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Original Article

A Split Face Comparative Study of Melasma Treatment with Fractional Erbium: Glass 1540 Nanometer and Nd: YAG Q-Switched 1064 Nanometer Laser Systems

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Abstract

Background: chloasma may be a common skin disorder associate degreed optical device began to be an possibility of treatment.
Objective: to check between the effectiveness of Erbium: Glass 1540 nm optical device and Nd: YAG Q-Switched 1064nm optical device within the treatment of chloasma.

Methods: This comparative split face clinical study was meted out in optical device analysis Unit, school of medication, University of Kufa, Iraq; for the amount from October 2012 to December 2013. every patient's face was divided into 2 halves, every [*fr1] was treated with one among the 2 optical device devices employed in this study; third Erbium: Glass 1540nm and Nd: YAG Q-Switched 1064nm lasers. The severity of chloasma was assessed before, once treatment and three months later with the changed chloasma space and Severity Index (MASI) Score and by images.

Results: The mean changed MASI scores were reduced within the facial halves treated by Erbium: Glass 1540nm optical device (statistically extremely important P worth of zero.001) quite those treated by Nd: YAG Q-Switched 1064nm optical device (statistically important P worth of zero.022).

Conclusion: The treatment was well tolerated and patients incontestable positive responses with promising results.

Keywords

Melasma, Erbium, Glass laser, Nd, YAG Q-Switched laser

Introduction

Melasma could be a comparatively common disorder of physiological state that affects sun exposed areas of skin, most ordinarily the face. It most frequently affects girls, notably with darker complexions, and World Health Organization board areas of intensive ultraviolet light exposure [1]. symptom is characterised by brown sharply demarcated patches, generally on the malar prominences and forehead.
Melasma happens often throughout physiological state and there's a powerful association with contraception pills uses [2]. In Iraq, symptom is taken into account because the commonest pigmentary drawback and is seen in twenty six.6% of Iraqi females with a mean age of onset of twenty six.6 years [3,4]. victorious treatment of symptom involves the triad of sun block, bleaching agents and time [3]. totally different modalities of topical bleaching agents [5-7], antioxidants [8], and chemical peels [9] are tried. white vitriol and tranexamic acid [10,11] may additionally have a job optical device medical aid has been used for the treatment of symptom in several countries with promising results. The Nd: YAG Q- Switched 1064nm optical device has higher results on dermal pigments than the 532nm wave length of same optical device [12]; and cuticular symptom responds higher than dermal or mixed sorts. The Erbium: Glass 1540 nm optical device is fragmentary non-ablative kind, with a mid-infrared vary that has additionally been used for betterment of fine facial rhytides and symptom facial scars. almost like different infrared optical device systems, Erbium: Glass optical device targets additionally living thing water and penetrates tissue to a depth of zero.4-2mm [13]. Recently, it's been used as treatment for symptom with conflicting results. Indeed, the primary clinical studies reported vital improvement in symptom with this sort of optical device, and were supported by the decrease in melanocytes compared to the pre- treatment microscopic anatomy specimens [14].

Patients and strategies

This therapeutic comparative split face study was allotted within the optical device analysis Unit, faculty of medication, University of Kufa, Iraq; for the amount from Gregorian calendar month 2012 to Dec 2013.

Thirty eight patients with symptom were listed during this study. The inclusion criteria enclosed patients with symptom of various facial sorts World Health Organization attended for optical device treatment. All patients mustn't receive any treatment for symptom for the last 2 months apart from sun block.
The exclusion criteria enclosed patients with skin sorts V and VI, past or recent history of skin tumors, personal or case history of hypertrophic scar and scar formation, the presence of chronic general illness, immune suppressed patients, pregnant and wet girls, females on contraceptive pills and people on synchronal treatment with different depigmenting agents.
A detailed history was taken from every patient as well as the name, sex, age, occupation, illness onset, history of physiological state, contraceptive pills, and details of sun exposure. Drug history and the other intensifying factors were additionally recorded.
A careful physical examination for all patients was done as well as web site, pattern, color, homogeneity of symptom and also the area concerned. Wood's lightweight (Waldmann Medizintechnik Co., Germany) examination was performed for all patients to assess the depth of pig-

mentation and kind of symptom.
This study was approved ethically by the Scientific Committee of medical specialty and Venereology, Iraqi Board for Medical Specializations; and every one patients signed a written formal consent.

Treatment Protocol

Thirty eight patients (32 females and half dozen males) were enclosed within the study. every patient's face was divided into 2 halves, right and left, every 0.5 was treated with one in all the 2 optical maser devices employed in this study.

Erbium : Glass optical maser 1540nm
(Quanta system - DNA optical maser technology - MATISSE),
Non-ablative, fractional, flat tip, pulse period 7ms, frequency 1Hz, and energy half dozen.3mj; with expected skin depth of 150um.

Nd : YAG Q-Switched 1064nm
(Quanta system - DNA optical maser technology - ULTRALIGHT),
Low fluence of 10J/cm2, tip 2mm, and frequency 5Hz.

Total range of sessions for every patient was eight, at a two-week interval. throughout optical maser medical care, the patients were schooled to exist supine position on the couch and to wear the special specs for eye protection with no anesthesia was used. All facial sites plagued by symptom were treated including: the forehead, malar areas and chin. The probe of every optical maser device was control perpendicular on the patients faces. Treatment with metallic element glass optical maser was performed by the continual slippy technique; the ray of light was preceded by the cooling piece. the chosen skin depth was calculable to be 100um within the 1st four sessions increasing to 150um within the last four sessions; therefore approaching the bounds of higher corium. This depth was the utmost tolerable setting used with rock bottom aspect effects. whereas the probe of Nd: YAG optical maser was control separated from the patient faces at a set distance through a antimonial guide connected to the machine handle. All patients were asked concerning any pain or discomfort throughout optical maser treatment. At the tip of every session, the treated sites were discovered, and therefore the early skin reactions to optical maser treatment were recorded

Post-Treatment directions

All patients were schooled to avoid sun exposure and a sun screen of sun protection issue (SPF) of thirty or a lot of was prescribed, throughout the treatment and follow up periods. additionally the patients were asked to not strive the other topical facial medical care throughout the study amount. Patients United Nations agency complained of discomfort and erythroderma got topical skin emollient

Follow Up

The patients were seen frequently each {two weeks|fortnight|time amount|period of time|period} throughout the treatment period and at every visit the aspect effects were recorded. The patients were followed up monthly for 3 months when the last treatment session to seem for any complication or any sign of relapse.

Evaluation

All the treated patients were evaluated objectively and subjectively concerning their response to treatment with each optical maser varieties, by the subsequent methods:

Objective ways

A. changed MASI score: symptom severity was scored with the Modified symptom space and Severity Index "Modified MASI". during this system the face is split into 2 halves, right and left. every 0.5 is more divided into 3 elements, forehead, malar space and chin. Then symptom in every of those elements is stratified looking on 3 variables:

Homogeneity
on scale 0(minimal) to 4(maximal).
So the changed MASI score in every 1/2 the face was calculated by the subsequent equation:
Forehead (A+D+H) + Malar (A+D+H) + Chin (A+D+H)
Whereas A is space, D is darkness and H is homogeneity.
So changed MASI score was measured for every 1/2 the patient's faces at baseline, when period of time from the last optical maser session and at 3 months later.
B. Photographic assessment: Color images for every patient were taken at bottom line, and when finishing all the eight sessions of optical maser therapy; mistreatment Sony-digital, high sensitivity, 9.1 mega pel, DSC-HX1 still camera; within the same place with mounted illumination and distance.
Subjective method: Patient's satisfaction to response to medical care was evaluated on a score of three points as follows:

1 Full satisfaction.
2 Partial satisfaction.
3 No satisfaction

Results

Twenty 9 out of thirty eight patients completed all eight sessions of treatment, and therefore the different 9 patients were defaulted from the study because of totally different causes as well as physiological condition, poor compliance for treatment, and for unknown causes.
There were twenty five (86.21%) females and four (13.79%) males as in (Figure 1). Their ages ranged from 23-48 years with mean of thirty five.2 ± 7.2SD years as in (Figure 2).
Regarding skin varieties, all patients were Fitzpatrick's skin varieties III and IV, with totally different symptom patterns and every one of them showed negative Wood's light-weight examination indicating dermal and mixed forms of symptom (Figure 3).
Total range of sessions for every patient was eight, at a two-week interval. In every session each optical maser systems were used for every patient; Erbium: Glass 1540nm on one 1/2 the face and Nd: YAG QSW 1064 nm on the opposite 0.5, and continued a similar protocol for all sessions of every patient.

Evaluation

Each patient was assessed objectively at baseline, once treatment and three months later by a pair of methods: modified MASI score (Table 1), and footage (Figure 4A, 4B, Figure 5A, 5B). Subjective assessment was done by asking each patient regarding his or her satisfaction degree to the event of symptom in each 1/2 the face one by one (Table 2-4).

Follow up

Three months when the last treatment session, the changed MASI score was elevated in most of the patients in each facial halves and reached to the pre-treatment score. This elevation within the score was statistically not important in each Erbium: Glass optical device (P value=0.477), and in Nd: YAG optical device (P value=0.155), as in (Table 5).

Discussion

Since optical device medical aid started these days to realize a revolutionary role within the treatment of pigmentary skin diseases, several therapeutic optical device trials are explored with variable results on mask of pregnancy worldwide [14,15].
Tourlaki et al. used a mixture of halfway Erbium: Glass optical device

and topical medical aid in mask of pregnancy patients United Nations agency square measure immune to triple combination cream and terminated that this plan was logical and effective medical aid, however its future effectualness was restricted [14]. Manela- Azulay M and writer J used halfway Erbium: Glass 1540nm optical device alone and showed 50-100% improvement in their patients [15].

Manaloto and Alster used Erbium: YAG resurfacing that effectively improved mask of pregnancy, however with marked post inflammatory hyper pigmentation (PIH), so that they terminated that this sort of optical device can be solely used for refractory mask of pregnancy [16].
Suh et al. used Q-switched Nd: YAG 1064nm and located that it absolutely was safe and effective modality for treating mask of pregnancy in Asian peoples [17]. Bevec et al. treated with success mask of pregnancy with low fluence Q-switched Nd: YAG optical device however with high return rate [18]. Kar et al. terminated that low fluence mode of Q-switched Nd: YAG optical device was simpler than the high fluence mode within the treatment of mask of pregnancy with the smallest amount facet effects [19].

The choice of optical device systems within the gift study relied on previous studies and on the actual fact that each Erbium: Glass and Nd: YAG QSW lasers square measure medical procedure modes with minimum period of time.
The mechanism of action of those optical device sorts is totally different and this explains the variations in improvement of mask of pregnancy between them. Erbium: Glass optical device acts on rejuvenation of skin through its icon thermal activity, therefore up albuminoid and elastic fibers integrity which can have positive influence on skin texture and pigment reduction; beside the creation of thermal small columns within the skin that eliminate excess pigmentation and preserve healthy skin [15].
On the opposite hand the process result of Nd: YAG Q-Switched optical device results in fragmentation of melanosomes and dispersion of the pigment within the body covering tissue owing to thermal gradient between melanosome and therefore the encompassing tissue, through each icon thermal and process effects [20,21].
This may make a case for the patterned hyper pigmentation that developed on one facet of the faces of 3 patients treated by Nd: YAG Q-Switched optical device whereas the opposite facet of these faces treated by Erbium: Glass optical device failed to show such hyper pigmentation; otherwise all patients developed transient erythroderma and gentle burning sensation lasting for a handful of days following every session on each side of the faces.
Using low fluence Nd: YAG Q-Switched 1064 nm optical device during this study was aimed to beat the attainable post inflammatory hyper pigmentation that's closely related to the employment of this sort of optical device on the skin.
Wood's light-weight examination was negative altogether studied patients, therefore reflective that their mask of pregnancy was either dermal or mixed kind. consequently when 3 months follow up amount the return rate of mask of pregnancy was high within the most of the patients particularly on the perimeters treated with Nd: YAG Q-Switched optical device. The P worth of follow up results was statistically not important in each styles of optical device.
Modified MASI score employed in this study expedited associate degree correct objective methodology for evaluating the results of optical device treatment, through dividing the faces into 2 halves and doing split face comparative treatment victimisation 2 modes of optical device systems within the same patient.
Recurrence of mask of pregnancy within the follow up amount during this study is also attributed to the subsequent causes: absence of combination medical aid of optical device with alternative topical preparations like hydroquinone and steroids not like most previous studies; the character of mask of pregnancy and its shut relationship to {uv|ultraviolet|ultraviolet radiation|ultraviolet light-weight|ultraviolet illumination|UV|actinic radiation|actinic ray} light exposure; and therefore the impact of genetic background on mask of pregnancy patients.

Conclusion

In general this optical device medical aid was well tolerated and therefore the patients incontestable positive responses with promising results. Erbium: Glass 1540nm optical device was simpler than Nd: YAG Q-Switched 1064nm optical device within the treatment of mask of pregnancy despite of the high return rate of illness reported when each optical device sorts.

References

1. Kauh YC, Zachian TF (1999) Melasma. Adv Exp Med Biol 455: 491-499.

2. Odom RB, James WD, Berger TG (2000) Disturbances of pigmentation. In: Odom RB, James WD, Berger TG. Andrews Diseases of the Skin, clinical Dermatology. (9th edn) W.B. Saunders Company, Philadelphia: 1058-1059.

3. Mosher DB, Fitzpatrick TB, Ortonne JP, Hori Y (2008) Hypomelanosis and hypermelanosis. In: Freeberg UM, Eisen AZ, Wolff K, Austen KF, Goldsmith LA, et al. (7th edn) Fitzpatrick's Dermatology in General Medicine, McGraw- hill, New York: 996-997.

4. Sharquie KE, Dhahir SA (2000) Melasma in Iraqi women, a Clinical, Histopathological and Histochemical Study. J Pan-Arab League Dermatologists 3: 111-117.

5. Palumbo A, d'Ischia M, Misuraca G, Prota G (1991) Mechanism of inhibition of melanogenesis by hydroquinone. Biochim Biophys Acta 1073: 85-90.

6. Fitton A, Goa KL (1991) Azelaic acid. A review of its pharmacological properties and therapeutic efficacy in acne and hyperpigmentary skin disorders. Drugs 41: 780-798.

7. Nakagawa M, Kawai K, Kawai K (1995) Contact allergy to kojic acid in skin care products. Contact Dermatitis 32: 9-13.

8. Huh CH, Seo KI, Park JY, Lim JG, Eun HC, et al. (2003) A randomized, double-blind, placebo-controlled trial of vitamin C iontophoresis in melasma. Dermatology 206: 316-320.

9. Sharquie KE, Al-Tikreety MM, Al-Mashhadani SA (2005) Lactic acid as a new therapeutic peeling agent in melasma. Dermatol Surg 31: 149-154.

10. Wu S, Shi H, Wu H, Yan S, Guo J, et al. (2012) Treatment of melasma with oral administration of tranexamic acid. Aesthetic Plast Surg 36: 964-970.

11. Na JI, Choi SY, Yang SH, Choi HR, Kang HY, et al. (2013) Effect of tranexamic acid on melasma: a clinical trial with histological evaluation. J Eur Acad Dermatol Venereol 27: 1035-1039.

12. Grevelink JM, Duke D, van Leeuwen RL, Gonzalez E, DeCoste

SD, et al. (1996) Laser treatment of tattoos in darkly pigmented patients: efficacy and side effects. J Am Acad Dermatol 34: 653-656.

13. Alster TS, Lupton JR (2002) Are all infrared lasers equally effective in skin rejuvenation. Semin Cutan Med Surg 21: 274-279.

14. Tourlaki A, Galimberti MG, Pellacani G, Bencini PL (2012) Combination of fractional erbium-glass laser and topical therapy in melasma resistant to triple-combination cream. J Dermatolog Treat 25: 218-222.

15. Manela-Azulay M, Borges J (2011) Treating Melasma with 1540nm fractional non-ablative erbium laser: a pilot study. Surg Cosmet Dermatol 3: 313-318.

16. Manaloto RM, Alster T (1999) Erbium:YAG laser resurfacing for refractory melasma. Dermatol Surg 25: 121-123.

17. Suh KS, Sung JY, Roh HJ, Jeon YS, Kim YC, et al. (2011) Efficacy of the 1064-nm Q-switched Nd:YAG laser in melasma. J Dermatolog Treat 22: 233- 238.

18. Bevec T (2011) Treating melasma with sub-thermolytic Q-Switched Nd:YAG. Journal of Laser and Health Academy: 53-55.

19. Kar HK, Gupta L, Chauhan A (2012) A comparative study on efficacy of high and low fluence Q-switched Nd:YAG laser and glycolic acid peel in melasma. Indian J Dermatol Venereol Leprol 78: 165-171.

20. Cencic B, Lukac M, Marincek M, Vizintin Z (2010) High fluence, high beam quality Q-switched Nd:YAG laser with optoflex delivery system for treating benign pigmented lesions and tattoos. J LAHA 2010: 9-18.

21. Kim YJ, Whang KU, Choi WB, Kim HJ, Hwang JY, et al. (2012) Efficacy and safety of 1,064nm Q-switched Nd:YAG laser treatment for removing melanocytic nevi. Ann Dermatol 24: 162-167.