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Impact of intense pulse light on quality of life in patients with erythematotelangiectatic rosacea

Eritematöz telenjiektazik rozasede yoğun atımlı ışık tedavisinin yaşam kalitesine etkisi

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Abstract

Background and Design: It has been shown that acne rosacea (AR) seriously affects quality of life (QoL). Various options are available for the treatment of AR. There are many studies in the literature demonstrating that QoL of patients have improved after these treatments. Positive outcomes have been attained with intense pulsed light (IPL) in the treatment of AR and erythematotelangiectatic rosacea (ETR) in particular. However, although there are studies in the literature showing the effectiveness of IPL in ETR, no studies have been conducted at either international or national level showing to what extent it has positive impact on QoL.

Materials and Methods: Our goal in this study was to reveal to what extent IPL affects QoL positively. To this end, 30 patients who were diagnosed with ETR and met the inclusion criteria were included in the study. In this open-label, prospective, uncontrolled cohort study, visual analog scale (VAS), Physician's Global Assessment (PGA), Dermatology Life Quality Index (DLQI) and 36-Item Short Form Health Survey (SF-36) were administered before and after the IPL therapy, which was planned to be administered to the patients once in four weeks in a total of three sessions.

Results: The data collected before the first session and after the last session were evaluated with the SPSS statistics software and statistically significant p values were obtained. The difference in VAS score between before and after treatment was -3.13±1.46 ($p<0.01$), -1.6±0.6 in PGA ($p<0.01$), and -11.63±3.13 in DLQI ($p<0.01$). The SF-36 was assessed in 8 subscales; physical functioning (PF), role-physical (RP), social functioning (SF), role-emotional (RE), bodily pain (BP), vitality (VT), mental health (MH), and general health (GH). The statistical analysis of the SF-36 showed that the difference was 35±16.24 in SF ($p<0.01$), 61±20 in RE ($p<0.01$), 8±16.9 in VT ($p<0.05$), 38±11.03 in MH ($p<0.01$), and 47.03±12.74 in GH ($p<0.01$). A comparison of the data obtained during the first and last visits revealed that there was a decrease of 3.13 points in VAS, 1.6 points in PGA, and 11.63 points in DLQI. Statistically significant improvements were found in the scores of SF, RE, VT, MH, and GH subscales of the SF-36.

Conclusion: The results of this study revealed that IPL was an effective method in the treatment of ETR. Marked reductions were seen in the clinical symptoms after the IPL therapy as evidenced by the VAS and PGA scores. Patient satisfaction was also evidenced by the DLQI and SF-36.

Keywords: Erythematotelangiectatic rosacea, intense pulse light, Dermatology Life Quality Index, visual analog scale, Physician's Global Assessment Scale, Short Form-36

Öz

Amaç: Yapılan çalışmalar göstermiştir ki, akne rozase (AR) hastalığı yaşam kalitesini (YK) ciddi bir şekilde etkilemektedir. AR tedavisinde farklı seçenekleri mevcuttur. Bu tedaviler sonrası hastaların YK'de iyileşme saptandığına dair literatürde birçok çalışma mevcuttur. Yoğun atılımlı ışıkla [intense pulse light (IPL)] AR'nin özellikle eritematöz telenjiektazik rozasenin (ETR) tedavisinde olumlu sonuçlar elde edilmiştir. Fakat, literatürde IPL'nin ETR'de etkinliğini gösteren çalışmalar olsa da, YK'yi ne kadar olumlu etkilediğine dair çalışmalar ne uluslararası, ne de ulusal düzeyde yapılmıştır.

Gereç ve Yöntem: Bu çalışmada amacımız IPL'nin YK'yi ne kadar olumlu etkilediğini belirlemektir. Bu amaçla, çalışamaya ETR tanısı almış ve alınma kriterlerini karşılayan 30 hasta dahil edilmiştir. Açık-kontrolsüz, prospektif ve kohort bir çalışmada 4 haftada bir olmakla toplam 3 seans IPL tedavisi planlanan hastalara, hem IPL öncesi, hem de IPL tedavisi bitiminden sonra vizüel analog skalası (VAS), Doktor Global Değerlendirme Skalası (DGDS), Dermatolojik Yaşam Kalitesi İndeksi (DYKİ) formu ve Kısa Form-36 (KF-36) ölçeklerinin doldurulması planlandı.

Bulgular: İlk seansta ve son seanstaki elde edilen veriler SPSS programı ile değerlendirilmiştir ve istatistiksel anlamlı p değerleri elde edilmiştir. VAS farkı -3,13±1,46 ($p<0,01$), DGDS farkı -1,6±0,6 ($p<0,01$), DYKİ farkı ise -11,63±3,13 ($p<0,01$) olmuştur. KF-36 formu ise 8 bölümde: Fiziksel

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fonksiyonellik (FF), fiziksel rol kısıtlılığı (FRK), sosyal fonksiyonellik (SF), duygusal rol (DR), bedensel ağrı, canlılık (CA), genel ruh sağlığı (GRS) ve genel sağlık (GS) incelenmiştir. KF-36 formunun istatiksel değerlendirilmesi zamanı, SF farkı 35±16,24 (p<0,01), DR farkı 61±20 (p<0,01), CA farkı 8±16,9 (p<0,05), GRS farkı 38±11,03 (p<0,01), GS farkı ise 47,03±12,74 (p<0,01) olmuştur. İlk ve son vizitlerdeki elde edilen verileri karşılaştırdığımız zaman, VAS'ta 3,13, DGDS'de 1,6, DYKİ'de ise 11,63 birim gerileme görülmüştür. KF-36 formunun SF, DR, CA, GRS ve GS bölümlerinde istatiksel anlamlı iyileşme saptanmıştır.

Sonuç: Bu çalışmanın sonucunda, IPL'nin ETR tedavisinde etkin bir yöntem olduğu saptanmıştır.VAS ve DGDS ölçekleri ile IPL tedavisi sonrası klinik belirtilerde belirgin gerileme görülmüştür. Aynı zamanda hasta memnuniyeti, DYKİ ve KF-36 formları ile ortaya konulmuştur.

Anahtar Kelimeler: Eritematöz telenjiektazik rozase, yoğun atılımlı ışık, Dermatolojik Yaşam Kalitesi İndeksi, vizüel analog skalası, Doktor Global Değerlendirme Skalası, Kısa Form-36

Introduction

Acne rosacea (AR) is a chronic disease of the facial skin and it is associated with severe psychoemotional complications. Clinical studies showing that AR affects quality of life (QoL) have been made at both international and national levels[1]. So far, five clinical studies have been conducted to demonstrate the negative impacts of AR on QoL[2]. The Rosacea Quality of Life Index, 36-Item Short Form Health Survey (SF-36) and Dermatology Life Quality Index (DLQI) were used in those studies to assess QoL[3-7]. There are also studies in the literature showing that noticeable improvement occurs in the QoL of AR patients after topical and systemic treatments. There are 11 clinical studies in the literature showing improvement in QoL after AR treatments. Three of these studies assessed QoL using DLQI before and after a pulsed dye laser (PDL) therapy and a significant decrease was seen in DLQI scores[8-10]. Papageorgiou et al.[11] have demonstrated the effectiveness of the intense pulsed light (IPL) in the treatment of erythematous telangiectatic rosacea (ETR) by using photographs, spectroscopy and the visual analog scale (VAS). Using the photographing method, erythema was found to reduce by 46% (p<0.001) and talengiectasia by 55% (p<0.001) and a 3.5-point (p<0.001) improvement was seen in the 10-point VAS. The VAS values obtained by the patient and the physician were almost equal. However, that study did not use DLQI or SF-36 and how much QoL of patients improved was not explored. QoL was also not assessed in other studies showing the efficacy of the IPL and PDL therapies in ETR patients[12-37]. In fact, no international or national clinical studies have been conducted to reveal the effect of IPL on the QoL in patients with rosacea. There are no studies in the national journals on the effect of IPL on DQoL in rosacea patients. The present study aimed at showing the effect of IPL on QoL in 30 ETR patients with the help of DLQI and SF-36.

Materials and Methods

The study were approved by the Ege University Faculty of Medicine of Local Ethics Committee (protocol number: B.30.2.EGE.0.20.05.00/OY/1749/805).

In this open-labeled, uncontrolled, prospective, cohort study, we included 30 patients aged between 18 and 65 who were diagnosed with ETR in the Department of Dermatovenereology outpatient clinic at Ege University Medical School. The study was reviewed and approved by the ethics committee. The subjects were selected according to the inclusion and exclusion criteria. Those who used photosensitive drugs such as doxycycline and oral retinoid, those who were pregnant or lactating, those who had diseases induced by light such as lupus and solar urticaria, those with recurrent herpes infection and those who received rosacea treatment in the past month were excluded from the study. After signing informed consent form, 30 patients were enrolled in treatment in the Cosmetology Unit of the Department of Dermatovenereology at Ege University Medical School. The sessions were planned to take place once in four weeks. The IPL device used in the study (A&M technology, L900 France) had 620-1000 nm wavelength with fluence values ranging between 4 and 14 mj/cm^2 and a spot area of 2 cm^2. The patient and the physician who administered the procedure wore special glasses in every session to protect from the IPL. Cold compress was applied immediately after the procedure to ease the burning and erythema, the early side effects of IPL. Following a total of 3 sessions of IPL therapy, the effect of IPL on the QoL of the rosacea patients was assessed. To do this, a Physician's Global Assessment (PGA) form was completed by each physician participating in the study to determine the severity of ETR before the first session of the IPL therapy. The patients completed DLQI, VAS to measure the severity of symptoms such as burning and stinging, and the SF-36. The same forms were completed once more at the end of the 3rd session (12 weeks later). Finally, the possible changes in the QoL of the ETR patients after the 3-session IPL therapy were assessed statistically.

The Scales

Visual Analog Scale

VAS is used to convert some values, which cannot be numerically measured, into numerical values. The two extreme descriptions of the parameter to be assessed is written at the two ends of a 100 mm line and the patient is asked to draw a line or make a dot or mark the place on this line that suits his/her condition. For example, for pain, no pain is written at one end and very severe pain at the other end and the patient marks his/her current condition on this line. The length of the distance from the place where no pain is written to the place marked by the patient shows the patient's pain. In this study, we put 'no pain' at the "0" end of the VAS and 'pain, burning and stinging' at the "10" end and the patients marked their ETR-related symptoms during their first and last visits.

Physician's Global Assessment

PGA is a rating method used by the physician to show the severity of a disease of the patient. In this study, the severity of ETR was assessed in 5 ratings. The lowest rating was accepted to be "0" and the highest "4". The ratings were:

Scale 1. Physician's Global Assessment Scale

Score	Rating	Meaning
0	Clear	No symptoms
1	Mild	Mild erythema. Very rare burning/stinging
2	Moderate	Moderate erythema. Moderate burning/stinging
3	Severe	Severe erythema. Severe burning/stinging
4	Very severe	Very severe erythema. Very severe burning/stinging

0- No symptoms,
1- Mild,
2- Moderate,
3- Severe, and
4- Very severe (Scale 1).

Dermatology Life Quality Index

DLQI is one of the most widely used QoL questionnaires in dermatology. The original of this questionnaire is in English and its validity in Turkish has been demonstrated by Öztürkcan et al.[38]. The questionnaire can be administered to patients older than 16 years. DLQI consists of a total of 10 questions with four possible responses under the subtitles of symptoms and patient feelings, daily activities, leisure activities, school/work life, personal relationships, and treatment[39]. Each question can get at least 0 and at most 3 scores and the total maximum score is 30 and minimum 0. Higher scores are directly associated with impaired QoL. This questionnaire was first designed by Professor Dr. Finlay[40].

36-Item Short Form Health Survey

SF-36 was developed and presented for use by Rand Corporation for the purpose of assessing QoL[41-43]. It was translated into Turkish and its validity and reliability study was completed by Kocyigit et al.[44] in 1999. The study to identify the standards for Turkish people was made by Demiral et al.[45]. It is a self-report scale with generic criteria. It consists of 36 items enabling the measurement of 8 domains; physical functioning (PF), physical role limitations (RP), social functioning (SF), role functioning/emotional (RE), bodily pain (BP), vitality (VT), general mental health (MH), and general health (GH). The score interval is from 0 (lowest) to 100 (highest) and higher scores indicate better QoL. All domains are scored independently. The scores in the SF-36 are classified for each category as; 87-100 "excellent", 75.5-86.9 "very good", 56-75.4 "good", 30.6-55.9 "poor", and 0-30.5 "very poor". There appears no QoL score as a general total (Scale 2)[41-43].

Results

The data were analyzed using the SPSS statistics software. The demographic data included age, gender, occupation, marital status, comorbidity, drugs used, skin type, and ETR-related risk factors (Table 1, 2). From the patients taking part in the study, 14 (46.7%) were male and 16 (53.3%) female. The mean age was 36.3±11.06 years (22-65). The mean duration of the disease was 4.36±3.71 years (range: 1-14 years). The marital status was married in 19 (63.3%) patients. No comorbidity was found in 21 (70%) patients. There were diseases not related to ETR in only 9 (30%) patients. As comorbidities, 3 patients had hypertension (HT), 2 patients - type 2 diabetes mellitus, 1-chronic obstructive pulmonary disease, 1-Hashimoto's thyroiditis, 1-stasis dermatitis, and 1 patient had irritant contact dermatitis. From these 9 patients with comorbidities, 7 used the drugs captopril, enalopril,

Scale 2. Subscales of 36-Item Short Form Health Survey and questions relating to each subscale

SF-36 subscales	Number of questions	Questions
1. Physical functioning	10	3, 4, 5, 6, 7, 8, 9, 10, 11, 12
2. Role-physical	4	13, 14, 15, 16
3. Social functioning	2	20, 32
4. Role-emotional	3	17, 18, 19
5. Bodily pain	2	21, 22
6. Vitality	4	23, 27, 29, 31
7. General mental health	5	24, 25, 26, 28, 30
8. General health	5	1, 33, 34, 35, 36

SF-36: 36-Item Short Form Health Survey

Table 1. Statistics of demographic data

Demographic data		Number n (%)
Age (36.3±11.06)		
Gender		
Male		14 (46.7)
Female		16 (53.3)
Occupation		
Outdoor		13 (43.3)
Indoor		17 (56.7)
Marital status		
Married		19 (63.3)
Single		8 (26.7)
Other		3 (10)
Skin type		
1		7 (23.3)
2		10 (33.3)
3		6 (20)
4		7 (23.3)
Duration of disease (4.36±3.71)		
Comorbidities		
Yes	HT	21 (70)
No	DM	9 (30)
	Hashimoto's thyroiditis	
	COPD	
	Stasis dermatitis	
	Irritant contact dermatitis	
Drugs used		
Yes	Captopril	
No	Enalopril	23 (76.7)
	Metformin	7 (23.3)
	Emollient	

HT: Hypertension, DM: Diabetes mellitus, COPD: Chronic obstructive pulmonary disease

Table 2. Statistics of related risk factors

Related risk factor	Number n (%)
Sun	19 (63.3)
Warm environment	7 (23.3)
Hot beverages	6 (20)
Cold-wind	4 (13.3)
Spices	6 (20)
Alcohol	3 (10)
Stress	9 (30)
Menopause	1 (3.3)

metformin, or emollient. In their occupational anamnesis, 17 (56.7%) were found to work indoors and 13 (43.4%) outdoors. The most frequent triggering factor that exacerbated ETR was the sun. Out of 30 patients, 19 (63.3%) rated the sun as the primary triggering factor and 7 (23.3%), the warm environment. Cold and wind were reported as triggering factors by only 4 (13.3%) patients. The ETR activation was found to be associated with spices in 6 (20%) subjects. Alcohol was found to trigger ETR in 3 (10%) patients. Stress exacerbated ETR in 9 (30%) patients. Menopause was found only in one female patient and flashing was thought to be the trigger for ETR. Since patients using calcium channel blockers were not included in this study, it was not recorded as a relevant risk factor. This study included patients with skin types 1-4. The majority of those included in the study were assessed to have skin type 2[10]. The skin type was assessed to be 1 and 4 in 14 patients and 3 in 6 patients. The differences in the scores of the scales between the first visit and the last visit were evaluated with the Wilcoxon signed-rank test (Table 3). VAS showed a difference of -3.13±1.46, PGA -1.6±0.6, and DLQI -11.63±3.13 on the average and this was found to be statistically significant (p<0.01). The SF-36 form was assessed in 8 subscales; PF, RP, SF, RE,BP, VT, MH, and GH. No statistically significant improvements were seen in the PF, RP, and BP subscales. However, statistically significant improvements were found in the SF, RE, VT, MH and GH subscales (p<0.01). The mean difference was calculated to be 35±16.24 in SF, 61±20 in RE, 38±11.03 in MH, and 47.03±12.74 in GH. When the improvements in the scales are assessed with respect to genders using the Mann-Whitney U test, more improvement was seen in females in the VAS, PGA and SF-36, whereas more reduction was seen in males in DLQI. However, these values were not statistically significant (p>0.05). The improvement in the scales in patients with comorbidities was lower compared to those with no comorbidities. Although such difference was not statistically significant, the GH part of the SF-36 was significant (p<0.05). When we compared the degree of improvement in occupational scales, we found that the reduction turned out more in the patients working indoors and gained statistical significance (p<0.05).

The improvements in the VAS, PGA, DLQI and SF-36 scores were paradoxically higher in patients who reported that the sun was the triggering factor for exacerbation of ETR. When we correlated the skin types with the reduction rates in the scales using the Kruskal-Wallis test, we found that the improvement was more in light-skinned patients (1-2) than in those with darker skins (3-4). However, a statistically significant improvement was observed in PGA, DLQI and only the RE part of SF-36 (p<0.05). When we compared the duration of disease to the scale scores, we found that the improvement in the scores was statistically significantly less in those with longer duration of disease and more in those with shorter duration of disease (p<0.05).

Table 3. Changes in scales

Scales	Difference	p value
VAS	-3.13±1.46	p<0.01
PGA	-1.6±0.6	p<0.01
DLQI	-11.63±3.13	p<0.01
PF	2.5±13.5	p=0.197
RP	4±23.7	p=0.157
SF	35±16.24	p<0.01
RE	61±20	p<0.01
BP	2±25.51	p=0.854
VT	8±16.9	p<0.05
MH	38±11.03	p<0.01
GH	47.03±12.74	p<0.01

VAS: Visual analog scale, PGA: Physician's Global Assessment, DLQI: Dermatology Life Quality Index, PF: Physical functioning, RP: Role-physical, SF: Social functioning, RE: Role-emotional, BP: Bodily pain, VT: Vitality, MH: Mental health, GH: General health

Discussion

As a result of the statistical analysis of the data obtained from this study, statistically significant p values were identified. A statistically significant difference was found in the VAS, PGA, DLQI, and SF-36 between values at baseline and after the IPL therapy. An average of 3.13 points of improvement was found in VAS, which was the scale for post-IPL therapy symptoms. The highest score given by the patients in VAS was 10 and the lowest 5 at the first visit. No increase in the VAS values, i.e. no worsening, was seen after the IPL therapy in any of the patients. In only one patient, there was no difference in the VAS values between the first and the last visits. The PGA also showed no improvement in this patient. Although an improvement was found in the DLQI and SF-36 scores, it was not considered statistically significant. In brief, only one patient showed no improvement when we assessed the patients with VAS. The remaining patients had statistically significant improvements when assessed with VAS.

The severity of ETR was measured with PGA by a physician at the first and last visits and a mean reduction of 1.6 points was found. The highest score given to the patients was 4 and the lowest 2 at the first visit. No worsening was found in any of the patients who were assessed with PGA after the IPL therapy. There was no difference in the severity of ETR in 3 patients during their post-IPL therapy assessments. There were statistically significant reductions in the severity scores of the other patients.

The QoL of the patients was assessed using the DLQI and a mean improvement of 11.3 points was found after the IPL therapy. When we assessed the DLQI scores of the patients at the first visit, the score was 27 and the lowest 15. The DLQI score worsened only in one patient after the IPL therapy, but a decrease was seen in the complaints of this patient in the VAS and PGA assessments. As this patient was one of the 9 patients who had comorbidities (stasis dermatitis), we concluded that comorbidities may also have an impact on the DLQI score. When we compared the first visit and the last visit DLQI scores of the remaining 29 patients, we observed a statistically significant reduction. This meant that the IPL therapy improved the QoL in ETR patients.

The QoL of 30 patients was assessed in 8 subscales using the SF-36. No significant change was seen in the PF, RP and BP subscales. In fact, most of the patients gave 100 points to the questions on these parameters, which meant complete well-being. Since AR is a local disease, not a systemic one, the PF, RP and BP parts of the SF-36 were not affected. For this reason, many of the patients gave positive responses to the questions related to physical problems and pain. However, the SF, RE, VT, MH and GH parts of the SF-36 received lower scores from the patients at the first visit, meaning that ETR significantly lowers QoL not in physical but in psychosocial terms. However, at the end of the 3-session IPL therapy, an increase towards 100 was seen in the scores of the SF, RE, VT, MH and GH subscales of the SF-36. This shows that IPL therapy has a positive effect on QoL (Table 3). The statistical analyses

revealed that there was an average rise of 35 points in SF, 61 points in RE, 8 points in VT, 38 points in MH and 47 points in GH. The p values of these increases were found to be statistically significant (Table 3). The analysis of the demographic data showed that most of the patients were in the middle age group as their mean age was 36.3. The study included 14 male and 16 female patients. Although the p value was not significant, the improvement in QoL was more in female patients compared to males. Twenty one patients out of 30 were fully fit and 9 had comorbidities not related to ETR. The improvement in the scale scores was greater in patients who had no comorbidities as compared to those with comorbidities, but this was not found to be statistically significant. Only the GH subscale of the SF-36 showed the value p<0.05. For this reason, the efficacy of IPL did not differ between ETR patients with comorbidities and healthy subjects. Besides, the drugs the patients with comorbidities were using during the IPL therapy were not any drugs that would affect the efficacy of IPL therapy. The mean time from ETR onset to treatment was calculated as 4.36 years for the patients taking part in the study. The analysis made for assessing whether or not the duration of disease had any correlation with the improvements in the scale scores showed that the improvement was greater in patients who had shorter duration of disease and less in those who had the disease for a longer period of time. This result suggested that the earlier an IPL therapy is started in ETR the more positive outcomes can be attained, improving QoL further.

Occupation has also a great impact on the development of the ETR disease. From the subjects included in this study, 17 were working indoors and 13 outdoors. The 17 patients were office workers, civil servants, housewives and university students. The 13 patients were farmers, laborers and those who had constructional and military duties. Looking at the effect of the IPL therapy on QoL with respect to occupations, we observed that QoL improved more in those working indoors after the IPL therapy. A more apparent improvement was found in the VAS, PGA and DLQI scores of those working indoors and it was statistically significant (Table 4). In the SF-36, significant differences were found in the RE and GH subscales. These showed that the IPL therapy was more effective in those working indoors. Therefore, it can be concluded that the efficacy of an IPL therapy may be higher with improved QoL in those who protect themselves from triggering factors in a more effective way. Nineteen of subjects included in the study stated that the sun was the trigger for ETR. However, there were a number of triggering factors in each patient in general. A correlation study was carried out to assess the change in the QoL statistics in patients who found the sun as the most triggering factor. In the end, the efficacy of the IPL therapy turned out to be more apparent in patients who did not find the sun as a triggering factor. At the same time, their QoL improved more. For example, the average improvement in the VAS score was -3.68 points in patients who did not see the sun as a triggering factor, whereas the reduction in the VAS score was -2.18 points in those who showed the sun as a risk factor. The PGA and DLQI scores also showed marked improvements. In the SF-36, the RE, MH and GH subscales scores had a more obvious increase in patients who did not see the sun as a triggering factor. This difference was found to be statistically significant (Table 5). Ten of the 19 patients who thought the sun was the main triggering factor for ETR were working outdoors. This suggests that the efficacy of IPL was low in those who stated the sun as the main trigger because they did not protect themselves from the sun properly during the IPL therapy. These results indicate that the efficacy of the therapy can further be improved if the patients whose ETR is aggravated by the sun protect themselves from the sun in a proper way during their IPL therapy.

Table 4. Correlations between scale differences with respect to occupations

	Outdoors	Indoors	p value
VAS difference	-2.3±1.31	-3.76±0.83	p<0.01
PGA difference	-1.23±0.83	-1.88±0.60	p<0.05
DLQI difference	-9.69±5.57	-13.11±2.84	p<0.05
PF	2.30±5.99	1.17±7.8	p>0.05
RP	2.56±9.26	3.91±16.15	p>0.05
SF	29.80±23.68	38.97±14.57	p>0.05
RE	35.88±28.74	80.37±23.75	p<0.01
BP	-3.46±32.74	0±3.53	p>0.05
VT	9.23±18.91	6.76±15.70	p>0.05
MH	31.30±17.70	41.64±14.49	p>0.05
GH	36.84±18.21	55.29±16.24	p<0.01

VAS: Visual analog scale, PGA: Physician's Global Assessment, DLQI: Dermatology Life Quality Index, PF: Physical functioning, RP: Role-physical, SF: Social functioning, RE: Role-emotional, BP: Bodily pain, VT: Vitality, MH: Mental health, GH: General health

Table 5. Correlations between scale differences with respect to sun exposure

	Yes	No	p value
VAS difference	-3.68±0.94	-2.18±1.25	p<0.01
PGA difference	-1.89±0.56	-1.09±0.83	p<0.01
DLQI difference	-13.05±2.87	-9.18±5.79	p<0.05
PF	1.05±7.37	2.72±6.46	p>0.05
RP	3.5±15.27	3.03±10.07	p>0.05
SF	40.13±17.95	26.13±18.91	p>0.05
RE	78.93±25.37	30.29±23.34	p<0.01
BP	0±3.3	-4.09±35.83	p>0.05
VT	5.78±14.64	11.36±20.5	p>0.05
MH	42.94±15.30	27.18±14	p<0.05
GH	56±17.75	32.27±10.57	p<0.05

VAS: Visual analog scale, PGA: Physician's Global Assessment, DLQI: Dermatology Life Quality Index, PF: Physical functioning, RP: Role-physical, SF: Social functioning, RE: Role-emotional, BP: Bodily pain, VT: Vitality, MH: Mental health, GH: General health

Conclusion

In conclusion, an apparent reduction was seen in the VAS and PGA scores of 30 patients after administering them the IPL therapy once in 4 weeks in a total of 3 sessions. This shows that IPL therapy contributes to the reduction of the clinical symptoms in ETR patients. Such reduction in clinical findings affected QoL positively. An apparent improvement was found in QoL in the DLQI and SF-36. A significant correlation was found between the efficacy of IPL and occupation. IPL was more effective in those working indoors. Another significant correlation was found between considering the sun as a triggering factor and IPL efficacy. IPL proved to be less effective in patients who showed the sun as the trigger. The fact that a majority of these subjects were working

outdoors suggested that they failed to protect themselves from the sun during their IPL therapy and that IPL can be more effective in those who protect themselves from the sun properly.

Ethics

Ethics Committee Approval: The study were approved by the Ege University Faculty of Medicine of Local Ethics Committee (protocol number: B.30.2.EGE.0.20.05.00/OY/1749/805).
Informed Consent: Consent form was filled out by all participants.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: M.I., İ.E., Concept: M.I., İ.U., Design: M.I., İ.Ü., Data Collection or Processing: M.I., Analysis or Interpretation: M.I., İ.Ü., Literature Search: M.I., Writing: M.I.
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