Original article

Efficacy of intense pulsed light therapy in the treatment of idiopathic hirsutism

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ABSTRACT

Background: Hirsutism is a male pattern of terminal, coarse and medullated hair growth in females at androgen dependent sites. Idiopathic hirsutism is the second most important and frequent cause of hirsutism after polycystic ovarian syndrome. It has an adverse impact on psychosocial status of patients. Lasers- and light-based treatment modalities are now increasingly used and yield long lasting reduction of unwanted facial hair. Light-based modalities include intense pulsed light (IPL) and E-Light. This study aims to assess the efficacy of IPL in the treatment of idiopathic hirsutism.

Subjects and methods: This prospective interventional study was carried out from 1st June 2015 to 29th Feb 2016, on female patients of age between 20-41 years, having idiopathic hirsutism with chin hair of Grade 4 Ferriman and Gallewey (F-G) score. The patients were not on any prior oral, topical or laser therapy for hirsutism during last 6 months and had no active infection or eczema at treatment site. Patients were treated with IPL having fixed parameters. Baseline hair count was noted before treatment and then hair count was done at 1 month after 6 complete sessions, each session being 1 month apart. Final hair count was done at 7th month from baseline and percentage hair reduction was calculated. Effectiveness was evaluated in terms of percentage of patients showing >50% hair reduction.

Results: Eighty patients with mean age 28 years were assessed. Fifty-four patients (67.5%) showed >50% hair reduction while 26 patients (32.5%) showed <50% hair reduction at follow up of 1 month after 6 complete sessions. No significant side effects were observed except mild diffuse and/or perifollicular erythema and the treatment was tolerated well by the patients.

Conclusion: Intense pulsed light (with fixed parameters) is an effective treatment modality for the treatment of idiopathic hirsutism.

Keywords:

Idiopathic hirsutism, Intense pulsed light, Hair reduction, Effectiveness.

INTRODUCTION

Hirsutism is a male pattern of terminal hair in females at androgen dependent sites due to increased production or increased responsiveness of pilosebaceous unit to androgens. It is a common disorder affecting 5-15% of women of reproductive age group.[1,2] Idiopathic hirsutism (IH) is considered one of the commonest causes of hirsutism.[2] IH is defined as hirsute females having normal ovulatory function and normal level of serum androgens.[3] In international studies prevalence of IH is stated to be 5-20%, while in Pakistan it is reported as 22.6 to 47.3%.[2,4]

Hirsutism is a health issue and is a source of psychological stress for patients. It compels them to use temporary and inconvenient methods of hair removal which include shaving, tweezing, plucking and waxing.[5,6] Electrolysis gives permanent hair reduction, but it is a blind procedure.[7] Laser and light-based modalities are now commonly used and yield long lasting reduction of hair. Lasers for hair removal include Nd-YAG, Diode, Alexandrite and Ruby lasers while light-based therapy includes intense pulsed light (IPL) and E-Light/ELOS (electro-optical system).[8]

IPL is a non-coherent light-based device and works on the principle of selective photothermolysis.[7] Both, laser and IPL are considered to be comparable in effectiveness for hair removal, as evident in many studies.[9,10] Recently, the use of IPL has increased as it is cost effective, less time consuming and relatively safe for hair reduction.[11] There are many studies in which effectiveness of IPL on hair reduction was seen and success rate varies from 30 to 76%.[11-13] This study aims to assess the outcome of IPL in IH in terms of percentage of patients showing >50% hair clearance 1 month after 6 IPL sessions (done 1 month apart) compared to baseline.

Competing interests: The authors declared no competing interests exist

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SUBJECTS AND METHODS

A prospective interventional of 80 hirsute female participants was carried out from June 2015 till February 2016 at the Department of Dermatology, Sir Ganga Ram Hospital, Lahore. The study was commenced after obtaining ethical clearance from institutional ethics review committee, Fatima Jinnah Medical University, Lahore. Written informed consent was taken from all patients fulfilling inclusion criteria before undergoing treatment. Patients between age group 21-40 years with diagnosis of idiopathic hirsutism fulfilling inclusion criteria i.e. having thick, coarse, black chin hair of grade 4 F-G score[14], were enrolled. For the diagnosis of IH[2], operational definition was: (A) hirsutism according to modified Ferriman-Galleway score >8; (B) normal ovulatory function (regular menstrual cycle and normal ovaries on ultrasound) and; (C) normal serum testosterone and dehydroepianderosterone sulphate levels.

Criteria was fulfilled after detailed history and clinical examination, supported by baseline and specific investigations to rule out secondary causes of hirsutism (serum LH, FSH, Testosterone, DHEA sulphate, prolactin, cortisol and abdomino-pelvic ultrasound). These patients were having chin hair of grade 4 Ferriman-Gallewey scoring system.[14] Patients were neither on oral, topical or laser therapy for hirsutism during the last 6 months, nor did they have any active infection or eczema at treatment site. On first interaction patients were advised to avoid plucking, tweezing and bleaching for at least 4 weeks prior to treatment. At the time of session, chin area was cleaned and 2.5×2.5 cm^2 area was marked with white eye pencil from mid-mandibular notch and baseline hair count was done. Hair were trimmed to approximately 1mm. Digital photograph was obtained with fixed illumination and distance, before starting treatment. Protective measures were taken both by the doctor and patient with protective goggles. Intense pulsed light/ELOS device (E-LOSE-YB3, China) with spectrum range of 520-1200nm, built in cooling system, spot size of 8×40mm^2, pulse sequence1~5pulses, pulse width 5-60msec and pulse intermission 2-16msec) available at Sir Ganga Ram Hospital was used. Area to be treated was cooled with a hand piece having built-in cooling system. After appropriate cooling, treatment was done on fixed parameters i.e., influence 38 J/cm^2, number of pulses 2, pulse duration 8 msec, pulse delay 40 msec and 750 nm cut off filter. Desired therapeutic end point were perifollicular edema and erythema. Pre, parallel and post- procedure cooling was done to prevent side effects. Total of 6 sessions (each session done 1 month apart) were done with above mentioned protocol. Hair count was done on follow up after 1 month of last session and percentage hair reduction was calculated by formula:

$$Hair\ reduction\ (\%) = \frac{Baseline\ hair\ count - Hair\ count\ after\ treatment}{Baseline\ hair\ count}\ x\ 100$$

The findings were recorded on the study proforma. All collected data was analyzed using SPSS version 21. Quantitative variable like hair count at baseline and 1 month after 6 sessions were presented as mean±SD. Qualitative variable like outcome in terms of hair reduction was presented in terms of frequency and percentage. Cross tabulation was performed to determine the effect of disease duration, Body Mass Index (BMI)[15] and reproductive age (effect modifier) on treatment outcome.

RESULTS

Total of 80 patients were included in this study. The age of the patients was between 20 to 41years (mean age 28±5 years). Out of 80 patients, 54 patients (67.5%) showed >50% hair reduction while 26 patients (32.5%) showed <50% hair reduction. Also mean hair count was reduced to >50% after complete 6 sessions. Figure 1 depict the clinical evidence of efficacy of the procedure in terms of >50% reduction in hair growth on follow up 1 month after 6 sessions (each session done 1 month apart).

To determine the effect of disease duration, BMI and reproductive age on treatment outcome (effect modifier) cross tabulation was done. Out of 54 patients who had >50% hair reduction, 37 (68.52%) had a disease duration of <5 years while 17 had disease duration of >5 years. Similarly 45 patients (83.3%) fell in early reproductive age group, while 16.7% fell in late reproductive age group. As far as BMI was concerned 29 patients (53.7%) were of normal weight, 17 (31.5%) were overweight and 8 patients (14.8%) were found to be obese. However, the correlation between duration of disease (p-value = 0.67), BMI (p-value = 0.78) and reproductive age (p-value = 0.77) with the outcome of IPL was not found to be statistically significant as evident in Table 1.

Side effects were barely appreciated except mild diffuse and/or perifollicular erythema and treatment tolerated well by the patients. Total follow up was only 1 month after complete 6 sessions (done 1 month apart). Patients were satisfied and compliant, evident from their regular sessions and without any drop out.

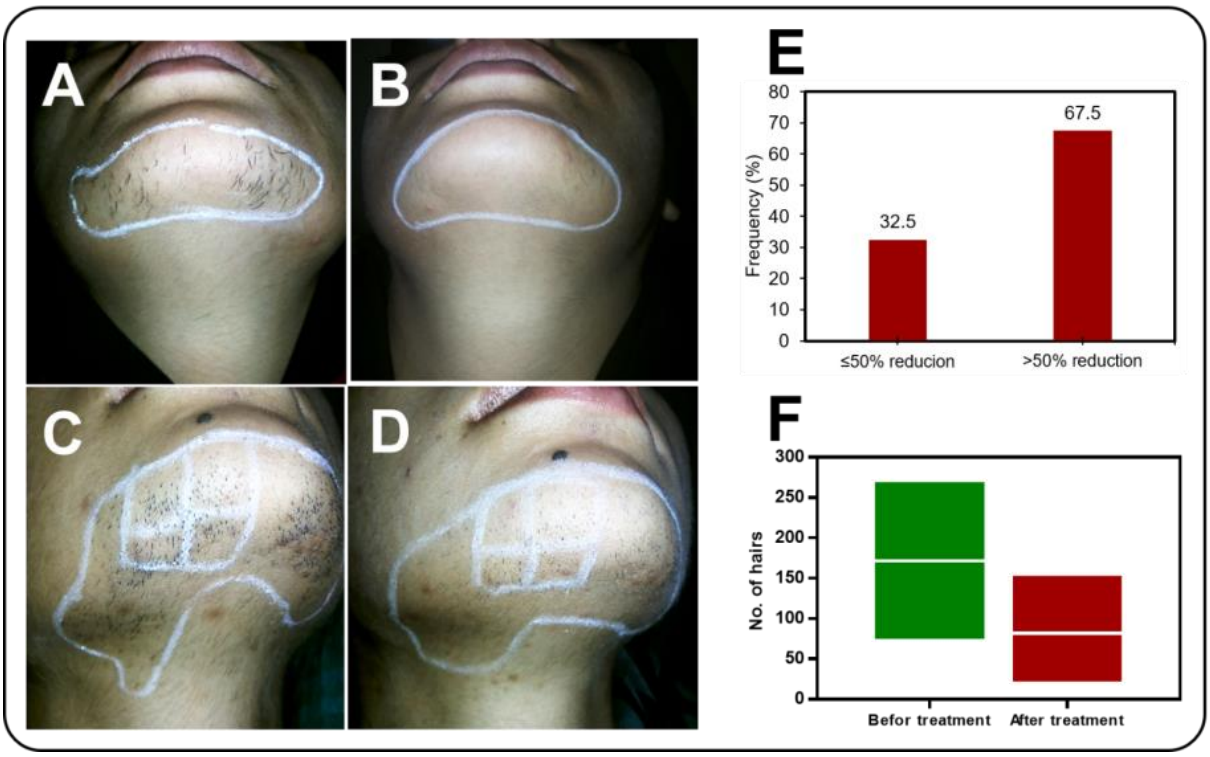

Figure 1. Outcome of intense pulsed light (IPL) in hirsutism. A-D) Clinical efficacy of intense pulsed light therapy in the treatment of idiopathic hirsutism. A and C) Before treatment and; B and D) after treatment (1 month after 6 sessions). A considerable hair reduction at follow up of 1 month after completion of treatment and >50% hair reduction is appreciated. E) Frequency of >50% hair after treatment. F) Reduction in the number of hairs after 1 month treatment as compared to baseline. Upper and lower boundaries of the bars represent maximum and minimum number of hairs, respectively. White line in the middle of the bar represent mean values.

Table 1. Outcome of IPL with duration of disease, reproductive age group and body mass index

Characteristics	Outcome of IPL		Total	p-value
	≤50% Hair reduction	>50% Hair reduction		
Duration of disease				
<5 years	19 (73.08%)	37 (68.52%)	56 (70%)	0.677
>5 years	7 (26.92%)	17 (31.48%)	24 (30%)	
Reproductive age group				
18-30 years	21 (80.8%)	45 (83.3%)	66 (82.5%)	0.777
31-45 years	5 (19.2%)	9 (16.7%)	14 (17.5%)	
Body mass index (kg/m²)				
Normal	12 (46.2%)	29 (53.7%)	41 (51.2%)	0.798
Over weight	10 38.5%)	17 (31.5%)	27 (33.8%)	
Obese	4 (15.4%)	8 (14.8%)	12 (15.0%)	

No recurrence was appreciated within this short follow up duration.

DISCUSSION

Hirsutism is a health issue which is a constant source of distress for patients. It has a negative impact on psychosocial status of patients that includes lack of self-confidence, self-esteem and being uncomfortable in social situations which creates a significant psychological burden in society.[5] All these factors compel the patients to use temporary and conventional methods of hair removal. Approximately, 20% of females use these temporary methods at least once weekly.[16]

There are many temporary methods for hair removal e.g., shaving, tweezing, waxing and chemical depilation.[17] In order to remove hair permanently, laser and light-based devices are in use nowadays. The meaning of word "permanent" in hair removal is different for the patient and for the dermatologist.

According to patient, permanent hair removal means complete absence of hair in treated area for life time.[17] But Dierickx and co-authors[18] proposed permanent hair loss as the significant reduction in the number of terminal hair after a given treatment, that is stable for a period longer than the complete growth cycles of hair follicles, at any given body site.

IPL is a laser-like device used for hair removal. In comparison with lasers, intense pulsed light is polychromatic and incoherent in nature and emits wide range of wavelengths (400-1200nm). Different filters with cut-off values are used to tailor the range of wavelength that is required for cutaneous target of interest.[11] Recently, the use of IPL has increased, as it is less time consuming and cost effective as compared to lasers.[8,11]

In the present study, the age of the patients ranged from 20 to 41years with a mean of 28 ±5 years, which is comparable with other national and international studies.[8,11,12] Mostly females of this age group consult for permanent hair reduction as they are more concerned about their looks and feel embarrassed by hirsutism. It also affects women's perception of feminity and result in immense distress.

In the present study, 67.5% of the patients showed more than 50% hair reduction, 1 month after complete 6 sessions. These results are comparable with other studies.[12,19] Al-Hilo and co-workers[12] found 76% hair clearance in 76.3% of patients. Similarly, the study done by Bashir and co-authors[19] showed that mean percentage hair reduction was 68%. In these studies, although >50% hair reduction was achieved but skin type, number of sessions, fluence, pulse width and wavelength used, were not fixed. These wide range of parameters might act as confounding factors in the outcome of IPL, in terms of percentage hair reduction. Also, fewer studies were conducted on Asian population in Pakistan, on effectiveness of IPL.

In this study, parameters used were; wavelength of 755 nm, fluence 38 J/cm^2, number of pulses 3, pulse duration of 8.0 msec and pulse delay of 40 msec. A 755 nm wavelength was selected based upon the principle i.e., longer the wavelength deeper the penetration, in order to target all the hair follicles.[11] Also it is evident from the study of Bashir and colleagues[19] that two different wavelengths of IPL (755 nm and 690 nm) did not give statistically significant difference in the results. Fluence used in present study was fixed at 38 J/cm^2. This was done to prevent the confounding effect of wide range of fluences (20-40 J/cm^2) used in other studies.[12,19] This showed that higher fluence can be equally effective as compared to lower fluence.

There is a limited data available on the relationship of effect modifiers (BMI, reproductive age and duration of disease) with the outcome of treatment. In the present study, cross-tabulation of reproductive age, BMI and duration of disease was done with the outcome of treatment but it was found to be statistically insignificant.

CONCLUSIONS

Intense pulsed light (with fixed parameters) is an effective modality for the treatment of idiopathic hirsutism.

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