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Original Research Article

Intense Pulsed Light as Monotherapy in the Management of Acne

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Abstract:

Introduction: Acne vulgaris is an exceedingly common chronic disease of the pilosebaceous unit, affecting approximately 40 million adolescents and 25 million adults. Additionally to the potential for long-term scarring and disfigurement, acne vulgaris carries a significant psychosocial morbidity including social withdrawal, clinical depressive disorder, and suicide.

Aims: To determine the role of Intense Pulsed Light in the treatment of all grades of acne.

Materials & Methods: The present study was an Interventional study. This Study was conducted from One year at Department of Dermatology in a tertiary care hospital. Total 81 patients were included in this study.

Result: In this study, the most commonly reported side effect was erythema, observed in 13 patients (16.05%), and followed by itching in 5 patients (6.17%) and burning sensation in 3 patients (3.70%). The side effects were generally mild and manageable, indicating a favourable safety profile for the treatment used.

Conclusion: We concluded that, intense Pulsed Light (IPL) therapy, used as monotherapy in this study, proved to be an effective and well-tolerated treatment modality for acne. A significant reduction in lesion count was observed over successive sessions, with the majority of patients showing good to excellent clinical improvement.

Keywords: Intense Pulsed Light (IPL), Acne Vulgaris, Monotherapy and Non-invasive Therapy.

Introduction

Acne vulgaris is an exceedingly common chronic disease of the pilosebaceous unit, affecting approximately 40 million adolescents and 25 million adults. [1] Additionally to the potential for long-term scarring and disfigurement, acne vulgaris carries a significant psychosocial morbidity including social withdrawal, clinical depressive disorder, and suicide. [2] Acne is conventionally treated with topical and oral medications such as antibacterials and retinoids. While these therapies provide adequate control for several patients, they often have drawbacks involving side effect profile, length of medical treatment and patient compliance. [3].

Acne is among the most prevalent skin disorder and the most common cause for visit to a dermatologist. Acne is considered "Stigma of Adolescence", causing significant psychological, social and emotional distress along with a self-perception of poor health. [4]. The pathogenesis of acne is complex and a multifactorial process. The main factors in the pathogenesis of acne include; increased sebaceous secretion production, hypercornification of pilosebaceous duct, abnormality of the microbial flora, especially colonization of the ducts with Propionibacterium acnes and inflammation. [5].

The current therapies that are available for treatment of acne are mainly targeted towards multiple factors contributing to the pathogenesis of acne. We are in an era where dermatologists use novel treatment modalities like chemical peeling, laser and light therapies, photodynamic therapy, etc. to overcome antibiotic resistance, reduce adverse effects seen more commonly with conventional treatment of acne like antibiotics and retinoids. Light-based therapies are a good alternative for treatment of acne vulgaris because they potentially offer more rapid onset and better patient compliance with a low incidence of adverse events. However, the optimal treatment methods and the relative efficacy of these light-based therapies as compared to traditional methods of therapy for acne remain unclear. Various light- related technologies have been evaluated in

the treatment of acne vulgaris. These techniques give result in a shorter time and are independent of patient compliance. Light-based acne therapies act via reducing P. acnes proliferation or by targeting the sebaceous gland to decrease the production of sebaceous secretion; however, other mechanisms may also exist. [6] The trials of intense pulsed light on acne vulgaris have been small and conflicting, till date. Hence, it is worthwhile to study the efficacy of intense pulsed light in acne vulgaris. To determine the role of Intense Pulsed Light in the treatment of all grades of acne. To determine the role of Intense Pulsed Light in the treatment of all grades of acne.

Materials and Methods

Study Area: Department of Dermatology in a tertiary care hospital

Study Population: Healthy volunteers attending the Dermatology outpatient department.

Study Design: Interventional study

Sample size: 100

Inclusion Criteria

1. Atleast 5 lesions of acne on every side of face.
2. Age- >18 to <35 years
3. Able and willing to complete informed consent process with understanding of the purpose and procedures of the study
4. If female is of childbearing potential she must have a negative urine pregnancy test result within 24 hrs of the scheduled procedure; (a woman who has not undergone permanent sterilization procedure and has had 4 menstrual periods in last 12 months is considered as 'female of child bearing potential'.

Exclusion Criteria

1. Use of oral retinoids prior to the study.
2. History of keloid, vitiligo, consumption of drugs that exacerbate or remit acne.
3. History of skin cancer, photosensitivity disorders.
4. History of poor wound healing such as diabetes mellitus
5. Pregnant / lactating women.
6. All patients not willing to participate in the study.

Statistical Analysis

The data were entered into Microsoft Excel and analyzed using SPSS (version 27.0) and GraphPad Prism (version 5). Numerical variables were summarized using means and standard deviations, while categorical variables were described with counts and percentages. Two-sample t-tests and paired t-tests were used to compare means between independent or paired groups. Chi-square tests (χ^2) and Fisher's exact test were applied for comparisons of proportions. Statistical significance was set at a p-value ≤ 0.05, indicating rejection of the null hypothesis in favor of the alternative hypothesis.

Result

Table 1: Demographic and Baseline Characteristics of Patients

Characteristic		Value (n = 100)	P-value
Age (mean ± SD)		23.4 ± 4.2 years	
Gender (Male/Female)		45/55	.15854
Acne Type	Comedonal	40 (40%)	.02382
	Inflammatory	35 (35%)	
	Mixed (both types)	25 (25%)	
Acne Severity	Mild	20 (20%)	<0.0001
	Moderate	60 (60%)	
	Severe	20 (20%)	

Table 2: Pre-treatment vs Post-treatment Acne Lesion Count

Lesion Type	Pre-treatment (mean ± SD)	Post-treatment (mean ± SD)	p-value
Comedones	34.5 ± 8.1	12.4 ± 4.2	< 0.001
Inflammatory Lesions	28.2 ± 7.4	9.3 ± 3.7	< 0.001
Total Lesion Count	62.7 ± 12.5	21.7 ± 6.9	< 0.001

Table 3: Improvement in Acne Severity Scores

Acne Severity	Pre-treatment (mean ± SD)	Post-treatment (mean ± SD)	p-value
Mild	2.2 ± 0.4	1.1 ± 0.2	< 0.05
Moderate	3.7 ± 0.6	2.1 ± 0.5	< 0.001
Severe	4.9 ± 0.8	3.0 ± 0.9	< 0.001

Table 4: Patient Satisfaction Post-treatment

Satisfaction Level	Number of Patients (n = 100)	Percentage (%)	p-value
Highly Satisfied	55	55%	< 0.05
Satisfied	35	35%	
Neutral	5	5%	
Dissatisfied	5	5%	

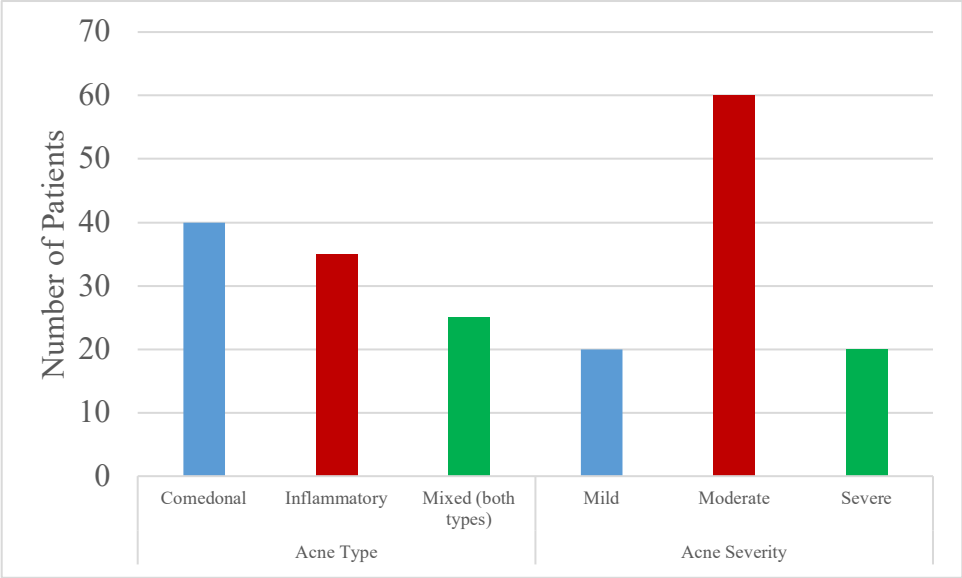

Figure 1: Acne Type and Severity Classification

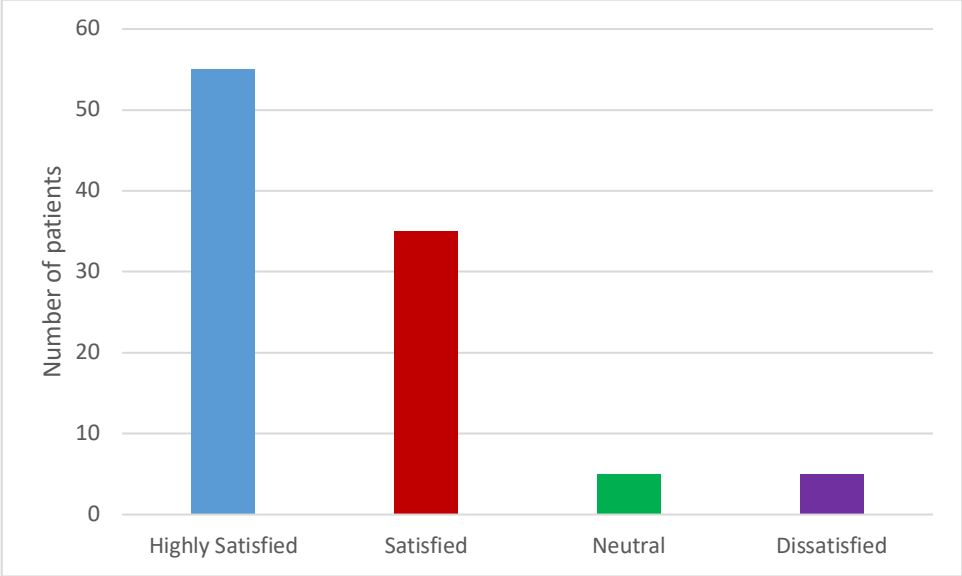

Figure 2: Satisfaction Post-treatment

A total of 100 patients were included in the study with a mean age of 23.4 ± 4.2 years. The gender distribution comprised 45 males and 55 females, with no statistically significant difference (P = 0.15854). The predominant type of acne was comedonal, observed in 40% of patients, followed by inflammatory (35%) and mixed types (25%). The distribution of acne types showed a statistically significant difference (P = .02382). Regarding acne severity, the majority of patients (60%) had moderate acne, while 20% each had mild and severe acne. The distribution of severity was statistically significant (P < 0.0001). A significant reduction in acne lesion counts was observed following treatment. The mean number of comedones decreased from 34.5 ± 8.1 at baseline to 12.4 ± 4.2 post-treatment (P < 0.001). Similarly, inflammatory lesions were reduced from a pre-treatment mean of 28.2 ± 7.4 to 9.3 ± 3.7 after treatment (P < 0.001). The total lesion count showed a marked decrease from 62.7 ± 12.5 to 21.7 ± 6.9, which was also statistically significant (P < 0.001).

There was a statistically significant improvement in acne severity scores across all severity categories following treatment. Among patients with mild acne, the mean severity score decreased from 2.2 ± 0.4 to 1.1 ± 0.2 ($P < 0.05$). In the moderate group, scores reduced significantly from 3.7 ± 0.6 to 2.1 ± 0.5 ($P < 0.001$). Patients with severe acne showed the most pronounced reduction, with mean scores decreasing from 4.9 ± 0.8 to 3.0 ± 0.9 ($P < 0.001$).

Patient-reported satisfaction following treatment was generally high. A majority of patients (55%) reported being highly satisfied with the treatment outcomes, while 35% were satisfied. A smaller proportion of patients were neutral (5%) or dissatisfied (5%) with the results. The overall distribution of satisfaction levels was statistically significant ($P < 0.05$), indicating that the treatment was well-received and perceived as effective by most patients.

Discussion

This study evaluated the clinical profile of acne patients and the efficacy of a specific treatment modality in reducing lesion counts and improving acne severity. The mean age of the participants was 23.4 years, reflecting the typical age group affected by acne vulgaris, consistent with previous epidemiological studies highlighting adolescence and early adulthood as peak periods for acne incidence [7].

Gender distribution in our study showed a slight female predominance (55%), though the difference was not statistically significant. This trend aligns with observations by Bhate and Williams [8], who noted that while acne affects both genders, females are more likely to seek treatment, possibly accounting for their higher representation in clinical studies. The predominant acne type was comedonal (40%), followed by inflammatory (35%) and mixed (25%). This distribution is comparable to findings by Tan et al. [9], who reported comedonal acne as the most common subtype in early-onset cases. The significant difference in acne type distribution ($P = .02382$) emphasizes the importance of tailored treatment strategies based on lesion morphology.

In terms of acne severity, moderate acne was the most frequent presentation (60%), with mild and severe forms constituting 20% each. These findings are similar to a multicenter study by Doshi et al. [10], which also identified moderate acne as the most common severity category among treatment-seeking individuals. The statistically significant distribution of severity ($P < 0.0001$) highlights the need for stratified analysis in treatment outcomes.

The treatment administered in this study resulted in a significant reduction in both comedonal and inflammatory lesion counts, as well as total lesion count. These findings are in agreement with a study by Thiboutot et al. [11], which demonstrated that combination therapy targeting multiple pathogenic factors leads to substantial lesion reduction. The comedone count decreased from 34.5 ± 8.1 to 12.4 ± 4.2 ($P < 0.001$), and inflammatory lesions reduced from 28.2 ± 7.4 to 9.3 ± 3.7 ($P < 0.001$), indicating broad-spectrum efficacy.

Acne severity scores also improved significantly across all baseline severity groups. Patients with severe acne showed the most marked improvement, echoing results from studies by Zaenglein et al. [12], who observed that even severe acne responds well to appropriate pharmacological regimens. The reductions in severity scores affirm the clinical relevance of the intervention across all patient categories.

Patient satisfaction was notably high, with 90% of participants expressing satisfaction or high satisfaction with treatment outcomes. This is consistent with previous research emphasizing the psychological and quality-of-life benefits associated with successful acne therapy [13]. The statistically significant satisfaction distribution ($P < 0.05$) underscores the perceived effectiveness of the treatment, which is crucial for adherence and long-term success. Overall, the study demonstrates that targeted treatment can significantly reduce lesion counts, improve clinical severity, and enhance patient satisfaction in acne management. Limitations include the lack of a control group and the short follow-up period. Future studies should consider randomized controlled designs and longer follow-up durations to assess recurrence and long-term outcomes.

Conclusion

We concluded that, intense Pulsed Light (IPL) therapy, used as monotherapy in this study, proved to be an effective and well-tolerated treatment modality for acne.

A significant reduction in lesion count was observed over successive sessions, with the majority of patients showing good to excellent clinical improvement. The treatment was associated with minimal side effects, primarily mild erythema and itching, indicating a favorable safety profile. These results suggest that IPL can serve as a non-invasive, safe, and efficacious option in the management of acne, particularly for patients who are non-responsive or intolerant to conventional therapies. Further studies are recommended for long-term evaluation.

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