectively.

Emotional well-being is a crucial but often overlooked aspect in adolescent girls with PCOS. More research is necessary to understand the pathophysiology of emotional symptoms, their onset in adolescence, and the most effective treatment strategies. In addition, investigating how these symptoms might affect engagement with management strategies is essential for providing comprehensive care to adolescents with PCOS. By addressing emotional well-being alongside physical health, health-care providers can better support adolescents in managing their condition and improving their overall quality of life.

CONCLUSION

Diagnosis of PCOS during adolescence is both controversial and challenging due to the overlap of normal pubertal physiological changes.

Polycystic ovarian morphology on ultrasound should not consider for the diagnosis of adolescent PCOS.

Emotional well-being is a crucial but often overlooked aspect in adolescent girls with PCOS. A holistic approach is essential in managing PCOS. While pharmacotherapy plays a role, it should be integrated with education, counseling, lifestyle interventions, and other options such as cosmetic therapy. This comprehensive approach addresses the physical, emotional, and psychological aspects of PCOS.

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