

Photodynamic therapy for conventional treatment resistant acne vulgaris

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Abstract Acne vulgaris is a common chronic inflammatory skin disease, typically affecting young adults and adolescents. Acne vulgaris can leave the patient with severe skin scarring and psychological effects. Photodynamic therapy (PDT) is an increasingly used therapeutic modality for various diseases in dermatology. In this study we used PDT to treat acne vulgaris, which developed resistance to conventional treatments.

A 25-years old female patient presented with facial acne vulgaris. The patient had received conventional treatments for the last 7 years, with no satisfactory outcome. The patients was treated with methyl aminolaevulinate based PDT in three sessions; the first two sessions were repeated at two weeks interval, while the third session was given at one month interval. After 3 months of treatment, the patient response to the treatment was assessed at 95%. The patient was followed up to 6 months and no recurrence has been observed. MAL-PDT has a rapid response, excellent cosmetic outcomes and significantly effective for improving acne lesions

Key words

Photodynamic, dermatology, photosensitizer, acne, methyl aminolaevulinate.

Introduction

Acne vulgaris is a chronic inflammatory condition which affects the pilosebaceous units of the human skin.¹⁻³ It consists of open comedones (blackheads), closed comedones (whiteheads) and inflammatory lesions such as nodules, pustules and papules⁴, resulting in significant skin scarring; such scarring at prominent positions of the patient's body (e.g., face, forehead, chin, nose, etc.) is considered to markedly compromise the personality of the patient, and essentially impose psychological burden. Specifically, it may cause discomfort, emotional stress, anxiety, and disfigurement,

ultimately affecting the physiological health and social life of the patient;^{8,9} in particular, this situation is exacerbated in younger patients, belonging to age group of 15-25 years.^{6,7}

The conventional treatment modalities for acne vulgaris may be classified in topical, systemic, complementary and alternative medicine (CAM), and physical treatments; each of these treatments has its own set of merits and demerits.^{8,9} In addition, photodynamic therapy (PDT) is a relatively novel, yet rapidly growing, therapeutic modality used in dermatology.¹⁰ Specifically, PDT has received FDA approval for actinic keratosis, basal cell carcinoma, superficial squamous cell carcinoma, and inflammatory skin diseases. The primary advantages of PDT, compared to other treatment modalities, include excellent cosmetic outcomes, brief treatment duration, non-invasiveness, simplicity and cost-effectiveness.

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Herein, we present a case of acne vulgaris treated with PDT. The patient received, and developed resistance to, conventional treatments, without any improvement. The patient has been treated with PDT, and upon regular follow up, demonstrated excellent cosmetic response.

Case report

A 25 years old female patient presented with complaints of ulcerated facial lesions, as shown in **Figure 1**. The lesions had been diagnosed as acne vulgaris and the patient suffered the disease for the last thirteen years. She had received conventional treatment for many years with no satisfactory outcome. She was planned to receive photodynamic therapy (PDT), the treatment protocols was approved by the local institutional base ethics committee of the Swat Institute of Nuclear Medicine, Oncology and Radiotherapy (SINOR). The patient was informed about the treatment procedures and written signed consent was obtained from the patient. All information about the patient's, treatment history, size (diameter) of the lesions and lesions photographs were recorded.

To perform PDT, the lesions were cleaned and scrubbed, followed by local topical application of the photosensitizer cream (i.e., methylaminolevulinate; MAL) on the lesions. After an incubation period of 3 hours, the cream was removed and the lesion was washed with normal saline. The lesions were irradiated with red laser light of 635nm wavelength and light energy dose of 75 J/cm² was delivered. The light exposure time was set as per the institutional protocol. All the safety measures were insured, the patient's eyes were covered properly to avoid any unnecessary light exposure. The patient received three sessions of PDT; the first two sessions were repeated at two weeks interval, while the third session was given at one

month interval. The clinical features of the patient, lesion characteristics and PDT protocol used have been summarized in **Table 1**. The response of the PDT was evaluated through clinical examination, and evaluation of inflammation was assessed by erythema and swelling and size of the lesion. **Figure 1b-c** shows the progressive improvement of the patient. Currently, the patient is on regular follow up and remained almost (i.e. 95%) disease free after the treatment. Moreover, no complications has been observed.

Discussion

Acne vulgaris is a common inflammatory skin disease, most commonly affecting the face, chest, upper back and upper arms. These body regions are known to have a high density of sebaceous glands, which may have a role in progression of the disease.¹¹ The conventional treatments for acne, such as topical therapies, systemic therapies, CAM and physical treatments, have illustrated limited success in producing complete response rates. Moreover, the said treatments also exhibit potential systemic toxicities. It has also been observed that acne vulgaris is developing resistance towards the available antibiotics. There is need of new treatment modality.¹²⁻¹⁴

Photodynamic therapy (PDT) may offer an improved alternate treatment for acne vulgaris¹⁵, potentially countering the shortcomings of the prevailing treatment, as it allows for lower treatment costs, no or limited profile of side effects and higher treatment efficacy. Specifically, skin lesions like acne and cutaneous leishmaniasis have been shown to exhibit complete response in just 3-4 treatment sessions of PDT. Moreover, PDT has no risk of systemic toxicity and offers better option to heal rapidly disseminated lesions in short span of time.

Table 1 Summary of clinical features of the patient with acne vulgaris, lesion characteristics and PDT

<i>Clinical Features</i>		<i>Lesion Characteristics</i>		<i>PDT Treatment</i>	
Age	25 years	Site	Face	Photosensitizer	MAL*
Gender	Female	Average size	7 cm on either side	Laser wavelength	635 nm
Previous Treatment	Conventional treatments	Ulceration	Present	Light dose	75 J/cm ²
Treatment outcome	No response	Disfigurement	Present	No. of sessions	03

* MAL: Methylaminolevulinate



Figure 1 Sample white light photos summarizing the progress of PDT treatment of the Acne vulgaris lesion. Multiple chronic disfiguring ulcerated lesion on the face (a), express significant improvement after first session (b) and after third session of PDT complete response with excellent cosmetic results was observed (c)

However mild burning sensation is observed during the application of laser light but it can be tolerated and managed.

In this study, we have successfully treated a case of facial acne vulgaris in Peshawar which did not respond to the conventional treatment for prolonged duration. PDT not only reduced the treatment time significantly but also the patient ease and satisfaction for PDT was markedly high. Photodynamic therapy treatment offered excellent cosmetic outcome without any

considerable side effect. Consequent upon the encouraging results from the treatment of acne vulgaris case, we have planned to conduct a comparative study of acne patients treated with photodynamic therapy and conventional treatments.

Conclusion

We presented the first successful treatment of acne vulgaris with photodynamic therapy (PDT) from SINOR, Pakistan. Three sessions of PDT

were given and the patient was followed up to 6 months and no recurrence has been observed. PDT is best option to treat acne vulgaris, as it offers promising results with excellent cosmetic outcomes and no side effects. Moreover, in PDT the treatment time and cost reduced significantly

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