

Long-pulsed Nd: YAG Laser and Intense Pulse Light-755 nm for Idiopathic Facial Hirsutism: A Comparative Study

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Abstract

Background: Hirsutism means excessive terminal hair growth in a female in male pattern distribution. Perception of hirsutism is subjective. Permanent laser hair reduction is a slow process taking many sessions and tracking of improvement parameters is tedious. Hence, a lot of confusion still exists regarding the type of laser most beneficial for treatment. **Aim:** The aim of this study was to compare the effectiveness and safety profile of long-pulsed Nd: YAG laser (1064 nm) and intense pulse light (IPL)-755 nm in management of idiopathic facial hirsutism. **Settings and Design:** Open-labelled, randomly allocated experimental study. **Subjects and Methods:** The study included 33 cases of idiopathic facial hirsutism. Patients were randomly divided into Group A, treated with long-pulsed Nd: YAG laser and Group B, treated with IPL-755 for a total of six sessions at 1 month interval. **Statistical Analysis:** Chi-square test was used in Medcalc® version 9.0 and the test of significance was taken to be $P < 0.05$. **Results:** Average percentage of improvement in Group A, according to patients at each sessions were 46.33%, 70.66%, 81.66%, 84.67%, 85.33%, 87.33% and that in Group B were 28.06%, 39.72%, 52.22%, 64.72%, 67.78%, 71.11%, respectively. Excellent response (>75% reduction in hair) after six sessions in Group A was seen in fourteen (93.33%) out of fifteen patients, whereas in Group B, it was seen only in three (16.66%) out of eighteen patients. In Group A, erythema was seen in 26.67%, perifollicular edema and hyperpigmentation in 13.33% each. In Group B, erythema was seen in 50% patients, perifollicular edema in 16.67% and hyperpigmentation in 38.89% patients. **Conclusions:** Long-pulsed Nd: YAG Laser (1064 nm) is better than IPL-755 nm in terms of safety and effectiveness in the management of idiopathic facial hirsutism.

Keywords: Hirsutism, intense pulse light-755, laser, long-pulsed Nd:YAG laser

INTRODUCTION

Hirsutism is defined as excessive terminal hair growth in a female in male pattern distribution. Perception of hirsutism is by definition subjective, and women present with a wide variation in severity.^[1]

Hirsutism affects 5%–10% of unselected women, depending on the definition and ethnicity.^[2] Female hirsutism is an embarrassing condition that threatens both a woman's perception of her femininity and her self-esteem.^[3] Underlying causes of hirsutism may be congenital adrenal hyperplasia, polycystic ovary syndrome, ovarian and adrenal tumours, pharmacological agents, familial or it may be idiopathic.^[4]

It is very important to determine the underlying causes. Although the most common causes are ethnic or hereditary, one must look to out any sign of androgen excess, such as, an increase in body hair, irregular menstrual cycles, acne, alopecia and seborrhoea.^[5]

Such male-pattern growth of terminal body hair usually occurs in androgen-sensitive locations, such as upper lip, chin, chest, areola, abdomen, back and femoral region.^[6]

On the other hand, hypertrichosis is independent of androgen influence and is manifested, particularly by the superfluous and uniform growth of non-terminal (vellus) hairs over the body particularly in non-sexual areas.

Many temporary hair removal methods exist including shaving, tweezing, waxing, chemical depilatories and electrolysis.^[7] The need for a rapid, non-invasive method has led to the development of various light sources.

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Laser hair reduction (LHR) has emerged as a popular cosmetic dermatology procedure. Several types of lasers are available for hair removal along with non-laser intense pulse light (IPL) epilators. However, optimising these devices according to the skin and hair type of the patient to be effective yet safe, is a difficult task.

Lasers emitting light in the wavelength range of 600–1100 nm can effectively target the melanin in the entire portion of hair follicles.^[8] Different laser systems and intense-pulsed light currently approved by the Food and Drug Administration, USA, for the reduction of hair are ruby (694 nm), alexandrite (755 nm), diode (800 nm) and long pulse Nd: YAG (1064 nm) laser and IPL (515–1200 nm) sources.^[9]

LHR is a slow process which takes at least six to eight sittings and spacing between the sessions is done depending on the hair cycle of that area. The apparent cosmetic improvement may be related to reduction in number of hairs or a decrease in diameter or pigmentation. Tracking of these parameters over such long periods is tedious. Hence, a lot of confusion still exists regarding the optimum settings and the type of laser most beneficial for a given hair and skin type.

In spite of different laser systems available for LHR, no single system has been found to be safest and most effective in all skin types.

The purpose of this study was to evaluate the safety and effectiveness of a high-energy, long-pulsed 1064-nm Nd: YAG Laser and IPL-755 in the treatment of hirsutism in Indian population.

AIM

The aim of this study was to compare the effectiveness and safety of long-pulsed Nd: YAG laser and IPL-755 in management of idiopathic facial hirsutism.

SUBJECTS AND METHODS

The study was an open-labelled randomly allocated experimental type. A total of thirty-three cases were included in the study. The inclusion criteria were hirsutism patients presenting in the outpatient department (OPD) with age more than 18 years and those who gave consent to participate in the study.

Patients having hypertrichosis, greying of hirsute hairs, associated photo-aggravated diseases such as systemic lupus erythematosus, keloidal tendency or taking photosensitive drugs, undergoing treatments such as chemical epilation or electrolysis or active cutaneous infections in the treatment area such as herpes labialis and bacterial folliculitis were excluded from the study.

Detailed history taking and clinical examination, hormonal and sonological evaluation was done as per relevance to the particular case. Eligible patients were randomly divided into two groups:

- Group A: Patients who received treatment with long-pulsed Nd: YAG Laser (Lumenis, Israel)
- Group B: Patients who received treatment with IPL-755 nm (Lumenis, Israel).

A skin patch test was performed at a comparatively less sun-exposed site 2–3 days before the procedure to select the parameters for treatment and safety profile of a particular patient.

Patients were asked not to take up threading, bleaching, plucking, waxing or electrolysis once the treatment was started.; Shaving was to be avoided 2 weeks before the session; and sunscreen to be used during the study period. Photographs were taken before starting the laser sessions each time and after every session.

Procedure

The area to be treated was marked with skin marking pen and shaving was done using a cleansing gel carefully to avoid cuts. Any tattoo and mole were marked with white pencil and laser were avoided over the area. Furthermore, metallic jewellery was removed during the procedure. Patient's eyes were covered with metallic shields and protective eye goggles were worn by doctors performing the laser. Baseline parameters were determined based on patch test result as well as hair type scoring. Cooling was done with inbuilt cooling device. After each sessions patients were evaluated and the results were graded according to a 4-point scale as excellent >75% reduction; good, 50%–75% reduction; fair, 25%–50% reduction and poor, <25% reduction in hair density. Comparison of efficacy and safety between long-pulse Nd: YAG Laser (1064 nm) and IPL-755 nm was determined using Chi-square.

Follow-up was done at every 4–6 weeks and dose was adjusted according to response and tolerability of the patient. After completing treatment, follow-up was done at 3 and 6 months.

RESULTS

A total thirty-three cases of idiopathic hirsutism were enrolled in the study and six sessions were performed in both group at regular interval and following results were documented after proper analysis of the cases.

Efficacy

The percentage of reduction in the hairs was evaluated separately by patient, investigator, and expert evaluator after every session of laser in each group by visual impression [Table 1].

Patients were evaluated and results were graded according to a 4-point visual scale [Table 2].

On analysis of the data, it was found that poor response after first session in Group A was 13.33% and in Group B was 50%. After fourth session, average of excellent response in Group A was 86.67% and in Group B was 11.11% and after sixth session, average of excellent response in Group A [Figures 1 and 2] was 93.33% and in Group B [Figures 3 and 4] was 16.66%. In Group

B, 83.33% showed good result. All the patients in the study group after sixth session showed >50% reduction in hair [Table 3].

Safety

Erythema [Figure 5], perifollicular oedema and hyperpigmentation [Figure 6] were the adverse effects noted. In Group A patients, erythema was seen in 26.67%, perifollicular oedema in 13.33% and hyperpigmentation in 13.33%; whereas in Group B, erythema was seen in 50% patients, perifollicular oedema in 16.67% and hyperpigmentation in 38.89% patients [Table 4]. None of the patients reported any scar or crusting.

DISCUSSION

The study was conducted in a tertiary care hospital of eastern India with thirty-three patients of idiopathic hirsutism who came to the OPD of Department of Dermatology, Venereology and Leprosy.

In a study conducted by Tanzi and Alster,^[10] a mean hair reduction of 41%–46% on the face were noted after 6 months

of a series of three long-pulsed Nd: YAG laser treatments. Whereas, in our study, patients treated with monthly session of long-pulsed Nd: YAG laser showed an average hair reduction of 84.67% after four sessions and 87.33% after six sessions [Table 1].

Goldberg and Silapunt *et al.*^[11] achieved hair reduction of 26%–29% at different sites such as axilla and bikini area treated with long-pulsed Nd: YAG laser.

In a study by Noor and Paracaha,^[12] maximum hair reduction was observed 1 month after the series of laser treatments, with a mean hair reduction ranging from 68% to 75%.

In our study Group B, after six sessions, 50%–75% reduction in hairs was seen in 83.33% patients [Table 1] and >75% reduction in 16.66% patients [Table 3]; however, in study by Asad *et al.*,^[13] a mean hair density reduction >50% was achieved in 71% patients in those who have completed their five treatment sessions.

Table 1: Percentage of improvement recorded after each session

Evaluation by	Group A (%)	Group B (%)
After 1 st session		
Patient	46.33	28.06
Investigator	43.33	29.44
Expert evaluator	58	41.67
After 2 nd session		
Patient	70.66	39.72
Investigator	66	45.83
Expert evaluator	76	56.11
After 3 rd session		
Patient	81.66	52.22
Investigator	78	61.94
Expert evaluator	83	64.17
After 4 th session		
Patient	84.67	64.72
Investigator	85.33	70.83
Expert evaluator	89.33	74.44
After 5 th session		
Patient	85.33	67.78
Investigator	84.33	71.67
Expert evaluator	88	74.72
After 6 th session		
Patient	87.33	71.11
Investigator	85.33	74.44
Expert evaluator	89.33	75.33

Table 2: 4-point visual scale

Grading	Percentage improvement
Poor	<25
Fair	25-50
Good	50-75
Excellent	>75

Table 3: Response recorded on basis of 4-point visual scale

End of session	Group A (n=15) (Long pulsed Nd: YAG Laser)	Group B (n=18) (IPL-755)
1 st	Poor 13.33%	Poor 50%
	Fair 46.67%	Fair 44.44%
	Good 40%	Good 5.56%
2 nd	Excellent 0%	Excellent 0%
	Poor 0%	Poor 11.11%
	Fair 13.33%	Fair 66.67%
3 rd	Good 53.33%	Good 22.22%
	Excellent 33.33%	Excellent 0%
	Poor 0%	Poor 0%
4 th	Fair 6.67%	Fair 50%
	Good 26.67%	Good 44.44%
	Excellent 66.67%	Excellent 5.56%
5 th	Poor 0%	Poor 0%
	Fair 0%	Fair 16.67%
	Good 13.33%	Good 72.22%
6 th	Excellent 86.67%	Excellent 11.11%
	Poor 0%	poor 0%
	Fair 0%	Fair 5.56%
6 th	Good 6.66%	Good 83.33%
	Excellent 93.33%	Excellent 11.11%
	Poor 0%	Poor 0%
6 th	Fair 0%	Fair 0%
	Good 6.66%	Good 83.33%
	Excellent 93.33%	Excellent 16.66%

Table 4: Adverse effects reported

	Group A (n=15)	Group B (n=18)
Erythema	26.67%	50%
Perifollicular edema	13.33%	16.67%
Hyperpigmentation	13.33%	38.89%



Figure 1: Response in patient treated with long-pulsed Nd:YAG (Group A)



Figure 2: Response in patient treated with long-pulsed Nd:YAG (Group A)



Figure 3: Response in patient treated with intense pulse light-755 (Group B)



Figure 4: Response in patient treated with intense pulse light-755 (Group B)



Figure 5: Adverse effect: Post-procedure erythema



Figure 6: Adverse effect: Post-inflammatory hyperpigmentation

Amin and Goldberg^[14] reported >50% reduction in all patients after six sessions using IPL and minimal adverse effects were noted. Feng *et al.*^[15] showed that hair reduction by IPL was 49.9% after first session, 58.6% after two sessions, 79.3% after three sessions and 80.8% after four sessions in Chinese patients; whereas in our study, average hair reduction was 28.06% after first session, 39.72% after two sessions, 64.72% after four sessions and 71.11% after last session.

Kamal *et al.*^[16] showed long-pulsed Nd: YAG laser and IPL-755 both are equally effective for hirsutism treatment, our study data showed that the response to long-pulsed Nd: YAG laser is far better than IPL-755.

The side effects reported in our study are minimal and in accordance with other studies using long-pulsed Nd:YAG laser.^[17]

In Group A, 26.67% patients reported post-session erythema. Perifollicular oedema and hyperpigmentation were seen in 13.33% patients [Table 4]. In study by Noor and Paracaha,^[12] 95% patients showed erythema, 89% patients perifollicular

oedema and in 2% patients with hyper-pigmentation were seen with long-pulsed laser for hair removal.

Asad *et al.*^[13] using IPL-755 for hirsutism reported its adverse effect as mild erythema in 80% patients, folliculitis in 13% patients and hyper-pigmentation in 10% patients, whereas in our study, 50% patients showed erythema, 16.67% showed perifollicular oedema and 38.89% showed hyperpigmentation with IPL. None of the patient showed folliculitis.

The side effects reported in our study were minimal and self-limiting, none of the patients encountered side effects warranting discontinuation of treatment or leading to long-term scarring or pigmentation. Although statistically insignificant, more side effects were noted with IPL than with long-pulsed Nd: YAG laser which is compatible with the findings of other studies.^[18]

CONCLUSIONS

Long-pulse Nd-YAG (1064 nm) is better than IPL-755 nm in term of efficacy and safety in treating idiopathic facial hirsutism in Indian skin. However, further study over large group of patients is required to confirm the observation.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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