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Polycystic Ovarian Syndrome: Pathophysiology and Chronic Health Implications

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Introduction

Polycystic Ovarian Syndrome (PCOS) is the most common endocrine disorder affecting women of reproductive age, with a reported incidence rate of six to twenty percent in the United States (Witchel et al., 2019).

PCOS affects women of every ethnic and socioeconomic background. If untreated, PCOS can lead to chronic and debilitating diseases.

It is essential that advance practice nurses (APN) understand how this disease process affects women's health and provide early intervention to prevent chronic disease.

Topic Selection

The prevalence of PCOS is rising and is a disease process that significantly impacts women's health throughout their lifespan.

This project aims to facilitate education among APNs to understand the unique disease pathophysiology of PCOS and to identify solutions that promote health and well-being for women.

Implications for the Advance Practice Nurse

Early identification, treatment, and prevention of comorbidities is essential; however, many primary care providers miss the opportunity to diagnose PCOS during routine visits. Strikingly, it is estimated that as many as seventy-five percent of patients remain undiagnosed after visiting their primary care provider (Wolf et al., 2018).

The development of PCOS comorbidities such as type II diabetes results in high healthcare costs and poor community health outcomes (Ding et al., 2018).

There is a unique opportunity for APNs working in family practice to identify PCOS, provide early interventions, educate on lifestyle changes to promote health and decrease chronic disease (Pfleiffer, 2019).

Signs & Symptoms

PCOS is a cluster of symptoms. Each patient presentation is different based on the underlying disease mechanism. The four cardinal signs of the disease are hyperandrogenism, menstruation irregularities, polycystic ovarian morphology, and metabolic disorders (Osibogun et al., 2020).

The following are common signs and symptoms which are grouped according to disease mechanism.

Hyperandrogenism

- Hirsutism (Ashraf et al., 2019)
- Acne (Ashraf et al., 2019)
- Androgenic alopecia (Ashraf et al., 2019)

Polycystic ovarian morphology

- Infertility (McCance & Huether, 2019)
- Pregnancy complications (McCance & Huether, 2019)

Menstruation irregularities

- Menorrhagia (Papadakis et al., 2019)
- Anovulation (Papadakis et al., 2019)



Figure 1. Polycystic ovarian morphology as seen on ultrasound.

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Conclusion

PCOS presents as a complex and evolving cluster of symptoms. More research is needed to identify the pathophysiology pathway and to develop effective pharmacological treatments.

Recognizing how PCOS alters neuroendocrine signaling, metabolic function, and ovarian health is essential to providing appropriate treatment interventions.

Increasing screening for PCOS during routine health visits can help effectively treat PCOS symptoms and reduce chronic illness

APNs should implement a multifactorial approach to successful treatment of PCOS throughout women's lifespan.

Underlying Pathophysiology

PCOS is a multifactorial disease process with both genetic and environmental etiology.

A multifactorial genetic inheritance and lifestyle factors may influence the disease phenotype expressed throughout the patient's lifespan (Ashraf et al., 2019). There is a strong genetic link in the disease expression, with the prevalence of PCOS increasing 55-60% with a first degree relative with the disease (Khan et al., 2019).

Neuroendocrine, metabolic, and ovarian dysfunction contribute to disfunction in the signaling pathways, resulting in a cycle that progresses the disease state.

The primary systemic dysfunction of PCOS is a hyperandrogenic state. Excess androgen secretion by the ovarian stroma promotes follicular ovarian growth resulting in an abnormal number of ovarian follicles (McCance & Huether, 2019).

Disordered gonadotropin secretion of luteinizing hormone (LH) and decreased follicle stimulating hormone increases ovarian follicle growth resulting in disrupted menstruation cycles (McCance & Huether, 2019).

The hyperandrogenic state contributes to a defect in the insulin molecular signaling pathway (Witchel et al., 2019). Excess insulin suppresses apoptosis and promotes follicle development in the ovaries (McCance & Huether, 2019). Excess insulin contributes to weight gain and metabolic disorders, which further perpetuate the hyperandrogenic state (Witchel et al., 2019).

Increased androgen suppresses the ovulation cycle leading to ovarian hyperplasia (Witchel et al., 2019).

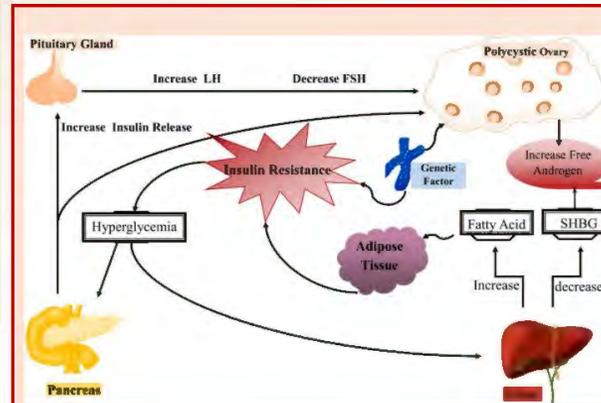


Figure 2 Disrupted neuroendocrine signaling, metabolic and ovarian dysfunction create a cycle which perpetuates the disease state.

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Significance of Pathophysiology

Given the cyclical nature of the disease process, women with PCOS are at an increased risk for developing chronic disease.

Metabolic syndrome, perpetuated by a hyper-insulin state can contribute to the development of obesity, insulin resistance, Type II diabetes, hyperlipidemia, hypertension, cardiovascular disease (Osibogun et al., 2020).

Inhibition of follicular development contributes to estrogen dominance and hyperplasia of the endometrial lining (McCance & Huether, 2019). Women with PCOS are three times more likely to develop endometrial carcinoma than women with normal menstruation cycles (McCance & Huether, 2019).

PCOS is a cluster of syndromes with variable clinical presentations. It is essential for the APN to recognize the unique pathophysiology that contributes to these symptoms and provide a patient-centered, holistic care plan.

Nursing Care

Identify PCOS during routine visits. Due to genetic link, each patient visit should include an in-depth history and physical. Any female patient presenting with symptoms related to hyperandrogenism, irregular menstrual cycles, or metabolic syndrome should have further diagnostic testing (Witchel et al., 2019).

Early interventions. For adolescences, PCOS can promote the development of obesity, acne, and hirsutism which can negatively impact social and psychological development (Pfleiffer, 2019). Screening for pre-pubescent female patients is crucial to preventing disease progression (Witchel et al., 2019).

Target treatment to pathophysiological dysfunction. Providers should approach women's health problems with attention to how female pathophysiology uniquely contributes to the disease state. The primary therapeutic goal in the treatment of PCOS is aimed at reducing hyperandrogenism. First-line treatment includes estrogen/progestin combination oral contraceptives disease (Lim & Hutchison et al., 2019).

Educate on lifestyle changes. Weight reduction through lifestyle changes, including diet modification and exercise, reduces the risk of developing metabolic disorders and type II diabetes. Weight reduction reduces hyperinsulinemia, improves insulin sensitivity, and decreases hyperandrogenism (Ding et al., 2018).

Support patient holistic wellbeing. PCOS symptoms can negatively impact women's mental and emotional wellbeing (Lim et al., 2019). FNP's can support patient's health outcomes by implementing holistic lifespan care that supports the physical and psychological wellbeing of PCOS patients (Lim et al., 2019).

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