

Effectiveness and Safety of Intense Pulsed Light in the Treatment of Hirsute Women

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Abstract

Background: this study focused on the use of Intense Pulsed Light (IPL) technique for the treatment of hirsutism. Hirsutism results in psychological and severe cosmetic problems. IPL device is one of the most use technique for hirsutism. Similar to the laser, the basic concept of IPL technique is selective photothermolysis theory which cause thermal damaged for the stem cell in the hair bulge.

Objective: assessment the safety and efficiency of intense pulse light in the treatment of hirsutism.

Methodology: The research was carried out in private medical clinic, in Baghdad, Iraq on 40 women with hirsutism have black, brown hair and Fitzpatrick skin type scale (II to IV) with five sessions along a period of 8 months on chin site. The hirsutism degree was assessed by using "Ferriman-Gallwey scale (FGS)". Also, density, diameter and patient's satisfaction were assessed at the baseline and after each session.

Results: Thirty patients diagnosed with hirsutism completed the study. The mean of the patients age was 30.24 ± 8.569 years (18-42) years. Hirsutism degree was significantly decreased after the end of sessions ($p - \text{value} < 0.01$). The density and diameter of hair was significantly decreased by 65.3% and 41.9% respectively at the end of study. Patient satisfaction significantly increased by 70% throughout the sessions. The adverse effect shows two cases of pain and one case of burning.

Conclusion: the IPL device with wavelength range from 500 nm to 1200 nm seems to be safe and effective for hirsute women with skin type (II to IV) Based on the Fitzpatrick scale and dark hair.

Keywords: IPL device, Hirsutism, IPL hair reduction, chromophore, selective photothermolysis, photo epilation.

Introduction

About 40% of women in some degree of unwanted hair, ranging from almost invisible to excessive growth (1). Hirsutism is the abnormally fast growth of terminal hair on a woman's body in a masculine pattern. Hirsutism has been recorded in 5 to 15% of ladies and is often related to a decrease in high-satisfactory of existence and loads of mental stress (2). It often shows excessive degrees of androgen in hair follicles from unusual quantities of androgens in the blood (endogenous or exogenous) or improved the hair follicles sensitivity to regular degrees of androgen in the blood. Having too many androgens in the body can result in the excessive face and body hair (3)(4). Hirsutism can have various causes, such as tumors in the ovaries or adrenal glands, polycystic ovary syndrome, inherited adrenal gland disorder, genetic factors, or medications like steroids,

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androgen, phenytoin, and cyclosporine (5)(6)(7). To quantify hirsutism degree, Various techniques are at disposal for evaluating hair growth in females. In 1961, both of Ferriman and Gallwey developed a system of scoring that encompassed eleven regions of androgen-dependent, including the face (chin), lips, upper abdomen, chest, forearm, thigh, upper back, lower back and lower leg. The present scoring system assesses eleven distinct anatomical regions, assigning scores that span from zero (denoting the absence of excessive terminal hair growth) to four (indicating the presence of extensive hair growth) for each region under examination. The highest achievable score is 36, however, a score equal to or greater than 8 is commonly associated with the presence of hirsutism(8). Women feel self-conscious about having unwanted hair since beauty standards have changed significantly over the last few decades; this causes them to have poor self-esteem and some even experience stress. Hirsutism may be emotionally upsetting, but it is treatable. Females are under great pressure to undertake unpleasant hair removal treatments including threading, waxing, and using lotions that might temporarily eliminate undesirable face and body hair.(9). IPL devices, emit light of many wavelength range between (500-1200 nm) modulated by a special filter. The IPL flash-lamp emits polychromatic, incoherent light; different special filters used to restrict the emitted wavelength range. IPL technique similar to laser in the action mechanism which is selective photothermolysis; however, unlike lasers, IPL is polychromatic while, laser is monochromatic (10) (11). The wavelength must be adjusted to come within the region of melanin's absorption spectrum, The bulge area of the hair, especially the stem cells, is damaged by heat, which slows down the growth of new hair (12).

This study aims to assess how well and how safely IPL system works for reducing hair in women with hirsutism.

Methodology

This investigation was carried out at a private dermatology clinic in Baghdad. Under the dermatologist specialty supervision, data collection occurred during eight months from September 2022 to April 2023. This study included a total of forty patients diagnosed with hirsutism by a consultant dermatologist in the patients with ovarian tumors. Five IPL treatments were performed on the chin over a period of eight months. A dermatologist evaluated the reduction in facial hair count following each session. Also recorded any adverse effects that the patients experienced.

A complete patient history was obtained, including information on family history, onset and progression of symptoms, menstrual irregularities, use of medication for other medical conditions or for hirsutism, and the current method of hair removal. Prior to treatment, we verified that all patients had provided written informed consent and photography permission. Following each session, a detailed clinical examination was conducted using the Ferriman-Gallwey scale (FGS) scoring system.

Inclusion criteria include: patients with black and brown hair, Fitzpatrick skin type (II to IV), female patients with hirsutism, up to 18 years old.

Exclusion criteria include: patients with white, red, gray and blond hair, under 18 years old, pregnant women, photosensitizers user.

A flash lamp produces IPL pulses of light with wavelength range from 500 nm to 1200 nm, fluence (1.8 – 4.9 J/cm²) by Philips co. The irradiated area is 3 cm², pulse width from 0.9s to 2s, with cooling degree at 5°C. The energy level is chosen based on the patient's skin type and the intensity they can tolerate.

Patients were instructed to avoid mechanical hair removal except shaving, sun exposure, and other treatments on the areas to be treated. They received five treatment sessions each. The chin site was evaluated after each session and one month after the final session.

A 1 cm² test site was marked on the right chin of each patient. Standard images captured the test site's appearance with a 12-megapixel camera is featured on an iPhone 7 Plus. before the first session and at each follow-up visit. The pictures were used to calculate the hair density (hairs count / cm²) in the area where treated it. The skin was cleaned with alcohol swipe and dried, then a special gel was applied to facilitate the handpiece movement and cool the skin surface. The hair diameter reduction was measured by taking the average of three hair diameters from the treated area using a micrometer

The data was analyzed using the Statistical Analysis System- SAS (2018) software. In this study, a chi-squared test compared the hair reduction rate and another variable. A p-value below 0.01 indicated a statistically significant difference (13).

Results

Forty patients participated in this study. Thirty patients complete the study programs. The patients age was ranged from 18 to 42 years with a mean 30.24 years \pm 8.569. Hirsutism degree for all patients was assessed by the Ferriman-Gallwey scale (FGS) (table 1). Before the treatment score 0 (no terminal hairs) was present in 0% of patients with hirsutism and found that most of the women was present in score 1 (55%) and 2 (36.6%) (greater than minimum terminal hairs). after the five-session found that the (FGS) score decreased with high significant and most of the women then had score 0 of hirsutism degree (85%) (minimal terminal hairs) according to (FGS) score (figure 1).

Table 1: comparison of FGS of hirsutism at the pretreatment and after the five sessions.

FGS score	At the pretreatment	After the last sessions
Score 0	0%	85%
Score 1	55%	13.3%
Score 2	36.6%	1.6%
Score 3	5%	0%
Score 5	3.3%	0%

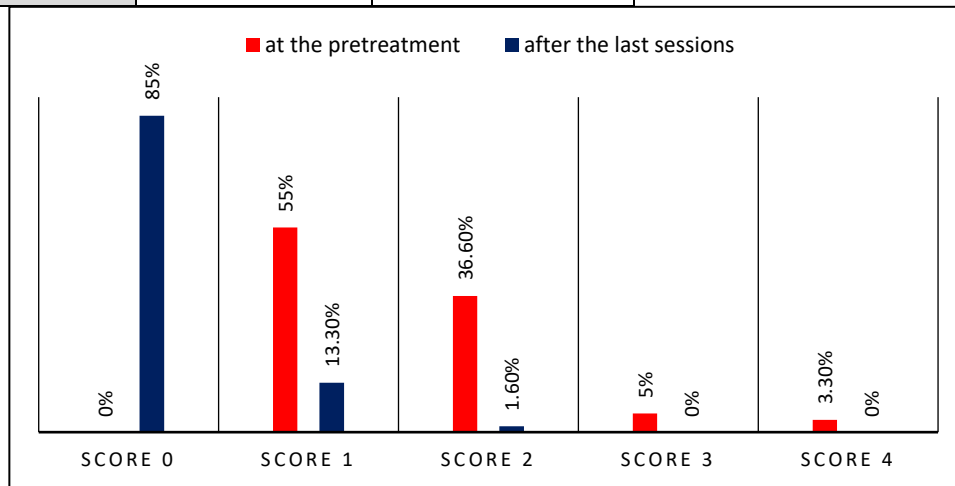


Figure 1: FGS score of hirsutisms at the pretreatment and after the five sessions.

The mean of hair density in the treatment site before the first session was 16.9 ± 6.97 (hair count / cm²). After the fifth session shows a high significant decrease in the hair density when the mean of hair counts became 5.85 ± 3.32 (65.3%) after five sessions (P-value = 0.0001) (table 2). Also, there is a high significant decrease in the diameter of hair (table 2). When the mean of hair diameter was 42.18 ± 8.54 (micrometer) before the first session then decreased to 24.48 ± 6.23 (micrometer) (41.9%) after five sessions (P-value = 0.0001).

Regarding to the patient’s satisfaction for the treatment with IPL system (table 2). After the first session patients record 16.6% (n=5) of satisfaction. After the last session patient’s satisfaction increased to 70% (n= 21) of satisfaction.

Two cases of pain (6.6%) and one case of burning (3.3%) occurred in patients treated with IPL device and resolved completely 1-2 hours after the treatment session. While erythema, swelling, hyper pigmentation and itching not appear in this study.

Table 2: hairs density and diameter at the pretreatment and after the five sessions.

Parameters	At the pretreatment	After the last session	Reduction %	p-value
Density of hairs /cm ²	16.9 ± 6.97	5.85±3.32	65.3%	0.0001
Diameter of hairs (in micrometer)	42.18 ± 8.54	24.48± 6.23	41.9%	0.0001

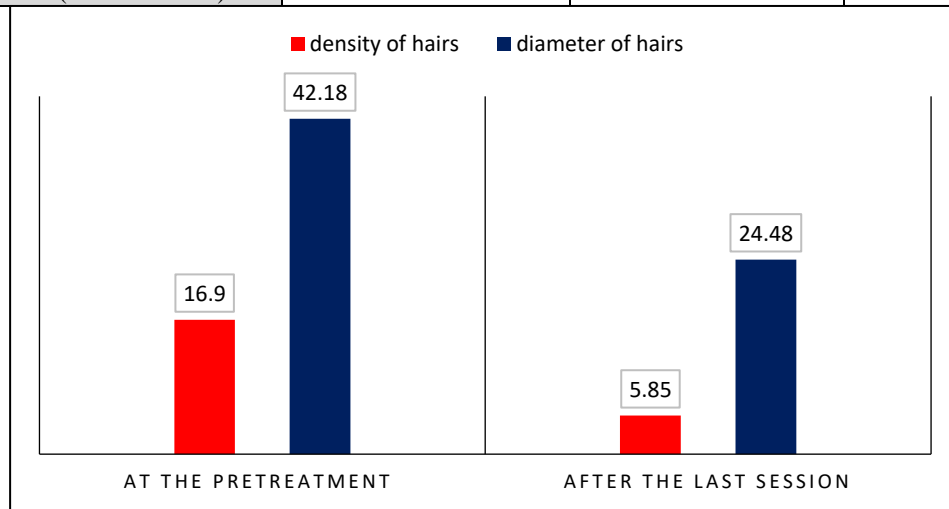


Figure 2: comparison between hairs density and diameter at the pretreatment and after the five sessions.

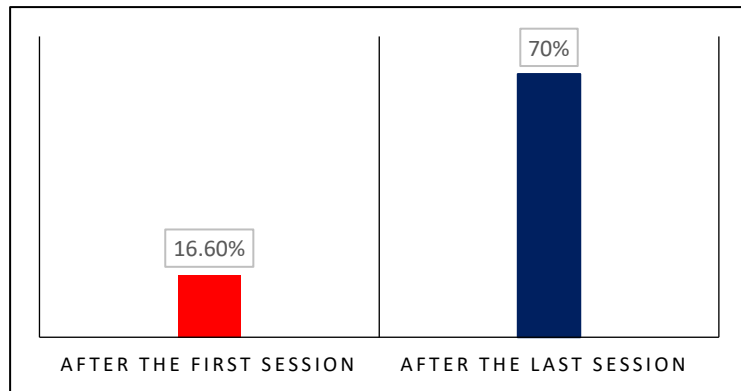


Figure 3: comparison between patients’ satisfaction after the first session and at the last session.

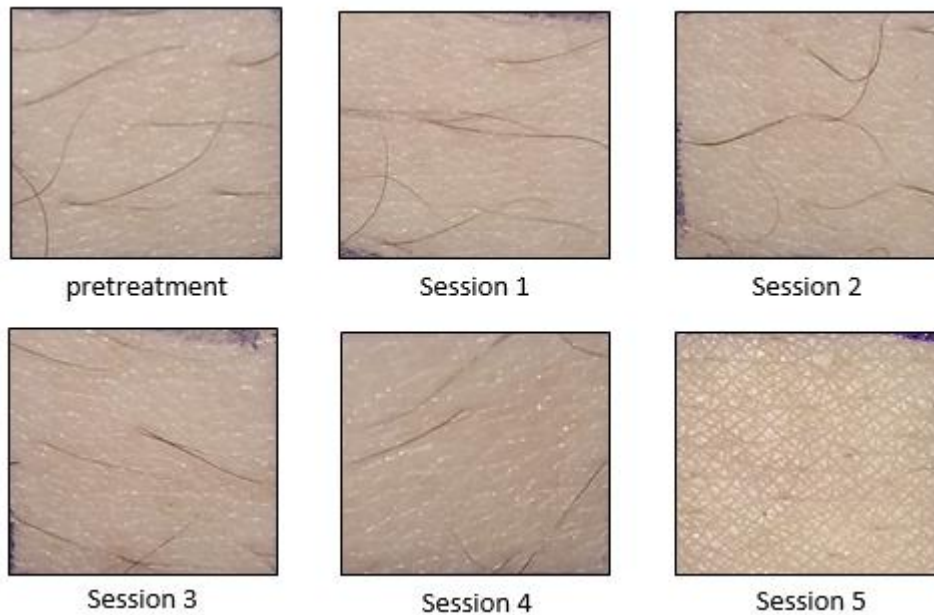


Figure 4: Represent the decrease in hair density (number of hairs in a certain area) at the pretreatment and after each session for patient with 20 years old treated with IPL device.

Discussion

A comprehensive history and physical examination are important to assess women with hirsutism. Also, to identify which patients require more diagnostic testing. 30 patients complete all the treatment sessions after diagnosed to had hirsutism. Hirsutism was assessed in this study and the most important way that used for the assessment was Ferriman – Gallwey scale (FGS) which assessed the degree of hirsutism (14).

The result of the study, according to FGS score when score 0 (no presence of terminal hair) present in (85%) of the patients treated with IPL. That shows a high significant decrease in hirsutism degree and these results are in agreement with Rezvanian et al study, they reported that (80%) of the patients treated with IPL had a satisfied decrease in the hirsutism degree (15). The decrease in FGS score showed that the IPL device considered effective technique for the treatment of hirsutism.

The other parameters include hair density, hair diameter, patient's satisfaction and side effect were assessed in many researches which studied the effect of IPL technique like the study of Shanza Obaid et al that used the IPL system. Where the patients had (31.6%) of hair reduction, (68.4%) had satisfied and the common side effect (11.5%) of the patients had erythema while (11.5%) of the patients had pain (16). While A. Krasniqi et al showed a significant response for IPL with 70% decrease in hairs density (17). That results was the most accurate for what came in this study when found that the patients had (65.3%) decrease in the hair density, (70%) of the patients was satisfied and the most common side effect 6.6% (n=2) of the patients had pain and 3.3% (n=1) of the patients had burning at the end of study.

IPL devices have 2 main advantages such as the lower cost compared to laser system and have filters that enhance the use of the light on the bigger surface area than in laser system. But they still require more treatment sessions (18). Many studies applied IPL for the management of hirsutism for women with different disorder by using various number of sessions (1-13) (19, 20, 21, 22). In this study used five treatment sessions. Kumari et al (22) found that ten treatment sessions achieved significant hair reduction rates compared to 6 or 4 sessions (69.5% in case with 10 16.1% cases with 6 and 16.6% cases with 4

sessions). Also, Puri study (21) found that the response to IPL is influenced by the number of treatment sessions applied to the affected area (10% for 2, 48% for 4, and 70% for patients with 6 sessions).

This study shows a statistically significant difference between response for the treatment with IPL system and female patients with hirsutism. So that the IPL appear good and excellent hair reduction in 70% of patients. Additionally, the small number of side effects were reported and completely resolved after the session. There for we highly recommend to use IPL for hirsute women.

Conclusion

The result shows that low-fluence IPL device with wavelength between (500 – 1200 nm) appears to be efficient and safe in hair reduction in patients with hirsutism who have Fitzpatrick skin phototype (II to IV) and dark hair.

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