

Acne Management in Polycystic Ovary Syndrome (Review article)

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ABSTRACT:

Background

Polycystic ovary syndrome (PCOS) is a common endocrine disorder in Females. Hyperandrogenism, ovulatory dysfunction, and morphology are the main feature of polycystic ovaries syndrome. Acne is one of the characteristic of hyperandrogenism that may have a negative impact on a female's life.

Aim

The aim of this review is to explore different treatment approaches for acne in PCOS patients.

Methods

PubMed, Cochrane and Embase, databases were investigated for acne treatment in polycystic ovary syndrome using the terms, acne management, acne management in PCOS polycystic ovary syndrome.

Results

Hormonal contraceptives are first-choice therapy for treating acne in PCOS patients either as monotherapy or combined with standard topical acne therapy. Spironolactone, oral antibiotics, and metformin as second-line medications, and Isotretinoin for severe and refractory acne.

Conclusions

According to a multitude of studies, different treatment approaches can be used in the treatment of PCOS patients with acne. Treatment selection is dependent on several factors including clinical presentation, patient's age, medical history patient preference and pregnancy.

Keywords: Acne, acne management, polycystic ovary syndrome.

INTRODUCTION

Polycystic ovary syndrome (PCOS) is a prevalent endocrinopathy that affects 8–13% of females [1], and it is characterized by hyperandrogenism, ovulatory dysfunction, and polycystic ovaries [2]. PCOS is distinguished by high level of adrenal and ovarian androgens hormone, abnormal gonadotropin secretion, low levels of sex hormone-binding globulin (SHBG), and often increased insulin level, as a consequence of insulin resistance [3].

ACNE

Acne is one of the cutaneous manifestations of PCOS. Most women with PCOS show facial acne lesions and up to 50% of women affect the neck, chest, and upper back [4]. The leading cause of acne is excessive ovarian and/or adrenal androgen secretion [5]. Most females with PCOS have high plasma concentrations of androgens [6]. Testosterone and androstenedione are indicators of ovarian androgen hormone secretion [7]. The insulin resistance and hyperinsulinemia appear to be a significant element in eliciting hyperandrogenaemia, acting directly to secrete excessive androgen by ovaries [8]. Androgens results in overproduction of the sebum causing abnormal keratinization resulting in comedones formation, additional colonization of the follicles by Propionibacterium acnes (P acne) leads to inflammation and later development of, pustules, papules, nodules, cysts, and scars [9].

ACNE MANAGEMENT

Hormonal Contraceptives

Combined oral contraceptives (COCs) are first-choice treatment for acne in females with PCOS [10]. COCs consist of ethinyl estradiol and a progestational agent, the estrogen suppresses the luteinizing hormone, increases SHBG, and decreases ovarian androgen production, which eventually diminishes the free testosterone that is responsible for acne [11].

The commonly used COCPs are desogestrel/ethinylestradiol, drospirenone/ethinylestradiol, and cyproterone acetate/ethinylestradiol; However, due to the risk of adverse effects like venous thromboembolism, cyproterone acetate/ethinylestradiol must not be considered as a first-line in PCOS [12].

Side effect:

Headaches, nausea, weight gain, and breast tenderness. The major possible vascular associations include myocardial infarction, venous thromboembolism, and cerebrovascular accident in women with a history of smoking, obesity, hypertension and age 35 years or older [13].

Spironolactone

It is an oral aldosterone antagonist and potassium-sparing diuretic having blocker action on androgen receptor and 5-alpha reductase inhibitor activity [14]. Spironolactone has been used to manage acne in women with PCOS as an alternative to oral isotretinoin and COCs [15]. It has been found that spironolactone in conjunction with COCPs improved acne by 50% [16]. The suggested daily dose is 50 mg to 200 mg daily; however, it is usually best to start at 50 mg daily and increase to 100 mg daily if the clinical response is not adequate after 2 to 3 months [13].

Side effect:

Headache, breast tenderness, fatigue, dizziness, irregular menstruation (reduced by COCs), and uncommon side effects such as hyperkalemia, which increased in elderly patients and patients with renal impairment or diabetes [17].

Oral Isotretinoin

Oral isotretinoin suppresses sebum secretion, inhibits cell proliferation, inhibits bacterial proliferation, controls the development of microcomedones, normalizes keratinization and reduces the development of lesions and comedones, and it may have anti-inflammatory effect [18]. In females whose acne is severe and unresponsive to COCs, spironolactone, and oral antibiotics, isotretinoin use would be considered [17]. Isotretinoin treatment may be acceptable option for patients with severe cystic acne who could not use COCs [19].

Side effect

The most common side effects of oral isotretinoin are dry mucous membranes, dry skin, dry lip, dry eyes, and nose bleed, while the most important side effects are increased levels of total cholesterol, serum triglycerides and liver enzymes [20].

Flutamide

Flutamide is an anti-androgenic that blocks androgens by competitive inhibition of receptors, reducing androgen synthesis [21]. A combination of flutamide and COCs improved acne by 80% [16]. Flutamide at a dose of 62.5 mg daily or 1 mg/kg/day seems to be effective and safe for the treatment of acne in females [22]. Side effects include gastrointestinal upset, breast tenderness, insomnia, and fatigue [23].

Oral Antibiotic

Antibiotics are effective for acne with inflammation as it exhibits anti-inflammatory and antibiotic effects [24]. It is recommended to use oral antibiotics as second-choice therapy for a short period of time and as an adjunctive treatment if COCs are inadequate [17]. Tetracyclines, mainly minocycline and doxycycline are the most prescribed drugs [25]. Macrolides such as azithromycin are commonly prescribed when tetracyclines are not tolerated or contraindicated [26]. Monotherapy with oral antibiotics should be avoided to decrease the development of antibiotic-resistant acnes (P acne), and limit the treatment to 3-6 months [27]. trimethoprim/sulfamethoxazole, cephalosporins, and penicillins are also effective to use in acne [28].

Side effect

The common side effect of tetracyclines include gastrointestinal tract disturbances and photosensitivity reactions [29]. Gastrointestinal distress are common with penicillins, macrolides, and cephalosporins [26].

Insulin Sensitizers

Metformin is an anti-diabetic drug that enhances insulin sensitivity and reduces insulin levels which adjusts ovarian and functional adrenal hyperandrogenism in PCOS [30]. It is effective as an adjunct therapy in the management of moderate-to-severe acne [31]. Initial dose is 850 mg and may titrate up to 2,000 mg daily, and if the improvement is not established within 6 months the treatment should be discontinued [32].

Side effect

Diarrhea, nausea, abdominal discomfort, anorexia are the most common side effect, while vitamin B12 deficiency with the long term use of metformin [33].

Topical therapy:

Standard topical acne therapy is used in acne associated with PCOS as adjunctive therapy with COCs (Table 1).

Table 1: Topical preparations

	Dosage Forms	Frequency of use
Topical Retinoid		
Tretinoin	Cream 0.1%, 0.05%, 0.02%, 0.025% Gel 0.1%, 0.05%, 0.025% Liquid 0.05% Lotion 0.05% Microsphere gel 0.1%, 0.04%, 0.06%, 0.08%	Apply once daily at evening time
Tazarotene	Cream 0.1% and 0.05% Gel 0.1% and 0.05% Foam 0.1%	
Adapalene	Cream, Gel, and Lotion (0.1%) Adapalene 0.1%/benzoyl peroxide 2.5% gel Adapalene 0.3%-benzoyl peroxide 2.5% gel	
Topical antibacterial		
Erythromycin	Ointment, Pads, Gel (2%)	Apply twice daily
Clindamycin	Gel, Lotion, Solution, Swab (1%)	Apply twice daily
Benzoyl peroxide	Cream 2.5%, 5.5%, 6%,7%,10% Gel 2.5%, 4%, 5%,8%,10% Foam 5.3%, 5.5%, 9.5% Cleansers 2.6%	Topical formulation apply once daily Topical Cleansers apply once or twice daily
Combination Topical antibacterial		
Benzoyl peroxide and clindamycin	Benzoyl peroxide 2.5 %-clindamycin 1.2%	Apply once daily
	Benzoyl peroxide 3.75%-clindamycin 1.2%	Apply once daily
	Benzoyl peroxide 5%-clindamycin 1%	Apply twice daily
	Benzoyl peroxide 5%-clindamycin 1.2%	Apply once daily
Benzoyl peroxide and erythromycin	Gel 3%, 5%	Apply twice daily

Retinoids

Retinoids control the development of microcomedones, decrease the development of lesions and existing comedones, decrease sebum production and normalize keratinization. Moreover, they demonstrate anti-inflammatory activity [34]. Local application of retinoids may cause erythema, skin dryness, and pain, and may aggravate eczema or dermatitis [35].

Benzoyl peroxide

Topical benzoyl peroxide is considered the recommended antimicrobial of choice as it limits the possibility of bacterial resistance [36]. Benzoyl peroxide is as effective as oral antibiotics and is superior to topical tretinoin for inflammatory lesions [37]. Drying and irritation is the common side effects [38].

Erythromycin and clindamycin

In addition to their antibiotic effect against P acnes, they have anti-inflammatory properties [34]. Concomitant use of Benzoyl peroxide is recommended to decrease the development of resistant P acnes bacteria and increase efficacy [39]. All of the topical antibiotics can cause local irritation [39].

Others:

Dermocosmetics, dermabrasion, laser or light therapy or cosmetic surgery are considered as adjuvant therapies for acne and scarring [40].

Conclusions

Acne is common in PCOS patients. COCs are first-choice therapy for treating acne in PCOS patients and can be used in combination with topical acne therapy or as monotherapy. Spironolactone, oral antibiotics, and metformin can be either added as second-choice medications if COCs are inadequate. Isotretinoin can be considered when acne is severe and unresponsive to COCs, spironolactone, and oral antibiotics,

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