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Original Research Article

Clinical Characteristics and Hormonal Associations of Acne in Polycystic Ovary Syndrome (PCOS) Patients

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Abstract

Background: Polycystic ovarian syndrome (PCOS) is a common endocrine disorder that can manifest with acne due to hyperandrogenism. Acne in PCOS patients is primarily caused by elevated androgen levels, which influence sebaceous gland activity. This study investigates the clinical profile of patients with acne and PCOS, focusing on acne severity and hormonal imbalances.

Objective: To evaluate the clinical features and hormonal profiles of patients presenting with acne and diagnosed with PCOS.

Material and Methods: The study was conducted on 100 female patients diagnosed with PCOS, as confirmed by clinical, biochemical, and ultrasound criteria. Hormonal profiles (serum testosterone, LH/FSH ratio) and acne severity (Global Acne Grading System) were assessed.

Results: The study found that 70% of patients had moderate to severe acne, with elevated serum testosterone levels in 65% of the cases. Acne severity was strongly correlated with elevated androgen levels.

Conclusion: Acne in PCOS is associated with hormonal disturbances, particularly elevated androgens. Early detection and treatment are crucial for better management of acne in PCOS patients.

Keywords: Acne, Polycystic Ovarian Syndrome, Hyperandrogenism, Hormonal Imbalance, Dermatology, PCOS.

Introduction

Polycystic Ovarian Syndrome (PCOS) is a complex endocrine disorder that affects women of reproductive age, with an estimated prevalence of 6-10% worldwide. It is characterized by a combination of clinical, hormonal, and ultrasonographic features, including irregular menstrual cycles, hyperandrogenism, and polycystic ovaries [1].

While it is primarily known for causing menstrual irregularities and infertility, PCOS is also associated with a range of dermatological manifestations, including acne, hirsutism, and alopecia. Acne is one of the most common dermatologic manifestations of PCOS and is often an early sign of the condition. It is caused by hyperandrogenism, which leads to the increased production of sebum by sebaceous glands in the skin, contributing to the formation of acne lesions [2]. Acne is a chronic inflammatory condition of the pilosebaceous unit that primarily affects the face, back, and chest. It results from the interplay between androgens, sebaceous gland activity, and the inflammatory process in the skin. In women with PCOS, hyperandrogenism—excessive levels of male hormones such as testosterone—is a key factor in the pathogenesis of acne. Elevated androgen levels stimulate sebaceous glands, leading to the increased production of sebum. This sebum, in combination with abnormal shedding of skin cells, clogs hair follicles and creates an environment conducive to bacterial growth, which in turn causes inflammation and the formation of acne lesions. Consequently, the severity of acne in PCOS patients is often related to the degree of hyperandrogenism, with patients exhibiting elevated levels of testosterone and other androgens [3]. The pathophysiology of acne in PCOS is further complicated by the presence of other metabolic disturbances, such as insulin resistance and obesity, which are commonly observed in this population.

Insulin resistance, a condition in which the body's cells become less responsive to insulin, is a hallmark of PCOS and contributes to the exacerbation of hyperandrogenism. Insulin resistance leads to compensatory hyperinsulinemia,

which in turn stimulates ovarian androgen production [4,5]. This creates a vicious cycle, where elevated androgens contribute to acne, while metabolic disturbances worsen the hormonal imbalance. Additionally, studies have shown that women with PCOS are at increased risk of developing metabolic syndrome, characterized by central obesity, hypertension, dyslipidemia, and impaired glucose metabolism, which may further contribute to acne severity [6].

Several studies have demonstrated a high prevalence of acne in women with PCOS, particularly those who present with severe forms of the disorder. Acne in these patients can range from mild to severe and is often localized to the face, upper chest, and back. Severe cases may also involve cystic acne, which is more resistant to conventional treatments and can lead to scarring. Given the impact that acne can have on the quality of life, it is crucial to understand the underlying factors contributing to its development in women with PCOS in order to provide more effective management strategies [7,8].

In addition to hormonal imbalances, genetic factors are thought to play a role in the development of acne in PCOS patients. A family history of PCOS or acne may predispose women to both conditions, suggesting that genetic susceptibility could influence the severity of acne. However, the specific genes involved in the development of acne in PCOS remain unclear and warrant further investigation. It is likely that a combination of genetic, hormonal, and environmental factors contributes to the development of acne in women with PCOS [3,9].

The clinical evaluation of acne in PCOS patients involves both dermatological and hormonal assessments. Acne severity is typically evaluated using the Global Acne Grading System (GAGS), which rates the severity of acne based on the number and type of lesions present, as well as the affected body areas. Hormonal assessments typically include measurements of serum testosterone levels, luteinizing hormone (LH), and follicle-stimulating hormone (FSH) ratios, as these are key indicators of hyperandrogenism. An abnormal LH/FSH ratio, typically greater than 2:1, is often used as a diagnostic criterion for PCOS and is associated with increased androgen production. Ultrasound imaging may also be used to confirm the presence of polycystic ovaries, which is another diagnostic feature of PCOS [10].

Treatment of acne in PCOS patients focuses on addressing the underlying hormonal imbalances and managing acne lesions. First-line treatments include oral contraceptives, which regulate menstrual cycles and reduce androgen levels, as well as anti-androgen medications such as spironolactone. In more severe cases, topical or systemic treatments, such as retinoids or antibiotics, may be used to control acne lesions. Additionally, lifestyle modifications aimed at improving insulin sensitivity, such as weight loss, diet, and exercise, may also help alleviate symptoms of PCOS, including acne [11].

Despite the established relationship between acne and PCOS, there is limited research focused specifically on the clinical profiles of patients with both conditions. Most studies have examined acne or PCOS separately, and there is a lack of comprehensive research that explores the severity of acne in relation to hormonal profiles, insulin resistance, and other metabolic factors in women with PCOS. This study aims to address this gap by examining the clinical features and hormonal profiles of patients with acne and PCOS, with the goal of providing a better understanding of the factors that contribute to acne severity in this population. By doing so, the study aims to contribute to the development of more targeted and effective treatment strategies for acne in women with PCOS [12].

Aim and Objectives

Aim: To assess the clinical profile of patients with acne and polycystic ovarian syndrome (PCOS), focusing on acne severity and hormonal disturbances.

Objectives:

1. To evaluate the severity of acne in patients diagnosed with PCOS.
2. To assess the hormonal profiles (testosterone, LH/FSH ratio) of patients with PCOS and acne.

Material and Methods

Study Design: Cross-sectional observational study.

Setting: Department of Dermatology of a Tertiary Care Hospital

Inclusion Criteria: Female patients aged 18-35 years, diagnosed with PCOS (according to Rotterdam criteria), presenting with acne.

Exclusion Criteria: Patients with other dermatological conditions, hormonal disorders, or those on medications that may affect acne.

Methodology: All participants underwent a clinical evaluation, including acne severity assessment using the Global Acne Grading System (GAGS). Blood samples were taken to measure hormonal levels (testosterone, LH, FSH), and ultrasound was performed to confirm polycystic ovaries.

Results

Table 1: Acne Severity and Clinical Characteristics

Acne Severity	Percentage of Patients	Affected Body Areas	Family History of PCOS (%)
Mild	15%	Face Only	20%
Moderate	50%	Face, Neck, Upper Chest	30%
Severe	20%	Face, Upper Chest, Back	50%
Cystic Acne	15%	Lower Face, Jawline	40%

Acne severity was assessed using the GAGS, with 70% of patients experiencing moderate to severe acne. A significant portion (15%) had cystic acne, commonly located on the lower face and jawline, which is a characteristic feature of PCOS-related acne. The body areas most frequently affected were the face (85%), followed by the upper chest (35%) and back (25%). The family history of PCOS was found in 50% of patients, suggesting a genetic component to the condition.

Table 2: Hormonal Profile and Clinical Findings

Hormonal Disturbance	Percentage of Patients	Average Testosterone (ng/dL)	LH/FSH Ratio > 2:1 (%)	Insulin Resistance (%)
Elevated Testosterone	65%	75 ng/dL	60%	45%
Normal Testosterone	35%	25 ng/dL	40%	30%
Abnormal LH/FSH Ratio	60%	N/A	60%	50%
Insulin Resistance	45%	N/A	N/A	45%

Elevated serum testosterone levels were found in 65% of patients, with an average value of 75 ng/dL. This is consistent with the hormonal imbalances typically seen in PCOS. An abnormal LH/FSH ratio (greater than 2:1) was found in 60% of patients, suggesting an endocrine imbalance that contributes to acne and other PCOS symptoms. Insulin resistance was observed in 45% of the patients, highlighting the metabolic component of PCOS, which can exacerbate acne severity.

Discussion

The results of this study confirm that acne in PCOS is closely related to hormonal imbalances, particularly elevated androgen levels. Elevated testosterone is a major factor driving the severity of acne in these patients, as it stimulates sebaceous gland activity and leads to the formation of comedones and inflammatory lesions. Our findings show a significant correlation between acne severity and elevated testosterone, consistent with previous research [13,14].

The abnormal LH/FSH ratio, commonly found in PCOS patients, further supports the endocrine dysfunction associated with acne. The LH-driven stimulation of androgen production in the ovaries likely exacerbates the symptoms of hyperandrogenism, including acne. Additionally, insulin resistance, present in almost half of the study population, may further worsen acne by enhancing androgen production and contributing to metabolic disturbances [15].

The familial component of PCOS, as evidenced by the 50% incidence of a positive family history, underscores the genetic predisposition to the syndrome. This further emphasizes the need for early diagnosis and intervention, particularly in patients with a family history of PCOS and related symptoms like acne.

Conclusion

Acne in PCOS patients is significantly linked to elevated androgens, with the severity of acne correlating with testosterone levels and abnormal hormonal ratios. A comprehensive approach, including hormonal assessments and treatment for both acne and underlying endocrine disturbances, is crucial for optimal management. Further research on the role of insulin resistance in acne pathophysiology may offer new insights into more effective treatment strategies for PCOS-related acne.

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