RESEARCH
O&G Forum 2024; 34 – 3s: 2036-2041

THE OUTCOME OF TWO SESSIONS OF PRO YELLOW LASER (577 NM) IN POST ACNE ERYTHEMA IN DIFFERENT SKIN PHOTOTYPES

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Abstract

Background: Acne vulgaris is a common inflammatory disease of the pilosebaceous unit. Post-acne erythema (PAE) means persistent erythemato-telangiectatic rash after traditional acne therapy and is a well-known sequel of inflammatory acne in all skin photo types. Although many PAE rash subsides with time, patients unlike the longlasting PAE due to aesthetic concerns. More efforts were done to address acne scars than PAE, So there is a real demand for an effective solution. Aim of Study: To assess the outcome of two sessions of pro-yellow laser 577nm for treatment of post acne erythema in different skin photo types. Methodology: A prospective therapeutic trial, performed on thirty Iraqi patients with PAE, to assess their disease response to 577nm pro-yellow laser. According to the skin photo type, the most common work flounces used were (18-25 J/cm^2).The duration of pulse used was (40ms), spot size of 1 mm, we continued until the appearance of visible vasoconstriction was in all of patients. Patients underwent 2 sessions. Results: According to the results, patients were grouped into 4 categories; excellent response was seen in 16.6%, good response in 53.33%, and medium response in 30% according to the Quartile scale. Side effects were mild and reversible. Conclusions: Two sessions of pro yellow laser are promising modality in the treatment of post-acne erythema, even in dark skinned people.

Key Words: Post acne erythema, Acne vulgaris, Pro yellow laser, Two sessions, Dark skin.

Introduction

Acne vulgaris is frequently encountered dermatological disease seen in adolescents. Post-acne erythema and scarring may account for nearly 80% of patients with severe acne and can persist.[1] The term "post-acne erythema" (PAE) signifies erythematous and telangiectatic skin rash that continues after the treatment of acne and is a common sequel of inflammatory acne. Although many PAE rash may improve within weeks, patients are unhappy the way they appear if the PAE continues.[2] Treating post acne erythema is equally essential as treating the acne itself. Many topical products like 12% glycolic acid , 0.025% retinoic acid, 5% tranexamic acid, brimonidine tartrate and vitamin C formulations were tried in the treatment.[3]Lasers frequently implied to deal with vascular skin lesions. The targeted intravascular chromophores are oxyhemoglobin, deoxygenated hemoglobin, and methemoglobin. The peaks of absorption for oxyhemoglobin are 418, 542, and 577 nm .[4-6] Vascular laser targets intravascular oxyhemoglobin to induce damage of vascular walls. Famous lasers used to target abnormal vessels are the KTP (532 nm), krypton (568 nm), argon (488-514 nm), copper laser (578 nm), PDL (585-595 nm), and Nd:YAG (532 and 1064 nm).[7] A 577 nm pro-yellow laser was used in the treatment of retinopathy since 20 years, recently used in dermatology specially for the last 4 years.[3] It has specific wavelength for treating abnormal vessels.[8] All (100%) of the energy of pro-yellow laser is 577nm yellow light, which is ideal wavelength for the treatment of vascular lesions in comparison to copper bromide laser.[9] This pure yellow light in pro-yellow laser allows it to use in the treatment of vascular lesions especially in patients with dark skin with negligible chance of side effects.[8] It causes fading

of vascular lesions and reduction in erythema by photo thermal damage.[8,10] In this trial, the patients with post acne erythema(different skin photo types) were exposed to pro-yellow laser and the results were assessed. There are few trials in the literature elucidating the efficacy of pro-yellow laser in the treatment of post acne-erythema,especially-indark-skin.

Methodology:

This trial included 30 patients with PAE, who attended at dermatology clinic over two years (2022 - 2024). The diagnosis was done by a detailed history, and clinical assessment. Patients on other treatments, with connective tissue disease, local infections, pregnant, and photosensitivity were excluded. Biopsy was not needed. A written consent forms to participate and publish were recieved from all the participants and the trial was done in accordance with the ethical standards in the 2013 Helsinki Declaration.

Procedure:

After cleansing the patients face with tap water, topical anesthetic [EMLA] cream (2.5% lidocaine hydrochloride and 2.5% prilocaine [both wt/vol]; Sweden) was used on the lesions 20 minutes before the session. Disinfection with povidon iodine 4% solution. Proper safety measures were followed, like using protective eye glasses by the doctor and opaque goggles by the patient. All the patients were treated with two sessions (4 weeks interval) of 577 nm pro-yellow laser (Quadro Star PRO YELLOW Asclepion Laser Technologies, Germany) each session with a flounce of 18-25 J/cm2 in the expert mode of the machine according to skin photo type and patient tolerance. We mainly used pulse duration applied was (40ms). Also , 1 mm spot size , with ending point of visible vasoconstriction in all of participants. After the treatment, ice bags were applied to the treated area, then cold alhydran cream (100% aloe vera to reduce itching and redness) applied to the area immediately and the participants were informed to sun avoidance and use sunscreens regularly.

Patients assessment:

Photography was done before and 4 weeks after each session by (I phone pro max14) camera and assessed by two board certified dermatologists. A 4-item quartile scale applied to assess the response of erythema, as follows; 1 point: 1%- 25% mild response, 2 points: 26%-50% moderate response, 3 points: 51%- 75% good response, 4 points: 76% - 100% excellent response in erythema. When there were discrepancies between the readings of two dermatologists, a mean value was applied for the analyses. Any side effects that can happen, were recorded, and follow up for two months for recurrences or adverse effects was done.

Statistical assays:

Analyses was done by using simple statistics. Qualitative data were expressed as numbers and percentages. Pearson chi-square analysis were used

Results

The mean age of the patients was 24.6±6 years. The most frequent age (20-25). Females patients were the majority (63.33%) of patients. Skin Photo Types: About half of patients (50%) had skin type III, followed by type IV (36.66%), as illustrated in table (1).

Table 1: Numbers and percentages of patients skin photo types.

Skin type	No. of patients	Percentage
I	0	0%
II	2	6.66%
III	15	50%
IV	11	36.66%
V	2	6.66%
VI	0	0%
TOTAL	30	100%

Triggering factors: This trial found that all the patients (100%) had sun exposure as a provoking factor for PAE, one third were aggravated by heat exposure or stress (33.33%) for each. Spicy food in (26.66%) of patients.

As shown in table (2) results grouped in to 4 categories, excellent response was found in 5(16.66%), while good response in 16 (53.33%) Medium response in 9(30%) and Fair response in 0% according to Quartile formula.

Table 1. Clinical response categories and percentage.

Category	Response rate	No. of patients	Percentage
poor	Up to 25%	0	0%
Medium	25%-50%	9	30%
Good	50%-75%	16	53.33%
Excellent	Above 75%	5	16.66%

Figure 1. Two sessions of laser for a 20 years female. Before (left) & after (right)

Figure 2. Before (left) & after (right) two sessions of laser for a 25 years old female.

Figure 3. Before(left) and after (right) two sessions of laser for a 30 years female.

Figure 4. Before (left) and after (right) two sessions of laser for a 22 years old female

Figure 5. Before (left) and after (right) two sessions of laser for a 30 years male.

Adverse effects were minimal stinging or burning sensation during the procedure in seven patients. Also mild erythema and scaling recorded in five patients that resolved after 10 days. Two patients (skin photo type IV) developed mild hyperpigmentation that resolved after one month. A two months follow up was fortunately un eventful.

Discussion

Acne affects people at different ages , 80% of them are adolescents. Post acne erythema, scarring, or hyperpigmentation are expected sequel of severe inflammatory acne lesions. PAE can lead to great psychological impact on a person's quality of life by decreasing self-esteem and leading to some anxiety disorders. There is still no global agreement on the management of post acne erythema. Lasers and intense pulsed light have been used to treat post-acne erythema. Particularly in dark skin patients, it may cause dyspigmentation and scarring. Erythematous reaction is the most frequent side effect of this laser, which may persists for about 30 minutes after the procedure. However, the persistent erythema (more than one week)following pulse dye laser therapy may be so severe as to need a longer down time recovery.[11]

The technical fact that pro yellow laser is minimal consumable in contrast to other vascular lasers like pulsed dye laser and ND:YAG, make it a preferable choice. Beside the good safety profile and high affinity of its wavelength absorption by oxyheamoglobin leading to more precise effects. In contrast, Nd: YAG lasers contanin cooling system, and this increases their price and lead to a complex design. While pro yellow laser is cheaper, had shorter downtime and high safety profiles in patients who recently used systemic isotretinoin therapy than conventional vascular lasers.[8]

This trial used two laser sessions (one month interval), and it was found that PAE improved from good to excellent degree in nearly 70 % of patients after the second session. The parameters used in this trial were, spot size of 1 mm, a photo type-specific flounce of (18–25 J/cm^2), and a pulse duration of 40 ms. In spite of the

high doses, none of our participants suffered any long term adverse events.

A study by G-sarac et al., used similar parameters but continued to three sessions (a shorter pulse duration of 20-30 ms , similar spot size of 1.0 mm, lower flounce of 18 J/cm^2), in basic mode. The erythema and telangiectasia both significantly subsided at the end. About 52% of his patients had dramatic response. [11]

A significant improvement in erythema was seen on the treated lesions one month after first session compared to the baseline. But we noticed more satisfactory results after the second session. Another three sessions trial by Wanitphakdeedecha et al. achieved similar improvement in 75%, with a lower energy (12 - 15 J/cm^2).[3] Despite using higher flounce, none of the patients in the current study had serious side effects. Arzu A. et al. achieved a 100% rate of excellent and very good improvement for post-acne erythema, after three sessions. They found no significant link between the Fitzpatrick skin type and treatment success.[12]

A study with younger age of patients and nearly comparable female to male ratio to this study by Karaağaç O. using single session with irradiation of 22 J/cm^2 yellow laser for patients with Fitzpatrick skin types II and III.

Similar to this trial , these patients were not using any therapy for their acne at the time of the study. A bout 77% had good to excellent improvement.[13]Kapicioglu et al. reported 80-100% improvement in 40 patients with facial erythemas. In Kapıcıoğlu study, nasal involvement was more in men .In agreement to this study, and in addition, treatment success was lower in cases with nasal involvement.[8] Important findings: Possibility of achieving high 70% of good - excellent improvement with fewer sessions even in dark skinned patients. Minimal transient side effects may due to proper patient selection, careful technique and follow up.

Conclusions:

Two sessions of pro yellow laser are effective & safe for PAE. Proper patient selection , laser parameters, sun avoidance and regular use of sunscreens can improve the outcome of this laser. Proyellow laser could be considered as safe and effective even in dark skinned people. Since it is new modality in dermatology, one cannot predict long term sequel. But it is considered a low cost laser option that may be suitable to address other types of the erythema. Follow up is mandatory to look for recurrences and adverse events.

Authors declare no conflict of interest.

There was no financial support.

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