ORIGINAL RESEARCH

Red light alone and MAL-PDT in patients with acne vulgaris

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ABSTRACT

Background: Although it can last into maturity, acne vulgaris is a common skin ailment that primarily affects people throughout adolescence. The present study compared red light alone and MAL-PDT in patients with acne vulgaris. **Materials & Methods:** 76 cases of acne vulgaris of both genderswere divided into 2 groups of 38 each. In group I, patients received red light alone and in group II, MAL-PDT treatment at baseline and after 2 weeks, 4 weeks and 8 weeks.Measurements of inflammatory and non-inflammatory lesions, as well as the severity grade of acne, were made at baseline and at each follow-up appointment. A six-point scoring system was used to assess the severity of acne. **Results:** Group I had 20 males and 18 females and group II had 23 males and 15 females.Acne severity grade I was seen in 1 and 1, grade II in 20 and 2, grade III in 16 and 30 and grade IV in 1 and 5 patients in group I and II respectively. The difference was significant (P< 0.05). Inflammatory lesions in group I at baseline, 2 weeks, 4 weeks and 8 weeks was 42%, 13%, 12%and 5% respectively. In group II was 54%, 10%, 3%and 1% respectively. Non- inflammatory lesions in group I was 28%, 20%, 14% and 8% respectively. In group II was 46%, 18%, 11% and 2% respectively. The difference was significant (P< 0.05). Grade 0-I in group I at baseline, 2 weeks, 4 weeks and 8 weeks was 5%, 21%, 57%and 79% respectively. In group II was 25%, 53%, 74%and 100% respectively. Grade II- IV in group I at baseline, 2 weeks, 4 weeks and 8 weeks was 45%, 36%, 20%and 5% respectively. In group II was 39%, 28%, 2%and 0% respectively.The difference was significant (P< 0.05). **Conclusion:** Inflammatory and non-inflammatory lesions benefit greatly from red light MAL-PDT as well as red light alone. However, red light MAL-PDT shows a faster onset of activity and a higher reactivity than red light alone.

Keywords: Acne vulgaris, MAL-PDT, nodules

INTRODUCTION

Although it can last into maturity, acne vulgaris is a common skin ailment that primarily affects people throughout adolescence.[1] It is distinguished by the presence of different kinds of skin lesions, such as cysts, papules, pustules, nodules, and comedones (blackheads and whiteheads). Acne vulgaris causes include Clogged pores result from the sebaceous glands producing more sebum due to increased testosterone levels throughout adolescence.[2] Inflammation results from the proliferation of Propionibacterium acnes (P. acnes) bacteria inside clogged pores. Excessive oil production from overactive sebaceous glands contributes to pore obstruction. Sebum and dead skin cells can build up and obstruct hair follicles.[3]

Because acne has a complex and multidimensional etiology, there are many different types of treatments available.[4] The pillars of traditional acne treatment include benzoyl peroxide, antibiotics, and retinoid therapies. Conversely, the ineffectiveness of these treatments non certain circumstances may lead to refractory acne. Additionally, propionibacterial resistance to antibiotics has increased in recent years, leading to a regular change of acne therapeutic guidelines. Oral isotretinoin use can also result in severe side effects, such as cutaneous and systemic symptoms, including birth defects. As a result, studies on alternative remedies are being conducted.[5]Acne can be successfully treated with photodynamic therapy using topical porphyrin precursors such as methyl aminolevulinate (MAL) or 5-aminolaevulinic acid (ALA). Photoactivated porphyrins produce singlet oxygen and other potent oxidizers, which have short-term antibacterial and anti-inflammatory effects. Additionally, it has been demonstrated that red light ALA-PDT directly destroys sebaceous glands by photodynamic methods, resulting in a protracted acne remission.[6]The present study compared red light alone and MAL-PDT in patients with acne vulgaris.

MATERIALS & METHODS

The present study was conducted on 76 cases of acne vulgaris of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 38 each. In group I, patients received red light alone and in group II, MAL-PDT treatment at baseline and after 2 weeks, 4 weeks and 8 weeks.Measurements of inflammatory and non-inflammatory lesions, as well as the severity grade of acne, were made at baseline and at each follow-up appointment. A six-point scoring system was used to assess the severity of acne.Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Male	20	23
Female	18	15

Table I shows that group I had 20 males and 18 females and group II had 23 males and 15 females.

Table II Acne severity

Acne severity	Group I	Group II	P value
Grade I	1	1	0.05
GradeII	20	2	
GradeIII	16	30	
GradeIV	1	5	

Table II shows that Acne severity grade I was seen in 1 and 1, grade II in 20 and 2, grade III in 16 and 30 and grade IV in 1 and 5 patients in group I and II respectively. The difference was significant ($P< 0.05$).

Table III Inflammatory and non-inflammatory lesions

Type of lesions	Group	Baseline	2	4	8	P value
Inflammatory	Group I	42%	13%	12%	5%	0.02
	Group II	54%	10%	3%	1%	
Non- inflammatory	Group I	28%	20%	14%	8%	0.05
	Group II	46%	18%	11%	2%	

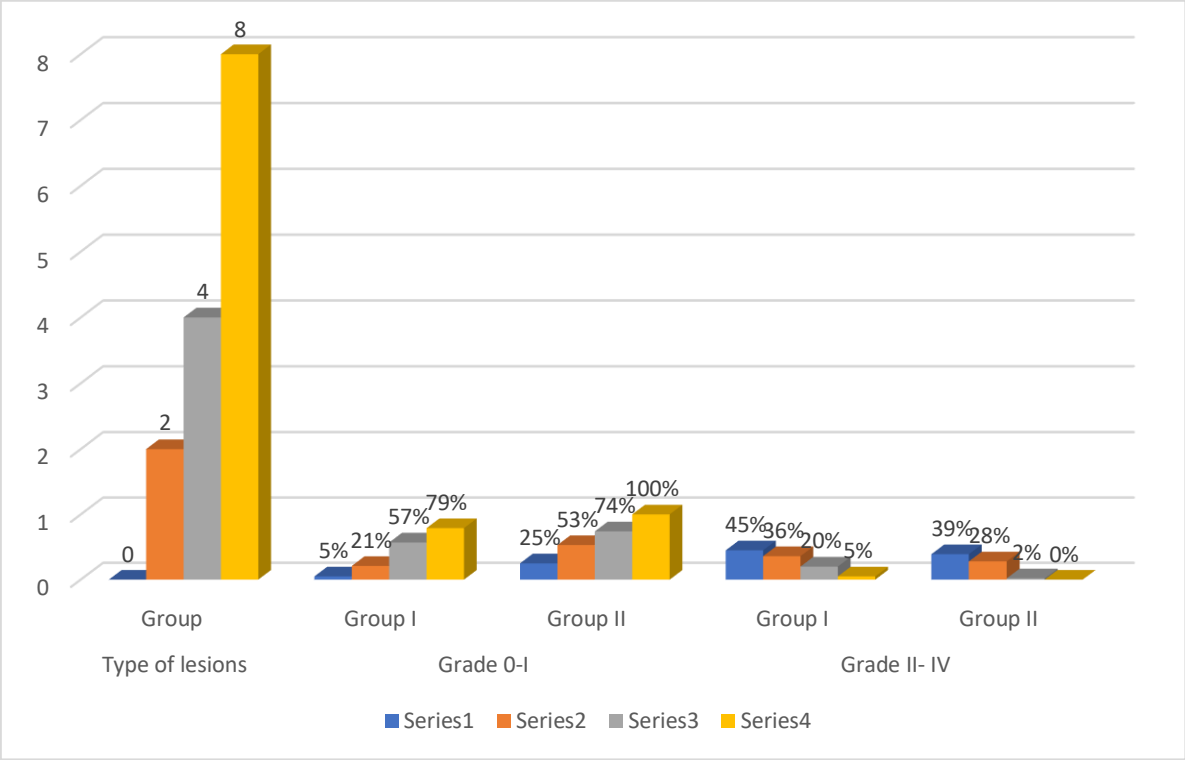
Table III shows that inflammatory lesions in group I at baseline, 2 weeks, 4 weeks and 8 weeks was 42%, 13%, 12% and 5% respectively. In group II was 54%, 10%, 3% and1%respectively. Non- inflammatory lesions in group I was 28%, 20%, 14% and 8% respectively. In group II was 46%, 18%, 11% and 2% respectively. The difference was significant ($P< 0.05$).

Table IV Percentage of acne severity grade

Type of lesions	Group	Baseline	2	4	8	P value
Grade 0-I	Group I	5%	21%	57%	79%	0.05
	Group II	25%	53%	74%	100%	
Grade II- IV	Group I	45%	36%	20%	5%	0.04
	Group II	39%	28%	2%	0%	

Table IV, graph I shows that grade 0-I in group I at baseline, 2 weeks, 4 weeks and 8 weeks was 5%, 21%, 57%and 79% respectively. In group II was 25%, 53%, 74%and 100% respectively. Grade II- IV in group I at baseline, 2 weeks, 4 weeks and 8 weeks was 45%, 36%, 20%and 5% respectively. In group II was 39%, 28%, 2%and 0% respectively.The difference was significant ($P< 0.05$).

Graph I Percentage of acne severity grade



DISCUSSION

Light treatment is used to cure Propionibacterium acnes and other anaerobic and commensal bacteria on human skin because they produce endogenous porphyrins, particularly coproporphyrin III (CPIII).[7] Porphyrins may worsen the inflammatory response because of their cytotoxic actions on the sebaceous glands. On the other hand, the photosensitizing effect of endogenous porphyrins has been connected to advantages from exposure to blue and/or red light sources.[8]The present study compared red light alone and MAL-PDT in patients with acne vulgaris.

We found that group I had 20 males and 18 females and group II had 23 males and 15 females.Acne severity grade I was seen in 1 and 1, grade II in 20 and 2, grade III in 16 and 30 and grade IV in 1 and 5 patients in group I and II respectively. PDT's impact on acne patients was investigated by Itoh et al.[9] Using topical delta-aminolaevulinic acid (ALA) and polychromatic visible light, PDT was used to treat ten women and three men with intractable acne vulgaris. Using a light-shielding dressing, 20% ALA in an oil-in-water emulsion was administered to the lesions for four hours. Then, using a halogen light source with an energy intensity of 17 mW cm-2 and a total energy dose of 13 J cm-2, the lesions were subjected to polychromatic visible light at 600–700 nm. At 1, 3, and 6 months after PDT therapy, all patients showed a noticeable improvement in the appearance of their faces and a decrease in the number of new acne lesions. As a result of the following side effects, the treated lesions returned to normal skin conditions within a month: discomfort, burning, and stinging during irradiation; oedematous erythema for three days following PDT; epidermal exfoliation from the fourth to the tenth day; irritation and hypersensitivity to physical stimulation for ten days following PDT; and pigmentation or erythema following epidermal exfoliation. Acne was effectively treated with PDT. Because of its affordability, consistent illumination, and ability to treat vast regions quickly, polychromatic visible light was considered to be a more effective photoactivating light source for acne patients than laser light.

We found that inflammatory lesions in group I at baseline, 2 weeks, 4 weeks and 8 weeks was 42%, 13%, 12%and 5% respectively. In group II was 54%, 10%, 3%and 1% respectively. Non- inflammatory lesions in group I was 28%, 20%, 14% and 8% respectively. In group II was 46%, 18%, 11% and 2% respectively. In individuals with mild to moderate facial acne, Pinto et al[10] evaluated the effectiveness and tolerability of MAL-PDT versus red light alone. A total of 36 individuals with mild to moderate acne were included in the study. In two sessions spaced two weeks apart, 18 patients underwent MAL-PDT and 18 received red light alone. Blinded assessors evaluated lesion counts and acne grade at baseline, 2, 4, and 10 weeks. At week two, 82.3% of the MAL-PDT group and 14.2% of the red light alone group showed clinical improvement from acne grade II-IV to 0-I. At week 10, the red light-only group's reaction rate was 77%, indicating a steady clinical improvement over time. On the other hand, the MAL-PDT group experienced a complete response at week 10 and a quick clinical improvement. Acne lesions

were considerably improved by both treatments. The MAL-PDT group, however, responded more (P<0.001). Histologically, following MAL-PDT, atrophic sebaceous glands and reduced levels of lipids and sebocytes were noted.

We observed that grade 0-I in group I at baseline, 2 weeks, 4 weeks and 8 weeks was 5%, 21%, 57%and 79% respectively. In group II was 25%, 53%, 74%and 100% respectively. Grade II- IV in group I at baseline, 2 weeks, 4 weeks and 8 weeks was 45%, 36%, 20%and 5% respectively. In group II was 39%, 28%, 2%and 0% respectively.Using a portable device, Na et al[11]evaluated the effectiveness of red light phototherapy for face acne. After eight weeks of treatment, the treated side had a considerably higher percent reduction of total lesions (55% reduction) than the control side (19% increase).

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that inflammatory and non-inflammatory lesions benefit greatly from red light MAL-PDT as well as red light alone. However, red light MAL-PDT shows a faster onset of activity and a higher reactivity than red light alone.

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