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Original Research

Efficacy of red light alone and MAL-PDT in patients with facial acne

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ABSTRACT:

Background: Acne vulgaris is a common skin condition that affects many people, particularly during adolescence, though it can persist into adulthood. The present study was conducted to assess the efficacy of red light alone and MAL-PDT in patients with facial acne. **Materials & Methods:** 88 cases of acne vulgaris of both genderswere divided into 2 groups of 44 each. In group I, patients received red light alone and in group II, MAL-PDT treatment at baseline (0 day) and week 2. **Results:** In group I, males were 20 and females were 24 and in group II, males were 21 and females were 23. Previous treatment was performed in 21 in group I and 28 in group II. Acne severity grade I was seen in 4 and 1, grade II in 22 and 4, III in 17 and 28 and grade IV in 1 and 11 respectively. The difference was significant (P< 0.05). Inflammatory lesions in group I at baseline, 2 weeks, 4 weeks and 8 weeks was 45%, 14%, 10%and 6% respectively. In group II was 50%, 11%, 2% and 1% respectively. Non- inflammatory lesions in group I was 25%, 21%, 16% and 9% respectively. In group II was 30%, 17%, 10% and 3% 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%, 19%, 56%and 76% respectively. In group II was 23%, 51%, 72%and 100% respectively. Grade II- IV in group I at baseline, 2 weeks, 4 weeks and 8 weeks was 42%, 32%, 18%and 5% respectively. In group II was 37%, 25%, 3%and 0% respectively. **Conclusion:** Both red light MAL-PDT and red light by itself have a considerable positive impact on both inflammatory and non-inflammatory lesions. However, compared to red light alone, red light MAL-PDT exhibits a higher reaction and a speedier start of activity.

Keywords: Acne vulgaris, red light, inflammatory

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INTRODUCTION

Acne vulgaris is a common skin condition that affects many people, particularly during adolescence, though it can persist into adulthood. It is characterized by the presence of various types of skin lesions, including comedones (blackheads and whiteheads), papules, pustules, nodules, and cysts.[1]Causes of acne vulgaris are Increased androgen levels during puberty stimulate the sebaceous glands to produce more sebum, leading to clogged pores.Propionibacterium acnes (P. acnes) bacteria proliferate within clogged pores, causing inflammation.Overactive sebaceous glands produce too much oil, contributing to pore blockage.Dead skin cells can accumulate and combine with sebum to block hair follicles.[2]

Acne has a complicated and multifaceted pathophysiology, which is reflected in the large range of therapies available. Benzoyl peroxide, antibiotics, and retinoid treatments are the mainstays of conventional acne treatment.[3] Refractory acne, on the other hand, could result from these treatments' ineffectiveness un specific situations. Furthermore, in recent years, there has been an increase in propionibacterial resistance to antibiotics, which has resulted in a regular modification of acne therapy guidelines. Furthermore, using oral isotretinoin can have serious side effects, including cutaneous and systemic consequences, including birth abnormalities. Consequently, research is being done on alternative therapies.[4]

Methyl aminolevulinate (MAL) or 5-aminolaevulinic acid (ALA), topical porphyrin precursors, can be used in photodynamic treatment to effectively treat acne. Singlet oxygen and other strong oxidizers are created by photoactivated porphyrins, and these compounds have brief antibacterial and anti-inflammatory properties.[5]Furthermore, red light ALA-PDT has been shown to directly destroy sebaceous glands by photodynamic means, leading to a prolonged remission of acne.[6]The present study was conducted

to assess the efficacy of red light alone and MAL-PDT in patients with facial acne.

MATERIALS & METHODS

The present study was conducted on 88 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 44 each. In group I, patients received red light alone and in group II, MAL-PDT treatment at baseline (0 day) and week 2. They were evaluated at baseline and week 2, 4 and 8. Acne severity grade, inflammatory and non-inflammatory lesions were measured at baseline and at every follow- up visit. Acne severity grade was evaluated using a six- point rating scale.Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Baseline characteristics

Parameters	Group I	Group II	P value
Gender (M:F)	20:24	21:23	0.52
Previous treatment	21	28	0.04
Acne severity grade I	4	1	0.03
II	22	4	
III	17	28	
IV	1	11	

Table I shows that in group I, males were 20 and females were 24 and in group II, males were 21 and females were 23. Previous treatment was performed in 21 in group I and 28 in group II. Acne severity grade I was seen in 4 and 1, grade II in 22 and 4, III in 17 and 28 and grade IV in 1 and 11 respectively. The difference was significant (P< 0.05).

Table II Distribution of the expected number of inflammatory and non-inflammatory lesions at baseline, week 2, 4 and 8

Type of lesions	Group	Baseline	2	4	8	P value
Inflammatory	Group I	45%	14%	10%	6%	0.02
	Group II	50%	11%	2%	1%	
Non- inflammatory	Group I	25%	21%	16%	9%	0.05
	Group II	30%	17%	10%	3%	

Table II, graph I shows that inflammatory lesions in group I at baseline, 2 weeks, 4 weeks and 8 weeks was 45%, 14%, 10% and 6% respectively. In group II was 50%, 11%, 2% and 1%respectively.Non- inflammatory lesions in group I was 25%, 21%, 16% and 9%respectively. In group II was 30%, 17%, 10% and 3%respectively.The difference was significant (P< 0.05).

Graph I Distribution of the expected number of inflammatory and non-inflammatory lesions at week 2, 4 and 10

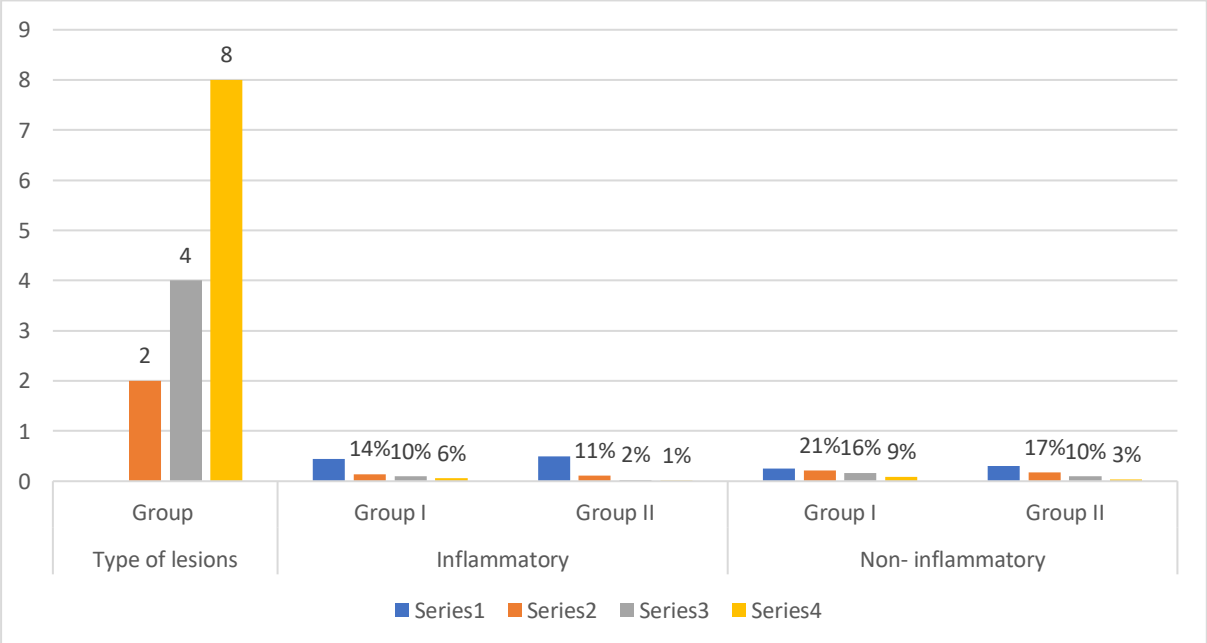

Table III Percentage of acne severity grade at baseline, week 2, 4 and 8

Type of lesions	Group	Baseline	2	4	8	P value
Grade 0-I	Group I	5%	19%	56%	76%	0.01
	Group II	23%	51%	72%	100%	
Grade II- IV	Group I	42%	32%	18%	5%	0.04
	Group II	37%	25%	3%	0%	

Table III shows that grade 0-I in group I at baseline, 2 weeks, 4 weeks and 8 weeks was 5%, 19%, 56%and 76% respectively. In group II was 23%, 51%, 72%and 100% respectively. Grade II-IV in group I at baseline, 2 weeks, 4 weeks and 8 weeks was 42%, 32%, 18%and 5% respectively. In group II was 37%, 25%, 3%and 0% respectively.The difference was significant (P< 0.05).

DISCUSSION

Because Propionibacterium acnes and other anaerobic and commensal bacteria on human skin create endogenous porphyrins, especially coproporphyrin III (CPIII), light therapy is used to treat these conditions.[7]Porphyrins have cytotoxic effects on the sebaceous glands, which may exacerbate the inflammatory response. Conversely, benefits from exposure to blue and/or red light sources have been linked to the photosensitizing impact of endogenous porphyrins.[8]The present study was conducted to assess the efficacy of red light alone and MAL-PDT in patients with facial acne.

We found thatin group I, males were 20 and females were 24 and in group II, males were 21 and females were 23. Previous treatmentwas performed in 21 in group I and 28 in group II. Acne severity grade I was seen in 4 and 1, grade II in 22 and 4, III in 17 and 28 and grade IV in 1 and 11 respectively. Using a portable device, Na et al[9] 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).

We found that inflammatory lesions in group I at baseline, 2 weeks, 4 weeks and 8 weeks was 45%, 14%, 10%and 6% respectively. In group II was 50%, 11%, 2%and1%respectively. Non- inflammatory lesions in group I was 25%, 21%, 16% and 9% respectively. In group II was 30%, 17%, 10% and 3% respectively. Pinto et al[10]compared the efficacy and tolerability of red light alone and MAL-PDT in patients with mild to moderate facial acne. Thirty- six patients with mild to moderate acne were enrolled. Eighteen patients received MAL-PDT and 18 received red light alone in two sessions, 2 weeks apart. Acne grade and lesion counts were assessed by blinded evaluators at baseline, 2, 4 and 10 weeks. At week 2, clinical improvement from acne grade II-IV to 0-I was observed in 82.3% of MAL-PDT group and 14.2% of redlight alone group. Red light alone group had a gradual clinical improvement over time with a 77% response at week 10. In contrast, MAL-PDT group had a rapid clinical improvement with total response at week 10. Both treatments were significantly effective for improving acne lesions. However, MAL-PDT group had a greater response (P< 0.001). Histologically, decreased amounts of sebocytes and lipids along with atrophic sebaceous glands were observed after MAL-PDT.

We found that grade 0-I in group I at baseline, 2 weeks, 4 weeks and 8 weeks was 5%, 19%, 56% and 76% respectively. In group II was 23%, 51%, 72% and 100% respectively. Grade II- IV in group I at baseline, 2 weeks, 4 weeks and 8 weeks was 42%, 32%, 18% and 5% respectively. In group II was 37%, 25%, 3% and 0% respectively. Itoh et al[11]studied the effect of PDT in patients with acne.Three men and 10 women who suffered from intractable acne vulgaris were treated using PDT with topical delta-aminolaevulinic acid (ALA) and polychromatic visible light. Twenty per cent ALA in an oil-in-water emulsion was applied to the lesions for 4 h with a light-shielding dressing. The lesions were then exposed to polychromatic visible light at 600-700 nm using a halogen light source of energy intensity 17 mW cm-2 and a total energy dose of 13 J cm-2.All patients had apparent improvement of facial appearance and reduction of new acne lesions at 1, 3 and 6 months following PDT treatment. The adverse effects were discomfort, burning and stinging during irradiation, oedematous erythema for 3 days after PDT, epidermal exfoliation from the fourth to the 10th day, irritation and hypersensitivity to physical stimulation for 10 days after PDT, and pigmentation or erythema after epidermal exfoliation; the treated lesions returned to normal skin conditions within 1 month.PDT was beneficial in the treatment of acne. As a photoactivating light source, polychromatic visible light was thought to be better for use with acne patients than laser light because of its cost-effectiveness, uniform illumination and time-efficiency in treating large areas.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that both red light MAL-PDT and red light by itself have a considerable positive impact on both inflammatory and non-inflammatory lesions. However, compared to red light alone, red light MAL-PDT exhibits a higher reaction and a speedier start of activity.

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