

The role of spironolactone in correction of hormonal disturbance in acne patients.

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Abstract

Introduction: Acne vulgaris is a common chronic skin disease involving blockage and/or inflammation of pilosebaceous units (hair follicles and their accompanying sebaceous gland). Acne can present as non-inflammatory lesions, inflammatory lesions, or a mixture of both, affecting mostly the face but also the back and chest. Polycystic ovary syndrome is the most common cause of hyperandrogenism in women. Spironolactone is an antagonist for mineralocorticoid receptors and used for treatment of hypertension, congestive heart failure, nephrotic syndrome. It causes decrease of androgen production which lead to decrease sebum so use in the treatment of acne. Aim of the study: We evaluated the efficacy of spironolactone therapy in women with acne and improvement of hormonal changes

Patients and Methods: This is a retrospective study done in our hospital between January to December 2022 on 200 patients diagnosed by dermatologist as acne vulgaris. All diagnosed cases were referred to gynecological clinic to evaluate hormones as follicle-stimulating hormone, serum levels of testosterone, dehydroepiandrosterone sulphate, luteinizing hormone, prolactin, and blood sugar, insulin on the second or third day of the cycle. Spironolactone 100 mg was given once daily for all patients for 12 weeks. Follow up was done at weeks 4 and 8. Hormonal profile was repeated at Week 12.

Conclusion: Spironolactone reduces hyperandrogenic state with significant improvement of hormonal disturbance in acne patient

Keywords: Acne vulgaris, Hormones, Spironolactone.

Introduction

Acne vulgaris is caused by blockage of hair follicles with oil of skin, bacteria and dead skin cells which may cause inflammation. Acne vulgaris can occur at any age but it is very common in teens and about 50 million are affected in United States, diet, hormones and diet can cause acne. Large amounts of sebum are produced by sebaceous glands which are markedly increased during puberty due to the effect of male sex hormones. For around 40% of women, acne may continue well into their 40s because of hormonal changes. By age 30 most acne stop to occur again but it recurs due to stress or overweight, sleep deprivation, which elevate the level of cortisol which affect the level of blood sugar and increase the sebum production. But some adults continue to have acne in their 40s or 50s [1].

Women who usually use skin care products can develop acne as these products block the pores and increase the bacteria, like Alcohol-based toners, astringents, exfoliates, oil-based cosmetics, thick skin creams and moisturizers and harsh soaps

or cleansers, dryness can occur from over cleaning of the skin which stimulate sebum production and development of acne. Family history of acne is a predisposing factor for acne especially if first degree relatives [2].

Gene mutations may be the cause of over production of acne. This seems particularly true in families where one or both parents have severe acne with scarring; rarely do their children escape significant acne breakouts. Many medications can affect hormones that influence the production of sebum. Others cause acne when treatment is stopped and hormone levels are suddenly imbalanced.

These include drugs like: 5 Oral corticosteroids, Oral contraceptives, Contraceptive injections (Depo-Provera), Contraceptive devices like Mirena IUD, Testosterone, Anabolic steroids, Anti-epilepsy drugs, Anti-tuberculosis drugs, Lithium, Immunosuppressant like cyclosporine [3].

Spironolactone is a mineralocorticoid receptor antagonist. The safety of long-term spironolactone use is well established

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given that it has been approved by the U.S. Food and Drug Administration (FDA) since 1960. (Pitt et al.,1999). It is also an androgen receptor antagonist and has been shown to reduce sebum production in vivo (Goodfellow et al., 1984), leading to an increase in off-label usage for the treatment of hyperandrogenism. Because androgens mediate increased sebum production, they have been implicated in the pathophysiology of acne (Zouboulis et al., 1994), which led to the current acceptance of spironolactone as a non-antibiotic alternative to traditional systemic treatments for women with acne [4].

Spironolactone is an anti-inflammatory alternative to traditional systemic acne treatments, partly because androgens increase sebum production (Zouboulis et al., 1994). A recent study implicates androgens as a key factor in acne pathophysiology (Zouboulis et al., 1994), which led to the acceptance of spironolactone as a non-antibiotic alternative to traditional systemic acne treatments. Because androgens generate more sebum, they have been implicated in the pathophysiology of acne (Zouboulis et al., 1994) [5].

Hormonal acne is a type of acne triggered by hormone fluctuations or imbalances. Although it's more prevalent during puberty as a result of hormonal changes, hormonal acne can persist throughout adulthood. Women are especially affected as they go through multiple hormonal changes during a lifetime, such as during menstruation and menopause. Hormonal acne is typically found on the lower part of the face, including lower cheeks and jawline. However, it can develop on other body parts like the back or chest.

Patients and Methods

Our retrospective study was conducted in Menofia university hospital, Egypt, UAE between January and December 2022. A written informed consent for participation was obtained from the patient as well as photo consent from the patient

who is used as an example in this article, and all participants were informed about the study. An ethical committee of the hospital approved the study. The study comprised adult female patients who visited our clinic between January and December 2022, had a diagnosis of acne, and fulfilled the other inclusion requirements. All patients who visited the dermatological clinic were given the acne diagnosis. Patients who fit these criteria were not allowed to receive treatment for their acne, including systemic treatment, topical treatment, and any kind of dermatological procedure. They were also not allowed to be pregnant, lactating, taking oral contraceptives or other hormone replacement therapies known to cause acne [6].

Evaluation of the patients was done in the form of full history, parity, age, medical history. After clinical diagnosis of patients with acne, they are referred to gynecologist to make hormonal tests in the amount of blood sugar, insulin, thyroid-stimulating hormone, luteinizing hormone, follicle-stimulating hormone, prolactin, and testosterone in the bloodstream on the second or third day of the cycle. Spironolactone 100 mg was given once daily for all patients for 12 weeks s. Patient follow-up at weeks 4 and 8. Hormonal profile was repeated at Week 12.

Results

In our study, 200 patients who met the inclusion and exclusion criteria were included. Four instances were removed from the study because they became pregnant, and six patients were also removed because they failed to be followed up throughout the study's 12-week follow-up period. Participants in the study had a median age of 22 years and a mean age of 22.98 3.423 years. The median age of acne beginning was 19, with a mean age of 19.453.7 years (Table 1).

Most of cases showed irregular periods in the form of irregular menstruation as period has no fixed time also may lasted for one or 2 days with little blood flow less than 40 ml. Hirsutism

Table 1: Clinical presentation.

Clinical presentation	
Acne	200 (100%)
Irregular menstruation	176 (88%)
Obesity	123 (61.5%)
Infertility	56 (28%)
Hirsutism	135 (67.5%)

Table 2: Hormonal profile of patients before and after treatment with spironolactone.

Hormonal profile of patients before and after treatment with spironolactone			
Hormonal profile	Before treatment	After treatment	P value
LH mean	11.84±4.37	5.06±1.52	<0.05
LH median	11.45	5	<0.01
FSH mean	5.49±1.08	5.43±0.91	>0.05
FSH median	5.42	5.15	>0.05
LH to FSH ratio mean	2.31±0.77	0.95±0.23	<0.001
LH to FSH ratio median	2.17	0.95	<0.001
TSH mean	1.11±0.24	1.01±0.12	>0.05
TSH median	1.1	1.01	>0.05
Prolactin mean	26.12±35.56	10.82±4.15	>0.05
Prolactin median	18.85	14.12	
Testosterone mean	2.05±0.48	0.85±0.31	>0.05
Testosterone median	2	0.8	

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is also presented in 67.5% of cases. Good number of patients is single so they do not think of pregnancy but the married patients about 50% of them seeking for conception and 82 % are primary infertility (Table 2) [7].

In our investigation, spironolactone medication for three months resulted in a considerable decline in serum LH levels without a corresponding change in FSH levels; however there was a shift in the LH to FSH ratio. There was a significant decrease in serum prolactin levels from before treatment to after treatment. No change in TSH level. Total testosterone decreased after treatment with significant difference.

Discussion

Despite the fact that oral spironolactone is successful at treating acne, the trials are too few and small for the FDA to approve it or for the Cochrane Database of Systemic Reviews to endorse its usage (Brown et al., 2009). Majority of the study concentrate on the improvement of the clinical pictures of acne which is subjective in cases but our study documented the hormonal changes which occurred after use of spironolactone. Medical treatment of the patients of acne patients in our study included isotretinoin, local and systemic antibiotics in the form of doxycycline or clindamycin we did not prescribe any other medications which might affect the hormones of the patients like oral combined pills or metformin. We did not go for ultrasound findings of the patients to diagnose the polycystic ovaries or not [8].

Our aim was to evaluate the effect of spironolactone in improvement of hormonal disturbance of acne patients. About 65 % of patients documented their improvement and regularity of menstruation after taking of medications which made them happy but some patients were excluded from the study as they got pregnant which was considered a very nice feedback of the line of medications. The side effects of the medications were monitored according to the patient complain, little few patients complained of dry skin after 6 weeks of use of medications but no dyspnoea or dizziness happened. The number of patients was good as we made the study so easy and for patients who could do hormonal profiles.

As a result, for many dermatologists, spironolactone is still an option rather than a go-to medication for treating acne in female patients. Spironolactone needs more study before it can be considered a legitimate systemic acne treatment. The addition of this more comprehensive retrospective analysis to the literature will help to further solidify the idea that spironolactone is a safe and efficient therapy option for people with acne. Spironolactone's safety record is more well-established than it is for treating acne. There have been two significant randomized placebo-controlled, double-blind studies of spironolactone for the treatment of acne sufferers since the identification of its anti-androgenic properties. Despite having only 36 and 21 patients, respectively, the investigations both showed a statistically significant reduction in acne. (Goodfellow et al., 1984, Muhlemann et al., 1986) [9].

According to a larger retrospective study, 93.4% of 85 individuals who received spironolactone for their acne exhibited some improvement (Shaw, 2000). Medical professionals have also started evaluating the effectiveness of topical spironolactone gels in an effort to lessen systemic symptoms. One early investigation (Walton et al., 1986) revealed there was no decrease in sebum excretion. Recent randomized controlled trials on the treatment of acne have yielded conflicting outcomes, which indicates that topical spironolactone gel is not an effective alternative for systemic spironolactone (Afzali et al., 2012, Kelidari et al., 2016).

Because it has numerous, possibly harmful side effects such as teratogenicity and depression, isotretinoin therapy is not as safe as spironolactone. Spironolactone offers women an excellent chance to achieve and maintain acne clearance with regular use because it has higher percentage improvement rates than minocycline, percentage improvement rates that are comparable to oral contraceptives, and a better safety profile than isotretinoin [10].

Conclusion

Spironolactone should be considered in the line of treatment of acne specially patients received isotretinoin and stopped it due to side effects spironolactone is a safe medication and has no effect in liver functions or lipid profile patient presented with irregular menstruation can use spironolactone to correct the abnormal hormone.

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